

Highlights of the January Sky...

... 1st ...
DUSK: Jupiter and Saturn are just over 1° apart low in the southwest.

... 2nd ...
PM: A waning gibbous Moon about 4° right of the Moon when they rise.

... 3rd ...
PM: The Quadrantid meteor shower peaks.

... 6th ...
Last Quarter Moon
4:38 am EST

... 10th ...
DUSK: Jupiter, Saturn, and Mercury form a tight triangle low in the west-southwest.

... 11th ...
DAWN: A thin waning crescent Moon and Venus are separated by 4°.

... 13th ...
New Moon
12:02 am EST.

... 20th ...
First Quarter Moon
4:03 pm EST

PM: The Moon and Mars are about 6° apart high above southwestern horizon.

... 23rd ...
PM: A waxing gibbous Moon is 4° above Aldebaran in Taurus.

... 26th ...
PM: Pollux is 7° to the upper left of the Moon.

... 28th ...
Full Moon
2:18 pm EST

... 29th ...
PM: The Moon and Regulus are separated by 4°.

Prime Focus

A Publication of the Kalamazoo Astronomical Society

★ ★ ★ January 2021 ★ ★ ★

This Months Events

General Meeting: Friday, January 8 @ 7:00 pm

Held on Zoom • [Click to Register](#) • See Page 10 for Details

Online Viewing: Saturday, January 9 @ 9:00 pm

Held on Zoom • [Click to Register](#) • See Page 9 for Details

Board Meeting: Sunday, January 10 @ 5:00 pm

Held on Zoom • All Members Welcome to Attend

Lecture Series: Saturday, January 23 @ 1:00 pm

Held on Zoom • See Page 3 for Details

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December Meeting Minutes



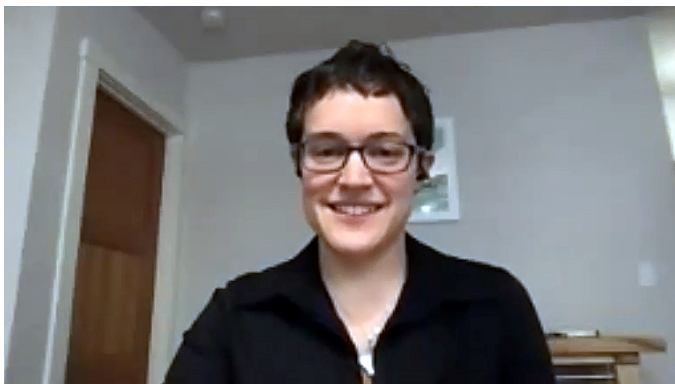
The annual meeting of the Kalamazoo Astronomical Society was brought to order by President Richard Bell on Friday, December 4, 2020 at 7:05 pm EST. Over 70 members and guests attended via Zoom. Two of those guests, Canadian astrophotographer [Alan Dyer](#) and MSU emeritus professor [Horace Smith](#), were past speakers.

Our rare December guest speaker (first in over two decades) was Dr. Emily Levesque, an astronomy professor at the University of Washington and the author of *The Last Stargazers: The Enduring Story of Astronomy's Vanishing Explorer's*. Both the book and her talk give a behind-the-scenes look at the life of a professional astronomer.

The first chapter deals with her own experience as a 24-year-old graduate student gathering data on distant galaxies with the 8.2-meter Subaru telescope in Hawaii. One of the computers alerted her and the telescope operator that the 400-lb secondary mirror supports had stopped working. Dr. Levesque said she had flashes of the 100-meter Green Bank Telescope collapsing in 1988 on her mind. After calling the engineers, they simply suggested turning the telescope on and off again!

Another infamous story deals with the 107-inch Harlan J. Smith Telescope at McDonald Observatory in West Texas. During one evening in 1970, a disgruntled telescope operator stormed into the observatory with a loaded handgun and demanded the operator lower the telescope. He proceeded to fire six rounds into the primary mirror. Other than reducing the 107-inch to a 106-inch, the telescope continues to gather data to this day. This unknown person tried to finish the job with a hammer, but he was able to be subdued and taken away by the local sheriff.

Another story deals with mysterious radio bursts detected by the famous 64-meter radio telescope at Parkes Observatory in Australia. Brief flashes of radio light are detected fairly often, but a visiting young postdoctoral researcher named Emily Petroff decided to find out their source. She was able to enlist the help of the entire observatory staff to track down what was dubbed "peryttons" (after the mythical creature that looks like one thing, but turns out to be something else). One



Dr. Emily Levesque, author of *The Last Stargazers*, was our special guest speaker on December 4th.

hint that helped lead to the source was that these peryttons often occurred around lunchtime. It turned out to be a microwave oven in the breakroom that released peryttons when opened before the timer was up. Although one burst in 2007 was not a peryton and the source is still unknown.

Many stories other astronomers shared with Dr. Levesque while she gathered information for the book were about Arecibo Observatory, the 305-meter radio telescope in Puerto Rico. She noted the past few years have been difficult ones for the observatory. It started in September 2017 with damage caused by Hurricane Maria. Then, on August 10th, a support cable wrenched out of its socket causing a 100-foot-long gash on the telescope's reflector dish. Another cable failed on November 6th. Drone footage revealed that individual wires were breaking daily, so the National Science Foundation decided it was best to demolish the facility. While many were debating this decision, the 900-ton instrument platform suspended 500-feet above the dish came crashing down on December 1st.

Dr. Levesque said one of the most common misconceptions that ordinary people have is that professional astronomers look through eyepieces. Today, they use all manner of devices such as CCD cameras and spectrographs to gather data. Astronomers also use more than telescopes on mountain top observatories. One telescope, the Stratospheric Observatory for Infrared Astronomy (SOFIA), is mounted inside a modified 747. High-altitude balloons can be utilized to observe the sky at submillimeter wavelengths. One ultraviolet telescope was even designed to work on the Moon and used during the Apollo 16 mission!

One question that Dr. Levesque asked in interviews with other astronomers is how has astronomy changed since they began observing. One gentleman has been active for over 60 years and started with photographic plates. The change in technology has certainly been a big factor and is changing how astronomers study the sky today. One example is with the Vera C. Rubin Observatory, currently under construction in Chile and expected to open in October 2022. This telescope is going to survey the entire southern sky every 3 nights over the course of 10 years. The telescope is going to follow a preset pattern, so almost nobody will be on site.

Dr. Levesque concluded her presentation after talking about Thorne-Żytkow objects, a focus of her research. These are red supergiants that have absorbed a neutron star. To learn more, buy her book! Learn more at: thelaststargazers.com

Final nominations and election (by acclamation) of the 2021 KAS Board was then held. See the results on page 9. Richard then gave his President's Report (most of which is covered in the board minutes). Under observing reports, Richard observed actual sunspots(!) from Owl Observatory on November 28th. David Parks talked about his efforts with Electronically-Assisted Astronomy (EAA) and discussed the possibility of giving a presentation at some point. After discussing current events, the meeting concluded at 8:45 pm.

BOARD Meeting Minutes

The KAS Board held a virtual meeting via Zoom on December 13, 2020. Members logged in were Richard Bell, Dave Garten, Kevin Jung, Scott Macfarlane, Pete Mumbower, Jack Price, Aaron Roman, Lloyd Simons, Don Stilwell, and Roger Williams. Richard called the meeting to order at 5:00 pm, and Don began with the Treasurer's Report. Since a summary had been emailed the previous day, members had been given the opportunity to examine it prior to the meeting, and there were only a few questions about individual items.

In summarizing December/January events, Richard noted the (unfortunate) apparent fact that there would be little-to-no chance of seeing the Geminid meteor shower later that evening, or even in the next couple of nights. There was still hope for the Great Conjunction of Jupiter and Saturn on December 21st, but December weather odds in Michigan are always dicey. Don expressed an interest in convoying with someone to better skies if that is required. The January general meeting was scheduled for Friday the 8th via Zoom. Kevin gave a brief summary of the planned program, featuring Dr. James Ashley of JPL speaking about the InSight probe on Mars. Finally, the next Online Viewing Session is scheduled for January 9th (or 16th) at 9pm.

In Follow-up items from last month, Richard said that he could not finish mounting the metal KAS logo in Owl Observatory until spring. He had also done some searching for an online vendor for a new line of KAS merchandise. The other members had not worked on this as yet, but Jack and Don agreed to check out some ideas. The general meeting schedule for 2021 was looking pretty good, although not everyone had responded with a confirmation as yet. There was a discussion about the year 2021 holiday celebration, replacing the party at KAMSC with a Winter Solstice Dinner and annual meeting at a restaurant. Possible restaurant choices and days of the week were considered, but no action was taken.

In a Remote Telescope update, Richard said that the routine for taking flat fields was not working properly. He was given a routine to monitor the taking of a flat field and to report what was happening just before it failed. Naturally, when this routine was active, no failures had occurred. On the subject of flat fields, the homemade luminescence panel used with the 20-inch PlaneWave works fine for standard LRGB exposures but not for narrowband filters, which require excessive exposure times. Richard noted that the 24-inch panel from Optec (originally planned for this setup) was now available again, after having been discontinued in the meantime. The price was about \$2,000. Don moved to authorize Richard to get a price quote from Optec (including any discounts), with the cost to be offset with proceeds from the sale of the former Constellation Camera (and lens, when we find a buyer). The motion was seconded, and all voted in favor.

Under the agenda item of "Thoughts on 2020 and for the future," Don suggested talking over public appearance events and determining which still have member backing. Richard is still interested in hosting an astronomy trade show, the Great Lakes Astronomy Super Show (GLASS), at KVCC. Over a longer time horizon, Richard envisioned obtaining a dark-sky site and building a larger observatory with space for meeting and/or classrooms. This is motivated in part by increasing sky brightness at our KNC site.

With the close of business, the Board graciously thanked Roger for some 20 years of service as Secretary and ALCOR. Roger thanked Aaron for stepping up to take over the task. The meeting was adjourned at 6:20 pm. The next board meeting is scheduled for Sunday, January 10th, 5:00 pm on Zoom.

Respectfully submitted (for the last time) by Roger Williams.



Introduction to *Amateur Astronomy*

The five-part lecture series that will help you become a star-hopping skymaster begins this month! [Please register](#) if you haven't done so already. Here is the first topic for January:

Part 1 — January 23rd:

Our Place Among the Infinities

For a long time, the stars were merely pinpoints of light on the black backdrop of the heavens. Before massive mountaintop telescopes came along, all we could observe were the Sun, Moon, planets, their satellites, and the occasional comet. Today we know that those pinpoints of light are distant suns and that we live in a remote corner of one galaxy amongst billions. For our first presentation, we'll travel through our solar system, explore the star clusters and nebulae of our Milky Way Galaxy, and the countless other galaxies in this vast, infinite universe.

Time: 1:00 pm - 3:00 pm

Location: Online via Zoom

Please visit the *Introduction to Amateur Astronomy* [web page](#) for more information on the entire series.



Observations of 2020

by Richard S. Bell

Let's face it, there's no simple way to put this. The year 2020 was miserable, a disaster, worst year in recent memory, and a real cluster (and I'm not talking about the open variety). Even the good things that happened in 2020 were tainted due to the overall rottenness of the year. Shall we start with the Australian bushfires that burned a record 47 million acres and killed over a *billion* living creatures (truly apocalyptic numbers)? The western U.S. also suffered a brutal wildfire season that turned skies orange. And for sanity's sake, let's not even mention the embarrassing political stories of the year. After all, *Prime Focus* is a family publication! And let us not forget what really made this a craptacular year: The Coronavirus Pandemic.

I honestly considered just skipping my usual year-in-review article, because there's so much about 2020 I want to forget. I'll do my darndest to highlight what was positive about the past 12 months for the KAS. The first 3 months started out great. Three members (Dale Mais, Jack Price, and Eric Schreur) gave short talks as part of our second annual "Astronomy Open House" on January 10th. Dr. Jen Owen from MSU presented *How Birds Use the Night Sky During Migration* on February 7th. Several guests included members of the Audubon Society of Kalamazoo. Many members raved about MSU astronomer Dr. Elias Aydi's talk, *Where is Everybody? The Fermi Paradox*, on March 6th.

A short time later, the pandemic hit and we decided to cancel the April meeting. Both Mike Sinclair and I filled in as speakers during the June and May meeting, respectively. Our planned May speaker offered to give his talk via Zoom, but

(frankly) I didn't know what that was yet and how many members would "zoom in." The July meeting and August picnic were canceled and we came back in the Fall on Zoom.

Observing fared far worse. Clear skies were had for the February Freeze Out and Messier Marathon. The Freeze Out was the first event members got peaks through the new Leonard James Ashby Telescope in Owl Observatory. Thanks to the pandemic, only two members attended the marathon. The entire 2020 season of Public Observing Sessions had to be canceled. This really hurt since we were unable to share our new Ashby Telescope with the public. Sessions later in the year were held for members only, but attendance was not stellar.

What was really sad about the observing season is that a nice comet came onto the scene! Comet NEOWISE was the brightest comet since Hale-Bopp in 1997...and we couldn't share it with members and the public! We also couldn't share a great Mars opposition in the Fall or the Great Conjunction of Jupiter and Saturn at the start of winter.

We made the best of the shutdown time in March and April. Dave Garten and I worked on the upgrades to Owl Observatory. Dave worked on (at last) motorizing the roll-off roof. We added the Tele Vue NP101is refractor to the Ashby Telescope. Greg Sirna and his friend Steve Hice built a custom cabinet to keep our new accessories in. While stuck at home, I decided to redesign *KAS Online*, even though the previous website was only a year-and-a-half old. My efforts paid off. I won the Great Lakes Region of the Astronomical League's 2020 Webmaster Award.

One thing not affected by the pandemic was our planned season of Online Viewing Sessions, featuring the Remote Telescope. The in-person sessions only scratched the surface of this activity's potential. I contacted nearly 350 other astronomy clubs in the U.S. and Canada in an effort to bring in as many viewers as possible. The first two sessions in November and December have had a combined 70 to 80 attendees between Zoom and YouTube.

The big story of 2020 for the KAS is the dramatic rise in membership. 2019 ended with 156 memberships - the second year in a two-year decline. We roared back in 2020 with a record 191 memberships! The previous all-time high was 179 set in 2017. So, not only did we surpass 180, but just leaped over 190! Why the dramatic increase? Was it the bright comet? I doubt it. Memberships kept rolling in after the comet faded from view. It appears we have the pandemic to thank, but I *really* don't want to. People were looking for new and alternative things to do. Guess we'll find out once the pandemic finally ends. Will we be able to retain all these new people? We have some fine programming scheduled for 2021. We'll have another slew of great speakers planned, the return of the amateur astronomy lecture series, and much more. Stick with us in 2021 and beyond!



KAS Member Observatories

Part 6: Dave Garten's Observatory

I have been interested in astronomy since I was about 8 years old, but my fascination really took off when my wife bought me a Celestron First Scope 80 in my early 20's. It was an 80 mm refractor with a 900 mm focal length on a German equatorial mount. I had a lot of fun with that telescope and learned a lot. I was like a lot of first-time users. I plopped that scope on the ground, put on the 6 mm eyepiece with a 2× Barlow and thought I was going to see the whole universe. (Boy was I ever wrong!) You got these knobs for up, down, left, and right. How hard can this be?

Ok, first target: The Moon. After about 20 minutes of picking up the telescope several times and moving these knobs, success! There it is, but it moves real fast - like 2 seconds fast. Well, that sucks. All that work for a 2 second look. Then after a few days I found out about this thing called polar alignment. You've got to set the mount up a certain way, level it and point it at the North Star. Oh, and by the way, if you set that little finder scope up on the side first, it makes life a lot better. Ok, then there was one more thing to figure out, where is the North Star? Once I got all that sorted out, I was amazed that all I had to do was to barely turn one knob and to keep it centered in the eyepiece. I can now sit in my chair and see all the craters on the Moon and enjoy looking at them for 10 minutes or more with very little effort.

After about a year I learned we had an astronomy club in Kalamazoo. Cool, I'm going to check these guys out. I remember going to my first couple of club meetings. I was really nervous at first, but after a while I found out these guys like the same things I like. After a while there were two guys that stood out to me. Bill Nigg and Eric Schreur did this thing called astrophotography and between these two guys you can learn how to do this. It never occurred to me to put a camera on a telescope. So, thank you Bill and Eric for getting me started in this wonderful hobby, it changed my life. Also, this was around 30 years ago or more during the film days (digital was not even heard of yet.)



So, after the years went by, I got tired of setting up and tearing down my telescope every night. By the time I got set up and had good polar alignment, I was losing good photographing time. So, I decided to build my own observatory. My main problem was to get the most sky in my backyard. I finally decided the observatory had to be about 9 feet in the air to clear my garage and some trees. I ran several ideas through my head and finally decided on a roll-off roof design. I could not find any good plans for one so I drew up my own. A roll-off roof under another roof.

I prefabricated the stationary roof in my basement then took it apart. The pier was next. I dug a hole 3 foot by 3 foot and about 4 foot deep. I was a little scared of it caving in on me when I got down to 4 feet but it didn't. I poured a round base with rebar and a 10-inch sonotube on top of it sticking out of the ground about 18 inches. I had a 13-foot stainless steel pipe 4-inch diameter inside that. Once I got that all done, I poured a cement floor then built the walls and put the stationary roof on. Then came the hard part, the roll-off roof. I used barn door sliding track rails and turn them upside down (got them at tractor supply). It was a real pain in the you know what. In the end I was really happy with it. One important thing I left out about the pier was that it does not come in contact with the observatory.

In all I am very happy with it, especially the warm room off to the side. I did all of this some 10 years ago and it is holding up very well. Just before my retirement I had a big surprise, my son Matthew decided to jump in and start doing this astrophotography thing. He did some good research and found out about these new ZWO cameras and bought one. Wow! The ASI6200MM Pro CMOS camera is amazing for the price. I am, or I should say, we are taking our best pictures ever! He upgraded my telescope so fast I didn't know how to use it for a while.

View [Dave & Matt Garten's Astrophotography Gallery](#) on KAS Online.

KAS Members Capture Great Conjunction of Jupiter & Saturn



Kevin Jung

December 20th @ Holland State Park
Canon 7D · 53mm f/5.6 · 1.3 seconds · ISO 400

Eric Schreur

December 22nd near Asylum Lake Preserve
Nikon D5500 · Celestron Ultima 8 · 1 second · ISO 800



Arya Jayatilaka

December 5th from Portage, MI
Canon 0D · 400mm f/5.6 · 1 second · ISO 1600



Check Your Sky's Quality with Orion

by **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.

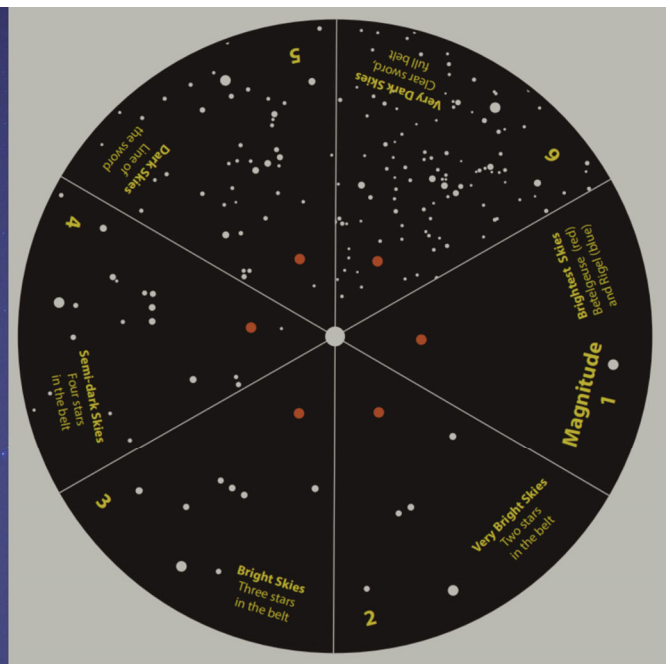
The brightness of planets and stars is measured in terms of **apparent magnitude**, or how bright they appear from Earth. Most visible stars range in brightness from 1st to 6th magnitude, with the lower number being brighter. A star at magnitude 1 appears 100 times brighter than a star at magnitude 6. 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 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. 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 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 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](#), and check out the latest NASA's science on the stars you can - and can't - see, at [nasa.gov](#).



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?

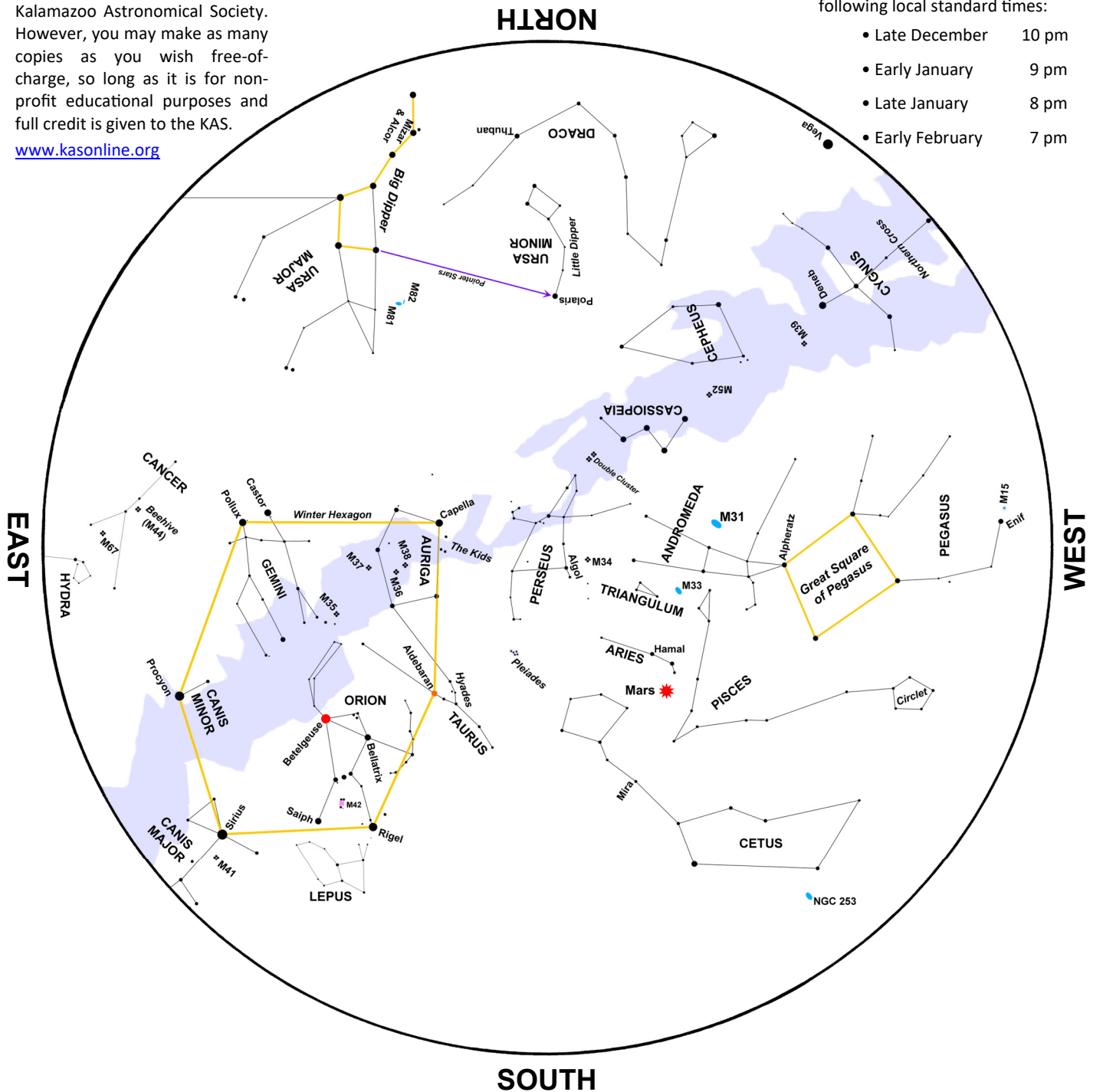
— January Night Sky —

This star map is property of the Kalamazoo Astronomical Society. However, you may make as many copies as you wish free-of-charge, so long as it is for non-profit educational purposes and full credit is given to the KAS.

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This map represents the sky at the following local standard times:

- Late December 10 pm
- Early January 9 pm
- Late January 8 pm
- Early February 7 pm



The New Year begins where the Old Year left off, with Jupiter and Saturn just over 1° apart above the southwestern horizon at dusk. The two gas giants will soon be joined by one more planet before exiting the evening sky.

The Quadrantid meteor shower peaks at approximately 9:30 am EST on January

3rd, so best viewing will be in the early morning hours. However, a waning gibbous Moon will interfere this year.

Jupiter, Saturn, and Mercury form a tight triangle low in the west-southwest at dusk on January 10th. All three worlds will easily fit in the field-of-view of 7×50 or 10×50 binoculars.

A very thin waning crescent Moon will appear almost 4° right of Venus at dawn on January 11th. You will need a clear view of the southeastern horizon.

A first quarter Moon and Mars will be 6° apart on the night of January 20th. Uranus can be spotted in binoculars about 1½° to the lower left of the Red Planet.

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January 2021

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ONLINE VIEWING SESSION



Enjoy the wonders of the universe as seen through the “eyes” of the KAS Remote Telescope, located under the dark skies of southeastern Arizona. Attendees will view images of deep-sky objects captured with the system’s CCD cameras in Arizona, transmitted to participant’s computer, tablet, and smart phone screens in southwest Michigan and around the world. Images acquired during each session will be made available for download.

Saturday, January 9th (16th) @ 9:00 pm

Held on Zoom • [Click here to Register](#)

Introduction to Astronomy

Astronomy is intimately connected to our most basic need; the quest to know where we fit in the grand scheme of things. To that end, Richard Bell is offering a 12-week online astronomy course. This is a course of personal enrichment. There will be assignments to complete and exams to be taken, but no grades or credits will be given. Challenge and better yourself while self-quarantining this winter. [Download the syllabus](#) to learn more and contact Richard to register.



Tuesdays & Thursdays from 6:00 - 7:40 pm

Begins January 12th on Zoom



CONTRIBUTE to Prime Focus

Share your passion for the cosmos with your fellow KAS members! Take us on a tour of the night sky or report on a memorable night under the stars. Review a book on amateur astronomy, astrophysics, space exploration, or even the latest gadget. There are limitless possibilities!

Deadline for articles is the 15th of every month. The quality of this newsletter depends on **YOU!**

General Meeting Preview

Gaining InSight into the Planet Mars



presented by **Dr. James W. Ashley**

Jet Propulsion Laboratory

Since landing at Elysium Planitia on Mars in November 2018, InSight (Interior Exploration using Seismic Investigations, Geodesy & Heat Transport) has been giving the Red Planet a “physical” - studying in detail the inner workings of the planet: its crust, mantle, and core. Gathering this data will help to answer key questions about the early formation of rocky planets in our inner solar system - Mercury, Venus, Earth, and Mars - more than 4 billion years ago, as well as rocky exoplanets. InSight also measures tectonic activity and meteorite impacts on Mars today. Join us as Dr. Ashley, the Deputy Science Operations Coordinator, Science Plan Integrator, and Science Integration Engineer for InSight, reports on the mission’s latest findings.

Friday, January 8 @ 7:00 pm

Held on Zoom • [Click here to Register](#)

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STAMP

