

Highlights of the July Sky...

--- 4th ---

Last Quarter Moon

AM: Jupiter is about 9° to the lower right of the Moon.

--- 8th ---

AM: The Pleiades is about 2° above a thin Waning Crescent Moon.

--- 9th ---

Dusk: Regulus is about 1° to lower left of Venus.

--- 10th ---

Dusk: Regulus is about 1° below Venus.

--- 11th ---

New Moon

--- 14th ---

Dusk: A thin crescent Moon is about 7° to the lower left of Venus.

--- 15th ---

Dusk: A crescent Moon is about 6.5° to the lower left of Mars.

--- 18th ---

First Quarter Moon

--- 21st ---

PM: Antares is 5° to the right of the Waxing Gibbous Moon.

--- 25th ---

Full Moon

--- 27th ---

Dusk: Regulus is less than ½° to upper right of Mercury.

--- 29th — 30th ---

Dusk: Mars is less than 2° below Saturn.

Dusk: Mars is 9° to upper left of Venus.

--- 31st ---

PM: Jupiter is 6° to lower right of the Waning Gibbous Moon.

Prime Focus

A Publication of the Kalamazoo Astronomical Society

★ ★ ★ July 2010 ★ ★ ★

This Months KAS Events

General Meeting: Friday, July 9 @ 7:00 pm

Kalamazoo Nature Center - See Page 8 for Details

Observing Session: Saturday, July 10 @ 9:00 pm

Super Summer Nebulae - Kalamazoo Nature Center

Field Trip: Saturday, July 17 @ 8:00 am

Science Central in Fort Wayne, IN - See Page 3 for Details

Observing Session: Saturday, July 31 @ 9:00 pm

Pleasant Planetary Nebulae - Kalamazoo Nature Center

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June Meeting Minutes

The general meeting of the Kalamazoo Astronomical Society was brought to order by President Jack Price on Friday, June 4, 2010 at 7:27 pm EDT. Approximately 37 members and guests were in attendance at the Kalamazoo Area Math & Science Center (KAMSC). Apologizes for the difficulty with locating a parking space. We had no idea a graduation was being held in Chenery Auditorium at the same time as the general meeting.

Our guest speaker was Dr. Richard Frazin, an assistant research scientist in the department of Atmospheric, Oceanic and Space Sciences at the University of Michigan. The title of his presentation was *3D Imaging of the Sun's Corona*. Dr. Frazin began by showing a remarkable total solar eclipse image taken by noted eclipse chaser Dr. Jay M. Pasachoff from Williams College. The heavily processed image shows remarkable detail in the corona, the Sun's outer atmosphere.

Dr. Frazin then gave a quick overview of the Sun's outer layers. The visible surface of the Sun is called the photosphere. Above that is the chromosphere, which is hotter but less dense than the photosphere. Above the chromosphere is the corona. Dr. Frazin discussed the exponential increase in temperature. The photosphere's temperature is only 5800 K. The chromosphere reaches temperatures of several hundred thousand Kelvin, while the corona reach temperatures measured in millions of Kelvin.

Dr. Frazin said that studying the corona is important because it presents us with a number of challenging problems in plasma astrophysics as well as a number of practical issues in space weather modeling prediction. Space weather effects on the Earth come from sources such as the solar wind, a constant stream of charged particles interacting with our atmosphere and magnetic field. Even more serious are coronal mass ejections, bursts of plasma ejected from the chromosphere. Dr. Frazin then went into detail on how he constructs three dimensional images from various solar satellite images and how this data is used in his research.

Jack gave his President's Report after the snack break. Now that warmer weather is here, he encouraged all members to attend a star party. Upcoming star parties mentioned include [Starfest](#) (Aug. 12th - 15th) and the [Great Lakes Star Gaze](#) (Oct. 7th - 10th). The GLSG is held near Gladwin, which is only three hours way. Jean DeMott mentioned that some members are planning to attend the [Okie-Tex Star Party](#) in early October (see page 3 for more information).

Don Stilwell reported using the KAS owned Coronado PST at various public events. Roger Williams had luck observing sunspots and large prominences. Jupiter was struck AGAIN by a small comet or asteroid on June 3rd. No reports of impact scares this time around though. Other topics mentioned were Copernicus' reburial and the launch of SpaceX's Falcon 9 rocket. The field trip to Science Central on July 17th was also mentioned (see page 3) The meeting concluded at 8:55 pm.



Board Meeting Minutes

The officers and at-large members of the KAS assembled for a board meeting on Sunday, June 13, 2010. President Jack Price brought the meeting to order at about 5:10 pm. Other board members present include Richard Bell, Jean DeMott, Jason Hanflik, Rich Mather, and Don Stilwell.

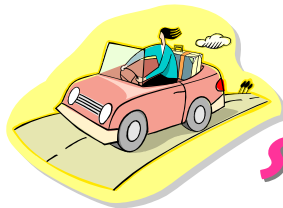
KAS Treasurer Rich Mather reported that he came up with an extra \$50 from sales at Astronomy Day. This is likely something just not recorded. One individual rejected a charge from Astronomy Day, but it was merely a case of not recognizing the PayPal charge on the statement. The matter is cleared up and we're waiting for PayPal to fix our negative balance. We also received \$500 from the NASA Space Grant Consortium. This money was promised to us last year for purchase of the Galileoscopes.

Under old business, Richard reported that the Robotic Telescope Task Force is still searching for an Arizona attorney to look over our agreement with Mike Patton. Richard contacted the International Dark-Sky Association (based in Arizona), but they referred him to the Tucson Amateur Astronomical Association (TAAA). The TAAA never replied, but Richard reported he'll try again. He'll also expend his inquiry to other groups in Arizona such as the Phoenix club.

Upcoming events were discussed next. The July General Meeting will be held at the Kalamazoo Nature Center. We normally hold the July meeting at WMU's Rood Hall, but no one is available to get us into the building on July 9th. The meeting will be held in the Cooper's Glen Auditorium, located in the Interpretation Building at KNC. The Kindleberger Festival will be held in Parchment on July 10th. The KAS will provided activities like it has the past several years. Volunteers include Richard Bell, Jean DeMott (in the afternoon), Jason Hanflik, Jack Price, and Don Stilwell. We'll set up a solar telescope or two and offer the Big Dipper Clocks as a hands-on activity.

The Perseid Potluck Picnic will be held on August 14th at the Nature Center. Don Stilwell volunteered to bring a grill. Jim Kurtz has been our chef the past several years, so the Board decided a break was due. Plus, Jim is very busy with work and fixing up a house to rent. Next item was the itinerary for the field trip to Science Central in Fort Wayne, Indiana (please see page 3 for the complete schedule). Other upcoming activities the KAS has been requested to participate in include the Boy Scout 100th Anniversary event at the Air Zoo (August 5th - 7th) and a Girl Scout Camporee in Lawton (September 25th - 26th). Lastly, we're still hoping to see *Hubble 3D* on Saturday, August 28th. No word on show times yet.

The last item discussed was plans for the 75th anniversary of the KAS. The Board is seeking fund-raising ideas to help pay for our plans (see page 3). The first general meeting topic of the year will be a history of the KAS. The meeting concluded at 6:50 pm. The next board meeting will be held at 5:00 pm July 11th at Sunnyside.



Field Trip to Science Central

If you thought our Hubble Space Telescope 20th anniversary celebration ended with Astronomy Day 2010 then you were wrong. The celebration continues with a field trip to Science Central in Fort Wayne, Indiana on **Saturday, July 17th**. There we'll check out the travelling exhibit *Hubble Space Telescope: New Views of the Universe* along with other attractions. Our itinerary will include:

1. **Meet in State Systems Radio parking lot** for carpooling between 7:30 - 8:00 am.

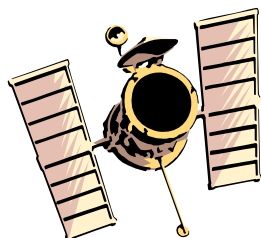
(State Systems Radio is located at 5090 Sprinkle Road, located just south of Kilgore Road on the west side of Sprinkle.)

2. Depart for Fort Wayne at 8:00 am.
3. Stop for breakfast in Coldwater at ~9:00 am.
(Your choice of McDonalds or Burger King)
4. Arrive at **Science Central** at ~11:00 am. View Hubble Space Telescope exhibit. Details:

Details: *This unique traveling exhibition contains images and video taken from the Hubble Space Telescope of planets, galaxies, black holes, and many other fascinating cosmic entities. Filled with numerous interactive displays, visitors will be able to "hit" Jupiter with a comet, attempt to put star clusters in order of age, estimate the number of galaxies in the universe, match before - and after images of colliding galaxies, use stars to calculate specific galaxy distances from Earth, and use an infrared camera to learn about the different wavelengths of light. The exhibition is an outstanding venue for presenting the spectacular images of the universe and the associated discoveries made with the Hubble Space Telescope.*

5. Lunch in Science Central's food court at ~1:00 pm. Drink and snack vending machines are available or you may pack your own lunch.
6. Depart Fort Wayne at ~4:00 pm.
7. Arrive in Kalamazoo at ~7:00 pm.

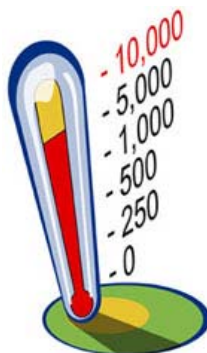
For last minute details please attend the General Meeting on July 9th. If you are unable to attend the meeting but would like to go on the field trip then please [contact the KAS](#). This trip is subject to cancellation if the weather is really bad (heavy rain, severe thunderstorms, etc.). Everyone that has signed up will be notified if a cancellation takes place.



Have you been working hard? Are you feeling burned out? What you need is a vacation under some incredibly dark skies. You need to attend the 2010 Okie-Tex Star Party, hosted by the Oklahoma City Astronomy Club. The 27th annual event will be held from October 2nd - 10th at Camp Billy Joe, located in the panhandle of Oklahoma near the very small town of Kenton.

How dark are the skies above Camp Billy Joe? They rank 1 on the Bortle Scale according to the [Clear Sky Chart](#). It doesn't get any better than that. Indeed, Tele Vue founder Al Nagler recently said in an interview that Okie-Tex has the darkest skies he's ever seen in the continental United States (see the June 2010 edition of the *Reflector*, page 17). Uncle Al has been to A LOT of star parties representing Tele Vue, so this statement carries a great deal of credibility.

At least 3 KAS members are planning to attend this year's Okie-Tex. We'd love for that small contingent to grow larger. Take a look at the [Okie-Tex website](#) and then look deep down and tell yourself to head west this October! [Let use know](#) if you plan to attend.



WANTED Fund-raising Ideas

The Kalamazoo Astronomical Society will celebrate its 75th anniversary next year. We're hoping to make it a year filled with special general meetings and events in addition to Astronomy Day 2011. Plus, if all goes well, we're hoping to launch a capital campaign to purchase a robotic telescope and supporting equipment for remote use. The telescope and related equipment will be installed on a pier that club member Mike Patton is making available for KAS use in his observatory at the Arizona Sky Village. All this is going to take money and this is where we need your input.

The KAS Board is looking for fund-raising suggestions from the entire membership. Whether or not you have had experience in this area we want to hear your ideas. Please [contact us](#) through the KAS website or any officer or at-large board member.

A Boy & His Telescope

by Richard S. Bell



On September 8, 1994 my Meade 10" LX200 arrived at Rider's Hobby Shop. It was a day I eagerly awaited. I first laid my eyes on an LX200 in the summer of 1991. The Kalamazoo Public Museum Planetarium and Kalamazoo Astronomical Society were having an observing session for astronomy students at Kalamazoo Valley Community College. I figured I would tag along since I happen to love astronomy and I worked at the planetarium. It was a pretty normal night of observing. Eric Schreur, the planetarium coordinator, showed us majestic objects like M13, M57, and Albireo. Then KAS member and Loy Norrix High School teacher, Mark Miller, came and set up his Meade 8" LX200.

At first it looked like your usual run-of-the-mill Schmidt-Cassegrain. Then he got it all plugged-in and ready to go. Needless to say I was amazed. I knew giant professional scopes were computerized, but I had no idea that a product like this was available for the amateur. I had been planning on getting a telescope, probably a Newtonian, but when I saw that 8" LX200 in action I desperately wanted one. Over the next three years I pretty much gave up my social life! I saved every dollar I could, but with what I made working part-time at the museum, it would have taken me forever to buy one. Then I made a deal with the manager of museum gift shop. She would order the scope for me and allow me to make payments. If it wasn't for that it would have taken me at least another year to get the scope. I wanted to get it before Comet Shoemaker-Levy 9 collided with Jupiter, but I didn't make it. I used the planetarium's 8" Newtonian to observe that historic event.

When my savings were large enough to pay off half of the telescope I placed the order on Monday, August 8, 1994. Exactly one month later I got home after a day of classes and got the message that my telescope was in. I literally dropped everything and fractured many traffic laws on the way to Rider's! I took a quick sneak peak at the scope in the box, but I wanted to get it home and play with my new toy.

As soon as I got home I unloaded all the boxes and put them in my living room. I carefully looked over every single piece



just to make sure nothing was damaged or missing. I read the manual enough so I could at least set it up and see how it looked. Seeing it sparkle on that perfectly clean chrome tripod was one of the most beautiful things I ever saw!

My Meade LX200 saw first light on Saturday, September 10, 1994. The first object my scope ever gazed at was the planet Venus. I tried to use the two-star alignment, but I had trouble getting it to point at anything accurately. This problem plagued me for a while. I would have figured it out sooner, but obligations with school and work, as well as the persistently cloudy weather in Michigan prevented me from getting more practice sessions. After some trial and error periods I finally discovered what I was doing wrong. The alignment stars I used at first were too close together. Apparently the telescope needs to be aligned with two stars at a reasonable distance from one another. After this the telescope worked perfectly. I was taking it all over the sky. It centered objects almost dead-on every time. It's amazing to watch as well as look through.

In the weeks and months after my trial period I've "traveled" millions of light-years with my telescope. Try doing that in a fancy sports car! Some of the most memorable objects I've observed with my LX200 are an edge-on Saturn, Comet Hyakutake, and Comet Hale-Bopp. I also have fond memories of observing the beautiful belts and zones of Jupiter as well as the Great Red Spot. I've seen spiral galaxies like M81, elliptical galaxies like M87, beautiful nebulae like Orion (M42) and Lagoon (M8), globular clusters such as M13 and Omega Centauri, plus hundreds of wonderful double stars.

Addendum

I wrote the above article years ago for my personal website, but never got around to finishing it. There's no need now as I sold my LX200 to Dave Woolf on Friday, June 4th after nearly 16 years of ownership. I wrestled with selling my telescope for quite some time. I felt it was time to try something new, but I really didn't want to sell the LX200. Meade can have a checked history when it comes to the reliability of its products, but I always felt I got lucky. Never did I have any serious problems with my LX200.

Fork mounted SCT's are great for visual use, but they can be difficult to use for astrophotography. It's easier when you can permanently mount them in an observatory, but this isn't an option for me. I now own a Celestron CGEM, which will become my workhorse. German EQ mounts have numerous advantages over fork-mounted telescopes. They're easier to balance and can hold a variety of optical tubes. My imaging setup will consist of a TMB-92SS triplet apochromatic refractor (which replaces my Pronto) and an Astro-Tech 8" f/4 Newtonian. I've also ordered a Celestron EdgeHD 9.25" aplanatic (coma-free) Schmidt-Cassegrain, but won't get it until later this year. Keep your eye out for some sweet astrophotos in the near future (I hope).



Black Holes No Joke

by Dr. Tony Phillips

Kip Thorne: Why was the black hole hungry?

Stephen Hawking: It had a light breakfast!

Black hole humor — you gotta love it. Unless you're an astronomer, that is. Black holes are among the most mysterious and influential objects in the cosmos, yet astronomers cannot see into them, frustrating their attempts to make progress in fields ranging from extreme gravity to cosmic evolution.

How *do* you observe an object that eats light for breakfast?

“Black holes are creatures of gravity,” says physicist Marco Cavaglia of the University of Mississippi. “So we have to use gravitational waves to explore them.”

Enter LIGO — the NSF-funded Laser Interferometer Gravitational-wave Observatory. According to Einstein's Theory of General Relativity, black holes and other massive objects can emit gravitational waves — ripples in the fabric of space-time that travel through the cosmos. LIGO was founded in the 1990s with stations in Washington state and Louisiana to detect these waves as they pass by Earth.

“The principle is simple,” says Cavaglia, a member of the LIGO team. “Each LIGO detector is an L-shaped ultra-high vacuum system with arms four kilometers long. We use lasers to precisely measure changes in the length of the arms, which stretch or contract when a gravitational wave passes by.”

Just one problem: Gravitational waves are so weak, they change the length of each detector by just 0.001 times the width of a proton! “It is a difficult measurement,” allows Cavaglia.



Laser Interferometer Gravitational-wave Observatory in Livingston, Louisiana. Each of the two arms is 4 kilometers long. LIGO has another such observatory in Hanford, Washington.

Seismic activity, thunderstorms, ocean waves, even a truck driving by the observatory can overwhelm the effect of a genuine gravitational wave. Figuring out how to isolate LIGO from so much terrestrial noise has been a major undertaking, but after years of work the LIGO team has done it. Since 2006, LIGO has been ready to detect gravitational waves coming from spinning black holes, supernovas, and colliding neutron stars anywhere within about 30 million light years of Earth.



So far the results are ... nil. Researchers working at dozens of collaborating institutions have yet to report a definite detection.

Does this mean Einstein was wrong? Cavaglia doesn't think so. “Einstein was probably right, as usual,” he says. “We just need more sensitivity. Right now LIGO can only detect events in our little corner of the Universe. To succeed, LIGO needs to expand its range.”

So, later this year LIGO will be shut down so researchers can begin work on Advanced LIGO — a next generation detector 10 times more sensitive than its predecessor. “We'll be monitoring a volume of space a thousand times greater than before,” says Cavaglia. “This will transform LIGO into a real observational tool.”

When Advanced LIGO is completed in 2014 or so, the inner workings of black holes could finally be revealed. The punch line may yet make astronomers smile.

Find out more about LIGO at:

<http://www.ligo.caltech.edu/>

The Space Place has a LIGO explanation for kids (of all ages) at <http://spaceplace.nasa.gov/en/kids/ligo>, where you can “hear” a star and a black hole colliding!

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

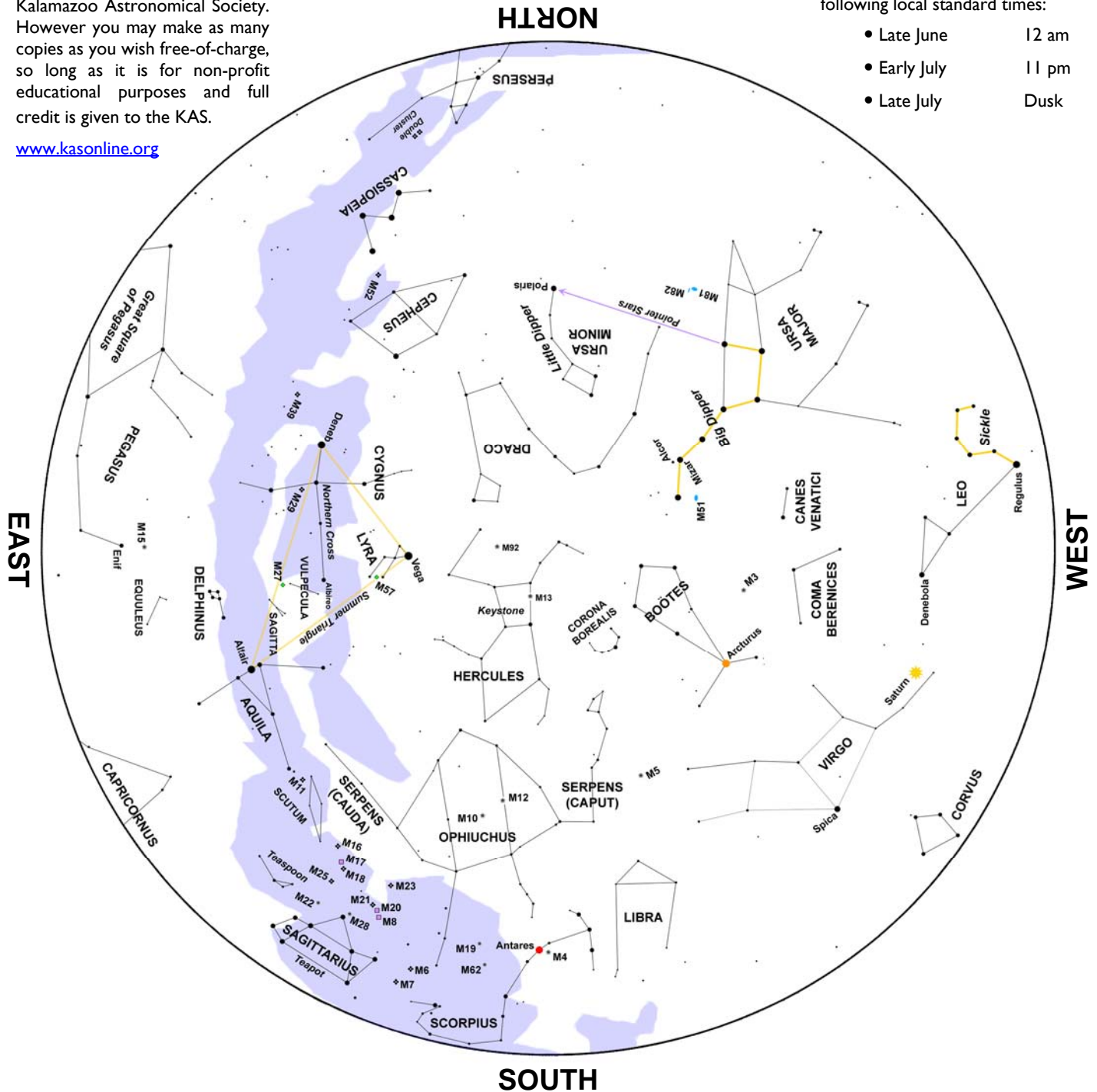
July Night Sky.....

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



A thin Waning Crescent Moon will be 2° below the Pleiades star cluster 2 hours before sunrise on July 8th. Look low in the northeast. The Hyades cluster will add to the splendid scene making for a great photogenic opportunity. Be sure to use binoculars as well.

Regulus, the heart of Leo the Lion, has a couple of encounters with some planets in July. Venus will be 1° to the lower left of Regulus on the 9th and 1° below it on the 10th. Mercury takes its turn after sunset on July 27th. They'll be separated by only $\frac{1}{2}^\circ$. Mercury will be the brighter

of the two. Point your binoculars low in the western sky just after sunset.

Jupiter gradually enters the evening sky in July. Look for it 6° to the lower right of the Waxing Gibbous Moon on the night of July 30th/31st.

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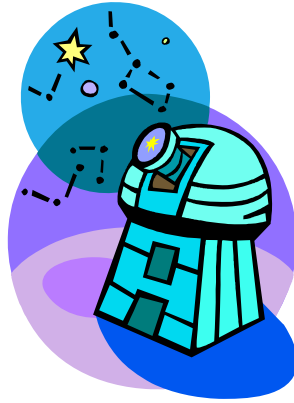
[E-MAIL a BOARD MEMBER](mailto:KAS@kalamazoomuseum.org)



July 2010

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OBSERVATORY NAMING CONTEST



Mike Patton is looking for suggestions on what to call his 20' x 20' roll-off roof observatory at Arizona Sky Village.

Therefore, we've decided to hold a "Name Mike's Observatory" Contest!

Please submit your suggestion (along with a brief explanation) using the [Contact Form](#) on KAS Online. We'll submit a list of names to Mike and he'll pick his favorite suggestion.

Kalamazoo Valley Museum Planetarium Show Schedule

The Little Star That Could

Weekdays, 11am; Saturdays; 1pm; Sundays, 2pm

Saturday Summer Nights (Live)

Saturdays at 2:00 pm

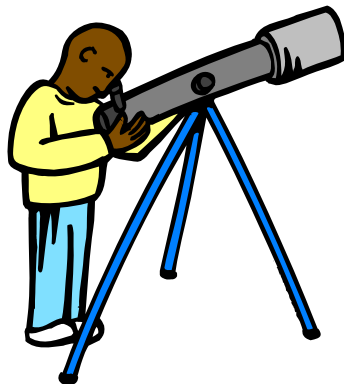
Ice Worlds

Everyday at 3:00 pm



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

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JULY STARGAZING DATES

Kalamazoo Nature Center • 7000 N. Westnedge Ave.

Saturday, July 10 @ 9:00 pm
Super Summer Nebulae

Saturday, July 31 @ 9:00 pm
Pleasant Planetary Nebulae

with the **Kalamazoo Astronomical Society**

General Meeting Preview



Gadget Night

Today the 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. Richard Bell's self-made focusing mask (seen at your left) is an excellent example. 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.

Friday, July 9 @ 7:00 pm

*Kalamazoo Nature Center
7000 North Westnedge Ave.*

Kalamazoo Astronomical Society
c/o KAMSC
600 West Vine, Suite 400
Kalamazoo, MI 49008

STAMP

