Highlights of the September Sky. . .

- - - 1st - - -
PM: Antares 5° below Jupiter until mid-month.

- - - 2nd - - -
PM: Pleiades lower left of Moon; OCCULTATION.

- - - 3rd - - -
Last Quarter Moon

- - - 4th - - -
AM: Mars lower right of Moon.

- - - 6th - - -
Dawn: Saturn & Regulus 1° apart and separating.

- - - 7th - - -
AM: Pollux upper left of Moon.

- - - 9th - - -
Dawn: Venus upper right, Saturn & Regulus below Moon.

- - - 11th - - -
New Moon

- - - 13th - - -
Dusk: Mercury right of Moon.

- - - 14th - - -
Dusk: Spica right of Moon.

- - - 18th - - -
PM: Jupiter upper right, Antares right of Moon.

- - - 19th - - -
First Quarter Moon

- - - 21st - - -
Dusk: Spica ½° left of Mercury.

- - - 22nd - - -
Dusk: Spica ½° right of Mercury.

- - - 26th - - -
Full Moon

Prime Focus

A Publication of the Kalamazoo Astronomical Society

☆ ☆ ☆ September 2007 ☆ ☆ ☆

This Months KAS Events

General Meeting: Friday, September 7 @ 7:00 pm
Kalamazoo Math & Science Center - See Page 10 for Details

Observing Session: Saturday, September 8 @ 7:30 pm
Galaxies of Early Autumn - Kalamazoo Nature Center

Board Meeting: Sunday, September 9 @ 5:00 pm
Sunnyside Church - 2800 Gull Road - All Members Welcome

Observing Session: Saturday, September 22 @ 7:30 pm
Moon, Uranus, & Neptune - Kalamazoo Nature Center

Inside the Newsletter. . .

Perseid Potluck Picnic Report

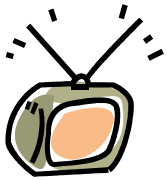
The thirteenth annual Perseid Potluck Picnic was held at the Kalamazoo Nature Center on Saturday, August 11, 2007. Approximately 47 members of the KAS were in attendance, which is more than double last years total. Weather for the picnic included temperatures in the mid-80's and partly cloudy to mostly clear skies. It was also a bit humid, but no where near as bad as the very first Perseid Potluck Picnic in 1995. That was the year of the now-historic KAS water fight!

Several members were able to observe the Sun this year. Richard Bell brought his Tele Vue Pronto equipped with a Coronado SolarMax 40 hydrogen-alpha filter. Dan Morgan brought the KAS Coronado Personal Solar Telescope (PST) on the Tele Vue Tele Pod, although Roger Williams kept it pointed at the Sun. The Sun was very quiet - again - but there was one large prominence visible above the northern section of the red disk. We never bothered to throw the white light filter onto the 12" Schmidt-Cassegrain in Owl Observatory, because a sunspot was not to be seen.

The key word of the Perseid Potluck Picnic is indeed potluck and this was once again proven by the many fantastic side dishes and deserts brought by those in attendance. I'd list them all if I could remember who brought what dish! A great deal of thanks also goes to Jim and Tim Kurtz. Jim provided his propane grill for the THIRD year-in-a-row and deserves much of the credit for preparing the hamburgers, hot dogs, and veggie burgers. Perhaps it's time for another KAS member to bring out their grill for next year's picnic. Volunteers?

The picnic concluded at 8:00 pm. Some members decided to call it a night, but several stayed and got ready for the next Public Observing Session. Many telescopes were brought out by our fellow members and the general public. A few of our guests took advantage of the Telescope Clinic and received some assistance learning to use their instruments. The session also marked the debut of Dan Morgan's hand-crafted 18" Dobsonian telescope. He showed the mirror at last month's *Gadget Night*. Dan discovered a few minor flaws in his design, which is to be expected with such an ambitious project. Let's hope we get a chance to view through it again before Dan gets busy with his studies at Michigan State University.

The transparency was above average and attendance was excellent, thanks to some publicity in the newspapers and on the radio. An estimated 70-80 people attended the session. Most came for the near-peak of the Perseid Meteor Shower. Several impressive Perseids were seen, but not in the numbers some had hoped. Everyone enjoyed the Constellation Workshop and sky tour given by Richard Bell and we even got a peak at the International Space Station (with the recently docked space shuttle *Endeavour*). A handful of members stayed until 3:00 am observing Perseids. A great night!



Prime Time Astronomy

Two programs dedicated to amateur astronomy will premiere on **September 19th** on PBS (WGVU in west Michigan).

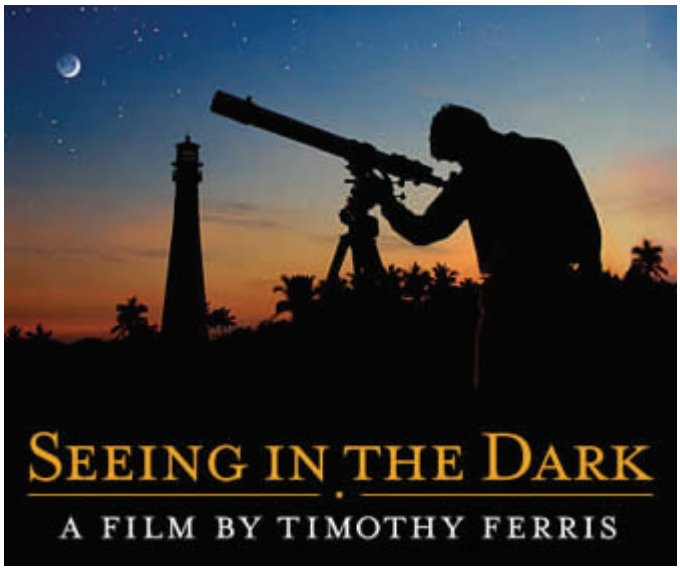
8:00 pm - *Seeing in the Dark*

Stargazing is the subject of *Seeing in the Dark*, a 60-minute, state-of-the-art, high-definition (HDTV) documentary by Timothy Ferris that premieres on PBS on September 19, 2007 at 8:00 p.m. The film, Ferris' third, is based on his book, *Seeing in the Dark* (2002), named by *The New York Times* as one of the ten best books of the year.

"*Seeing in the Dark* is meant to alter, inspire and illuminate the lives of millions," said Ferris. "It introduces viewers to the rewards of first-person, hands-on astronomy — from kids learning the constellations to amateur astronomers doing professional-grade research in discovering planets and exploding stars. I hope it will encourage many viewers to make stargazing part of their lives, and a few to get into serious amateur astronomy."

9:00 pm - *Sidewalk Astronomer*

On any given night around the world, thousands of people peer into deep space because of John Dobson. A 92-year old with a white ponytail and a knack for comedy, Dobson revolutionized astronomy. A *Sidewalk Astronomer* follows Dobson as he tours the country from the sidewalks of San Francisco to colleges, universities, astronomy clubs, star parties and to Stellafane, a convention of telescope makers in Vermont. It features sequences on sidewalk astronomy, telescope making, the Moon, Sun, major planets, galaxies, Big Bang Theory, and the nature of time and space. *(Note: This program is available for check-out in the KAS Library.)*



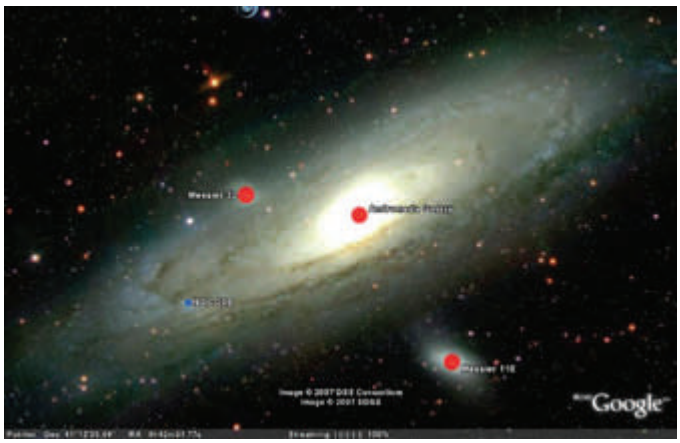
Observations

by Richard S. Bell

The months ahead hold much potential for amateur astronomy and September is no exception. For the KAS, September kicks off with our general meeting on Friday the 7th. This meeting marks the return to our regular meeting site, KAMSC. No word on the status of the elevator. I'll send out a note a few days before the meeting and let you know. Mike Simonsen, one of the most active and enthusiastic variable star observers in the world, will be our guest speaker. He last spoke to the KAS in March 2001 and his passion for variable star observing was clearly evident. Details on his latest presentation are on the back page of this newsletter. I hope you can attend the meeting on September 7th.

Summer break is over, which means the board members will start meeting again. The next board meeting is scheduled for September 9th at 5:00 pm. Among the topics of discussion will be the big field trip to Adler Planetarium in Chicago. I've never been to Adler and missed the last trip the KAS took in November 1999. If you'd like to get involved in the planning then please attend the board meeting. I'm also in the early planning stages of the next installment of the *Introduction to Amateur Astronomy* lecture series. My plan is to hold the next series at the main branch of the Kalamazoo Public Library. No dates or times have been scheduled and I'd like to get some feedback. If you'd like to participant then please drop me a line and tell me your preferences.

The Public Observing Sessions for September will be held on the 8th and the 22nd. Some of our sessions in July and August were very well attended thanks to some local publicity. The Kalamazoo Nature Center has invoked their right to collect the entrance fee as of late. Therefore, if you plan to attend any upcoming observing sessions, please make sure you're packing a KAS membership card. If you misplaced yours then please let me know and I'll make you another one.



***A close-up of M31, the Andromeda Galaxy, as seen in the brand new Sky component of* Google Earth.**

A handful of KAS members (myself among them) plan to attend the 2007 Black Forest Star Party in Pennsylvania from September 14th - 16th (most of us plan to leave a day early though). Registration for BFSP is now closed. However, if you really want to attend a star party in mid-September then there's always the Great Lakes Star Gaze near Gladwin, Michigan. Late registration is allowed, but at a slightly higher cost. Check out the official web site for more information:

http://www.boonhill.net/sunset/SASGLSG.htm

Let's hope our luck with star parties is MUCH better than last year. I'll have a full report on the 2007 BFSP in the next issue of *Prime Focus* (if all goes well). Please consider writing a report if you attend the GLSG or any other star party.

Some of us may stay an extra day at BFSP, but I want to make sure I'm back in town before 8:00 pm on September 19th. That's the premiere of the new Timothy Ferris film *Seeing in the Dark*, which is about amateur astronomy (both the hobby and the people). The film is based on Ferris' book by the same title and is a must-read. I may reread it again before the program debuts. More details are on page 2. One of my long-term goals/dreams is to create a comprehensive series on amateur astronomy. Nothing like this has ever been done before and I really feel there's a need for it. I drew up a detailed outline years ago, but this project will have to continue to wait on the back burner.

Last month, on August 22nd, Google released the latest version of their popular *Google Earth* program. This latest version includes a new Sky function, which is really cool. *Google Sky* (as I'll call it) isn't exactly a desktop planetarium program, but it allows you to meander across the celestial sphere and zoom in to deep sky objects for closer inspection. Most of the imagery comes from the Digitized Sky Survey (DSS) and the Sloan Digital Sky Survey (SDSS). There are also many images from the Hubble Space Telescope. There's talk of adding images from major observatories and even amateur astronomers.

I haven't had a chance to fully explore the program yet, so I won't bother to give a complete review. Perhaps some one will step forward and write something for a future issue of *Prime Focus*? Thus far, my favorite component of *Google Sky* are the images from the DSS and SDSS. The Hubble images are, of course, spectacular, but some don't blend seamlessly into the background. Let's hope the stunning images and information within *Google Sky* encourages others to join us in the ranks of amateur astronomy. In the meantime, download the latest version of *Google Earth* and have fun:

http://earth.google.com/

An Evening at Albion College

by Richard Bell

Fourteen members of the KAS participated in the field trip to Albion College on Saturday, August 25th. These members include (from left to right as seen in the group photo) Don Stilwell, Roger Williams, Molly Williams, Frank Severance, Jack Price, Richard Bell, Joe Borrello, Barbara Havira, Bob Havira, Jim Kurtz, Tim Kurtz, Jean DeMott, Dick Gillespie, and Jackie Gillespie.

Our group of intrepid explorers arrived at the Albion College Observatory slightly before 6:00 pm. Dr. Nicolle Zellner, who we first met in June, was already there to meet and greet us. Before we entered the observatory, Dr. Zellner gave us a brief history of the observatory. The cornerstone for the observatory was laid on September 8, 1883 and construction was completed in 1884 for only $10,000 (including equipment).

Previously, the spare rooms of the observatory were used for classes. During World War I, the observatory was used as barracks for the Army. The building currently houses the Prentiss M. Brown Honors Institute. Aside from the main

telescope, the observatory also contains a transit telescope. It's a 4" refractor mounted on a single axis and was used for determining time based on the passage of stars across the meridian. A Sidereal Clock was also on display. It was electronically connected to the transit telescope. We then walked into the observatory dome itself, containing the 8.25" Alvan Clark refractor. The refractor has a focal ratio of 15 (f/15) and a focal of 120" (3048 mm).

We then walked over to Palenske Hall, which houses the physics, geology, and mathematics departments. Several exhibits are on the first floor including the head of an Albertosaurus and a near complete Velociraptor. In June 2006, the Physics Department installed a Stellarium, a glass cube roughly 3' square. The Stellarium houses 253 stars ranging in size from tiny pinpoints to small peas. These 253 lights are *all* the known stars in our local neighborhood, which is 28.7 light-years across. The college's other observatory is on the roof of Palenske Hall. Recently, the original roll-off roof was replaced with a Ash Dome. The observatory usually contains a vintage 14" orange-tubed Celestron Schmidt-Cassegrain. Unfortunately, the Celestron was out for some upgrades.

Next on the agenda was dinner, which we had in a private room at Cascarelli's located in downtown Albion. They had many Italian style dishes with an American flare. We then headed back to the historic Albion College Observatory and observed through the Alvan Clark refractor. Our first target was Jupiter and its four Galilean Moons. Jupiter was fairly low in the sky at the time, but the belts are zones were very prominent. We were impressed with the quality of the image Very little chromatic aberration was evident, which is very impressive for a telescope of this era. Antares was the next target and gave a pleasing red hue. The Moon was next and again the image was impressive; very little, if any, color aberrations. We then got a little carried away and then checked out many familiar targets, including M57, Epsilon Lyrae, Albireo, and M13. We most definitely over-stayed our visit, but it was hard to resist observing with such a fine and historic instrument. Most of us got back in Kalamazoo at 1:30 am. We thank Dr. Zellner for an entertaining evening.

Lots of Pretty Colors

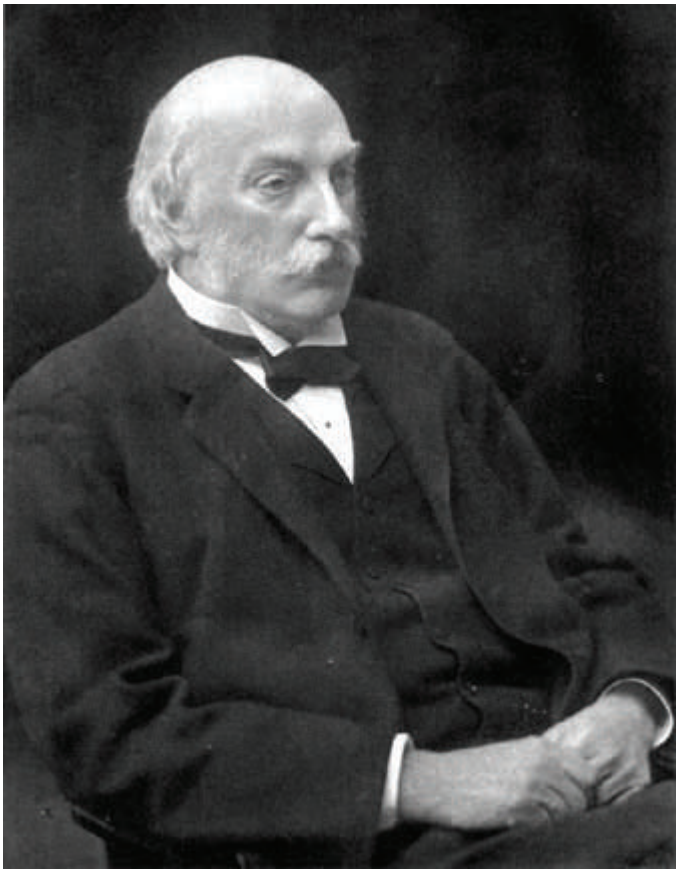
by Will Millar

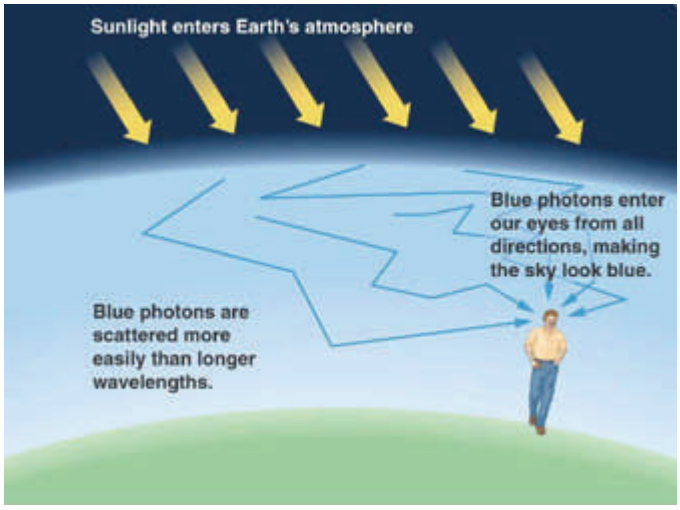
What do blue skies, red sunsets, red lunar eclipses, stellar extinction and stellar reddening have in common? They are all caused by the same physical phenomenon — Rayleigh Scattering. This scattering effect is a result of the wave properties of light. It was explained by the English, Nobel Laureate (1904) physicist, Baron John William Strutt Rayleigh (1842-1919).

Lord Rayleigh (picture below) succeeded James Clerk Maxwell as Professor of Experimental Physics at Cambridge University. He was also Professor of Natural Philosophy at the Royal Institution, President of the Royal Society and eventually, Chancellor of Cambridge University. Most of Lord Rayleigh's work in physics centered on wave phenomena, both optical and audio. One of his most well-known books is *The Theory of Sound*, published in 1878.

Rayleigh Scattering

Rayleigh scattering occurs as light passes through a volume of space containing small particles. These particles may be grains of dust or molecules, such as the molecules of our atmosphere. These small particles absorb and deflect the light as it passes through the volume of space containing them. If the light energy is absorbed, the dust particle is heated and then the energy is simply reradiated, generally as infrared. If the light is deflected, then it is sent off in another direction, never to be observed by any in the original path of the light. This deflection of light from its original path is known as scattering. Depending on the relationship between the size of the particle, the absorption efficiency and refractive index of the particles' material and the wavelength of the light, this scattering is known either as Rayleigh scattering or as Mie scattering (named after the German physicist Gustav Mie).





Rayleigh scattering causes the blue hue of the sky and the reddening at sunset.

Blue Skies, Red Sunsets and Red Lunar Eclipses

Red light has a longer wavelength (730 nm) than blue light (430 nm). The wavelength of the scattered light depends (mostly) on the size of the particles doing the scattering. The larger the particles, the longer the wavelength of light that is scattered. The Earth's atmosphere's molecules are the right size to scatter short wavelength blue light, but not the long wavelength red light. As light from the Sun enters the atmosphere from above, most of the light remains on a straight-line path to the ground. However, some of the blue light is scattered out of the path. When we look at a region of the sky (not at or near the Sun) we see the blue light that was scattered by the atmospheric molecules. Hence, the sky is blue.

When the Sun sets, it is (of course) near the horizon. In this position, the sunlight must pass through about four times more atmosphere before it reaches our eyes. This allows for a more significant amount of blue light scattering, such that essentially all of the blue light is removed. Thus, the Sun appears red as it sets. If there are larger particles in the upper atmosphere, such as those produced by human pollution or the

emissions of erupting volcanoes, more of the upper spectrum of light is removed, and the setting Sun appears even redder.

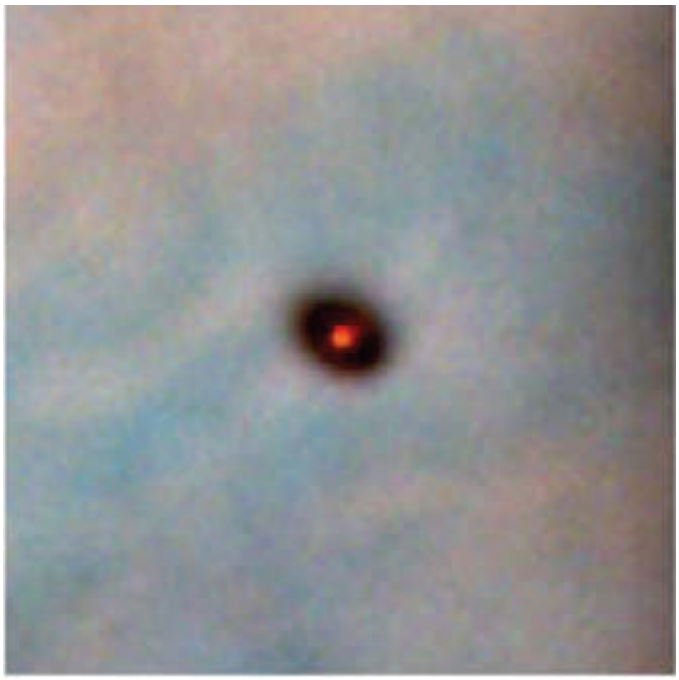
Red lunar eclipses are caused by the same process as the red setting Sun, except we must add in the refraction of light around the edge of the Earth by the atmosphere. The atmosphere acts a little like a lens and shapes the red light into a cone behind the Earth. As the Moon moves into the Earth's shadow during a lunar eclipse, the Moon actually passes into the Earth's red light district. On the other hand, maybe the Moon is just embarrassed.

By the way, clouds are white because they have particles that are large enough to scatter all wavelengths of light. White light is made of all wavelengths...

Stellar Extinction and Reddening

As I mentioned above, light is not only scattered by particles, it is also absorbed. The absorption of light decreases the amount of light reaching our eyes or instruments. This decreases the apparent magnitude of the star (or other object). This loss of light intensity and decrease in apparent magnitude is called stellar extinction. We must compensate for this effect when calculating the absolute magnitude of an object from its apparent magnitude and distance. The accepted average rate of extinction is two magnitudes per kiloparsec. We only state an average because extinction is highly directional, since the distribution of dust in the galaxy is not uniform. The distance to the galactic core is ten kiloparsecs and therefore the light from the core is extinguished by 30 magnitudes. Hence, we cannot observe the galactic core in optical wavelengths.

According to Rayleigh scattering, the red glow of a Total Lunar Eclipse arises because sunlight reaching the Moon must pass through a long and dense layer of the Earth's atmosphere. Shorter wavelengths are more likely to be scattered by the small particles, and so by the time the light has passed through the atmosphere, the longer wavelengths dominate. This image of the eclipsed Moon was taken on August 28, 2007 by Richard Bell.



This young star in the Orion Nebula appears red because much of its light has been absorbed by the dust in the protoplanetary disk that surrounds it.

Since it is easier to absorb and scatter blue light than red, the stars are not only dimmer in an overall sense; they are dimmer in the blue end of the spectrum than in the red. More blue light has been removed from the starlight than red. This effect is called stellar reddening and again, we must compensate for it in our magnitude measurements. This correction is generally called the star's color index. There are a number of ways to measure and state a star's color index, and I'm going to save the discussion of this topic for another column.

One more little effect of interstellar dust. The dust particles are generally not spherically shaped. The spatial orientation of these non-spherical dust particles is controlled mostly by the Galaxy's magnetic field. The non-spherically shaped particles cause the starlight to become polarized. By studying the polarization of the starlight, we can map the Galaxy's magnetic field. Pretty cool stuff, eh?

Will Millar is Professor of Astronomy at Grand Rapids Community College. He is also a member of the Grand Rapids Amateur Astronomical Association and a frequent guest speaker at KAS meetings. His primary area of research is spectra of supernova remnants, which he is conducting as part of his Ph. D thesis for James Cook University in Townsville, Australia. He is also the author of "The Amateur Astronomer's Introduction to the Celestial Sphere", the first in a series of astronomy books published by Cambridge University Press.

NASA Space Place

Cosmic Cockroaches

by Dr. Tony Phillips

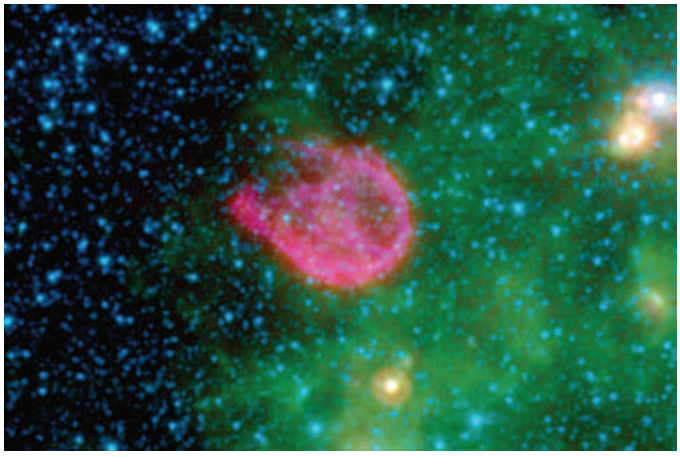
Cockroaches are supposed to be tough, able to survive anything from a good stomping to a nuclear blast. But roaches are wimps compared to a little molecule that has recently caught the eye of biologists and astronomers—the polycyclic aromatic hydrocarbon.

Polycyclic aromatic hydrocarbons (PAHs for short) are ring-shaped molecules made of carbon and hydrogen. "They're all around us," says Achim Tappe of the Harvard Center for Astrophysics. "PAHs are present in mineral oils, coal, tar, tobacco smoke and automobile exhaust." Aromatic, ring-shaped molecules structurally akin to PAHs are found in DNA itself!

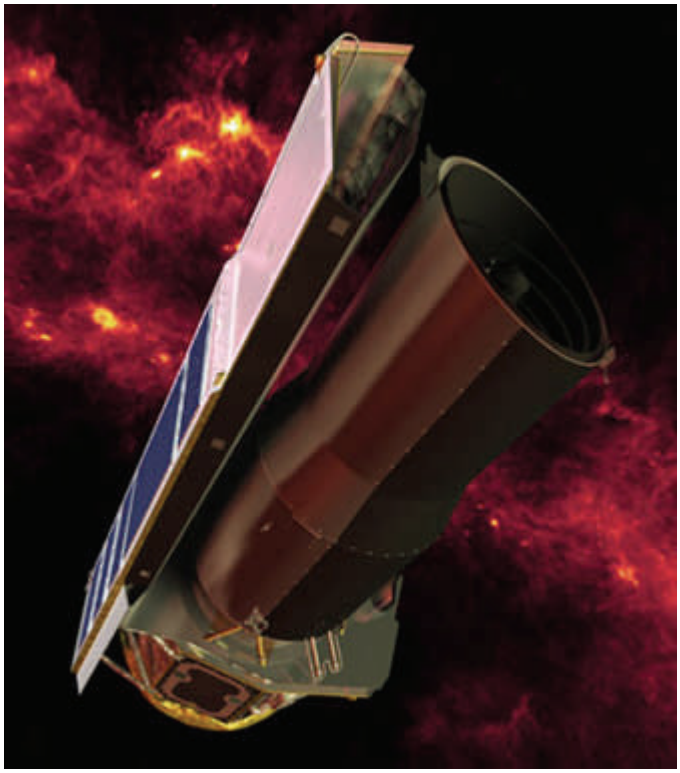
That's why Tappe's recent discovery may be so important. "PAHs are so tough, they can survive a supernova."

The story begins a few thousand years ago when a massive star in the Large Magellanic Cloud exploded, blasting nearby star systems and interstellar clouds with hot gas and deadly radiation. The expanding shell, still visible from Earth after all these years and catalogued by astronomers as "N132D," spans 80 light-years and has swept up some 600 Suns worth of mass.

Last year "we observed N132D using NASA's Spitzer Space Telescope," says Tappe. Spitzer is an infrared (IR) telescope, and it has a spectrometer onboard sensitive to the IR emissions of PAHs. One look at N132D revealed "PAHs all around the supernova's expanding shell. They appear to be swept up by a shock wave of 8 million degree gas. This is causing some damage to the molecules, but many of the PAHs are surviving."



Using the IR spectrometer on the Spitzer Space Telescope, scientists found organic molecules in supernova remnant N132D.



Astronomers have long known that PAHs are abundant not only on Earth but throughout the cosmos — they've been found in comet dust, meteorites and many cold interstellar clouds — but who knew they were so tough? "This is our first evidence that PAHs can withstand a supernova blast," he says.

Their ability to survive may be key to life on Earth. Many astronomers are convinced that a supernova exploded in our corner of the galaxy 4 to 5 billion years ago just as the solar system was coalescing from primitive interstellar gas. In one scenario of life's origins, PAHs survived and made their way to our planet. It turns out that stacks of PAHs can form in water — think, primordial seas — and provide a scaffold for nucleic acids with architectural properties akin to RNA and DNA. PAHs may be just tough enough for genesis.

Cockroaches, eat your hearts out.

Find out about other Spitzer discoveries at:

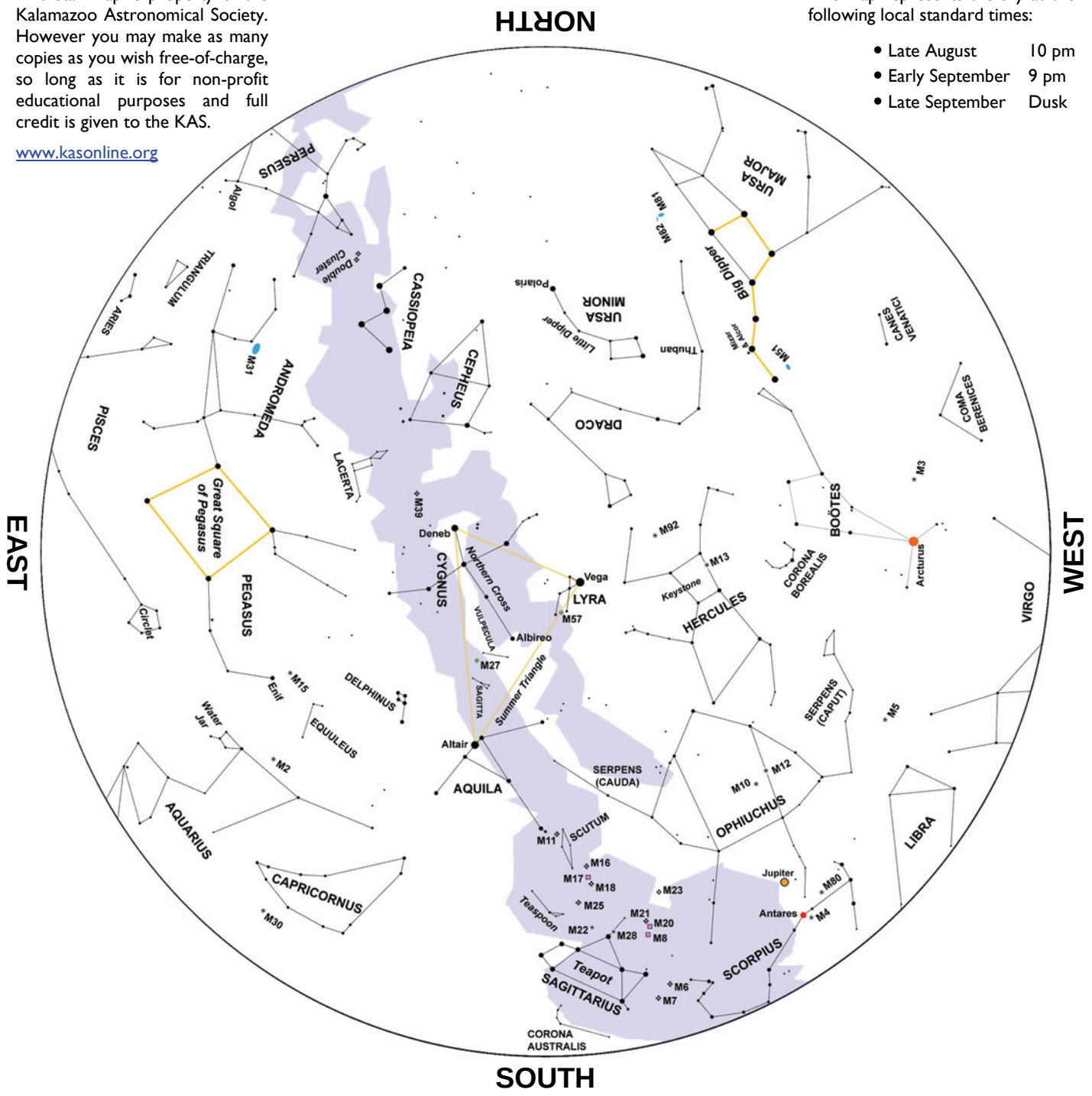
http://www.spitzer.caltech.edu/

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

September Night Sky.....

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

- Late August 10 pm
- Early September 9 pm
- Late September Dusk



September kicks off with a cover-up of cosmic proportions. The 66% illuminated Waning Gibbous Moon (one day before Last Quarter) will occult part of the Pleiades star cluster (M45) during the morning of September 3rd.

The star Celaeno will be the first to disappear at ~1:20 am EDT. Taygeta follows at ~1:30 am and then Sterope at ~1:48 am. Maia and 22 Tauri disappear almost simultaneously at ~1:52 am. Binoculars or a rich-field telescope will give the most pleasing view.

On the evening of September 21st, Spica and Mercury will be separated by ½°. They'll both be difficult to spot low in the WSW, so binoculars are a must. Spica can be found to the left of the smallest, innermost planet. They do it again on the 22nd, but trade places.

KAS OFFICERS

PRESIDENT
Richard S. Bell
373-8942
richard.s.bell@gmail.com

VICE PRESIDENT
Jack Price
343-3193
ka8aob@arrl.net

TREASURER
Rich Mather
629-5312
rlm512@yahoo.com

SECRETARY/ALCOR
Roger Williams
375-4867
ngcphile@sbcglobal.net

MEMBERS-AT-LARGE
Jean DeMott
381-1406
jeamott@hotmail.com

Dick Gillespie
966-9653
rwgillespie@comcast.net

Dan Morgan
964-3156
speedster2333@comcast.net

Dave Woolf
762-8268
medalguy@netzero.net

KAS Patch For Sale

KALAMAZOO ASTRONOMICAL SOCIETY
LOOKING UP SINCE 1936

Only $4.00!

Pick up some of our brand new patches at an upcoming general meeting and show your KAS pride! Put one on to your hat, T-shirt, sweatshirt, jacket, and more. The patches appear exactly as seen in the image above. The dimensions are 4.0" x 2.5". They can be sown or ironed on. If you'd like to reserve some before they sell out contact **Norm Terry** (327-0365).

Kalamazoo Valley Museum

Planetarium Show Schedule

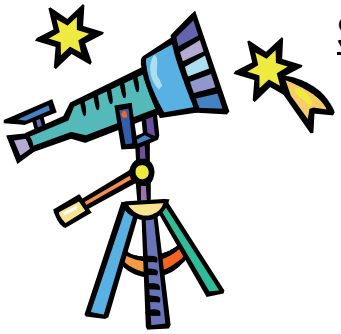
Death of the Dinosaurs
Saturday 11:00 am, Sunday & Wednesday 1:30 pm

Treasures of the Milky Way
Saturday 2:00 pm

Dinosaur Chronicles
Wednesday, Saturday & Sunday 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*

☆☆ GET OUT & OBSERVE! ☆☆



SEPTEMBER STARGAZING DATES

Kalamazoo Nature Center • 7000 N. Westnedge Ave.

Saturday, September 8 @ 7:30 pm
Galaxies of Early Autumn

Saturday, September 22 @ 7:30 pm
Moon, Uranus, & Neptune

with the Kalamazoo Astronomical Society

General Meeting Preview

Variable Stars
& The Stories They Tell

Presented by Mike Simonsen

Why do variable stars continue to be important to astronomers? How do they fit into the big picture and relate to stellar evolution, planetary formation and destruction, galaxy formation and the ultimate fate of the universe?

Even more profound, is your opportunity, as an amateur astronomer, to contribute to the next chapter in this tale by observing these dynamic celestial wonders and reporting your observations to the AAVSO.

Friday, September 7 @ 7:00 pm

Kalamazoo Area Math & Science Center
600 West Vine, Suite 400

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

STAMP