Highlights of the July Sky...

- - - 1st → 7th - - -
DAWN: Pleiades, Jupiter, Venus, and Aldebaran (top to bottom) form a nearly straight line low in east an hour before sunrise.

- - - 3rd - - -
Full Moon

- - - 8th → 10th - - -
DAWN: Aldebaran is just 1° to lower right of Venus.

- - - 10th - - -
Last Quarter Moon

- - - 14th - - -
DAWN: Waning Crescent Moon is lower right of the Pleiades and upper right of Jupiter.

- - - 15th - - -
DAWN: A thin crescent Moon forms a tight quadrangle with Venus, Jupiter, and Aldebaran.

- - - 16th - - -
DAWN: A very thin Moon is 2° to the upper right of Zeta Tauri low in east an hour before sunrise.

- - - 19th - - -
New Moon

- - - 21st - - -
DAWN: Io's shadow falls on Jupiter's eastern limb at 5:51 am, just before Europa's shadow leaves Jupiter's western limb

- - - 24th - - -
PM: A Waxing Crescent Moon forms a quadrangle with Saturn, Spica, and Mars.

- - - 26th - - -
First Quarter Moon

- - - 29th - - -
AM: Southern Delta Aquarid meteor shower peaks (ZHR = 15 - 20).

Prime Focus

A Publication of the Kalamazoo Astronomical Society

☆ ☆ ☆ July 2012 ☆ ☆ ☆

This Months KAS Events

General Meeting: Friday, July 13 @ 7:00 pm

Kalamazoo Nature Center - See Page 14 for Details

Observing Session: Saturday, July 14 @ 9:00 pm

Pleasant Planetary Nebulae - Kalamazoo Nature Center

Observing Session: Saturday, July 28 @ 9:00 pm

Waxing Gibbous Moon & Double Stars - Kalamazoo Nature Center

Training Session: Monday, July 30 @ 9:00 pm

Owl Observatory - Kalamazoo Nature Center - See Page 13 for Details

Inside the Newsletter. . .

BOARD Meeting Minutes

The officers and at-large board members assembled for another meeting on Sunday, June 10, 2012. KAS President Richard Bell brought the meeting to order at 7:05 pm at Sunnyside Church. Other board members in attendance included Mike Cook, Rich Mather, Scott Macfarlane, Jack Price, and Don Stilwell.

The meeting began with a review of upcoming activities. These include "Gadget Night" on July 13th and Public Observing Sessions on July 14th & 28th. All KAS activities will be held at the Nature Center in July. An update on the Robotic Telescope Project (RTP) was the first item under old business. Total sales from the Eclipse Shades Fundraiser is not certain yet, but the profits should take the RTP Fund over $30,000 at this point. The RTP Task Force will need to get together to plain the next step; most likely another donation request letter to the membership.

Mike Cook gave an update on the Library Telescope Project (LTP). He reported that the LTP committee is looking for observing sites accessible at night for patrons checking out the telescope at Portage District Library. The potential sites include Central, Haverhill, and South Westnedge Parks. Finally, Richard mentioned a couple possible guest speakers for the September and November general meetings.

The Kindleberger Festival in Parchment was the first item under new business. This year's event is scheduled for July 14th. Volunteers are needed. Owl Observatory is in great need of cleaning and repairs. A date of July 21st at 4:00 pm was set. Some minor things will be taken care of before the observing session on July 14th. Volunteer cleaners are also needed. Another Owl Observatory Training Session is being planned. Jack Price suggested e-mailing a list of dates to the membership and see which one fits everyone's schedule.

An handful of members have reported difficulties opening or printing *Prime Focus*. Richard suggested purchasing a new version of Adobe Acrobat X Pro, since he has been using version 7 since 2005. This may not solve everyone's problem, but the Board unanimously voted to approve $169 toward the purchase of an upgrade version. The Perseid Potluck Picnic will be held at the Nature Center on Saturday, August 11th at 6:00 pm. Don Stilwell will provide the gas grill again. Possible field trips to either Starfest (near Mount Forest, Ontario) or Manitoulin Star Party were discussed. (See Richard's column at right for further details).

Rich Mather concluded the meeting with his treasurer's report. The account balances was healthy to say the least. The meeting concluded at about 6:30 pm. No board meetings will be held in July or August.

Observations

by **Richard S. Bell**

The first half of 2012 has been a busy time for the KAS and yours truly. So far this year we've had many great general meeting guest speakers, the return of the five-part *Introduction to Amateur Astronomy* lecture series, Astronomy Day 2012, a partial solar eclipse, and a Transit of Venus. All this after celebrating our 75th anniversary in 2011. Frankly, I'm exhausted. I could use a vacation!

Oh, that's right! I already had one. Jean DeMott, Robert Wade, and I attend the Northeast Astronomy Forum (NEAF) & Telescope Show on April 28th & 29th. I've held off giving a report due to all that's happened between then and now. Plus, it seems more appropriate to give a report on all the nifty gadgets I saw at Gadget Night. This is the subject of our next general meeting on July 13th at the Kalamazoo Nature Center. Please note the date and location. Be sure to bring and share any astronomically themed items you've either built or purchased.

Let me rephrase the point I tried to make above. Now I need *another* vacation. I want to go to a star party! There are several to choose from in the coming months, but those that occur in August work best with my schedule. This year's Starfest is being from August 16th - 19th at River Place Park near Mount Forest, Ontario, Canada. Both Jack Price and Mike Sinclair have already registered. I've attended Starfest 3 times over the years and only one of those had decent weather. The skies are dark, but not *really* dark.

Another alternative is the Manitoulin Star Party. This event is held at Gordon's Park on Manitoulin Island, which is also in Ontario, Canada. This year's event is scheduled from August 17th - 20th. Hundreds of people attend Starfest every year, but Manitoulin generally has less than one hundred attendees. Gordon's Park has been designated as a dark sky preserve by the Royal Astronomical Society of Canada. Its skies have a ranking of 2 on the Bortle Scale (Starfest only ranks a 4).

It takes a little over 6 hours to reach Starfest, but takes between 11 - 13 hours to get to Manitoulin Island. If you're interested in lots of talks then Starfest is the place to go. If you're interested in observing and/or imaging under very dark skies then Manitoulin is the place to go. Jean DeMott, Don Stilwell, and I are interested in attending the Manitoulin Star Party. Why don't you join us?

Another alternative is Cherry Springs State Park in Pennsylvania. The skies there are just as dark as Manitoulin. There's no star party at Cherry Springs in August, but it doesn't matter. You can go there year-round. Either way, let's get out of town and have some fun! We deserve it.

Members Share Their Stories

Solar Eclipse & Transit of Venus

Members of the Kalamazoo Astronomical Society were privileged to witness two special astronomical events recently; a partial or annular solar eclipse on Sunday, May 20th and a rare Transit of Venus on Tuesday, June 5th. Members in attendance at the general meeting on June 8th shared their stories, videos, and images. It would be a long and arduous task for the editor to summarize them in the standard meeting minutes format, so he asked the members to share their experiences in their own words. Some members not in attendance at the meeting also share their adventures. Enjoy!

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Richard Bell - Partial Eclipse

When I first learned that a partial solar eclipse was going to be visible low on the western horizon in Michigan on May 20th my first thought was to organize a KAS event for both the eclipse and Venus transit in South Haven. Turns out this would be difficult due to the insurance costs involved. KAS board members Rich Mather and Don Stilwell checked out several other locales along the lake shore. One of them was Warren Dunes State Park.

The weather was excellent when I first arrived at Warren Dunes at about 4:00 pm on Eclipse Day. We got to do some nice solar observing with the public for about an hour or so before it started to get very cloudy; too bad as the Sun looked great in white light and hydrogen alpha. Everyone was patient, but you could see the looks of disappointment on everyone's face. We spent over three hours with nothing to do, but wait and enjoy one another's company. During this time, the most exciting thing to observe was some guy trying

A clearing in the oncoming storm allowed KAS members and guests to witness the partial eclipse on the shore of Lake Michigan. This is a still from a brief movie created by Richard Bell. Watch it on YouTube.

Members were treated to a spectacular thunderstorm during and after the partial solar eclipse at Warren Dunes State Park on May 20th. Credit: Tim Kurtz

to swim after his giant blue ball floating up the coast of Lake Michigan. Another guy on a kayak eventually got it and called it his own. Yeah, you could say things were looking pretty desperate.

I decided to throw in the towel (literally, I brought one with me) and began to pack up at about 8:15 pm. Others soon followed. Wind from an incoming storm blew open a hole in the clouds right on the western horizon. As I headed back to my Jeep to pack up my gear people began to cheer. I turned around and saw a wedge-shaped piece of Sun slowly appear from behind the clouds. It was as if a great curtain was opening. Show time, baby! Before you knew it an oddly shaped crescent Sun made its appearance. I quickly setup my camera tripod and began shooting photos with my 100-300mm lens.

Not only did we get to witness part of the partial eclipse, but we got to enjoy multiple lightning bursts from the incoming storm. Loud gasps and cheers broke out with each thunderbolt. It was one of the most memorable observing experiences of my life. Thank goodness we packed up when we did. Once the Sun set I packed up the rest of my stuff and hit the road. It started pouring rain as soon as I got onto I -94. The Venus transit had a tough act to follow. What a show!

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Joe Comiskey – Partial Eclipse

As the time for the eclipse approached, it looked as if the clouds were going to completely block our view. During this

time, a young lad (10 years old?) started asking me a lot of questions about solar and lunar eclipses, such as how to view them and how often they occurred. I also told him about the upcoming Transit of Venus and to be sure to purchase some eclipse glasses. Since he would have to go find his mom to get money for the shades, I went ahead and bought a pair for him. Later, the hole in the clouds we had been praying for got larger, and I saw him and his family at their car getting ready to leave. I went over and convinced his mom that they ought to stay because the chance of seeing the eclipse was getting better. I'm glad I did. This event and the Transit of Venus provided lots of opportunities to not only show the wonders in the sky, but also to spread our love of astronomy.

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Bill Nigg – Annular Eclipse

The recent annular solar eclipse was observed in excellent conditions from the Herlong, California school grounds less than 300 feet from the center line. My visit started with a school assembly on Friday where I showed slides of my previous solar eclipses and gave specific examples and instructions about solar observing safety. I gave my host 10 eclipse shades for sharing during the event on Sunday. Weather and geographic planning resulted in this ideal location and "chasing" to a plan B spot was not necessary. My telescope was set up the night before and polar aligned with several invited students viewing the planets and constellations. The area is mostly high desert with wind but I was located in between school buildings on a grassy spot for minimum daytime thermal, wind, and dust problems.

I was joined by Patty Krupa, the school host, and about 40 students and locals, plus KAS members Becky and Kalman Csia for the 3 hour eclipse event. The early afternoon temperature was quite hot but we were all in "the shade" soon. The scenery sunlight turned to a bright grey and we could all see Venus near the eclipse center time. I had my usual multiple photo plan - all with 5.0 Baader filters. Nikon D40 and F3 (film) images at 1006mm (f/8), video at 20× during annularity with WWV, D40 at 600mm (f/8), and an experimental scenery shot with occulting disc (not filtered) to try imaging Venus during annularity.

The mosaic above was created by Kalman Csia. Bill Nigg is shown at left sharing the annular eclipse with the citizens of Herlong through his mighty Astro-Physics refractor. Becky Csia is pictured on the right. The series of annular eclipse images was also taken by Kalman.

Hopefully, I have left Herlong with some training and experience so they can get a good look at the Venus transit and plan on seeing the "big one" – the total solar eclipse in August 2017. I usually contact the local astronomy club for some inside observing site guidance but the Reno club planned a big eclipse festival at the planetarium and sold over 5000 eclipse shades. This was adequate for them as the annularity band was wide but I desired the centerline for maximum photo time.

Many thanks to Patty for her enthusiastic and educational assistance in making this effort a success.

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Kalman & Becky Csia – Annular Eclipse

We were fortunate enough to piggy-back on the excellent research and preparations that fellow KAS member Bill Nigg had provided for the May 20th annular solar eclipse. Bill wanted to be on the centerline, away from coastal fog, in an area of generally clear weather with a flat landscape of trees low in the west. His research pointed to the town of Herlong in the California desert. With a federal prison, an ammunition disposal site and an Indian reservation in the area, obtaining permission for a viewing location was a challenge for which Bill was ready.

Bill's program on the eclipse to a high-school audience on

Jean DeMott (left) sells another pair of eclipse shades, while Molly Williams helps create Transit of Venus Flipbooks. The KAS cannot thank them enough for their sacrifice during such a historic event.

Friday garnered a turnout of 13% of the town's population of 300 for the viewing Sunday on the school grounds. Dense cumulus clouds rolling off the mountains presaged our drive from Reno to the desert. But just as Bill had predicted the skies cleared for the eclipse. On our weekend vacation, we were able to tour Lake Tahoe which we first saw from our hike on Spooner Pass. The Donner Pass area also offered scenic hiking as well as a history lesson.

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Richard Bell - Transit of Venus

After eight years of waiting Transit Day had finally arrived again! The first thing I did that morning was check the latest weather forecast, which had not changed in days. It simply said partly cloudy. There was cause for concern because the jet stream was passing right over Michigan and bringing in clouds from Canada. It was obvious our chances for clear skies were better on the lake shore.

I then checked my e-mail. I received at least a half-dozen last minute requests for eclipse shades. Too late, I said, but we'll have plenty at Warren Dunes. Besides, I spent the past two weeks filling eclipse shades orders from the website and making multiple trips to the post office. Enough was enough; it was time to see the Transit of Venus!

Another e-mail was from a reporter at WGVU Radio requesting a last minute interview. There's always time to get publicity for the KAS! Previous to this I did interviews with the Detroit News, MLive, NPR (Michigan Radio), WMUK, and WWMT. (ABC 57 News in South Bend also did excellent coverage during the event itself.) We hadn't received so much publicity since the 2003 Mars opposition. All this caused me to arrive a bit later at Warren Dunes State Park than I had planned. Clouds dominated the eastern sky, but the western sky above Lake Michigan looked beautiful. That's the way it stayed for the entire event. We enjoyed mostly sunny skies for *Our Last Transit of Venus*.

I briefly chatted with Roger & Molly Williams, who beat me there, and then setup my equipment. I started with my Celestron 9.25" EdgeHD Schmidt-Cassegrain on a CGEM equatorial mount. Through this I took video of about the first 30 minutes of the transit. My first goal was to capture Venus' aureole, a bright ring around the part of Venus still off the edge of the Sun. It's caused by sunlight refracting through Venus' dense atmosphere. Unfortunately, it was too windy to use the necessary magnification. The wind also prevented me from setting up my 32" HDTV, so folks could see what was on my computer screen. The wind did die down once the transit started, but by then it was too late. I did capture the black drop effect, but it wasn't terribly obvious.

I later replaced the 9.25" SCT with my TMB-92SS triplet apochromatic refractor. I was hoping to use the refractor to make a video of Venus setting with the Sun. I can't believe I'm saying this, but it was TOO CLEAR! The Sun never dimmed enough to safely make a video through the telescope. Look for my transit videos on my YouTube Channel.

My other telescope was a Lunt Solar Systems 60mm hydrogen alpha telescope. I figured I'd be busy running back and forth between telescopes, but Dan Morgan offered to operate my H-alpha scope. Thank you, Dan! I also got to use my Sun Funnel, which I wrote about in the May issue of *Prime Focus* (page 6). Don Stilwell made one as well and used it with his 6" refractor. Thanks to Jack Price for letting me use the 80mm short tube refractor I gave him years ago! Of course, there were A LOT of other telescopes setup all around the pavilion. I decided to go through all the photos taken by members at Warren Dunes and counted 30 individual telescopes! This does not include some hand-held binoculars with homemade filters I saw. That's impressive!

Total attendance for our event is a little harder to pin down. The gate staff at the park didn't keep track. One metric we

Both Richard Bell and Don Stilwell made Sun Funnels for the Transit of Venus. They worked really well! Here's Richard's Sun Funnel in action. It clearly shows Venus on the Sun's face.


Credit: Mark Miller

can use is the sale of eclipse shades. I brought a little over 500 pair with me and we ended up with 8 (yes, eight) at the end of the day. Both parking lots nearest to our pavilion looked full in photos taken by members. My guess is total attendance was over 700 people. Not bad at all.

All KAS members that brought and shared their telescope on June 5th deserve a great deal of thanks. However, two members above all deserve our eternal gratitude. They are Jean DeMott and Molly Williams. They sacrificed much of their viewing time for selling the eclipse shades and making Transit of Venus Flipbooks. Jean was kind of prepared for this, but Molly was not. She got drafted at the event, because no other members stepped forward to volunteer. We did make close to $1,700 in sales on that day alone. Every penny we made was pure profit. Eclipse shades sales at general meetings and Astronomy Day paid for the initial cost. Naturally, all proceeds go toward the Robotic Telescope Project. This is just one more reason for the project to succeed.

Applause broke out when the Sun slipped below Lake Michigan at 9:17 pm EDT; bringing *Our Last Transit of Venus* to a close. It was a touching moment to end a fantastic and historic day. Only seven Transits of Venus have been witnessed by humanity. It was an honor and a privilege to have witnessed two of them. One thought kept going through my head every time I saw Venus on the Sun's face: I'm never going to see this again.

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Mike Cook – Transit of Venus

What I appreciate most about the Transit of Venus is that we are alive at a time that allowed us to see and make history. The anticipation and preparation leading up to the transit was an absolute thrill! I couldn't help but sense the weight of the event, the sense of history, and the uncertainty of exactly what the transit will be like, as this was my first and only viewing. Many hours were spent preparing, making a filter, testing the filter, and photographic equipment while constantly wondering if there was something I missed. Finally everything came together. I felt confident on my end of things, not so sure about the weather.

The actual viewing day was a wonderful experience, even better experiencing this great event with friends. Warren Dunes State Park was the perfect site; the weather was beautiful yet windy. The transit was even better than I had imagined, the excitement level was very high, even among the many visitors deciding to join us. It sure was fun to show visitors views that they might not have had otherwise! We had a lot of fun offsite afterwards, watching the rest of the transit on NASA TV, only to be denied the very end (specifically the black-drop effect) due to technical difficulties. Yes, this resulted in yelling at the TV!

The gravity of the moment really set in afterward, not only in what we just witnessed, but in two realizations that really stood out in my mind. First, viewing Venus against the Sun really gave me a sense of perspective on the size of the Earth, a sense of the scale of our solar system. Second, I couldn't help but think of our mortality. Knowing the transit won't be viewable for another 105.5 years really put that in perspective. It helps me appreciate the magnitude of what we just experienced! The whole event will certainly be a memory that I will look back on fondly, and the record of this event will last long past our lifetime. Thanks to the KAS for making our viewing possible and sponsoring such a great event!

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Bob Havira – Transit of Venus

Barbara and I hosted an impromptu transit party at a funeral home in Louisville, Kentucky (long story). Seven people came out with us to the parking lot. The transit was visible

The image above is a heavily cropped still frame from a video taken by Richard Bell. It has been artificially colored for clarity. It was recorded just after second contact and barely shows the dreaded black drop effect. Equipment used includes a Celestron 9.25" EdgeHD Aplanatic Schmidt-Cassegrain (with Baader Solar Filter) and Canon EOS 550D.

through clouds, trees, telephone poles, and buildings. We had people use our eclipse glasses and image stabilizing binoculars. Everyone was able to see Venus, was delighted and asked great questions. Some were naive and others were very knowledgeable. Great fun.

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David Williams - Transit of Venus

I observed the transit from my backyard, south of Centreville, Michigan on Klinger Lake Road starting around 6:15 pm. I recorded video of the transit on my Canon Rebel T2i. First contact had already happened, but by only 30 minutes at most. I stopped recording after it became too cloudy around 8:00 pm. Most of my movies were short segments. My lens was a Kenko 420 - 800mm zoom. I used Baader solar filter in front of the lens.

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Joe Borrello - Transit of Venus

My wife, kids, and I decided to take a family vacation to Hawaii for this transit. We went to Egypt for the 2004 event (similar latitude but delta longitude = 169°). We were in the largest maze in the world (at Dole Plantation) at first contact. We were surrounded by hedges, but had no problem seeing the Sun, because it was at altitude 85°. Of course because it was so close to the zenith I didn't know where on the limb to look for Venus, so it took a little while to spot it.

Sam, Tom, and Joe Borrello watching the last of the Transit of Venus. Note Joe's vintage 1991 Hawaii Eclipse T-shirt. "Mooned in Hawaii" indeed.

We watched it ingress as we ate lunch, then went to Laniakea Beach to visit the sea turtles and watch Venus progress across the Sun. Then the kids went snorkeling at Waimea Falls. It was completely cloud covered there, so as soon as we left we went in search of clear skies. With the help of a friendly local, we found Kuaokala Forest Reserve on the extreme western side of Oahu. We sat on a practically deserted beach as the transit came to an end. My daughter, Kelly (whose birthday was that day), took the photo of the boys and me watching egress. We saw the last of the transit at 6:45pm local time, and stayed another half hour to watch sunset.

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Bill Nigg – Transit of Venus

My location for the Transit of Venus was planned for the southwest for best weather forecast and I was invited to setup at Mike Patton's observatory in Portal, Arizona. We agreed that this would be the first logged KAS observation at our future Astronomy Sky Village site. [Editor's Note: Sorry Bill, Jean DeMott and I beat you to it.] My wife and I stayed in a nearby RV park and monitored the evolving weather while exploring the area for several days. It was near 105° and some smoke from the Gila wildfire caused red sunsets but the high and low pressures danced around and cleared us up for 3 cloudless days in a row. The nights were clear to but dominated by the nearly Full Moon.

This is the desert. In the middle of many states with dry "rivers", bare sand or gravel, some scattered weeds and bushes, and various dead debris. The wind was from the west on Transit Day at 20+ mph and some dust was flying around. Humidity was about 8% and it only got down to 74° at night. Drinking an extra gallon of water each day was needed for your health. There are a few rare green spots along valley bottoms and some irrigated agriculture areas for better ranch house locations. Some of the desert is fenced for spacious cattle wandering.

I took a couple photos of the lunar eclipse at 5:05 am MDT on June 4th with a 600 f/8 lens. That evening I set up my refractor mount and polar aligned at Mike's observatory. I also visited his neighbor, Rick Beno, for a quick peek at his 24" Plane Wave telescope on a Mathis mount (drooly). Rick had invited the community of Portal to visit during the transit for viewing through his H-alpha scope out in the front "yard". Arizona stays on MST instead of daylight saving switching. Astronomers know what time it is but it is fun for me to hear the locals explain it.

The main project for my refractor is video of Contact 1 and 2. This was practiced at home on the Moon with success but

I discovered several more degrees of difficulty for the transit. Briefly: windy, reflections on view screen, zoom changes both focus and exposure, touching the view screen adds vibrations, with a needed diagonal addition I lost the intended Contact 1 location, and hot & windy. A dome solar observatory is all I need to correct these flaws - perhaps for the next transit.

I did record Contact 2 with this setup and will publish details after analysis. I installed the Nikon D40 DSLR after Contact 2 and shot several different exposures at 1006mm and then added a 2.5× for close ups. We viewed through a filtered C90 Maksutov-Cassegrain on a Vixen Porta Mount that my wife operated. This, and the 600mm f/8, would have been the Plan B scope if we had to drive to a clear sky spot at the last minute.

The Sun and Venus were a good 50° up into the sky so I hoped for decent seeing but the heated landscape caused some minor image wiggles. Hopefully short exposures helped. After 2 hours of viewing and keeping real warm, we dismantled everything and went back to the RV Park and showed several neighbors the transit in the C90. It's more fun with others - Rick Beno had a dozen cars at his place. I then shot the transiting sunset with the 600mm f/8 and video at 20× with solar filters of course. It is more than nice to have millions of people watching the same astronomical event at the same time. We should do this more often.

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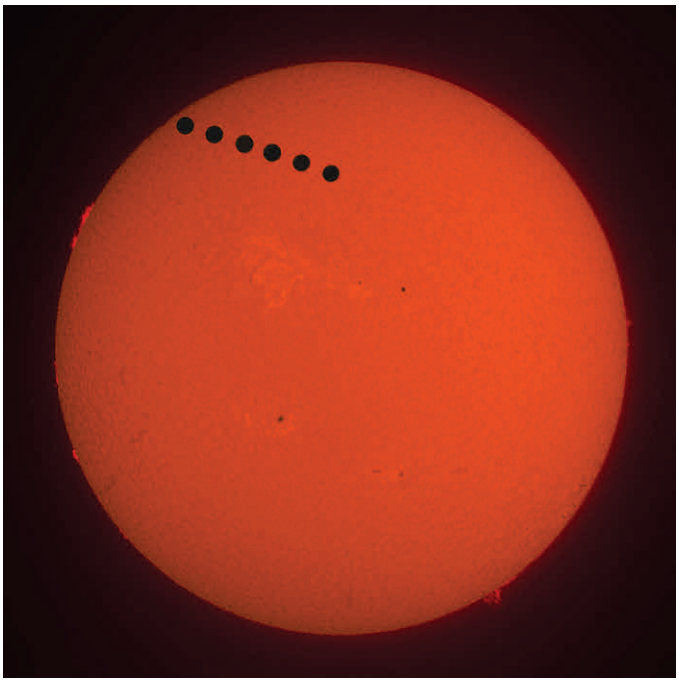
Kevin Jung - Transit of Venus

For the second Venus transit of this apparition, I decided to go to the shores of Lake Michigan for this event. This was something I had been thinking about since the last transit in 2004. At that time I got images of the Sun rising with Venus already on the disc over a cemetery in southwestern Kent County. I knew that the 2012 event would be at sunset, and the opportunities to photograph the transit over the Grand Haven Pier made that the place to be... for me at least.

This also turned out to be a fortunate decision, as the weather was not looking good for the inland areas. Numerous clouds were hanging in the sky, and the chances that they would clear out by the time the transit started were not good. However, the lake shore was nearly clear.

We (myself and a friend from the Grand Rapids club) set up in the pavilion at Grand Haven State Park, so we could have electricity for his telescope and some space to set our equipment. It also came in handy as the breeze was affecting the images by slightly shaking the telescope and my camera, and we were able to move back slightly into the building and still observe the Sun. Problem solved.

Since I was going to be photographing this, I made my own solar filter with some Baader material and a sheet of 3/16 foam core. I had the filter assembled and tested just a mere 24 hours before the event. It didn't look good, but it worked.



Roger Williams created this composite by taking 1 exposure/second during the course of the transit with his Coronado MaxScope 60 and Lumenera Skynyx 2-1 camera. Starting from the first "nibble" of Venus on the edge of the Sun, he used Registax 5 to combine 60 exposures every 25 minutes, using the same parameters each time to stack and sharpen the image. One of the early exposures was chosen for the background Sun, and the others were overlaid in Photoshop by selection only of the Venus shadow and the dark sky background. This allows precise positioning of the Venus shadows without degradation of the background solar image. Finally, the composite was stacked with an image exposed to show the prominences.

The telescope (an older Celestron C-8) had a Thousand Oaks filter on the front.

We observed first contact, but I didn't get any images until a few minutes later. I wasn't as concerned with getting an image of that, as I was waiting to see if the "black drop" effect was visible. As second contact was nearing, I took some images and made sure that I got at least one shot of the "drop" as it happened. I observed that the effect was less noticeable than the 2004 event (which could be an effect of local atmospheric phenomena). After Venus' disc was completely silhouetted against the Sun's disc, I put my camera on the telescope and took a few images through it. I was going to do that for the "drop" but we had some people show up and were looking at the transit at that time.

During the transit, we were joined by beach-goers who saw us and were wondering what we were looking at. Some people did know about the transit, and were fascinated by the views through both the telescope and my camera lens. In fact, we had one family that set up shop with us and stayed for the whole event. Every once in a while they would look

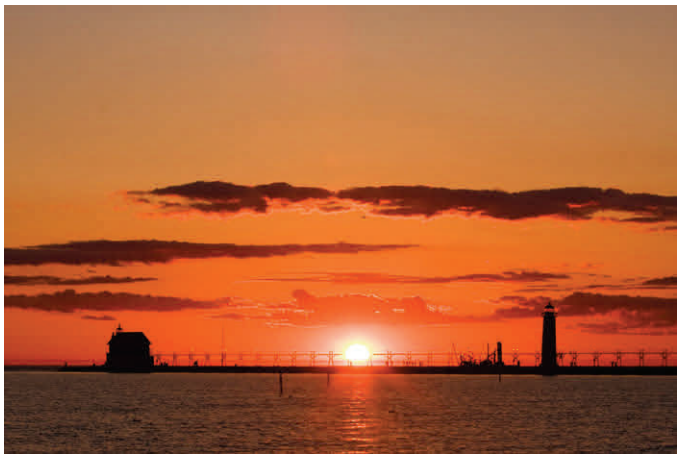
through the telescope, but they (and other people) were asking very good questions, which we were more than happy to answer.

As the transit progressed, I continued to take some photos, and also took photos of the people that were coming around to see the event. At one point a medium-sized cloud drifted over and eclipsed the transit. Otherwise we had nearly perfect clear skies.

As the Sun was setting, I moved from the pavilion down onto the beach close to the water to get my photo of the Sun over the pier. I was setting up so that the Sun would set directly between the two lighthouses. After finding my position, I just waited as the Sun sank lower and lower in the sky. It was about that time that I realized I was going to have a big problem getting my photo - the Sun was still incredibly bright. It was not dimming as it set. I could either get an image of the pier or the Sun, but not both. I had wanted clear skies for the transit, which I got, but the atmosphere at sunset was "too clear". I was counting on a nice orange-red sunset as the thicker atmosphere near the horizon would be the usual summertime murk and haze, but today those effect never materialized. The Sun was nice and bright all the way down. So while I did get a nice image of the Sun setting over the pier, it was not the image I've been envisioning for the past eight years. Oh well.

Despite that setback, seeing this once-in-a-lifetime event was great. I got to see the end of a transit back in 2004, and the beginning of one in 2012. The only problem with the next set of transits - beginning in 2117 - is that they will be in December. And we all know what the weather is like around here in December. I'm thinking road trip...

Unfortunately the end of "Transit Day" didn't go very well. I was home from the beach by 11:00pm, and WZZM TV13's news broadcast was on. They did a report on the transit, but they talked to an ASTROLOGER!!! I couldn't believe it. The biggest astronomical event in our lifetime, and they don't



Sunset behind the Grand Haven Pier. Unfortunately, Venus cannot be seen because it was "too clear." See the full panorama on Flickr. Credit: Kevin Jung

The Sun starts its descent behind the western horizon, bringing another day to a close. This sunset is special. Just above the band of clouds is the planet Venus. This scene won't be repeated for another 105.5 years. Credit: Arya Jayatilaka

even cover the event. Well, what do you expect from the media?

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Mike Sinclair – Transit of Venus

My Transit of Venus expedition to South Haven was, in a word, perfect. After a short drive from my home, I met up with fellow KAS member Greg Sirna on the south side of the South Haven channel on the bluffs overlooking the beach. It was deliciously cool with a light breeze and a few puffy clouds. Setting up our telescopes (Greg was using his 90mm refractor while I relied on my 8" Meade LX200) and laying out our solar-filtered binoculars - duct tape holding the filters in place - we waited anxiously for the beginning of the transit. Within seconds of the predicted moment of first contact, we both joyously observed the edge of Venus crossing the limb of the Sun. Greg and I had been at Lake Huron for the end of the 2004 transit and now we were here at Lake Michigan for the beginning of the 2012 transit...bookends in a once-in-a-lifetime opportunity.

Despite curious onlookers (and we conceded them some viewing time, although many of the interested passers-by clearly did not realize the rarity of the event), we both spent the lion's share at the eyepiece. My son Chris, along with several of my students from KAMSC who met us on the bluff, enjoyed the three-hour long event. Perfect conditions, few clouds, and a wonderfully light breeze to ease the heat of the Sun made our last Transit of Venus one of the most memorable astronomical activities I have ever had the pleasure of experiencing.

I can't wait until December 2117!

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Please be sure to visit the KAS Gallery to see several more images taken by members at our Partial Eclipse and Transit of Venus events. Thanks for sharing your stories!

How Many Discoveries Can You Make in a Month?

by **Dr. Tony Phillips**

This year NASA has announced the discovery of 11 planetary systems hosting 26 planets; a gigantic cluster of galaxies known as "El Gordo;" a star exploding 9 billion light-years away; alien matter stealing into the solar system; massive bullets of plasma racing out of the galactic center; and hundreds of unknown objects emitting high-energy photons at the edge of the electromagnetic spectrum.

That was just January.

Within NASA's Science Mission Directorate, the Astrophysics Division produces such a list nearly every month. Indeed, at this very moment, data is pouring in from dozens of spacecraft and orbiting observatories.

"The Hubble, Spitzer, Chandra, and Fermi space telescopes continue to make groundbreaking discoveries on an almost daily basis," says NASA Administrator Charlie Bolden.

NASA astrophysicists and their colleagues conduct an ambitious research program stretching from the edge of the solar system to the edge of the observable Universe. Their work is guided in large part by the National Research Council's Decadal Survey of Astronomy and Astrophysics, which identified the following priorities:

- Finding new planets — and possibly new life — around other stars.
- Discovering the nature of dark energy and dark matter.

Artist's concepts such as this one are based on infrared spectrometer data from NASA's Spitzer Space Telescope. This rendering depicts a quadruple-star system called HD 98800. The system is approximately 10 million years old and is located 150 light-years away in the constellation Crater.

- Understanding how stars and galaxies have evolved since the Big Bang.
- Studying exotic physics in extreme places like black holes.

Observing time on Hubble and the other "Great Observatories" is allocated accordingly.

Smaller missions are important, too: The Kepler spacecraft, which is only "medium-sized" by NASA standards, has single-handedly identified more than 2300 planet candidates. Recent finds include planets with double suns, massive "super-Earths" and "hot Jupiters," and a miniature solar system. It seems to be only a matter of time before Kepler locates an Earth-sized world in the Goldilocks zone of its parent star, just right for life.

A future astrophysics mission, the James Webb Space Telescope, will be able to study the atmospheres of many of the worlds Kepler is discovering now. The telescope's spectrometers can reveal the chemistry of distant exoplanets, offering clues to their climate, cloud cover, and possibilities for life.

That's not the telescope's prime mission, though. With a primary mirror almost 3 times as wide as Hubble's, and a special sensitivity to penetrating infrared radiation, Webb is designed to look into the most distant recesses of the universe to see how the first stars and galaxies formed after the Big Bang. It is, in short, a Genesis Machine.

Says Bolden, "We're on track in the construction of the James Webb Space Telescope, the most sophisticated science telescope ever constructed to help us reveal the mysteries of the cosmos in ways never before possible." Liftoff is currently scheduled for 2018.

How long will the list of discoveries be in January of that year? Stay tuned for Astrophysics.

For more on NASA's astrophysics missions, check out:

http://science.nasa.gov/astrophysics/

Kids can get some of their mind-boggling astrophysics questions answered by resident Space Place astrophysicist "Dr. Marc" at:

http://spaceplace.nasa.gov/dr-marc-space

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

Membership of the Kalamazoo Astronomical Society...

1.	Nicholas Andreadis	Regular	2012
2.	Paul Asmus	Regular	2012
3.	Harold Ballen	Senior	2012
4.	Richard Bell	Regular	2013
5.	Karen Berzins	Family	2012
6.	Jack Bley	Regular	2012
7.	Donald Bohan	Senior Family	2013
8.	Susan Bond	Senior	2012
9.	Jacqueline Bonn	Regular	2013
10.	Joseph & Patti Borrello	Family	2013
11.	Phyllis Buskirk	Lifetime	n/a
12.	Michael Bussey	Family	2012
13.	Beverly Byle	Senior	2012
14.	Mike & Mary Caldwell	Family	2012
15.	David Carpenter	Family	2012
16.	Joe Comiskey	Family	2012
17.	Mike Cook	Family	2012
18.	Harry Cotterill	Regular	2012
19.	Robert & Grace Cox	Family	2013
20.	Kalman & Becky Csia	Senior Family	2012
21.	Jean DeMott	Family	2012
22.	Kimberly A. Desch	Student	2012
23.	David Doan	Regular	2013
24.	Tom Dopp	Regular	2012
25.	Michael & Rachel Dupuis	Family	2012
26.	Fred E. Dutton	Senior	2013
27.	Jesse Dwyer	Student	2012
28.	Daniel Flanagan	Student	2012
29.	Jennifer Francis	Family	2012
30.	Diane & Niels Garlick	Family	2012
31.	Dave Garten	Regular	2012
32.	Tom George	Regular	2013
33.	Dick & Jackie Gillespie	Senior Family	2012
34.	Royce Goodchild	Regular	2012
35.	Richard Greter	Regular	2012
36.	Tony Gurczynski	Senior	2013
37.	Alexander Hanchar	Regular	2012
38.	Ron Hartgerink	Senior Family	2012
39.	Bill Haug	Regular	2012
40.	Robert & Barbara Havira	Senior Family	2012
41.	Michael James Higgins	Regular	2012
42.	Kim Hill	Regular	2012
43.	Keith Hoekwater	Senior	2012
44.	Jim Hoffman	Family	2012
45.	Angeline D. Jacobsen	Regular	2012
46.	Arya Jayatilaka	Family	2013
47.	Kevin Jung	Regular	2012
48.	Dan Keto	Regular	2012
49.	Ahsanuddin (Ali) Khan	Regular	2012
50.	Kirk & Angela Korista	Family	2012
51.	Jim Kurtz	Regular	2012
52.	Tim Kurtz	Regular	2012
53.	Cal & Jean Lamoreaux	Senior Family	2012
54.	Justin Losey	Student	2012
55.	Marilyn & Dan Lawrence	Family	2013
56.	Gary Leadley	Regular	2012
57.	Fernando David Lopez	Regular	2012
58.	Gary & Phyllis Lubbert	Family	2012
59.	Dave & Judy Lucio	Senior Family	2013
60.	Chuck Lund	Senior	2012
61.	Scott Macfarlane	Family	2013
62.	Richard Mather	Senior	2012
63.	Dayton Maynard	Senior	2013
64.	Michael J. Melwiki	Regular	2012
65.	William Millar	Regular	2012
66.	John Miller	Regular	2013
67.	Mark & Ninah Miller	Family	2014
68.	Michael Chad Miller	Senior	2012
69.	David & Carol Mitchell	Senior Family	2012
70.	Dan Morgan	Student	2012
71.	Katie Morgan	Regular	2012
72.	Kim & Pat Morgan	Family	2013
73.	David Murphy	Regular	2012
74.	Frank Netzel	Senior	2012
75.	Adam Newton	Student	2012
76.	Angela Newton	Regular	2012
77.	Bill Nigg	Lifetime	n/a
78.	Dheeraj Nosina	Student	2014
79.	John & Teri Olbrot	Family	2012
80.	Richard Olsen	Regular	2012
81.	Jim Oorbeck	Family	2012
82.	Alan D. Otterson	Supporting	2012
83.	Mike Patton	Regular	2013
84.	John Ponzini	Family	2012
85.	Jack & Ruth Price	Family	2012
86.	Sam Qualls	Family	2012
87.	Adrian Quint	Regular	2013
88.	Jonathan Reck	Regular	2012
89.	Sheila Reuther	Regular	2012
90.	Jack Roach	Supporting	2013
91.	Kerry Robbert	Regular	2012
92.	Andrew C. Robins	Regular	2012
93.	Dave & Cheri Ruble	Family	2012
94.	Brent Sanford	Family	2012
95.	Eric Schreur	Regular	2012
96.	Fred Schubkegel	Regular	2012
97.	Frank Severance	Regular	2012
98.	Norma J. Simmons	Regular	2012
99.	Michael & Karen Sinclair	Family	2012
100.	Greg Sirna	Regular	2012
101.	Todd D. Smith	Family	2012
102.	Don Stilwell	Family	2013
103.	Stephanie Stratton	Regular	2013
104.	Dennis Stuart	Regular	2012
105.	Eric R. Sullivan	Regular	2012
106.	Oxnar Theealien	Regular	2013
107.	Gary Theisen	Family	2012
108.	Amy Mead & Matthew Thompson	Family	2013
109.	Henry L. Upjohn II	Family	2012
110.	Michael Vandeveer	Regular	2012
111.	Bill Van Dien	Senior	2012
112.	Robert Wade	Supporting	2013
113.	Philip B. Wareham	Regular	2012
114.	John & Torrey Wenger	Family	2012
115.	Michelle Westerman	Regular	2012
116.	Bob White	Regular	2012
117.	Sharmini Wickremasinghe	Family	2012
118.	David Williams	Regular	2012
119.	Roger & Molly Williams	Family	2012
120.	Klay & Karen Woodworth	Family	2012
121.	David Woolf	Family	2012
122.	Bill Wrobel	Family	2012
123.	Katie Youngs	Family	2012
124.	Sharon Zordan	Regular	2013

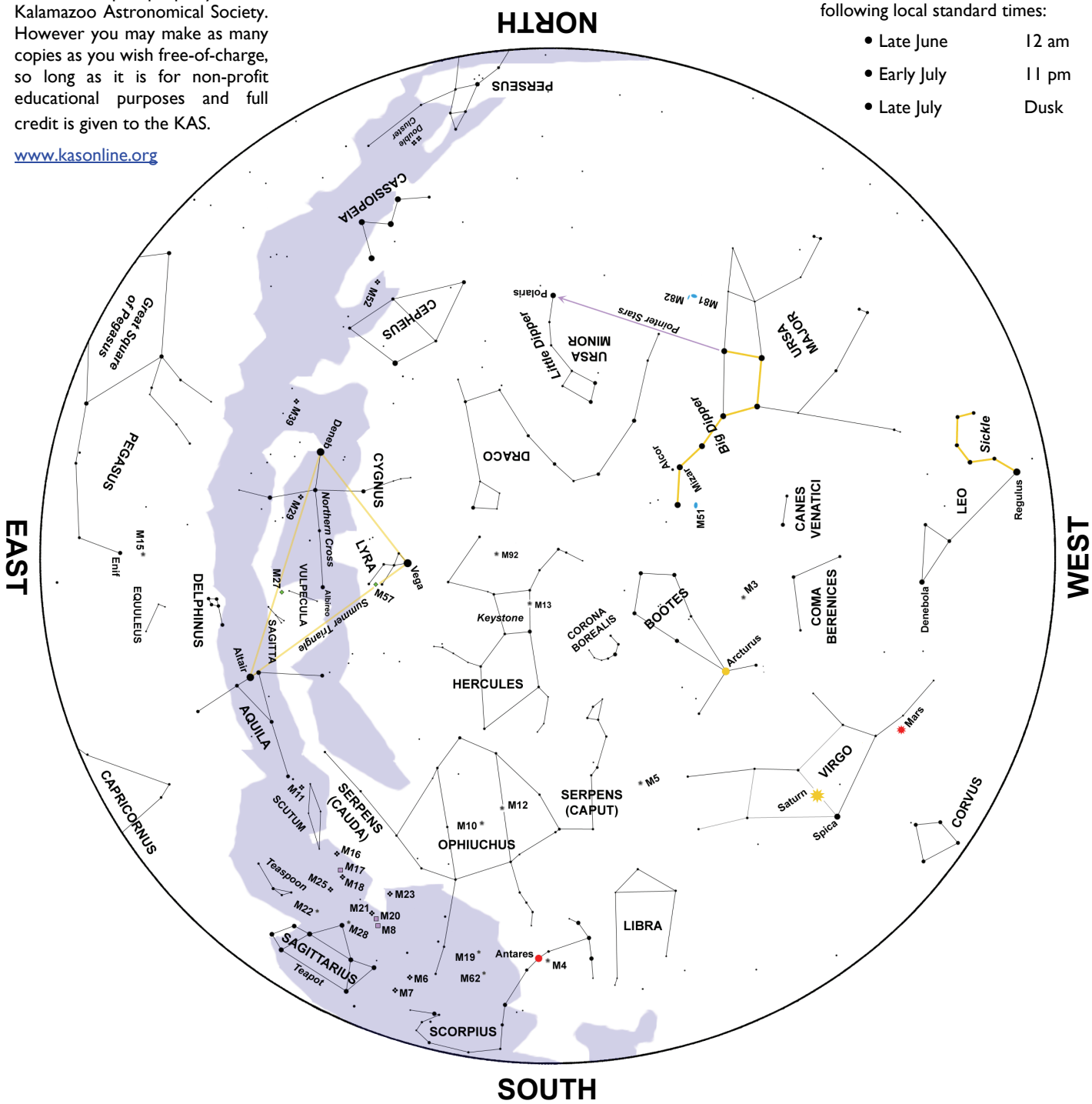
July Night Sky.....

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.

www.kasonline.org

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

- Late June 12 am
- Early July 11 pm
- Late July Dusk



Early risers get treated to one celestial spectacle after another during the first half of July. The Pleiades, Jupiter, Venus, and Aldebaran form a nearly straight line from July 1st - 7th. Look low in the east an hour after sunset. Aldebaran will be within 1° of brilliant Venus between July 8th & 10th.

The Waning Crescent Moon will be to the right of the Pleiades and upper right of Jupiter before sunrise on July 14th.

A slightly thinner crescent Moon will then form a tight quadrangle with Venus, Jupiter, and Aldebaran on the dawn of July 15th.

An even thinner crescent Moon will be 2° to the upper right of the 3rd-magnitude star Zeta Tauri, Look low in the east starting about an hour before sunrise.

Evening observers will see the Waxing Crescent Moon form a quadrangle with Saturn, Spica, and Mars on July 24th.

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Owl Observatory Training Session

Interested in learning how to gain access to Owl Observatory and using the 12" Schmidt-Cassegrain telescope? Registration is required; no walk-ins please. Sign-up through the KAS Contact Page by July 28th. Please read the User's Manual on the Owl Observatory website before attending the session.

Monday, July 30th @ 9:00 pm

Kalamazoo Valley Museum

Planetarium Show Schedule

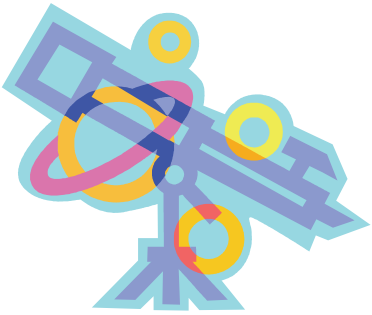
Dawn of the Space Age
Saturday @ 1pm; Sunday @ 2pm

Treasures of the Great Lakes
Tues. & Thurs. @ 3pm; Sat. @ 2pm

Ice Worlds
Sun., Mon., Wed., Fri. & Sat. @ 3pm

Planetarium admission is $3.00 per person. The Kalamazoo Valley Museum is located at 230 North Rose Street in downtown Kalamazoo. For more information please call (269) 373-7990 or visit us on the web at www.kalamazoomuseum.org

Public Observing Sessions



Saturday, July 14th
Features: Pleasant Planetary Nebulae

Saturday, July 28th
Features: Moon& Double Stars

Gates Open: 9:00pm • Observing Begins: 9:30 pm

Kalamazoo Nature Center • 7000 N. Westnedge Ave.

General Meeting Preview

Gadget Night

Today's astronomical marketplace is flooded with telescopes and accessories of all shapes, sizes, and price ranges. However, even with the wealth of goods now available, there are some gadgets that can only be hand crafted. It just goes to show that necessity really is the mother of invention and thankfully amateur astronomers are an ingenious lot.

For our next meeting we invite KAS members to trot out the results of their latest brainstorming. Please feel free to bring along any interesting astronomically themed doodads, doohickeys, and devices you've purchased as well. You won't want to miss this fun and entertaining evening.

BONUS: Richard Bell will give a slide show report on the 2012 Northeast Astronomy Forum & Telescope Show (NEAF) in Suffern, New York. Gadgets galore! He will also share some other astronomical points of interest visited after NEAF.

Friday, July 13 @ 7:00 pm

Kalamazoo Nature Center • 7000 North Westnedge Ave.

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c/o KAMSC
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Kalamazoo, MI 49008

STAMP