

Highlights of the May Sky...

... 1st ...

Dusk: Mercury less than 2° from center of Pleiades. Look low in WNW about 45 minutes after sunset.

First Quarter Moon

... 2nd ...

Dawn: Venus reaches its greatest illuminated extent, a 26% lit crescent that's 38" from tip to tip.

PM: Moon appears about 3° below Regulus.

... 3rd ...

PM: The Moon appears 6° below Saturn.

... 9th ...

Full Moon

... 17th ...

Last Quarter Moon

AM: The Moon is about 3° to the left of Jupiter.

AM: Shadows of Callisto & Io are visible on Jupiter from 3:56 - 5:16 am EDT.

... 20th ...

AM: Jupiter is 4' south of 5.1 magnitude star Mu Capricorni. Neptune is 0.6° to their left

... 21st ...

Dawn: Waning Crescent Moon forms a 6° equilateral triangle with Venus and Mars.

... 24th ...

New Moon

... 29th ...

PM: The Moon is about 5° below Regulus.

... 30th ...

First Quarter Moon

PM: The Moon is about 8° below Saturn.

Prime Focus

A Publication of the Kalamazoo Astronomical Society

★ ★ ★ May 2009 ★ ★ ★

This Months KAS Events

General Meeting: Friday, May 1 @ 7:00 pm

Kalamazoo Area Math & Science Center - See Page 10 for Details

Observing Session: Saturday, May 16 @ 8:30 pm

Saturn & Galaxies of Virgo - Kalamazoo Nature Center

Public Star Party: Saturday, May 23 @ 8:30 pm

Kiwanis Youth Conservation Area - See Page 9 for Details

Astronomy Day: Saturday, May 30 @ 9:00 am

Kalamazoo Valley Museum & Kalamazoo Nature Center - See Page 4

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April Meeting Minutes



The general meeting of the Kalamazoo Astronomical Society was brought to order by President Jack Price on Friday, April 10, 2009 at 7:12 pm EDT. Approximately **80** members and guests were in attendance at the Kalamazoo Area Math & Science Center (KAMSC)!

Our very special guest speaker for the evening was Dr. Fred Adams, Professor of Physics at the University of Michigan. The title of Dr. Adams' presentation was *Extrasolar Planets: Formation, Migration, and Long Term Evolution*. He began with a brief history lesson which included the Nebular Hypothesis developed by Immanuel Kant and Pierre-Simon Laplace in the mid to late 1700's. He also gave a brief overview of our current understanding of the four stages of star formation. Dr. Adams then discussed the historic discovery of a planet orbiting 51 Pegasi in 1995. This was the first of a planet discovered around a main sequence star. The current planet count stands at 300+ and is likely to grow exponentially in the years ahead.

Part 2 of Dr. Adams' presentation went into detail on the theory of how terrestrial and Jovian planets form. Part 3 covered the formation of terrestrial planets in binary star systems. Work on this subject has been done by Dr. Adams and his graduate student E. Quintana. In short, they've found that terrestrial planets can form and maintain stable orbits in wide binaries. They also found that the separation of the stars needs to be greater than 10 AU.

Part 4 dealt with the question of why some giant Jupiter-like planets are found very close to their parent star. In general, it's caused by a process called planetary migration. A planet embedded in gaseous disk creates spiral wakes. The leading wake pushes the planet outwards to a larger semi-major axis, while a trailing wake pulls back on the planet and makes the orbit decay. The planet migrates inward or outward depending on distribution of mass within the disk. The inward torques (usually) dominate, thereby leading to inward migration. The picture is far from complete as it doesn't explain the wide range of eccentricities observed in many extrasolar planet orbits. The final part was about the long-term stability of planets in binary systems. The short answer is that they are stable in stars that are separated by at least 7 AU. Dr. Adams then concluded his excellent presentation and answered many questions from the large crowd.

Jack thanked the 100 Hours of Astronomy volunteers (see page 3), mentioned the resurrection of NIAG Fest during Memorial Day weekend, and announced the success of our grant proposal to the Gilmore Foundation. Observing reports were non-existent and little news was discussed. Upcoming events was covered and then the meeting ended at 9:33 pm

Board Meeting Minutes



The KAS officers and at-large board members gathered at Sunnyside Church on Sunday, April 19th. President Jack Price called the meeting to order at 5:11 pm. Others in attendance included Richard Bell, Jean DeMott, Dick Gillespie, Rich Mather, and Mike Sinclair.

Rich Mather reported a very healthy treasury thanks to recent grants and donations for Astronomy Day. Depending upon how book sales go on May 30th, we have a fair chance of *at least* breaking even. Things would fair better if the grant from the Arts Council came through. Unfortunately our grant application was denied.

Jack then covered upcoming events. Some of these include the May 1st general meeting. Our guest speaker will be Dr. Jack Baldwin from Michigan State University. He'll speak on *Telescopes of the Future* (see page 10 for details). One Public Observing Session is scheduled for May 16th, while the other will be held on Astronomy Day on May 30th. The KAS will also co-host another star party at the Kiwanis Youth Conservation Area on May 23rd (see page 9).

We then discussed the many remaining details concerning Astronomy Day. Richard reported that the schedule is near complete (see page 4); only the planetarium show schedule remains unknown. The Board approved the purchase of an Astronomy Day banner if funds permit. Dick Gillespie agreed to build four wooden stands for the hands-on table and make copies of a reproduction of Galileo's famous 1610 treatise *The Starry Messenger*. We'll be giving copies away as part of the Galileo display.

The final Astronomy Day topic was exactly how many copies of Phil Plait's books to order. Phil will be signing copies of his books from 1 - 4 pm at the Kalamazoo Valley Museum on May 30th. In the end, we decided to order 40 copies of *Bad Astronomy* and 50 copies of *Death from the Skies*. Funds raised from the book sale will be used to pay for Phil Plait's travel expenses, so successful sales is paramount. We also talked about the possibility of accepting credit cards, but we'll likely use our existing PayPal account.

The KAS will co-sponsor another star party at the Kingman Museum on Friday, May 8th (see page 3). Dick agreed to give a demonstration on how reflectors work and he said Bill Nigg volunteered to cover refractors. We also talked about the possibility of setting up telescopes outside local theaters playing the latest *Star Trek* movie. We'll likely setup 'scopes from 9 - 11 pm on May 9th, but it depends on exact show times. Finally, the Board agreed to the purchase of another 500 observing brochures. The meeting concluded at 6:30 pm. The next board meeting is schedule for May 17th.

Report 100 HOURS OF ASTRONOMY

Over 100 countries came together between April 2nd & 5th for a planet-wide celebration called the 100 Hours of Astronomy (100HA). More than 1 million people had their first close-up views of the Moon, Saturn, and other celestial delights. Online users got to visit over 80 professional observatories around the world during a 24 hour live virtual tour.

The KAS cosponsored two 100HA events on Friday, April 3rd and Saturday, April 4th. One group was at the Kalamazoo Valley Museum and another was at the Kingman Museum of Battle Creek. The Kalamazoo group consisted of Richard Bell, Jean DeMott, Jason Hanflik, Jim Kurtz, Jack Price, Eric Schreur, Mike Sinclair, and Roger Williams. We enjoyed mostly clear skies on both nights. Friday was very busy for the first hour, but the crowds quickly dwindled after that. The main reason was a brisk, chilly wind. Attendance was more evenly distributed during our two hours on Saturday. In all we had about 120 folks peak through our telescopes.

The Kingman group consisted of Mike Chaffee, Dick & Jackie Gillespie, Dan Morgan, Bill Nigg, Jack Roach, and Tom Roland. They had cloudy skies until about 10:20 pm on Friday night. Saturday was better with only scattered clouds and much less wind. Kingman also ran planetarium shows for the public at the bargain price of \$1. Attendance was higher at Kingman thanks to some front-page publicity in the "Wow" section of the *Battle Creek Enquirer*. In all, over 200 visitors gazed at the Moon and Saturn through KAS member telescopes at Kingman. Thanks to all the volunteers for making this event a success!



Even "Little" Galileo got to peak through a telescope during the 100 Hours of Astronomy event in downtown Kalamazoo. He did need a boost from Mike Sinclair.

KINGMAN MUSEUM Star Party

May 8th | 8 - 11 pm

Do you have a telescope you've always wanted to use, but never knew how? In honor of the International Year of Astronomy, Kingman Museum is hosting a Star Party and telescope workshop on Friday, May 8th from 8 to 11 pm. The Kalamazoo Astronomical Society will set up telescopes and show visitors how telescopes work and how they are made. There will be several different telescopes on hand; some of which were made by KAS members. There will also be a live star talk outside. You're encouraged to bring your own telescopes, lawn chairs, and snacks.

Attention KAS Members: Please contact Dick Gillespie by phone (269-966-9653) or e-mail (rwgillespie@comcast.net) if you'd like to setup a telescope.



Sidewalk Astronomy



We astronomy enthusiasts are excited about celebrating the International Year of Astronomy. On the other hand, some die-hard Trekkers (Trekkies?) are excited (or dreading) the theatrical release of J.J. Abrams' vision of *Star Trek*. Why not combine the two?

The movie premieres on Friday, May 8th. However, we'll be busy at the Kingman Star Party mentioned above. So, anyone interested in setting up some telescopes outside the local movie theaters on **Saturday, May 9th**?

We haven't gotten the official word from Kalamazoo 10 on West Main or Crossroads Celebration Cinema in Portage yet, but they sounded very positive. A handful of members already plan on setting up outside Kalamazoo 10, so we're looking for at least two volunteers willing to setup at Crossroads. We're also looking into setting up some telescopes outside one of the theaters in Battle Creek.

Sound like fun? Then [contact us](#) to volunteer and live long and prosper!



ASTRONOMY DAY 2009

SATURDAY, MAY 30TH

KALAMAZOO VALLEY MUSEUM

10 AM - 4 PM | 230 N. ROSE ST.

Displays

Learn about telescopes, light pollution, and Galileo's discoveries. Check out the best astrophotography by members of the Kalamazoo Astronomical Society.

Hands-on Activities

Build a Galileoscope (limit of one per family) or make your own Planisphere, Big Dipper Clock, and more.

Solar Observing

View our star close up! Telescopes with safe solar filters will be setup in the Kalamazoo Valley Museum's courtyard (weather permitting).

The Starry Messenger

Galileo will give a lecture on his most recent discoveries made using the newly devised telescope. This interactive presentation is ideal for the whole family. **Show times are 11:00 am, 1:00 pm and 3:00 pm.**

Book Signing

Meet noted author and astronomer **Dr. Phil Plait** from **1:00 - 4:00 pm**. Copies of his books, *Bad Astronomy* and *Death from the Skies*, will be available for purchase.



KALAMAZOO NATURE CENTER

7:00 PM | 7000 N. WESTNEDGE AVE.

Keynote Talk: "BAD ASTRONOMY" by Dr. Phil Plait

Join us for this entertaining and informative presentation, packed with humor and backed by solid science. Tickets will be available at the Kalamazoo Valley Museum from 9:00 am - 4:00 pm (while they last). A ticket guarantees you seating between 6:30 and 6:50 pm only. All others will then be admitted until seating is filled.

Public Observing Session

Observe the First Quarter Moon, ringed-planet Saturn, and much more. As darkness falls, Dr. Plait will give sky talk beginning at 9:25 pm. He'll highlight the planetary and deep sky objects we'll be observing during the evening. Join us in the Nature Center's amphitheater for this bonus presentation.



astroday.kasonline.org



Two Ultra Affordable Telescopes

by *Richard Bell*

Normally, veteran amateur astronomers tell novices not to buy cheap telescopes. This is good advice. I've told hundreds of people to first learn the night sky and then buy a good pair of binoculars. Nearly every amateur has told the horror story of using their first telescope; usually bought at a department store. The mount is shaky and the eyepieces are tiny bits of garbage. I have fond memories of using my first telescope - a Jason 60mm refractor. In truth, it was a love-hate relationship.

Two telescopes have recently debuted that are the exception that proves the cheap telescope rule. Both are official products of the 2009 International Year of Astronomy (IYA2009). The first is the near legendary Galileoscope. I say legendary, because this little scope and Bigfoot have something in common - everyone has heard about them, but hardly anyone has ever seen them. Members of the International Astronomical Union and American Astronomical Society have volunteered thousands of hours of their time to develop this project. Its goal is simple: give as many people as possible the opportunity to look through a telescope.

To realize this goal the Galileoscope task force created a telescope that nearly *anyone* can afford. The price tag is a whopping \$15 (plus shipping)! Orders for the Galileoscope began on February 20th and the first shipments are expected to begin in late April. Thousands of museums, planetariums, science centers, and astronomy clubs (including the KAS) plan on giving hundreds of thousands of Galileoscopes away.

The Galileoscope is a refracting telescope with an objective lens (made of two types of glass) 50 mm in diameter and 500 mm in focal length. The supplied eyepiece (with plastic lenses) is 20mm in focal length, giving a magnification of



Students check out the Galileoscope during the opening IYA2009 ceremony in Paris.

25×. That can be doubled with an included 2× Barlow lens (also made from a plastic lens), which must be installed with the eyepiece assembly to be used. The eyepiece can be replaced with any standard 1.25" eyepiece. Focus is achieved by sliding the focuser assembly back-and-forth by hand. The only critical component not supplied is a tripod. It does include a ¼-20 mounting nut, which will work with any tripod in the world. The total weight of the Galileoscope is under 2.5 lbs, so just about any tripod will do.

One clarification about the Galileoscope - it's not meant to be a replica of one of Galileo's refractors but it is meant to allow you to replicate his discoveries. You'll be able to observe craters and mountains on the Moon, the four Galilean moons of Jupiter, innumerable stars in the Milky Way, and the phases of Venus. Not bad for \$15.

The other telescope is manufactured by Celestron, an official sponsor of the IYA. They call it the "Firstscope Telescope" and it retails for a mere \$50. It's a 76 mm (2.99-inch) aperture Newtonian reflector. The scope itself is nothing new; Celestron has been making these for years. However, instead of an EQ-1 German mount they've put it on a single-arm Dobsonian mount - just like Orion's popular StarBlast series. Don't let the picture (shown at right) fool you - this thing is tiny! Not only is it ultra portable, but it makes a nice decorative piece for your shelf.

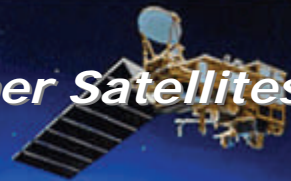


The Firstscope Telescope has a focal length of only 300 mm, making it a terrific wide-field viewer. I bought one to share with my nieces, Alexis and Merina. We took it out one night and it was really fun to use. The only caveat is that you need to set it on a table or stool. Our first target was Saturn. Seeing the rings is difficult right now since they're nearly edge-on. I had to use a Tele Vue 10mm Radian and 3x Barlow to see them clearly. The telescope does come with a 20 mm Huygens and 4 mm Symmetrical Ramsden (SR) eyepiece. These aren't any better than what the Galileoscope comes with, so you'll want to upgrade if you plan to use this little scope for anything other than decoration. The telescope excelled in wide-field views of Orion's Belt and the Pleiades (M45). Should be a joy to use when the summer Milky Way returns to the evening sky.

Neither the Galileoscope or Firstscope are meant to be serious beginner telescopes, but their price makes them better than the Jason 60mm I started with many years ago. In the end, many of us will get them as souvenirs to remember the good times during the International Year of Astronomy.



The Swiss Army Knife of Weather Satellites



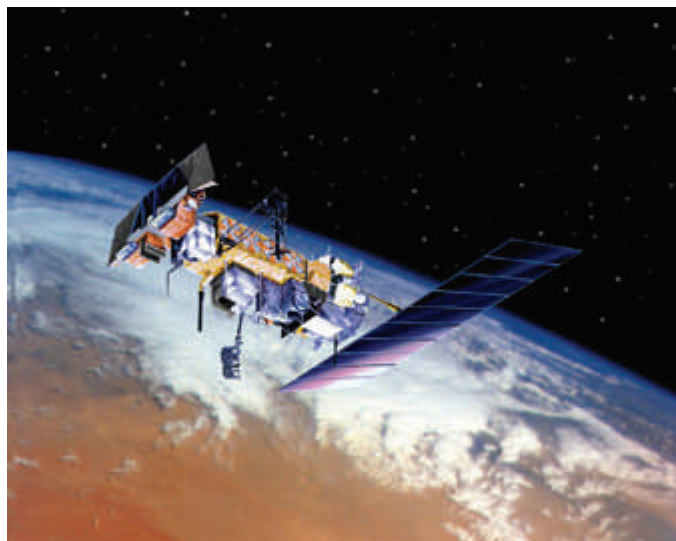
Spotting volcanic eruptions, monitoring the health of crops, pinpointing distress signals for search and rescue teams.

It's not what you might expect from a weather satellite. But these are just a few of the abilities of NOAA's newest polar-orbiting weather satellite, launched by NASA on February 6th and turned over to NOAA for full-time operations on February 26th.

Formerly called NOAA-N Prime and now renamed NOAA-19, it is the last in its line of weather satellites that stretches back almost 50 years to the dawn of the Space Age. Over the decades, the abilities of these Television Infrared Observation Satellites (TIROS) have gradually improved and expanded, starting from the grainy, black-and-white images of Earth's cloud cover taken by TIROS-1 and culminating in NOAA-19's amazing array of capabilities.

"This TIROS series has become quite the Swiss army knife of weather satellites, and NOAA-19 is the most capable one yet," says Tom Wrublewski, NOAA-19 Satellite Acquisition Manager at NASA's Goddard Space Flight Center in Greenbelt, Maryland.

The evolution of TIROS began in 1998 with NOAA-K. The satellites have carried microwave sensors that can measure temperature variations as small as 1 degree Celsius between Earth's surface and an altitude of 40 kilometers — even through clouds. Other missions have added the ability to track large icebergs for cargo ships, monitor sea surface tempera-



The new NOAA-19 is the last and most capable in the long line of Television Infrared Observation Satellites (TIROS).



tures to aid climate change research, measure the amount of ozone in Earth's protective ozone layer, and even detect hazardous particles from solar flares that can affect communications and endanger satellites, astronauts in orbit, and city power grids.

NOAA-19 marks the end of the TIROS line, and for the next four years it will bridge the gap to a new series of satellites called the National Polar-orbiting Operational Environmental Satellite System. NPOESS will merge civilian and military weather satellites into a single system. Like NOAA-19, NPOESS satellites will orbit Earth from pole to pole, circling the planet roughly every 100 minutes and observing every location at least twice each day.

NPOESS will have yet more capabilities drawn from its military heritage. Dim-light sensors will improve observations of the Earth at night, and the satellites will better monitor winds over the ocean — important information for ships at sea and for weather and climate models.

"A lot more capability is going to come out of NPOESS, improving upon the 161 various environmental data products we already produce today," Wrublewski says.

Not even a Swiss army knife can do that many things, he points out.

For more on the NPOESS, check out:

<http://www.npoess.noaa.gov/>

Kids can find out about another NOAA satellite capability — tracking endangered migrating species — and play a fun memory game at:

http://spaceplace.nasa.gov/en/kids/poes_tracking/

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 KAS

as of April 27, 2009

1. Rick Ainsworth	Regular	2010	58. Dayton Maynard	Senior	2010
2. Ted Allen Anderson	Senior	2009	59. Travis Mazer	Family	2009
3. David & Judith Andrews	Family	2010	60. Michael J. Melwki	Regular	2009
4. Paul Asmus	Regular	2010	61. Lynn C. Meyer	Regular	2009
5. Richard Bell	Regular	2009	62. John Miller	Regular	2010
6. Karen & Peter Berzins	Family	2009	63. Mark & Ninah Miller	Family	2009
7. Jack Bley	Regular	2009	64. Dan Morgan	Regular	2010
8. Susan Bond	Senior	2010	65. Katie Morgan	Regular	2010
9. Jacqueline Bonn	Regular	2009	66. Kim & Pat Morgan	Family	2009
10. Joseph & Patti Borrello	Family	2011	67. Elizabeth Morison	Regular	2009
11. Donald Brezinski	Regular	2009	68. Connie Myres	Family	2009
12. Angela Brooks	Regular	2009	69. Bill Nigg	Regular	2009
13. Rick Brumbaugh	Family	2009	70. Robert Norton	Regular	2010
14. Phyllis Buskirk	Lifetime	n/a	71. Amy Ohrstrom	Regular	2009
15. Beverly Byle	Senior	2010	72. John & Teri Olbrot	Family	2010
16. Bonnie Covert & Mike Chaffee	Family	2009	73. Rick Olsen	Regular	2008
17. Mike Cook	Family	2009	74. Jim Oorbeck	Family	2009
18. Harry Cotterill	Regular	2009	75. Alan & Cathy Otterson	Family	2009
19. Robert & Grace Cox	Family	2010	76. Mike Patton	Regular	2010
20. Kalman & Becky Csia	Family	2010	77. Chris A. Paynich	Family	2009
21. Jean DeMott	Family	2010	78. Donald A. Peterson	Senior Family	2010
22. David Doan	Regular	2009	79. John L. Pettit	Regular	2009
23. Fred E. Dutton	Senior	2009	80. Daniell Poulsen	Regular	2009
24. Diana & Brian Evans	Family	2008	81. Jack & Ruth Price	Family	2009
25. Diane & Niels Garlick	Family	2010	82. Sam Qualls	Family	2010
26. Dave & Bonnie Garten	Family	2010	83. Adrian Quint	Regular	2009
27. Tom George	Family	2009	84. Jack Roach	Regular	2009
28. Dick & Jackie Gillespie	Senior Family	2010	85. Kerry Robbert	Regular	2009
29. Royce Goodchild	Regular	2009	86. Andrew C. Robins	Regular	2010
30. John Grace	Regular	2009	87. Thomas Roland	Regular	2009
31. Tony Gurczynski	Regular	2010	88. Alvin & Judy Rosenthal	Family	2009
32. Jason Hanflik	Regular	2009	89. Eric Schreur	Regular	2009
33. Mark Hansen	Regular	2009	90. Jeanne Serne	Family	2009
34. Amie Harpe	Regular	2009	91. Frank Severance	Regular	2010
35. Bill Haug	Regular	2009	92. Norma J. Simmons	Senior Family	2009
36. Robert & Barbara Havira	Senior Family	2010	93. Michael & Karen Sinclair	Family	2009
37. Michael James Higgins	Family	2010	94. Greg Sirna	Family	2009
38. James, Ruth & Joseph Hill	Family	2009	95. Lorraine Monica Stanek	Regular	2009
39. Keith Hoekwater	Senior	2009	96. Don Stilwell	Family	2009
40. Geoff Howe	Family	2008	97. Stephanie Stratton	Regular	2009
41. Arya Jayatilaka	Family	2009	98. Dennis Stuart	Regular	2009
42. John Kapenga	Family	2009	99. Eric R. Sullivan	Regular	2010
43. Dan Keto	Regular	2009	100. Oxnar Thealien	Family	2010
44. Theresa M. Kohler	Regular	2009	101. Norm Terry	Senior	2009
45. Kirk & Angela Korista	Family	2009	102. Gary Theisen	Family	2010
46. Jim Kurtz	Regular	2010	103. W. R. Thomas Tyler	Student	2008
47. Tim Kurtz	Regular	2010	104. Henry L. Upjohn II	Family	2009
48. Cal & Jean Lamoreaux	Senior Family	2009	105. Michael Vandever	Regular	2009
49. David & Sandra Latimer	Family	2009	106. Carol & Bill Van Dien	Family	2009
50. Christopher Lebeda	Family	2009	107. Philip B. Wareham	Regular	2010
51. James Lilley	Regular	2009	108. Bob White	Regular	2009
52. Gary & Phyllis Lubbert	Family	2009	109. Roger & Molly Williams	Family	2010
53. Chuck Lund	Regular	2009	110. Susan Worsnop	Regular	2009
54. Scott Macfarlane	Regular	2009	111. David Woolf	Family	2009
55. Christopher Marttila	Regular	2010	112. Brenda Zielinski	Regular	2009
56. Richard Mather	Senior	2010	113. Sharon Zordan	Regular	2009
57. Cary & Sarita Mannaberg	Family	2009			

Year in **RED**? You still need to **RENEW!**

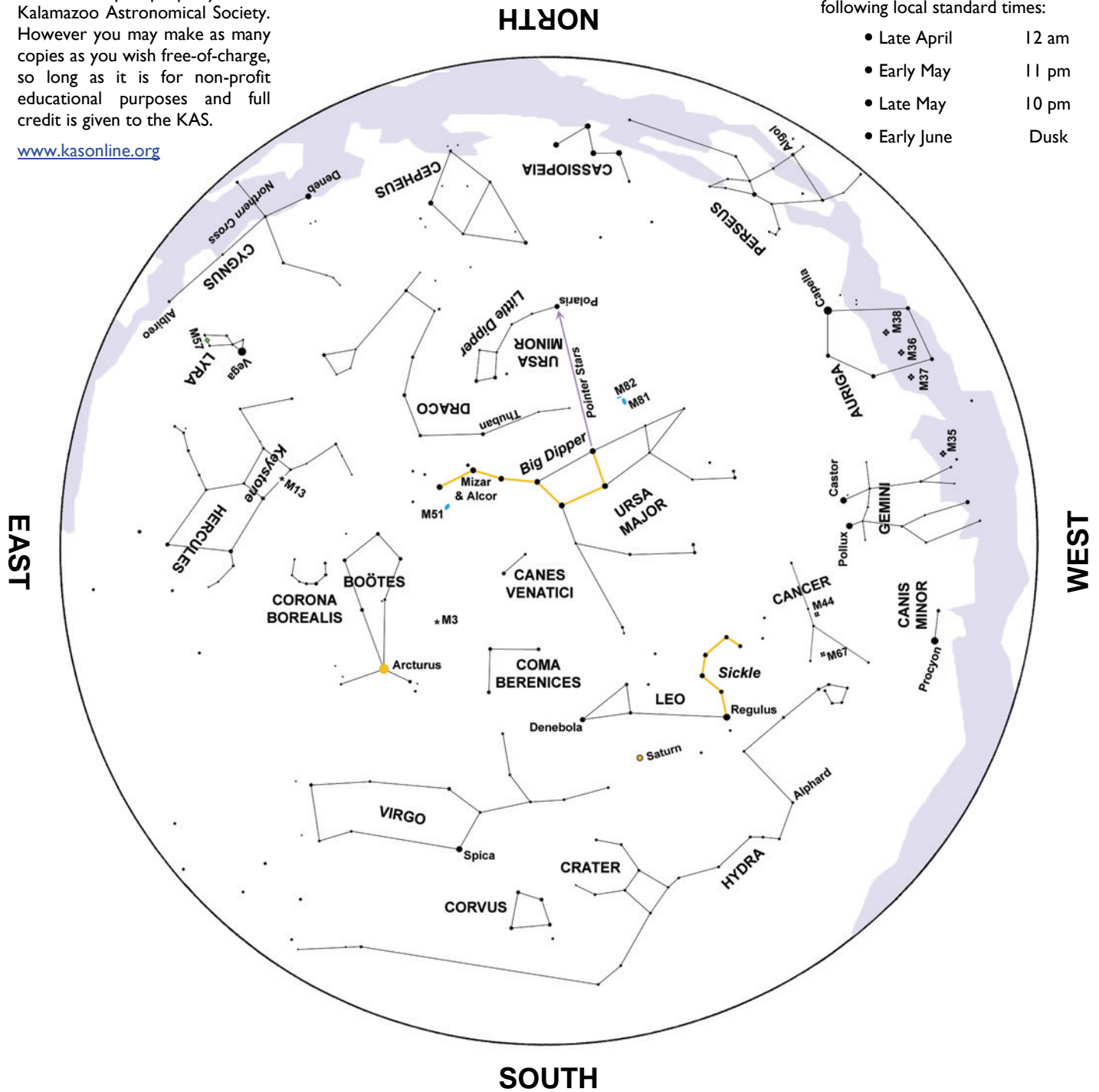
May Night Sky.....

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 April 12 am
- Early May 11 pm
- Late May 10 pm
- Early June Dusk



The Last Quarter Moon will be about 3° to the left of Jupiter on Sunday, May 17th. If you've got a telescope handy make sure you observe Jupiter between about 3:56 and 5:16 am EDT. The shadows of two of Jupiter's Galilean moons, Io and

Callisto, will be visible on the giant planet's disk.

On May 20th, Jupiter will be near Mu Capricorni, which will make the 5.1 magnitude star like an out-of-place fifth Galilean moon.

The First Quarter Moon will be about 8° below Saturn on Saturday, May 30th. The KAS celebrates Astronomy Day on May 30th, so please join us at the Kalamazoo Valley Museum and Nature Center for a full day of activities. Check the Astronomy Day [web site](#) for details.

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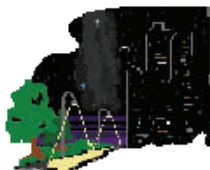
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May 2009

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Kiwanis Star Party



The KAS and Battle Creek Kiwanis Club of will co-host a public star party on **Saturday, May 23rd**. Gates open at 8:30 pm. It'll be held at the Kiwanis Youth Conservation Area on 15th Ave, 3.6 miles north of Turkeyville in Calhoun County. There is no admission fee. For more information or to volunteer your time and telescope, please contact **Dick Gillespie** (269-966-9653).

Kalamazoo Valley Museum Planetarium Show Schedule

Where in the Solar System is Carmen Sandiego
Saturdays, 11:00 am; Sundays, 1:30 pm

Constellation Tonight
Wednesdays 3:00 pm; Saturdays, 2:00 pm

Big
Saturdays & Sundays, 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!** ☆☆

MAY STARGAZING DATES

Kalamazoo Nature Center • 7000 N. Westnedge Ave.

Saturday, May 16 @ 8:30 pm
Galaxies of the Virgo Cluster

Saturday, May 30 @ 8:30 pm
Saturn & First Quarter Moon

with the **Kalamazoo Astronomical Society**

General Meeting Preview



Telescopes of the Future

Presented by **Dr. Jack Baldwin**

Professor of Astronomy, Michigan State University

We are rapidly moving towards a new generation of ground-based optical/infrared telescopes that will dwarf the current set of 8 to 10m giants. At the same time, the James Webb Space Telescope is being built to replace the Hubble with a new facility that has 7 times the collecting area, and a number of other space telescopes operating from infrared through x-ray wavelengths are being proposed or designed. And, returning to Earth, the Atacama Large Millimeter Array is well into its construction phase, and a new generation of giant radio arrays such as the Square-Kilometer Array is on the drawing board. Dr. Baldwin will briefly survey this broad range of proposed or approved new facilities, and try to give the flavor of the sorts of new science they are intended to open up.

Friday, May 1 @ 7:00 pm

Kalamazoo Area Math & Science Center

600 West Vine, Suite 400 • Use Dutton St. Entrance

- Dutton Entrance Locked by 7:15 pm -

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

STAMP