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The Newsletter of the Popular Astronomy Club ESTABLISHED 1936

President's Corner January 2021



Welcome to the Popular Astronomy Club's first newsletter of 2021. I am happy to bid 2020 adieu and am looking forward to a new, hopefully

better year. From an astronomical viewpoint, 2020 was actually not such a bad year. We had some interesting objects to observe such as Comet NEOWISE and the Jupiter-Saturn Conjunction. NEOWISE was one of the best comets to grace our skies in a long time and it was visible for several weeks last summer. We had numerous observing sessions centered around observing this excellent comet. So wonderful! The Conjunction, however, is a particularly good example, however, of how Mother Nature tries to confound our observing plans with bad weather. On December 20th, many of us decided to set up and target the pair of Jovian planets. Weather reports were for partly cloudy skies. Being of the persuasion that considers a cup half full rather than half empty, I set up my scope at the Black Hawk College running track. Rusty Case and Terry Dufek also met me there at sunset. The sky was clear, so we set up our scopes and got ready for it to be dark enough to draw a bead on the great Jovian planets. Right on

(Continued in next column)

cue, as it started to get dark enough to be able to visually see Jupiter, the clouds started to appear in the west. Luckily, we were able to get the planets in our scopes before the clouds got too dense to prohibit viewing. We were able to snap several telescopic images with our cameras as well as show a number of passersby what we were doing. So this was at least a partially successful observing session and a very successful public outreach--one of the very few we did all year because of the pandemic.

 $\left(\right)$

A number of us tried to set up the following night (December 21st) to try again. The same thing happened again. It was clear at sunset but just as the sky began darkening a dense blanket of clouds rolled in to thwart viewing. A third opportunity presented itself on December 22nd. It was clear at sunset and stayed clear long enough to enjoy the view. We were lucky. But to be lucky, one has to be persistent. I guess I would have to lump astronomers together with farmers and fishermen, optimists all!

Last week I talked with long time PAC member and AL Master Observer, Ken Boquist. We discussed how Jupiter and Saturn seemed to be playing "hide and seek" with us in the clouds. Ken related to me his "Boquist' s Laws of Astronomy":

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January 2021

EAGU

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1) <u>Boquist's First Law of Astrono-</u> <u>my</u>: The likelihood that it will be cloudy is directly proportional to the square of your desire to see an event.

2) <u>Boquist's Second Law of Astrono-</u> <u>my</u>: If the sky is mostly clear, but a few clouds are present, they will always be over the object of interest. Don't bother to look for something else because that object will also get covered instantly!

I find Ken's Laws of Astronomy to be amusing, if nothing else. But to compliment Ken's First and Second Laws, I would like to propose a Third Law of Astronomy:

3) <u>Sheidler's Third Law of Astronomy</u> (Corollary to Murphy's Law): Whatever can happen will happen. No matter how good or how bad the weather forecast, the opposite may actually happen.

These laws clearly describe the challenges the weather poses to astronomers. Based on our recent experience with the Conjunction, we only had one day out of three that had favorable sky conditions. Even though the odds of good weather are generally against us, astronomers nevertheless go out there and make the attempt. Eternal optimism. I love it. Keep this optimism and of course, keep looking up in 2021!

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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Popular

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ANNOUNCEMENTS / INFO

LOOKING FOR OLDER ISSUES OF REFLECTIONS NEWSLETTER?

HISTORY OF PAC?



Popular Astronomy Club on Facebook?



Thank you for Renewing Your Membership!

Ken Boquist Lee Carkner Joel Carter Dino Milani Mitch Milan Ellen Tsagaris Bryan Raser Dave Smith

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-

on of the

ICRA

ty of instruments and objects



Check out the Astronomical League **ONLINE**!

LAGI



wishes to express their condolences to Bryan Raser and his family on the passing of his mother and aunt this year

Check out

the North Central Region

ofthe

Astronomical League

(NCRAL)

online

ANNOUNCEMENTS / INFO

The Popular Astronomy Club

wishes to express their condolences to Mary Holt and her family on the passing of her father John A Atkinson on December 12th, 2020.





It is hard to believe it will soon be a New Year. I certainly hope 2021 will be a Happy New Year for all of

you! 2021 is a significant year for PAC as it will be your club's 85th birthday. In December 2021, we will have elections for PAC officers (president, vice-president, observatory director, secretary, treasurer and Alcor. I would like to urge you to consider if you would be interested in running for one of these posi-

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tions. Attached below is a link to PAC's constitution and policy & procedure document which spells out the suggested rolls and responsibilities of each post. Please take a few minutes to review these and consider if you would like to get more involved in the leadership of one of the best astronomy clubs in the region. Not only is it a good way to contribute to your club, it is also an opportunity to grow personally and enhance your leadership skills. Thanks. Al.

https://www.popularastronomyclub.org/ club-documents



Roberta & Lanny Wright are home and recovering after their serious car accident in October in Moline. There have been some ups and downs for them both since then. They wish to thank everyone for the cards and prayers for them. If you need their address or phone number, please contact Alan

NEED YOUR HELP!

This next year will be the Popular Astronomy Clubs 85th year. Roy Gustafson, Wayland Bauer, Dale Hachtel, Paul Levesque, Al and myself will be putting together a history of the Popular Astronomy club from 2000 to 2020. It will be based on club records, Reflections newsletters, members information and or photos (very important!). It will then be presented at the 2021 banquet in Power Point and then can be PDF'd out to the membership. The history before 2000 was well documented by Paul Castle. The club has a wealth of historical knowledge and we are asking for your help with the project! It will be a good way to remember our club in the future by what we have accomplished these past 20 years.

Thank you, Terry Dufek t_dufek@msn.com





Last night at just after 9:30pm, lava started pouring into the Halema'uma'u crater (a smaller one located inside the larger Kilauea crater) from one of the side walls. The lake which had formed inside the crater was boiled off in a violent burst of steam and vapor which was carried fairly high in the sky. The pictures attached are a time lapse from just after 10:30 pm from our summit camera. **Lisa Wells**























Chicago Astronomer

Yesterday (Nov 29th, 2020) at 3:14 AM ·

For my Astrophotography geek fans... I have been assembling astro filters, (with no end in sight) and I thought I would take the time to compare them on a bright familiar object, The Orion Nebula (M42).

Certain filters block out a great deal of light out and allow only a sliver of wavelength through, increasing contrast and bringing out hidden details. Some are less aggressive and allow broadbands through while stopping specific wavelengths. The celestial object also plays a part in the filtering - emissions give off different wavelengths of light than do reflective objects. So, there is no perfect filter, but

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broadband light pollution filters are a good all-around tool in darkening the skies from the ambient light scatter. I used a 8" SCT with a combo of 1.25" & 2" filters and a 90mm Refractor with just 1.25". The captures were not process and straight out of the camera in a raw comparison of what these filters accomplish. I did not use regular single -color filters, as they are used mostly on planets and the Moon....sometimes the Sun.

I like the Orion Sky Glow, 4000 Nebular Broadband and Zhumell Urban Sky in an easy subtle control of ambient light pollution while allowing through most of the spectrum. Astro Joe





Video of Arecibo Radio Telescope last moments Suggested by Mike Mack





Output State St Comment

A Share

We Persevered This Year @ NASA December 21st, 2020

💼 Like



You Tube Video Link suggested by **Ally Nordick**



Astronomy Calendar 2021 (Video)

Jeff Hoffman 2. May 20 at 12:01 PM This is what it means to raise your grandkids right!



1 Like

C Comment

....

7

8





Astronomy Picture of the Day (APOD)





Popular Astronomy Club - Quad Cities Published by Sara Sheidler

- December 13 at 12:25 PM ·



Dazee Dazee > The Backyard Astro Imaging Club December 11 at 6:23 PM · 🗷

Awesomeness



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People Reached	Engagement	BOOSt Onavailable





Pre-discovery views of Neptune



Neptune is too dim to be visible to the naked eye: its apparent magnitude is never brighter than 7.7. Therefore, the first observations of Neptune were only possible after the invention of the telescope. There is evidence that Neptune was seen and recorded by Galileo Galilei in 1613, Jérôme Lalande in 1795, and John Herschel in 1830, but none are known to have recognized it as a planet at the time. These pre-discovery observations were important in accurately determining the orbit of Neptune. Neptune would appear prominently even in early telescopes so other pre-discovery observation records are likely.

Galileo's drawings show that he observed Neptune on December 28, 1612, and again on January 27, 1613; on both occasions, Galileo mistook Neptune for a fixed star when it appeared close (in conjunction) to Jupiter in the night sky.

Historically it was thought that he believed it to be a fixed blue star, and so he is not credited with its discovery. At the time of his first observation in December 1612, it was stationary in the sky because it had just turned retrograde that very day; because it was only beginning its yearly retrograde cycle, Neptune's motion was thought to be too slight, and its apparent size too small, to clearly appear to be a planet in Galileo's

small telescope. However, in July 2009 University of Melbourne physicist David Jamieson announced new evidence sug-

gesting that Galileo was indeed aware that he had discovered something unusual about this "star". Galileo, in one of his notebooks, noted the movement of a background star (Neptune) on January 28 and a dot (in Neptune's position) drawn in a different ink suggests that he found it on an earlier sketch, *drawn on the night of January 6*, suggesting a systematic search among his earlier observa-

(Continued in next column)

tions. However, so far there is neither clear evidence that he identified this moving object as a planet, nor that he published these observations of it. There is no evidence that he ever attempted to observe it again.

In 1847, Sears C. Walker of the U.S. Naval Observatory searched historical records and surveys for possible prediscovery sightings of the planet Neptune. He found that observations made by Lalande's staff at the Paris Observatory in 1795 were in the direction of Neptune's position in the sky. In the catalog observations for May 8 and again on May 10 of 1795 a star was observed in the approximate position expected for Neptune. The uncertainty of the position was noted with a colon. This notation was also used to indicate an observation error so it was not until the original records of the observatory were reviewed that it was established with certainty that the object was Neptune and the position error in the observations made two nights apart was due to the planet's motion across the sky. The discovery of these records of Neptune's position in 1795 led to a better calculation of the planet's orbit.



John Herschel almost discovered Neptune the same way his father, William Herschel, had discovered Uranus in 1781, by chance observation. In an 1846 letter to Wilhelm Struve, John Herschel states that he observed Neptune during a sweep of the sky on July 14, 1830. Although his telescope was powerful enough to resolve Neptune into a small blue disk and show it to be a planet, he did not recognize it at the time and mistook it for a star.









Unusual Stingray Nebula Fades And Changes Shape Extremely Fast Story suggested by Byron Davies



DIGITAL ECONOMY DISRUPTION POSSI-BLE AS "TERMINATOR EVENT" SUG-GESTS STRONGEST SUNSPOT CYCLE ON RECORD IMMINENT











VIDEO CONTRIBUTIONS



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

Is Dark Matter stranger than we thought? - New Hubble results suggest

Ancient Astronomers

M48 - The Lost and Found Star Cluster

Triton - The Orphan Moon

Every Year NASA Simulates Our View of the Moon for the Upcoming 12 Months. Here's 2021, Hour by Hour

A Day In The Life Of An Astronomer

Mira | The Wonderful Star

lo - A Hell of a Moon!

M60 - And the 3rd densest galaxy



















Exploring the Winter Skies and a Christmas Surprise By Terry L Dufek

ASTRONOMY IN PRIN

Sunfranning

There are many things to see in the winter skies of December and we will touch on a few events in this article. Venus hangs in the southeastern early morning sky, 14º off the horizon on December 1st at 6:00am. The planet stays at about the same place in the sky throughout the month. The Moon will pass Venus on December 12th, making a close approach to within a mere ³/₄ ^o of each other. From the Quad Cities, the pair will be visible in the dawn sky, rising at 05:16am and reaching an altitude of 15° above the southeastern horizon before fading from view as dawn breaks around 07:01am. The Moon and Venus will be a little too widely separated to fit comfortably within the field of view of a telescope but will be visible to the naked eye or through a pair of binoculars. You might be able to catch Mercury just barely peeking over the horizon at around 6:30 am, on the 1st, if you have an unobstructed southeast horizon. Mercury will be below Venus and to the left. After the 1st, Mercury is lost in the Suns glare.

High in the east-southeastern sky at sunset, on December 1st, you can still see Mars with its reddish tint. The fourth planet from the Sun, is not as bright as it was a couple of months ago as the much faster Earth is pulling away from Mars in its orbit. It still makes a spectacular site in the sky, however. In the southwest, you can see a bright Jupiter and a much dimmer Saturn, only about 1 ½ ^o apart, getting ready for their big show later in the month. Saturn is much dimmer than Jupiter because it is twice as far away.

The great event to end the year 2020 is the great conjunction of Jupiter and Saturn on December 21st, 2020. A conjunction in Astronomy terms is when two objects in the sky are aligned remarka-



view on Saturn-Jupiter low in the southwestern evening sky on December 21st

bly close together. This may be between 1 to 5 degrees. The rarity of great conjunctions is due to the slow motion of Jupiter and Saturn across the sky plus an aligning up of their orbits so they can be incredibly close with spacing of 1/10 of a degree as in the case on December 21st, 2020. That is just 1/5 of a full Moon diameter apart! If you start looking at the pair at the beginning of the month, you can see Jupiter slowly closing in on Saturn until they are incredibly close in the sky on December 21st. Among the planets that are visible to the naked eye, they are the two most distant from the Sun, taking 11.86 years and 29.5 years respectively to orbit it. As the two planets gradually move through the constellations at different speeds, they follow almost the same path across the sky, called the ecliptic. Periodically, Jupiter catches up with Saturn and overtakes it, resulting in a conjunction, on average once every 19.6 years. The 2020 great conjunction will be the closest approach of the two planets since 1623, and they will not come so close again until 2080. A good set of eyes will be able to see a very bright Jupiter and a much dimmer Saturn, which will appear to look like it is winking because it is much fainter. In binoculars, which is the best to view the event from, you will be able see Jupiter and its four Galilean moons extremely near Saturn. In a telescope with an eyepiece, you will be able to view Jupiter, the

(Continued in next column)

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Galilean moons, Saturn and its bright moon, Titan. Since the pair will be very low in the early evening sky, from the Quad Cities and will be well on their way to setting, the best time to see the pair will be soon after sunset on the night of December 21st. The pair will become visible around 4:55pm as twilight fades, 17° above your southwestern horizon. The pair sets at 6:56pm.



close u view of Saturn- Jupiter along with moons (telescopic view)

The winter solstice (or beginning of astronomical winter) begins at 4:02am in the morning of Dec 21st. It occurs when one of the Earth's poles has its maximum tilt (23 ½ 2) away from the Sun giving the northern hemisphere the longest night and the shortest amount of daylight for 2020. Since prehistory, the winter solstice has been a significant time of year in many cultures and has been marked by festivals and rituals. This is also the day when the Sun's annual journey through the constellations of the zodiac reaches its most southerly point in the sky in the constellation of Capricorn and begins summer in the southern hemisphere as the Sun is above the horizon for longer than on any other day of the year.

(Continued in next column)

This month also marks the annual Geminid meteor show which runs from December 4th to the 17th and peaks on December 13th. The meteors appear to stream from a radiant point in the constellation Gemini. At about 5:30 pm, from the Quad Cities, the radiant point of the Geminids begins to rise in the northeast until it reaches a peak altitude of 81º at 2 am the next morning. The radiant point, then will be almost directly overhead. Through the evening, as the Earth rotates, the planet steadily turns until it is pointed directly into the meteor stream. The number of visible meteors increases the higher the radiant point is in the sky. Earlier meteors in the evening will have longer trails while meteors at the peak (2am) will have much shorter ones because you are seeing them come at you head on. At its peak, the shower is expected to produce a nominal rate of around 120 meteors per hour (Zenithal Hourly Rate). However, this ZHR is calculated assuming a perfectly dark sky and that the radiant of the shower is situated directly overhead. In practice, any real observing sight will fall short of these ideal conditions. The shower will peak close to new moon, and so moonlight will present minimal interference. So, try and get out and see a spectacular shower of light coming down from the heavens!

Terry L Dufek is a member of the Popular Astronomy Club which meets on the 2nd Monday of each month (currently through zoom). The club also has night-time public observing sessions every 3rd Saturday of the month, March through November, at Niabi Zoo in Coal Valley, Illinois. These dates may be cancelled based on current conditions so check our website or our home on Facebook.





December 2020

December 17.

The night of December 17, 1965 changed my life. That was the night I began a search for comets that this goes on to this day. It represents the second most important decision I have ever made, to begin a visual search for comets and exploding stars that are called novae. The first most important decision, of course, was to marry Wendee. Both decisions made my life what it is today.

Usually in Montreal, November, December,

(Continued in next column)



and April are the cloudiest months. Therefore I wasn't counting on a clear sky that evening. After a Friday evening dinner with my family, I walked over to my friend Tom Meyer's home and we visited for a while. Afterwards, around 11 pm. I took Clipper, our little beagle, for a walk towards the summit of the hill on which we lived.

It was during this little stroll with Clipper that things began to change. Towards the west there appeared to be some lightening of cloud cover, and soon after, clearing. Within about 15 minutes large swaths of sky were showing some stars. I couldn't believe it. I turned toward home, and for a few seconds Clipper and I enjoyed a tug-of-war until he gave up and walked back home with me. Just before midnight on the 17th, I began my first comet hunting and I scanned the sky between Pollux and Castor, in the constellation of Gemini. The clouds returned after that.

> As the famous ABC news reporter Jules Bergman said on the launch of Telstar, the world's first active telecommunications satellite in 1962, "And it all began today." For me, it surely did. In December 2020, fifty-five years will have passed, and I still am searching almost every clear night. There are 22 comets roaming about the solar system with the Levy name on them, plus one named Jarnac. Jarnac Observatory is the name of our observing site here in Vail, Arizona and is named in turn after my grandfather's cottage, Jarnac, near Ripon, Quebec. An object was found and automatically reported by Tom Glinos, who once had an automated telescope here. Because he incorrectly identified the object as an asteroid, when it turned out that it sported a tail and was reclassified as a comet, it was named, following the rules, for the observatory, not for the discoverer. Thus, my total is now 23 comets. If my grandfather knew that his beloved cottage (and later observatory) now had a comet with its name on it, he would be dancing all over heaven. It is a happy story that still goes on today.

UPCOMING EVENTS



Date: January 11th, 2021

Event: Regular Meeting Location: Zoom (*details to follow*) Program Speaker: Cosmic Horizons -Chuck Allen Vice President, Astronomical League All these dates and times are Tentative due to conditions! Please check your emails for any updates as to whether the

- 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
- March 8th,2021 PAC Business Meeting at Butterworth Center at 7:00 PM Presentation: Smorgasbord

Mark your calendars and watch upcoming emails for more information!

January Program - Cosmic Horizons

Chuck Allen, Vice President, Astronomical League

Cosmic Horizons

Cosmic Horizons explores the limits of human visibility imposed by planetary curvature, photon sensitivity of the human eye, and the speed of light in an expanding universe. We briefly explore the definition of planetary horizons and the role of planetary size in defining them. Next, we examine the faintest astronomical objects we can see with and without optical aid, and the smallest number of photons theoretically detectable

by humans. Finally, we discuss the four horizons imposed by time and the speed of light (the Hubble distance, cosmic particle horizon, cosmic event horizon, and future visibility horizon) and consider how these horizons change in an accelerating universe and what effect they have on what we can, or ever will, see.



(Continued in next column)

Charles E. Allen ("Chuck") Bio

Chuck is currently Vice-President of the 18,000-member Astronomical League, a national federation of over 300 astronomy organizations founded in 1946, and is a past League President (1998-2002). He is responsible for all League awards programs, national convention planning and coordination, and chairs the League's By-Laws Revision Committee. He founded the League's 30 year-old National Young Astronomer Award in 1991, received the G. R. Wright Award for service in 1998, and holds the League's Master Outreach Award for his more than 500 public programs since 1960. With 6,000 observations logged, he recently completed requirements for the League's Master Observer gold certification, and he also coordinates three of the League's Observing Programs.

Chuck is Program Director for the Evansville Astronomical Society and past President of the Louisville Astronomical Society (1991-94). In 1992, he co-founded Stars -at-the-Beach, an Indiana public star party drawing hundreds of visitors every summer for three decades.

From 1995 to 2002, he served as Lead Judge in earth and space science for the Intel International Science and Engineering Fair, co-chairing ISEF '02. He is also a past director and judge of the Louisville Regional Science Fair.

Chuck graduated from Duke University in 1970, served as a U.S. Air Force officer from 1970 to 1974, and graduated from the University of Kentucky College of Law in 1977. He was a partner in Kentucky's largest law, Frost, Brown Todd LLC, where he practiced for 27 years.

SIGN UP REPORT

MONTH	NEWSPAPER ARTICLES	CONSTELLATION REPORT	PROGRAM
JAN 2021	Chris Nordick	None Scheduled	Presentation: Cosmic Horizons - Chuck Allen, Vice President, Astronomical League via Zoom
FEB 2021	Wayland Bauer	None Scheduled	"The Year In Space" program by Larry Boyle, Chicago Socie- ty for Space Studies, via Zoom.
MAR 2021	Paul Levesque	Ally Nordick	SMORGASBORD (SEE BELOW)
APR 2021	Roy Gustafson	None Scheduled	Presentation: "Skies and Skywatchers of Ancient North America" Bill Iseminger, Cahokia Mounds State Historic Site via Zoom
MAY 2021	Dave Smith	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
AUG 2021			PICNIC
SEPT 2021			SMORGASBORD (SEE BELOW)
ОСТ 2021			BANQUET
NOV 2021			
DEC 2021			

Editors Note: Taul Levesque is willing to review and edit any newspaper article submissions. 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

MARO	CH
NUL	E
SEPTER	MBER

ASTRONOMICAL CALENDAR OF EVENTS



The Sun is in Sagittarius on January 1st. It moves into Capricorn on the 19th.

Mercury starts off in Sagittarius on January 1st (mag: -.98, dia:4.86", Illum: 97.6%). It is low and only 1 2/2º off the horizon in the SW evening sky at 5:00pm. Mercury is 7º 48' east of the Sun. On January 10th, Mercury climbs and makes a nice configuration with Jupiter and Saturn in the SW. Only 3° off the horizon at 5:30pm, it can be a challenge but rewarding viewing opportunity. It continues to



climb in altitude the rest of the month to altitude 8º 50'but dims to mag 1.05.

Venus is in Ophiuchus on January 1st (mag: -3.87, dia:10.69", Illum: 94.1%). It is 4º 14' above the SE horizon at 6:30 am. It is 20° west of the Sun on the 1st but closes to just 13^o on the 31st. A sliver of a late last quarter Moon passes 3º22' to the south of Venus on the 11th.

Mars is in Pisces on January 1st (mag: -.21, dia: 10.32", Illum: 89%). It is 57º above the SE-S horizon at 6 pm. The Moon passes 6 1/4 ° south of Mars on the 20th. Uranus passes due south $(2 1/3^{\circ})$ of Mars on the 23^{rd} . Jupiter is in Capricorn on January 1st (mag: -1.95; dia:32.86"). Jupiter is 12º 41' above the SW horizon at 6pm and 21º east of the Sun. Jupiter swiftly closes separation with the Sun towards a superior conjunction on the 28th. There is a nice conjunction with

Saturn and Mercury on the 10th. Saturn is in Capricorn on January 1st (mag:.62, dia:15.24", rings 35"). It is 1º 16' west of Jupiter. They stay about the same distance apart most of the month with Saturn coming into conjunction with the Sun on January 23rd. Mercury is near the pair on the 10th.

Uranuà

Pluto

Neptuné

Uranus is in Aries on January 1st (mag:5.73, dia 13.93"). It is 9º 3' east of Mars. They close to 1º 37' on January 20th.

Neptune is in Aquarius on January 1st (mag 7.92, dia 2.25'. It is 39º above the SW horizon at 6:00 pm. On the 16th, the Moon is 7º 18' to the south of Neptune.

Ceres (mag: 9.2) is 10° 16' to the south of Neptune on January 1st. Vesta (mag:7.3) is 2º 11' north of the Moon on the 4th. Vesta is 58^o high in the south at 5am.



From in the sky. org

Planetary Alignments in January 2021						
Phenomenon	Date and Time	Object 1	Object 2	Separation	Solar Elongation	Lunar Elongation
Conjunction	2021-01-11 12:32:46	Jupiter	Mercury	+1°24'49.2"	+13°31'27.4"	+32°39'27.3"
Conjunction	2021-01-20 12:27:46	Mars	Uranus	+1°36'48.4"	+95°45'50.1"	+8°45'36.1"
Conjunction	2021-01-09 22:10:02	Mercury	Saturn	+1°36'37.2"	+12°46'03.5"	+52°27'48.8"
Conjunction	2021-01-11 15:53:05	Moon	Venus	+2°13'21.8"	+17°46'50.5"	_
Conjunction	2021-01-13 18:13:42	Moon	Saturn	+3°42'56.2"	+10°15'15.5"	_
Conjunction	2021-01-13 21:54:29	Moon	Jupiter	+3°32'07.6"	+12°15'06.5"	_
Conjunction	2021-01-14 02:25:53	Moon	Mercury	+2°38'55.6"	+15°17'37.9"	_
Conjunction	2021-01-21 03:34:48	Moon	Uranus	+3°31'05.8"	+94°59'33.3"	_
Conjunction	2021-01-12 23:04:48	Sun	Moon	+3°08'34.4"	_	_
Conjunction	2021-01-14 08:28:42	Sun	Pluto	+1°12'43.2"	_	+18°51'24.6"
Conjunction	2021-01-23 21:12:18	Sun	Saturn	+0°24'44.4"	_	+125°11'02.6"
Conjunction From stellariun	2021-01-28 19:50:44 1	Sun	Jupiter	+0°31'23.9"	_	+174°17'40.9"

Double Stars in January							
Index	Object	Right As- cension	Declination	Magnitude	Separation	Position Angle	Year
7	Alpha Piscium	02 ^h 02 ^m .0	+02° 46'	4.1, 5.2	1.7"	266°	2012
8	Gamma Andromedae	02 ^h 03 ^m .9	+42° 20'	2.3, 5.0	9.4"	63°	2013
9	lota Trianguli	02 ^h 12 ^m .4	+30° 18'	5.3, 6.7	3.8"	69°	2012
10	Alpha Ursa Minoris	02 ^h 31 ^m .8	+89° 16'	2.1, 9.1	18.1"	233°	2013
11	Gamma Ceti	02 ^h 43 ^m .3	+03° 14'	3.5, 6.2	2.1"	298°	2012
12	Eta Persei	02 ^h 50 ^m .7	+55° 54'	3.8, 8.5	31.4"	295°	2012
13	Struve 331	03 ^h 00 ^m .9	+52° 21'	5.2, 6.2	11.9"	85°	2012
14	32 Eridani	03 ^h 54 ^m .3	-02° 57'	4.8, 5.9	6.9"	348°	2013
15	Chi Tauri	04 ^h 22 ^m .6	+25° 38'	5.4, 8.5	20.4"	24°	2012
16	1 Camelopardalis	04 ^h 32 ^m .0	+53° 55'	5.8, 6.8	10.6"	308°	2012
17	55 Eridani	04 ^h 43 ^m .6	-08° 48'	6.7, 6.8	9.3"	318°	2011
18	Beta Orionis	05 ^h 14 ^m .5	-08° 12'	0.3, 6.8	9.3"	204°	2011
19	118 Tauri	05 ^h 29 ^m .3	+25° 09'	5.8, 6.7	4.7"	209°	2012
20	Delta Orionis	05 ^h 32 ^m .0	-00° 18'	2.4, 6.8	52.4"	0°	2012
21	Struve 747	05 ^h 35 ^m .0	-06° 00'	4.7, 5.5	35.9"	226°	2014
22	Lamda Orionis	05 ^h 35 ^m .1	+09° 56'	3.5, 5.5	4.2"	44°	2012
23	Theta 1 Orionis	05 ^h 35 ^m .3	-05° 23'	6.6, 7.5, 5.1, 6.4	8.9", 12.7", 21.4"	31°, 132°, 96°	2013
25	Theta 2 Orionis	05 ^h 35 ^m .4	-05° 25'	5.0, 6.2	52"	93°	2012
24	lota Orionis	05 ^h 35 ^m .4	-05° 55'	2.8, 7.7	11.6"	141°	2012
26	Sigma Orionis	05 ^h 38 ^m .7	-02° 36'	3.8, 6.6, 3.8, 6.4	12.9", 41.3"	84°, 62°	2013
27	Zeta Orionis	05 ^h 40 ^m .8	-01° 57'	1.9, 3.7, 9.6	2.3", 58"	167°, 10°	2013
28	Gamma Leporis	05 ^h 44 ^m .5	-22° 27'	3.6, 6.3	95"	350°	2012
29	Theta Aurigae	05 ^h 59 ^m .7	+37° 13'	2.6, 7.2	4.0"	305°	2009
95	Xi Cephei	22 ^h 03 ^m .8	+64° 38'	4.5, 6.4	8.1"	268°	2013
96	Zeta Aquarii	22 ^h 28 ^m .8	-00° 01'	4.3, 4.5	2.3"	165°	2013
97	Delta Cephei	22 ^h 29 ^m .2	+58° 25'	4.2, 6.1	40.9"	191°	2013
98	8 Lacerta	22 ^h 35 ^m .9	+39° 38'	5.7, 6.3	22.4"	186°	2012
99	94 Aquarii	23 ^h 19 ^m .1	-13° 28'	5.3, 7.0	12.6"	349°	2012
100	Sigma Cassiopeiae	23 ^h 59 ^m .0	+55° 45'	5.0, 7.2	3"	326°	2012

From the Astronomical League

DEEP SKY WONDERS

For Janauary Evening Skies

Name	RA (J2000)	Dec (J2000)	Mag.	A.S., '	S.B.	Transit Type
M 31 (Andromeda Galaxy)	0h42m44.3s	+41°16'07.5"	3.59	250.800	13.49	17h57m galaxy
NGC 225 (Sailboat Cluster)	0h43m39.1s	+61°46'30.0"	7.15	12.000	12.28	17h58m open star cluster
NGC 253 (Sculptor Galaxy)	0h47m33.1s	-25°17'19.7"	8.49	34.300	13.91	18h02m active galaxy
NGC 457 (Dragonfly Cluster)	1h19m35.0s	+58°17'13.2"	6.54	20.000	12.79	18h35m open star cluster
NGC 457 (Dragonfly Cluster)	1h19m35.0s	+58°17'13.2"	6.54	20.000	12.79	18h35m open star cluster
M 103	1h33m23.0s	+60°39'00.0"	7.54	6.000	11.17	18h49m open star cluster
M 33 (Triangulum Galaxy)	1h33m50.9s	+30°39'35.8"	5.86	110.300	14.24	18h49m galaxy
NGC 663 (Lawnmower Cluster)	1h46m08.9s	+61°14'06.0"	7.24	15.000	12.86	19h01m open star cluster
NGC 869 (Double Cluster)	2h19m00.0s	+57°07'40.8"	3.94	30.000	11.06	19h34m open star cluster
NGC 884 (Double Cluster)	2h22m23.0s	+57°07'30.0"	3.94	30.000	11.06	19h38m open star cluster
M 34 (Spiral Cluster)	2h42m05.0s	+42°45'43.2"	5.33	25.000	12.06	19h57m open star cluster
NGC 1245 (Patrick Starfish Cluster)	3h14m48.2s	+47°15'10.8"	8.53	30.000	15.65	20h30m open star cluster
NGC 1342 (Little Scorpion Cluster)	3h31m37.9s	+37°22'37.2"	6.83	15.000	12.45	20h47m open star cluster
M 45 (Pleiades)	3h47m00.0s	+24°07'01.2"	1.34	220.000	11.28	21h02m cluster/nebulosity
NGC 1502 (Jolly Roger Cluster)	4h07m49.9s	+62°19'55.2"	7.04	7.000	11.00	21h24m open star cluster
NGC 1528 (m & m Double Cluster)	4h15m23.0s	+51°12'54.0"	6.53	25.000	13.26	21h31m open star cluster
NGC 1545 (m & m Double Cluster)	4h20m56.9s	+50°15'10.8"	6.33	18.000	12.35	21h37m open star cluster
NGC 1647 (Pirate Moon Cluster)	4h45m55.0s	+19°06'54.0"	6.55	40.000	14.30	22h01m open star cluster
NGC 1807 (Poor Man's Double Cluster)	5h10m48.7s	+16°31'19.2"	7.16	17.000	13.05	22h26m open star cluster
NGC 1817 (Poor Man's Double Cluster)	5h12m15.1s	+16°41'24.0"	7.86	16.000	13.62	22h28m open star cluster
M 79	5h24m10.6s	-24°31'27.3"	8.99	9.600	13.64	22h39m globular star cluster
M 38 (Starfish Cluster)	5h28m43.0s	+35°51'18.0"	6.55	15.000	12.16	22h45m open star cluster
M 1 (Crab Nebula)	5h34m31.9s	+22°00'52.2"	8.56	12.000	12.06	22h50m supernova remnant
M 42 (Great Orion Nebula)	5h35m17.3s	-5°23'28.0"	4.24	150.000	13.31	22h51m HII region
NGC 1980 (The Lost Jewel of Orion)	5h35m24.0s	-5°54'54.0"	2.74	420.000	14.07	22h51m star cluster
M 36 (Pinwheel Cluster)	5h36m18.0s	+34°08'24.0"	6.15	10.000	10.89	22h52m open star cluster
M 78 (Casper the Friendly Ghost Nebula)	5h46m46.8s	+0°00'50.4"	8.52	14.000	12.46	23h02m reflection nebula
M 37 (January Salt-and-Pepper Cluster)	5h52m18.0s	+32°33'10.8"	5.75	15.000	11.37	23h08m open star cluster
M 35 (Shoe-Buckle Cluster)	6h08m54.0s	+24°19'58.8"	5.27	25.000	12.00	23h25m open star cluster
NGC 2194 (Intergalactic Wanderer)	6h13m46.1s	+12°49'04.8"	8.70	5.000	11.93	23h29m open star cluster
NGC 2232 (Double Wedge Cluster)	6h27m15.1s	-4°45'28.8"	4.19	29.000	11.24	23h43m open star cluster
NGC 2244 (Rosette Nebula)	6h31m55.0s	+4°56'31.2"	5.04	24.000	11.68	23h48m open star cluster
NGC 2264 (Christmas Tree Cluster)	6h40m58.1s	+9°53'42.0"	4.13	17.000	8.48	23h57m open star cluster
M 41 (Little Beehive Cluster)	6h46m01.0s	-20°45'25.2"	5.17	39.000	12.86	0h02m open star cluster
NGC 2281 (Broken Heart Cluster)	6h48m17.0s	+41°04'40.8"	5.57	15.000	11.19	0h04m open star cluster
NGC 2301 (Hagrid's Dragon Cluster)	6h51m45.1s	+0°27'36.0"	6.29	15.000	11.91	0h07m open star cluster
M 50 (Heart-Shaped Cluster)	7h02m47.5s	-8°20'16.1"	6.32	15.000	11.94	0h18m open star cluster
NGC 2343 (Doublemint Cluster)	7h08m06.0s	-10°37'01.2"	7.18	6.000	10.81	0h24m open star cluster
NGC 2360 (Caroline's Cluster)	7h17m43.0s	-15°38'31.2"	7.92	14.000	13.39	0h33m open star cluster
NGC 2362 (τ CMa Cluster)	7h18m41.0s	-24°57'18.0"	6.05	8.000	10.30	0h34m open star cluster
M 47	7h36m35.0s	-14°28'58.8"	5.31	25.000	12.03	0h52m open star cluster
NGC 2420 (Twinkling Comet Cluster)	7h38m23.0s	+21°34'22.8"	8.55	7.000	12.51	0h54m open star cluster
M 46	7h41m46.1s	-14°48'36.0"	7.14	20.000	13.38	0h57m open star cluster
NGC 2539 (The Dish Cluster)	8h10m37.0s	-12°49'04.8"	8.34	21.000	14.69	1h26m open star cluster
M 48 (Beehive Cluster)	8h13m43.0s	-5°45'00.0"	6.74	30.000	13.87	1h30m open star cluster
M 44 (Beehive Cluster)	8h40m24.0s	+19°40'01.2"	3.49	70.000	12.46	1h57m open star cluster
M 67 (Golden-Eye Cluster)	8h51m18.0s	+11°48'00.0"	7.51	25.000	14.23	2h07m open star cluster
M 81 (Bode's Galaxy)	9h55m33.2s	+69°03'55.1"	7.17	41.000	13.35	3h12m galaxy
M 82 (Cigar Galaxy)	9h55m52.4s	+69°40'46.9"	8.64	15.500	12.58	3h13m galaxy

* Data from Stellarium







A good morning smile thanks to Gravitational Lensing! APOD picture today. We need this for 2020!

Suggested by Roy Gustafson

Spotlight: NGC 1333-Embryo Nebula (Phantom Tiara)

NGC 1333 is a reflection nebula located in the northern constellation Perseus, positioned next to the southern constellation border with Taurus and Aries. It was first discovered by German astronomer Eduard Schönfeld in 1855. The nebula is visible as a hazy patch in a small telescope, while a larger aperture will show a pair of dark nebulae designated Barnard 1 and Barnard 2. It is associated with a dark cloud L1450 (Barnard 205). Estimates of the distance to this nebula range from 980–1,140 light years (300– 350 pc). This nebula is in the western part of the Perseus molecular cloud and is a young region of very active star formation, being one of the best -studied objects of its type. It contains a fairly typical hierarchy of star clusters that are still embedded in the molecular cloud in which they formed, which are split into two main sub-groups to the north and south. Most of the infrared emission is happening in the southern part of the nebula. A significant portion of the stars seen in the infrared are in the pre-main sequence stage of their evolution.





The nebula region has a combined mass of approximately 450 solar masses while the cluster contains around 150 stars with a median age of a million years and a combined mass of 100 solar masses. The average star formation rate is 10×10^{-4} solar masses yr^{-1} . Within the nebular are 20 young stellar objects producing outflows, including Herbig–Haro objects. A total of 95 X-ray sources that are associated with known members of embedded star clusters. In 2011 researchers reported finding 30 to 40 brown dwarf objects in the cloud and in the Rho Ophiuchi cloud complex.

NASA Space Place Partner Article



This article is distributed by NASA Night Sky Network The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit <u>https://nightsky.jpl.nasa.gov/</u> to find local clubs, events, and more!

Check Your Sky's Quality with Orion!

David Prosper

Have you ever wondered how many stars you can see at night? From a perfect dark sky location, free from any light pollution, a person with excellent vision may observe a few thousand stars in the sky at one time! Sadly, most people don't enjoy pristine dark skies – and knowing your sky's brightness will help you navigate the night sky.

The brightness of planets and stars is measured in terms of **apparent magnitude**, or how bright they appear from Earth. Most visible stars range in brightness from 1st to 6th magnitude, with the lower number being brighter. A star at magnitude 1 appears 100 times brighter than a star at magnitude 6. A few stars and planets shine even brighter than first magnitude, like brilliant Sirius at -1.46 magnitude, or Venus, which can shine brighter than -4 magnitude! Very bright planets and stars can still be seen from bright cities with lots of light pollution. Given perfect skies, an observer may be able to see stars as dim as 6.5 magnitude, but such fantastic conditions are very rare; in much of the world, human-made light pollution drastically limits what people can see at night. Your sky's limiting magnitude is, simply enough, the measure of the dimmest stars you can see when looking straight up. So, if the dimmest star you can *(continued in next column)*

see from your backyard is magnitude 5, then your limiting magnitude is 5. Easy, right? But why would you want to know your limiting magnitude? It can help you plan your observing! For example, if you have a bright sky and your limiting magnitude is at 3, watching a meteor shower or looking for dimmer stars and objects may be a wasted effort. But if your sky is dark and the limit is 5, you should be able to see meteors and the Milky Way. Knowing this figure can help you measure light pollution in your area and determine if it's getting better or worse over time. And regardless of location, be it backyard, balcony, or dark sky park, light pollution is a concern to all stargazers!

How do you figure out the limiting magnitude in your area? While you can use smartphone apps or dedicated devices like a Sky Quality Meter, you can also use your own eyes and charts of bright constellations! The Night Sky Network offers a free printable Dark Sky Wheel, featuring the stars of Orion on one side and Scorpius on the other, here: <u>bit.ly/darkskywheel</u>. Each wheel contains six "wedges" showing the stars of the constellation, limited from 1-6 magnitude. Find the wedge containing the faintest stars you can see from your *(continued on next page)*

NASA Space Place Partner Article

January 2021



Check Your Sky's Quality with Orion!

David Prosper

area; you now know your limiting magnitude! For maximum accuracy, use the wheel when the constellation is high in the sky well after sunset. Compare the difference when the Moon is at full phase, versus new. Before you start, let your eyes adjust for twenty minutes to ensure your night vision is at *(continued in next column)* its best. A red light can help preserve your night vision while comparing stars in the printout. Did you have fun? Contribute to science with monthly observing programs from Globe at Night's website (globeatnight.org), and check out the latest NASA's science on the stars you can - and can't - see, at<u>nasa.gov</u>.



The Dark Sky Wheel, showing the constellation Orion at six different limiting magnitudes (right), and a photo of Orion (left). What is the limiting magnitude of the photo? For most observing locations, the Orion side works best on evenings from January-March, and the Scorpius side from June-August.





NEWS&LINKS

Three Planets Orbit Nearby Red Dwarf LHS 1140

November 14th, 2020

Hubble Space Telescope Looks at Faint Spiral: UGC 12588

November 16th, 2020

Chandra Finds Hot Bubble in Planetary Nebula IC 4593

November 13th, 2020

Brown dwarf discovered with a radio telescope for the first time

November 13th, 2020







NEWS&LINKS

Australia's Parkes Telescope Just Got a New Name: Murriyang, Which Means "Skyworld"

November 10th, 2020

Europa's Nightside Glows in the Dark

November 13th, 2020

Mars Might Have Lost its Water Quickly

November 23rd, 2020

Astronomers See a Newly Forming Planetary Disk That's Continuing to Feed On Material from its Nebula

November 26th, 2020









NEWS&LINKS

Geysers on Europa might come from pockets of water under the ice

November 26th, 2020

Fast radio bursts within the Milky Way seem to be coming from magnetars

November 17th, 2020

The family tree of the Milky Way. The mergers that gave us the galaxy we see today

November 17th, 2020

There's a Vast Microbial Ecosystem Underneath the Crater that Wiped Out the Dinosaurs

November 18th, 2020











Heard of Mini-Neptunes and gas-Dwarfs? Here's a new one: sub-Earths

December 9th, 2020

December 7th, 2020

December 5th, 2020

It Took 50 Nights of Observations to Capture New Data on the Magellanic Clouds

Chinese Spacecraft Dock in Lunar Orbit for Transfer of Moon Samples – Next Stop, Earth

Japan's Hayabusa 2 Probe Drops Off Bits of an Asteroid and Heads for Its Next Target

December 5th, 2020











Terrans

Neptunian

Gi



December 17th, 2020

Hubble watches massive storm on Neptune reverse course

November 29th,2020

Newfound 'Kraken merger' may have been the biggest collision in Milky Way's history

November 19th, 2020



November 19th, 2020

Some of the Milky Way's oldest stars aren't where they're expected to be

NEWS&LINKS

SMSS J232121.57 - 160505.4

Disk



From frustration to jubilation: A planetary conjunction story

By Paul Levesque

NASA estimates that, at any given time, about twothirds of Earth's surface is covered by clouds. In her 1968 hit tune, "Both Sides Now," Joni Mitchell sang, "So many things I would have done / But clouds got in my way."

I believe I speak for all amateur astronomers when I say, "NASA, we believe you, and Joni, we hear you." Clouds have spoiled many a planned astronomy event, and even a somewhat hopeful weather forecast of "Partly Cloudy" has often turned out to mean, "Cloudy at the worst possible time in the worst possible part of the sky."

But it isn't cloudy all the time, and the frustration we feel when clouds roll in is often followed by the jubilation felt when the sky clears and the observation we were hoping to make pops into sight.

Such was my experience with clouds during the December 2020 conjunction of Jupiter and Saturn, a true once-in-a-lifetime event which I simply did not want to miss. The conjunction, which built to a climax over time as the planets moved closer together from our vantage point, was scheduled to peak on December 21, a date on which we would be out of town, visiting my wife's sister and her family in Lake Forest, Illinois, located near Lake Michigan north of Chicago and right by old Fort Sheridan.

We arrived on December 20, a Sunday, and as the sun went down that evening I went out on my own, seeking a view of the conjunction. There is a relatively dark bike path located near my sister-in-law's home and I walked there, looking up at a bright half-moon, knowing that the planets would appear somewhere

between it and the sun, now below the horizon but still glowing in the southwest.

Also off to the west were some clouds, moving eastward, but not yet to where I thought the conjunction would appear. I walked along, looked to the left of the moon – further up the ecliptic – and saw Mars emerge, bright and reddish high in the darkening sky. Jupiter and Saturn could not be far behind.

Minutes passed, and then I saw it, about halfway between the moon and the horizon – Jupiter! Its companion, Saturn, still could not be seen – but what I could see was a bank of dark grey clouds, moving in exactly the wrong direction. Seconds later, Jupiter was covered in a cloudbank, before I could get a view of its companion planet. No conjunction! Frustrating indeed.

There was no hope of seeing the conjunction or anything else the next night – the peak conjunction night – as clouds completely covered the sky. But the sun was shining when we left for Moline on Tuesday the 22nd, and the evening forecast for the Quad Cities called for – you guessed it – "partly cloudy" skies.

It was still sunny and mild with a light breeze when we got home in the early afternoon, perfect viewing conditions, but would they hold until sunset? I kept an eye on the sky out the window as the sun moved lower – looking clear, looking good!

Soon after 5 p.m., I set out for Jefferson School in Moline. There is a large grass field right by the school which offers an unobstructed view pretty much from horizon to horizon, making it one of the best observing sites you'll find anywhere within the metro Quad Cities.

This field was apparently once part of the Oakwood Country Club golf course, which moved to Coal Valley in the 1960s due to the construction of a nearby in-

(Continued on next page)





terstate highway. In the early years of the Popular Astronomy Club, public viewings were held on this very spot, until Oakwood members put a stop to them due to fear that the fairways would be damaged.

I'd gone to this field a few weeks before, in the predawn hours, in hopes of catching a glimpse of the Geminid meteor shower. Though the sky was clear, no shooting stars appeared that morning; now, this evening, would the conjunction appear?

Yes! There is was, as clear as it could be, Jupiter the brighter and larger object, with Saturn just a little below and ahead of it, separated by a tiny sliver of sky. Truly a beautiful sight, viewed from ground where amateur astronomers had looked at similar phenomena decades before. I couldn't help but feel connected.

I took my recently acquired iPhone 12, pointed it at the planetary conjunction, and took a picture. It looked merely like a point of light on my phone's (Continued in next column) screen, so I wasn't expecting much.

When I got home and downloaded the photo, though, I saw that it had captured the separation between the planets, and that it showed both as distinct round disks. I was truly amazed, more at the capabilities of the phone than at my own amateurish photographic skills.

I am sharing this photo with all of you, knowing that millions of photos of the conjunction were probably taken worldwide, that much better photos were probably taken by members of this club, and that my photo ranks in the lowest percentile by any possible measure.

And yet I find myself constantly looking at this photo, admiring not my own handiwork but the handiwork of the sky above us, which has and always will inspire awe and wonder in those of us who choose to look up. That's why we do what we do, and why clouds will never stop us.

Editors note: this article appears in QC Online and Popular Astronomy Club Facebook!



Black Hawk College running track. Dec 20th, 2020) 5:05pm Nikon D7500, ISO 6400, focal length 2500mm, 1/5 second. Camera attached to my 10 inch Meade LX 200. Rusty Case and Terry Dufek also set up their scopes. We had to work fast as we could see the clouds rolling in from the West just after sunset. Eric and Sara stopped by along with 3 walkers on the track and a lady just driving around looking for a spot to view the conjunction. We viewed the Moon along with Jupiter and Saturn. By 5:15pm it was clouded over. **Al Sheidler**

I looked at Jupiter & Saturn tonight (Mon, Dec 21) about every 10 minutes as the sky darkened from about 5:10 PM to 5:50 PM. I used hand-held Canon 18x50 image stabilized binoculars. I did NOT see any of the Galilean moons, presumably because they were low in the sky and the sky was not yet totally dark even at 5:55. Over a month ago (more than 2 months?), I had seen the Galilean moons through the binoculars later at night when Jupiter and Saturn were just east of the zenith in a dark, clear sky. **Gerry Pearson**

We had clouds on Monday in Port Byron, but mostly clear on Tuesday, so we saw the almost closest conjunction then. I took very fuzzy cell phone pictures through binoculars, but this direct picture (photo right) with my cell phone was the only one with the two identifiable objects. **Dale Hachtel**





Rusty Cases photos from Blackhawk College on December 20th, 2020





Al, here's a shot of the Jupiter/Saturn pairing taken at 16:41 this afternoon (Sec 20th, 2020) from my back yard in Rock Island with my 9.25" S-C. It was very difficult to get Saturn in the bright twilight, which is when this pic was taken. Attempts to show the twilight invariably wrecked the view of Saturn. So, I ended up having to adjust contrast and gamma to get Saturn to come out at all. However, I think this picture gives a pretty good idea of how the two looked visually. The pic was shot through very thin stratus clouds.

It is not possible to get a shot that will show both Saturn and Jupiter without one or the other being greatly overexposed or underexposed. That is unfortunately the nature of this pair.

Ken Boquist

Jupiter and Saturn 21 Dec 2020 23:06:59 UT Rock Island, IL 9.25" f/10 S-C Separation: 0d 6' 17"



I tried some image processing to brighten up Saturn somewhat. It worked well for tonight, but yesterday's picture never looked good because unfortunately it was shot through an extremely thin cloud layer.

Looking at the US Naval Observatory's almanac, it appears the true conjunction itself occurred about 7:25am today. **Ken Boquist**

It cleared off this afternoon (November 27th, 2020) so I decided to see if there is much happening on the Sun. I had heard there is a large sunspot, so I wanted to check for myself. Indeed there are. There might be 9 or 10 sunspots in this image. The largest sunspot grouping is about 1/25th the size of the sun which means in reality it is about 4.5 times the size of the earth! This is one of the larger ones to come along in a while.

The image was taken using an ETX90 telescope, FL=1250mm, with a Nikon D7500 camera, 1/250 second exposure at IS0 400.

Enjoy. Thanks. Al





Coming home from Paul Castle on November 28th. I caught meteor just skimming the northern horizon.

Back tracking it when I got home I figured out that it was probably a Northern Taurid . It had a short tail and was about magnitude 1. Terry Dufek

Above is recreation of meteor path

Two different SpaceX satellite groupings from last night at the PCMO. The first taken at 5:46 pm as this group passed over Mars (the white dot below the line of satellites. The second taken at 6:44 pm looking to the west. As of Nov. 25, 2020, SpaceX has launched 955 Starlink satellites. Photos taken with my iPhone. Wayland Bauer







Photos (above and below) By Al Sheidler

J320, planetary nebula in Orion Settings: FL=1575mm, ISO 6400, 30 second exposure, 1.3x digital zoom



Messier 1 by Paul Saeger

I think this is my best yet. Messier 1. The Crab Nebula Explore Scientific 127mm ZWO ASI294MC Pro Camera Optolong L-Enhance Filter 220 Minutes Paul Saeger







Rosette Nebula

Flame and Horsehead Nebula

Photos by Byron Davies

Bubble Nebula

Helix Nebula

41



Photos by Byron Davies









NGC2392, "The Eskimo Nebula", planetary nebula in Gemini, 21:07CST Settings: FL=1960mm, ISO 6400, 30 second exposure, 1.3x digital zoom





NGC2024, "The Flame Nebula", in Orion, 21:18CST Settings: FL=1960mm, ISO 6400, 30 second exposure, 1.3x digital zoom



Abell 21, "The Medusa Nebula", planetary nebula in Gemini, 20:57CST Settings: FL=1960mm, ISO 6400, 30 second exposure, 1.3x digital zoom



NGC2371-2, "The Double Bubble", planetary nebula in Gemini, 20:37CST Settings: FL=1960mm, ISO 6400, 30 second exposure, 1.3x digital zoom

One of the problems I have had with imaging M42 is getting the nebula AND the Trapezium to both be visible. The image I took on December 9th using the new CPC scope in the observatory shows nice detail of the nebula, but the Trapezium area is way overexposed. So I went back through my library of images and found one I took several years ago with less exposure. This image shows the Trapezium fairly well. So I decided to play around with superimposing the

nice image of the Trapezium on top of the other image and see if I could get a nice composite. Attached is the result of that. What do you think? Thanks. Al. M42, "The Great Orion Nebula", and a satellite in Orion, 21:39CST Settings: FL=1960mm, ISO 6400, 20 second exposure

M42, "The Great Orion Nebula", and a satellite in Orion, 21:39CST Composite of Trapezium (15sec @ ISO 3200) and Surrounding Nebula (20sec @ ISO 6400

Paul Castle Observing Sessions November 28th, 2020



Last evening, a group of us met at the Paul Castle Observatory to take advantage of the clear skies. While we waited for it to get dark enough to begin observing, we had a picnic dinner with steaks, bratwurst and potatoes cooked on the charcoal grill. The Nordick family (Gary, Chris, and Ally) got a training session on the operation of the observatory and scope with Dale Hachtel as the instructor. Terry Dufek and the Holt family (Mary, Alex and Hugh) set up scopes outside to observe the planets and double stars. Terry is working on the AL double star program. In the large group photo is Al Sheidler, Chris Nordick, Ally Nordick, Gary Nordick, Dale Hachtel, Alex Holt, Hugh Holt, Mary Holt, and Terry Dufek. John Douglas was also there, but arrived after the group photo was taken.

Because there was a bright full moon, we focused on observing planets and double stars (which were un-affected by the sky glow from the moon).



Using the observatory's 11" Celestron (CPC 1100 HD), we observed the following objects:

<u>Planets:</u> Saturn, Jupiter, Mars, Uranus, Neptune. <u>Messier Objects:</u> M57 (The Ring Nebula), M56 (globular cluster in Lyra). These objects showed up fairly well despite the bright sky glow.

Double Stars:

Albireo, a fantastic double star in Cygnus with widely separated, bright gold & blue component stars Gamma Andromedae (Almach), a very nice yellow & blue-green double star in Andromeda

Eta Cassiopeiae, a pretty yellow & orange pair of contrastingly bright stars

Epsilon Lyrae (The Double-Double), which is actually two sets of very close double stars in Lyra. One needs a good scope and steady atmosphere to split each of the doubles.

Beta Lyrae, widely spaced pair of similarly bright white stars

Zeta Lyrae, widely spaced pair of contrastingly bright yellow stars

STF2470 & STF2474, "The Poor Man's Double-

(continued in next column)

(continued on next page)

Double", this was my favorite of the evening, showing two easily split pairs of similar bright double stars, very interesting

16 Cygni, pretty, widely spaced pair of bright yellowish stars in Cygnus

17 Cygni, a fine pair of unequally bright yellow and orange stars

52 Cygni, a close pair of very unequally bright stars-challenging to split visually

61 Cygni, widely spaced pair of nearly equally bright yel-

low-orange stars Delta Cygni, a very close pair of unequally bright blue-green stars. Because the primary is so much brighter than the secondary, I cannot say with certainty we could split the double STF2578, a bluish pair of nearly equal brightness in Cygnus STT290, a close pair of unequally bright stars in Cygnus

This was another in a long line of highly successful observing sessions! Thanks to all of the participants. Keep looking up. Al







Paul Castle Observing Session

December 4th, 2020 Last evening a group of us got together at the Paul Castle Observatory to take advantage of beautifully clear skies and do some observing. Wayland, Ken, Rusty, Al and the Holts set up scopes while Gary, Chris, and Dale used the observatory. Attached are some of my photographs of a variety of objects. I am working on observing the AL globular clusters and planetary nebulae. Attached are some of my attempts to photograph some of them. Enjoy. Thanks. Al



Wayland Bauer, Gary Nordick, Chris Nordick, Al Sheidler, Mary Holt, Hugh Holt, Alex Holt, and Ken Boquist. Dale Hachtel and Rusty Case arrived after the group photo.





STF2470 & STF2474, "The Poor Man's Double Double" in Lyra Settings: FL=2500mm, ISO 3200, 5 second exposure

More of Als photos in the Member Observation Pages

Paul Castle Observing Session December 9th, 2020

Last night, Byron Davies, Terry Dufek, Mike Dannenfeldt and Al Sheidler met at the Paul Castle Observatory to take advantage of excellent weather and moonless conditions to bag some objects. Attached are some of the pictures I took using the observatory's new telescope. I have been attempting to image all of the AL's planetary nebulae, but I also included a number of other objects. Keep looking up! Thanks. Al.



M77, "Cetus A" galaxy in Cetus, 19:17CST Settings: FL=1960mm, ISO 6400, 30 second exposure, 1.3x digital zoom



NGC584, "The Little Spindle Galaxy", in Cetus, 19:33CST Settings: FL=1960mm, ISO 6400, 30 second exposure, 1.3x digital zoom



ings: FL=1960mm, ISO 12800, 25 second exposure, 1.3x digital zoom





NGC936, "Darth Vader's Starfighter", galaxy in Cetus, 19:41CST Settings: FL=1960mm, ISO 6400, 30 second exposure, 1.3x digital zoom

More

by Al



President Alan Sheidler arranged (with the help of Dale Hachtel) for the December 2020 (business) meeting of the Popular Astronomy Club to be conducted via (Zoom) at 7:00 p.m. local time, on December 14th, 2020. We had 18 members, 0 guests.

Business meeting:

Vice President Report:

• website is due for renewal on March 10th, 2021

Director of Observatories Report:

- Purchased a new ladder for the Paul Castle Observatory
- Purchased a case for the eyepieces and accessories in the observatories

Frank asked about the possibility of having a radio telescope. Dale & Gerry added what they know about them.

Secretary Report:

• Nothing to report

ALCOR Report:

nothing to report

Treasurer Report:

- Dale reviewed the latest report
- Dale needs to pay the insurance for the PAC-MO by year end. It will be \$300.
- Insurance is covered for facilities and just need documentation
- No questions were raised on the report and a motion was made to accept, 2nd and approved by the majority.
- Wayland brought up the use of the Messiah Lutheran zoom license and possibly giving the church a donation for this use. Gerry made a motion and Frank seconded it. \$50 will be given to the church. Dale "put on his church hat" and thanked PAC for the donation.

Other ideas were to use a Zoom free meeting and re enter after 40 minute session ends or to pay for a \$150 license, A final decision about PAC getting their own zoom license will be made in March. Cost would be \$150 per year.

- Committee establish to create a document of PAC history from 2000–2020. Wayland, Roy, Paul Levesque, Terry, Al, and Dale. Have ready for the banquet in October.
- Elections are coming up in 2021. Asking for members to maybe looking at contributing their talents to making the club successful. Review board positions on the web site.
- 85th annual banquet at the Riverfront Grill. We have reservation. Need a committee of 1 to 2 people. Gerry may have a guest speaker that he will look into.

Business meeting was adjourned.

Presentation; A year in review by Roy Gustafson

Review of upcoming programs

Meeting was adjourned





PAG MONTRAEVINE

TREASURER'S REPORT

from 9/1/2020

11/30/2020

to

	description	current period detail	current	YTD
Receipts:				
	memberships	20 renewals	667.50	830.00
	member donations	3 patron, 1 sustaining, 2 supporting	200.00	200.00
	program donations			
	misc donations		1000.00	2630.75
	interest		0.13	2.04
	banquets			
	birdies		525.00	525.00
	calendars			
	special			
	sales			700.00
	other			45.00
	Total Peceints		2302 63	4032 70

Expenditures:				
	programs	awards	50.00	50.00
	speakers	3 speakers	150.00	150.00
	PACMO operation	rent	240.00	638.00
	observatory			301.00
	equipment			
	maintenance			
	Astronomical League			185.00
	insurance		577.00	577.00
	operating supplies		24.46	24.46
	newsletter			
	web page			
	banquet			100.00
	donations			
	miscellaneous	Gamble award	104.27	204.27
	legal			10.00
	PACMO upgrade			
	observatory upgrade			8612.29
	other			
	adjustments			
	Total Expenditures		1145.73	10852.02

Balances		as of	11/30/2020		
	previous balance			6817.19	13983.32
	net change			1246.90	-5919.23
	ending balance			8064.09	8064.09
	check account				2556.28
	money market account				5414.64
	savings account				10.23
	business special				45.44
	cash				0.00
	undeposited checks				37.50
	Total Cash Assets				8064.09

Popular Astronomy Club of the Quad Cities, Inc.

http://www.popularastronomyclub.org/





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.

<u>Submission of this application and payment confirms the applicant's agreement to abide by the policies</u> 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 include	les the \$30.00 membership, with the balance	e 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 ADDITION	AL FAMILY MEMBERS:	
Emergency Contact:	phone #	
THANK YOU!! Welcome to the P	opular Astronomy Club!!	
Make your check payable to the Pop	ular Astronomy Club, Inc. Mail or presen Dale Hachtel (treasurer) 1617 Elm Shore Drive Port Byron, Illinois 61275 cell # 614-935-5748	t at a PAC meeting to: