



Mingo Creek Park  
Observatory

# The Guide Star

Newsletter of the Amateur Astronomers Association of Pittsburgh, Inc.

Founded June 9, 1929 by Chester B. Roe and Leo J. Scanlon

Website: [3ap.org](http://3ap.org)



Nicholas E. Wagman  
Observatory

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## SEPTEMBER'S MEETING TOPIC: NRAO at Green Bank, WV

When: Friday September 11, 2009 at the Carnegie Science Center

Topic: The National Radio Astronomy Observatory (NRAO) was created in 1956 to ensure the United States was fully involved in the new scientific field of "radio astronomy". Green Bank, WV, was the original location of the NRAO facilities and has been a world leader in radio astronomy for over fifty years. The primary instrument in Green Bank is the 100m diameter Robert C. Byrd Green Bank telescope, the largest fully steerable telescope in

the world. Its design and accomplishments are many, and I will discuss not only the history of the NRAO and Green Bank but also the recent and future accomplishments of this magnificent telescope.

About the speaker: Dr. Karen O'Neil is the Site Director for the National Radio Astronomy Observatory's site in Green Bank, West Virginia. There she oversees the running and development of the Robert C. Byrd Green Bank Telescope (GBT), the world's largest fully steerable telescope, as well as the seven other telescopes on site. Dr. O'Neil is a native West Virginian, who received her Bachelor's degree from Marlboro college in southern Vermont and her PHD from the University of Oregon. After leaving Oregon she worked at the 300m diameter radio telescope in Arecibo, Puerto Rico before coming back home to West Virginia in 2003 to work at the Green Bank site.

## VP COLUMN FOR SEPTEMBER 2009

By Craig Lang

Firstly and most importantly, our first general meeting of the 2009 – 2010 season is being held Friday September 11th at 7:30 at the Carnegie Science Center. All members are welcome to attend and are encouraged to bring guests. This meeting is NOT a committee meeting or the like; it is intended for all members. The details of this meeting are listed above on the guest speaker, Dr. Karen O'Neil of the NRAO facility in Green Bank, WV. Don't miss the presentation! And we're not going to let the speaker intensity fade. On October 2nd Dr. Michael Wood-Vasey, University of Pittsburgh will be our guest.

Aristotle said "Good habits formed at youth make all the difference". All of us have a habit in common, the desire to look up and wonder. So why not share this habit with those younger than we? I encourage you all to find a youngster around you and bring them to some club meetings this season. Not that you folks aren't lively, but I would love to see some young folks liven up AAAP events other than star parties. Yes, I know we have to compete with PlayStation and high school sporting events, but I think we can make the club more appealing to youngsters. And if these young folks are concerned about the money involved in becoming members, we will have an expanded youth rate membership and family membership.

And that provides a nice segue into my next topic, the club's membership levels. The executive committee has reviewed and discussed the current levels available. It was decided to expand the Junior membership to cover those up to age 22. That should make those Raman-Noodle-Based life forms at our local colleges feel better about joining up. Also under consideration was the concept of a 'family' rate. This was well discussed and will likely be some dollars less than two regular memberships. A family rate will

be a nice discount and a way for families to participate more without a financial hit.

Now, get out there and start wondering....

## JUPITER AND MOONS

By Fred Klein

Posted to Yahoo Groups August 15, 2009. Last night was clear and steady, but a lot of moisture higher up. I measured the highest sky temperature I have yet seen, 31F. The previous high was 15F. My interpretation was that the moisture was reducing the light that could come down from the stars. The SQM said 19.1 which is not too bad for Monroeville. So the moisture was not reflecting back to the ground. Visually, the brighter stars stood out, but dimmer ones were lost. No sign of the Milky Way.

I was doing a practice deep sky pic with my new camera. Then with Jupiter in the south, I decided to try that. I used my TMB152/1200 APO, a 2x TeleVue Barcon barlow and my QHY8 Pro camera. I took two images, one at one second to get the moons and another at 0.2 seconds to get Jupiter. I made a composite in Photoshop at the full image scale, but cropped. Only gentle brightness adjust.

<http://www.fredkleinastro.com/images/JupMoons8-14-09.png>

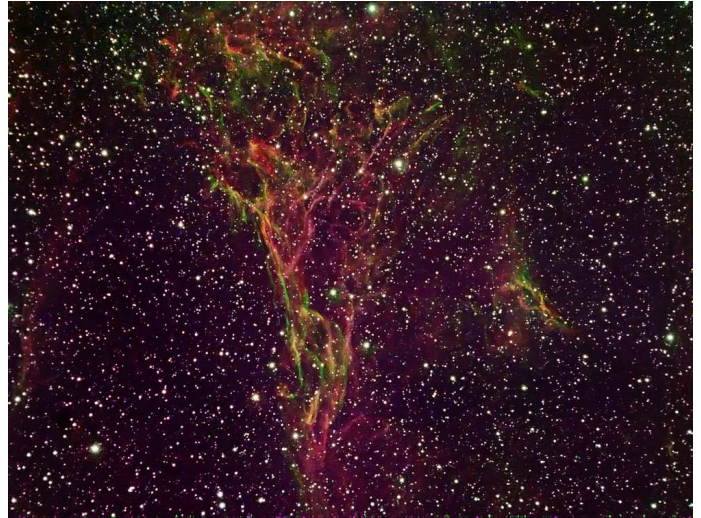


## PICKERING'S TRIANGLE

By Bill Snyder

Here's a Narrowband image of Pickering's Triangle in the Vail Nebula Complex. Ha 2hr, OIII 2hr, SII 1hr.

<http://www.astrophotogallery.org/showphoto.php/photo/3801>



## MOON AND VENUS

By Al Paslow

On my way to West Virginia I spied a beautiful combination of the Moon and Venus. Taken with an inexpensive Kodak 612Z digital camera. Set to manual. F-2.8, exposure 1 sec on asa 100. Focus set at infinity.



MINGO PICNIC 2009



## RECOGNITION LUNCH FOR 2009 KEYSTONE STATE PARK STAR PARTY VOLUNTEERS

By Bill Moutz

All AAAP members who volunteered at Keystone State Park for the Star Parties are invited to a picnic September 26, 2009. You must RSVP by September 11 by calling the park office at 724-668-2939 Monday through Friday from 8:00 to 4:00.

From 9 a.m. to 12 p.m. the boat house will be open for canoe and kayak tours. Also from 9 a.m. to 12 noon history/nature hikes will start from the James A. Kell visitor center. Hikes will be at one-hour intervals.

From 12:15 p.m. to 2:00 p.m. is the recognition lunch at Pavilion #1. The main entree is provided. Please sign up for the dish list below:

Rigatoni	Sloppy Joe's
Ham Bar BQ	Potato Salad
Macaroni Salad	Bake Beans
Stuff Cabbages	Veggie tray
Fruit tray	Deviled eggs
Jell-O salad	Buns
Drinks 2 liter pop	Water
Dessert	Chips and pretzels

## KEYSTONE STATE PARK STAR PARTY AUGUST 22, 2009

By Bill Moutz

We had a surprising turnout at Keystone despite the overcast skies. We were able to see the sliver of the Moon, Alberio, the Double Double, Vega, Mizar and Alcor, and Jupiter to name a few before the clouds rolled in. I also pulled in the Andromeda Galaxy but faintly. I counted seven of our members and about 20 adults and 10 kids. Thanks to AAAP members George Guzik, Bill & Maureen Moutz, Bill Hayeslip, Jim Kleuber, and Glen Smith and his wife, Sierra.

## RAYSTOWN STAR PARTY AUGUST 14, 2009

By Bill Moutz

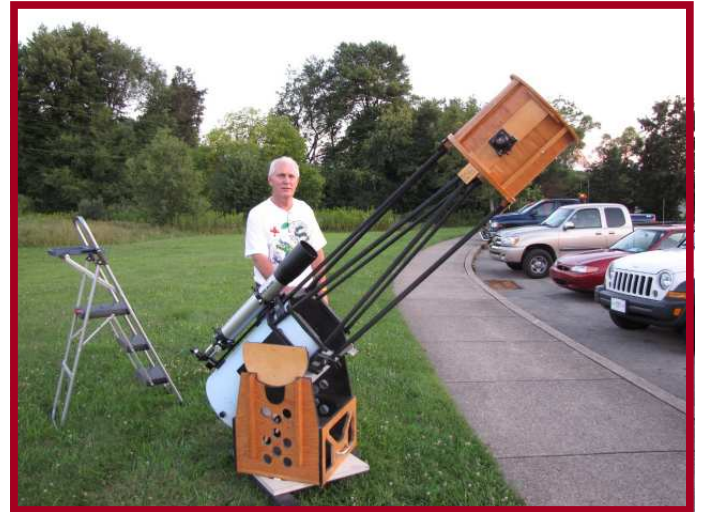
We had another great turnout for the Star Party at Raystown. The seeing was great. There were so many visitors that George had to give his PowerPoint presentation twice. We also had a good turnout from the Starlight Astronomy Club as well as Central Pennsylvania Observers. I had my 10-inch Dob and my 92 mm go-to. I instructed a couple of very enthusiastic teenage girls on how to use the Dob. They spent most of the night watching Jupiter. That allowed me to cruise the sky with the go-to. To an amazed audience I showed the coat hanger, the engagement ring, the Andromeda galaxy, the Double Double (with the Dob), M13, Vega, Antares and Arcturus to name a few. I was going down the list on my go-to and found the W cluster, very interesting. I also handed out a lot of flyers from NSN as well as our club flyers. I discussed and showed the book *Night Watch* by Terrence Dickinson. The green laser pointer was a hit also.



## MORaine STATE PARK STAR PARTY AUGUST 21, 2009

By Bill Moutz

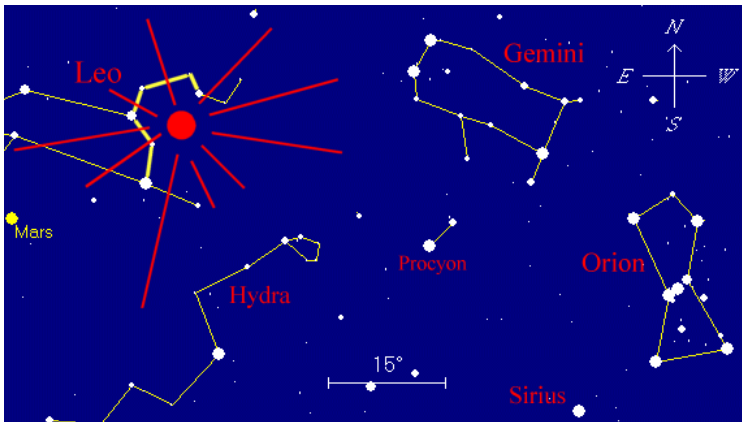
We had a great turnout last night, perhaps 60 adults and 15 children. The darker it got, the more people showed up. George Guzik once again gave his PowerPoint presentation. We then did some observing in totally clear skies. We had three scopes and a couple of binoculars on the field. Thanks to AAAP members George Guzik, Bill & Maureen Moutz, Bill Hayeslip, Phil Breidenbach, Edward Potosky, and Don Hoecker. Photos by Phil Breidenbach.



## LOOKING TOWARDS THE LEONIDS

By Kathy DeSantis

With Perseids behind us, buzz is building for a 2009 Leonid storm. Favorably, around November 17-18, 2009, the Moon will be near the new phase. Prepare for the possibility of clear skies and clear your schedule for meteor watching especially on the evening of Tuesday, November 17, 2009. The first Leonid peak is set for 7:26 PM EST, with THZ ~200. The heavenly display may be quite good for several hours. The Leonid "radiant", the point in the sky which meteors appear to come from, is predictably in the constellation of Leo specifically to the right of "the lion's" head. Rather than focus on a single point in the sky, expect meteors coming from that general area.



The image indicates the general region of the sky from which the Leonid meteors appear to emanate (red dot). This point, called the radiant, is really an optical illusion—the meteors are moving along parallel paths but appear to come from a single point just as a stretch of parallel railroad tracks will appear to meet at a point on the horizon.<sup>(1)</sup>

The Leonids, a major meteor shower, are associated with the comet Tempel-Tuttle. The Leonids are recognized historically for some spectacular storms in years when the earth's path aligns with dust trails laid down by previous passes of the comet. There have been widespread reports from the 1800's of storms with one and two hundred thousand meteors per hour. In 1831-33 in parts of the US, where there was little knowledge of astronomy these Leonid storms could be taken as divine signs threatening or encouraging. The 1833 Leonid storm coincided with the expulsion of the Mormons from Jackson County, Missouri.<sup>(2,3)</sup> The most recent storm happened in 1966, and was a complete surprise. Some US observers saw 100,000 meteors per hour.<sup>(4)</sup>

The IMO (International Meteor Organization) calendar (5) states:

"This year may produce another enhanced return with ZHRs predicted to peak at 100+ according to independent theoretical work by David Asher, Esko Lyytinen & Marku Nissinen, Mikhail Maslov, and Jérémie Vaubaillon. Trails laid down by the comet in 1466 and 1533 are expected to be the chief contributors to whatever happens with peaks on November 17 due at sometime from about 20h40m to 22h UT then. Esko & Marku's work suggests the 1466 trail may produce heightened rates generally with ZHRs above 20 from about 6h30m UT on November 17 till 0h30m UT on November 18 and likely above ~ 40 from ~ 16h-23h UT on November 17. This increased ZHR level will probably combine with that from the 1533 trail to push ZHRs up perhaps towards 120 at some stage between 21h-22h UT on the 17th. Mikhail suggested ZHRs should peak in that hour too, with ZHRs of ~ 130-140, but Jérémie's modelling implied the chance of a possible meteor storm with ZHR peaks around 21h44m (ZHRs ~ 950+) and 21h51m UT (~ 600) combining to give a rate perhaps in the 1000-1500 range briefly. Other submaxima with lower rates are possible too around November 17, 7h26m (ZHRs ~ 200+), 9h (~ 25-30); November 18, 0h04m (~ 15) and 19h UT (~ 10-15, faint meteors), according to some of these same researchers. The nodal crossing time listed above is another possible peak, based on previous non-enhanced returns, though its ZHR is likely to be a more modest 10-20."

In a [www.space.com](http://www.space.com) interview, NASA's Bill Cooke predicts a sub-storm, quite a display! "On November 17, 2009 we expect [the Leonids](http://www.space.com/scienceastronomy/top10_leonidsfacts.html) ([http://www.space.com/scienceastronomy/top10\\_leonidsfacts.html](http://www.space.com/scienceastronomy/top10_leonidsfacts.html)) to produce upwards of 500 meteors per hour", said Bill Cooke of the NASA Marshall Space Flight Center. "That's a very strong display". Importance of timing, "We predict a sub-storm level outburst on November 17, 2009 peaking sometime between 21:34 and 21:44 UT", Cooke said.

For us, in Western Pennsylvania, with sunset at 5:02 PM, and moonset at 5:24 PM, we are geographically well placed to enjoy this year's Leonids. Additionally, this coincides with nightfall and also is near the new Moon of November 16.<sup>(6)</sup>

Leo's rise and set in our area also affords our seeing a Leonid show. Below is the rise and set table for bright star, Regulus in lower Leo.<sup>(7)</sup> As the fading sunlight leaves the sky Leo will be rising over the eastern horizon.

(continued on page 7)

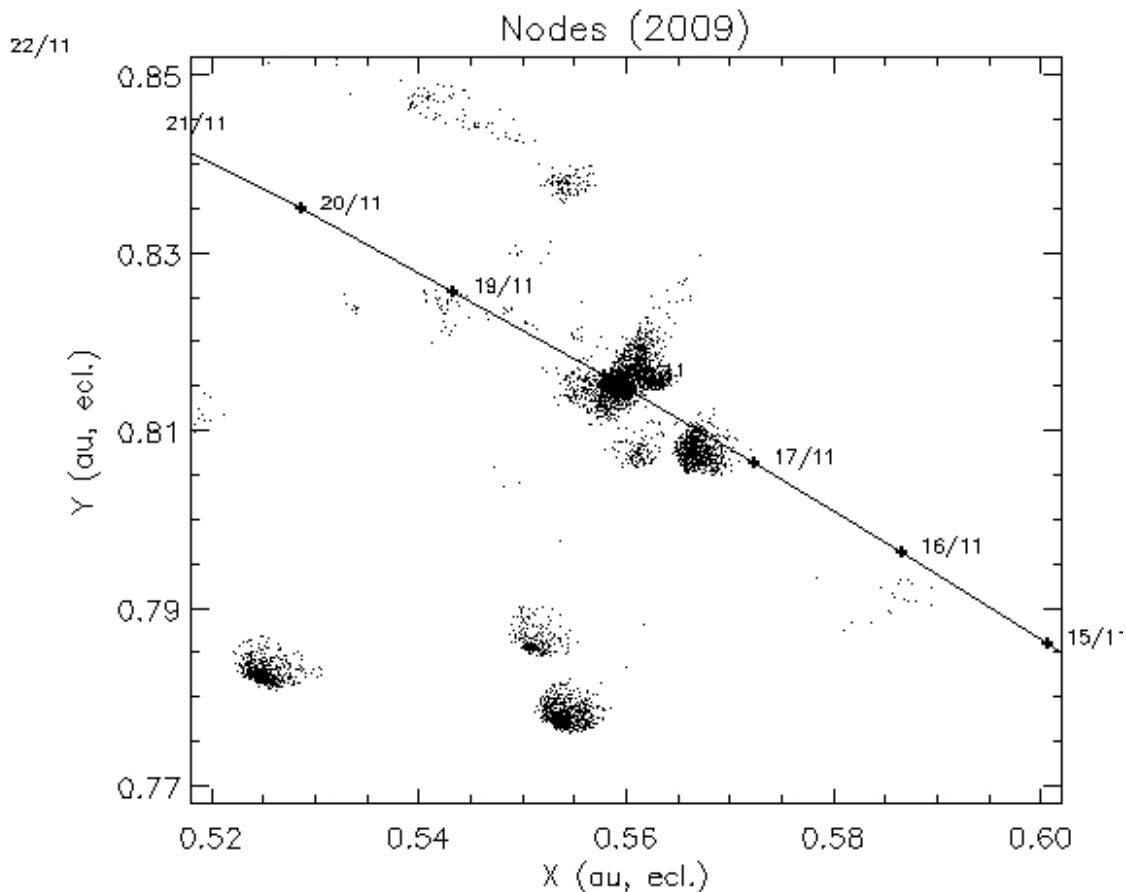
Regulus  
 PITTSBURGH, PENNSYLVANIA  
 Location: W 79°58'12.0", N40°26'24.0", 400m  
 (Longitude referred to Greenwich meridian)

Time Zone: 5h 00m west of Greenwich

Date (Zone)	Rise Az.		Transit Alt.		Set Az.	
	h	m °	h	m °	h	m °
2009 Nov 17 (Tue)	23:55	74	06:42	61S	13:26	286
2009 Nov 18 (Wed)	23:51	74	06:38	61S	13:22	286
2009 Nov 19 (Thu)	23:47	74	06:34	61S	13:18	286

We may see two bursts of heightened meteor activity during this particular shower. Check this scatter graph from France,<sup>(8)</sup> showing dual peaks in this year's Leonids, one in the evening of November 17 and the other in the morning of November 18.

/11



Don't expect rocks falling from the sky. The Leonid meteors (meteoroids if you prefer) are generally not the stuff of meteorites, the rocky or metallic cometary fragments large enough to not just glow extremely bright and possibly explode (bolide) making the sound of thunder but to make it to the earth's surface. Even the Leonid fireballs, which glow brightly for several seconds, almost always vaporize before reaching ground. Leonid particles, most fine as a grain of sand, are typically between a millimeter and 1 centimeter in diameter<sup>(9)</sup>,

and do not hit the ground instead vaporizing high in the air. Before they vaporize, due to the air compression that precedes them and exerts so much ram pressure, they glow with heat and light. There is a kind of friction involved but not direct friction with air molecules as many misunderstand.

Part of the high speed of the Leonid particles arise from the Leonids unusual way of orbiting the Sun in the opposite direction of the Earth's path around the Sun.

Such speed is generated that even the typical sand grain-sized particle glows brightly in the night sky.<sup>(10)</sup> A medium-sized Leonid can be expected to have a + 5 magnitude.<sup>(9)</sup>

Sometimes color (blue, green, or yellow) is seen in a meteor from vaporization of metallic elements in that meteor's composition, or perhaps red from the heating of the atmosphere, is seen. The metal atoms emit light when heated (think of sodium vapor lamps): Sodium (Na) atoms give an orange-yellow light, iron (Fe) atoms a yellow light, magnesium (Mg) a blue-green light, ionized calcium (Ca+) atoms may add a violet hue while molecules of atmospheric nitrogen (N<sub>2</sub>) and oxygen atoms (O) give a red light. The meteor color depends on whether the metal atom emissions or the air plasma emissions dominate.<sup>(9)</sup>

The brightest meteors can leave a persistent glow. A wake, a 1-10 second glow, behind a meteor's head may be caused by the green light of neutral oxygen atoms. Afterglow is the persistence of metallic (sodium, iron, magnesium) atom emission in the path of bright fireballs. Once the afterglow has faded, a persistent train may endure for 1–30 minutes, typically 4–6 minutes. This optical light comes from airglow-type chemistry of the recombination of oxygen atoms and ozone molecules catalyzed by metallic ions. Persistent trails may become distorted by winds in the upper atmosphere.<sup>(9)</sup> Lo(

(enduring emission

Sometimes the trail of ionized gases left in their wake creates a layer FM radio stations can bounce off of transmitting signals farther than they would ordinarily travel (meteor scatter propagation). Other times the meteor create a kind of static buzz.<sup>(11)</sup> They can, however, be known to occur in great swarms producing stunning displays.

If you can imagine stunning displays here on Earth, think of lunar meteoroids which have no atmosphere to slow their impact. Even small, centimeter-sized particles crash into the Moon with such speed, they can create light visible from Earth.<sup>(12, 13)</sup>

Getting back down to earth, and to the reality of weather in Pittsburgh, last year on November 16, 17, and 18, the National Weather Service in Pittsburgh reported unfavorable weather. Across those three days we had .3, 1.8. and .5 inches of snow, respectively.<sup>(14)</sup> This year if the often cloudy Pittsburgh skies of November give way to clear ones, we may be in store for a memorable Leonid Meteor Shower November 16-18 and especially on the evening of the 17th.

- 1) [http://spacescience.spaceref.com/newhome/headlines/ast10nov98\\_1.htm](http://spacescience.spaceref.com/newhome/headlines/ast10nov98_1.htm)
- 2) [http://science.nasa.gov/newhome/headlines/ast22jun99\\_2.htm](http://science.nasa.gov/newhome/headlines/ast22jun99_2.htm)
- 3) [http://www.jefflindsay.com/LDSFAQ/FQ\\_prophecies.shtml#destruction](http://www.jefflindsay.com/LDSFAQ/FQ_prophecies.shtml#destruction)
- 4) <http://www.eso.org/public/outreach/eduoff/aol/market/collaboration/meteor/>
- 5) <http://www.imo.net/calendar/2009#leo>
- 6) <http://www.space.com/scienceastronomy/081204-leonids-meteor-shower-2009.html>
- 7) <http://aa.usno.navy.mil/data/docs/mrst.php>
- 8) <http://www.imcce.fr/en/ephemerides/phenomenes/meteor/DATABASE/Leonids/BIN-tout/Noeuds-Earth2009.jpg>
- 9) <http://leonid.arc.nasa.gov/meteor.html>
- 10) [www.eso.org/public/outreach/eduoff/aol/market/collaboration/meteor/](http://www.eso.org/public/outreach/eduoff/aol/market/collaboration/meteor/)
- 11) [www.springerlink.com/content/t00274740h32x160/](http://www.springerlink.com/content/t00274740h32x160/)
- 12) <http://www.anarc.org/wtfda/propagation.htm>
- 13) [http://science.nasa.gov/headlines/y2006/13jun\\_lunarsporadic.htm?list6694](http://science.nasa.gov/headlines/y2006/13jun_lunarsporadic.htm?list6694)
- 14) <http://www.erh.noaa.gov/pbz/>



## WELCOME NEW MEMBERS

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 PAUL LaQUATRA  
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## IMPORTANT DATES

**September 2**—Jupiter 3° south of Moon  
**September 3**—Neptune 3° south of Moon  
**September 4**—Full Moon 12:03 p.m.  
**September 5**—Uranus 6° south of Moon  
**September 6**—Mercury appears stationary  
**September 11**—7:30 AAAP Meeting CSC  
**September 12**—Mingo Public Star Party  
 Wagman Public Star Party  
 Murrsville Community Park Star Party  
**September 13**—Mars 1.1° south of Moon  
**September 14**—AAAP IT Committee Meeting  
**September 16**—Moon at perigee  
 Venus 3° north of Moon  
**September 17**—Uranus at opposition  
 Saturn in conjunction with Sun  
**September 18**—New Moon 2:44 p.m.  
**September 19**—Covered Bridge (see web calendar)  
 Lewis & Clark Fall Festival (see web calendar)  
**September 20**—Mercury in inferior conjunction  
 Venus 0.5° north of Regulus  
 Lewis & Clark Fall Festival  
**September 22**—Fall Equinox 5:19 p.m.  
**September 24**—Antares 8.0° south of Moon  
**September 25**—Allegheny Observatory Open House  
 (volunteers requested—see web calendar)  
**September 26**—Mingo Public Star Party  
 Wagman Public Star Party  
 First Quarter Moon 12:50 a.m.  
**September 27**—Possible star hopping class at Wagman  
**September 28**—Moon at apogee

Mercury appears stationary  
 Possible star hopping class at Wagman  
**September 29**—Telecon 9:00 p.m. What is the Fate of the Universe (see web calendar)  
 Jupiter 3° south of Moon  
**September 30**—Neptune 3° south of Moon

**October 2**—7:30 p.m. AAAP Meeting CSC  
 Uranus 6° south of Moon  
**October 3**—Washington County Employees Picnic at Mingo  
 AAAP volunteers to provide astronomy program  
**October 4**—Full Moon 2:10 a.m.  
**October 5**—Mars 6° south of Pollux  
 Mercury at greatest elongation (18° west)  
 Possible star hopping class at Wagman  
**October 6**—Possible star hopping class at Wagman  
**October 8**—Mercury 0.3° south of Saturn  
**October 9**—Wagman Boy Scout Star Party (large scout group anticipated, volunteers needed)  
**October 10**—Mingo Public Star Party  
 Wagman Public Star Party  
**October 11**—Last quarter Moon 4:56 a.m.  
 Mars 1.2° north of Moon  
**October 13**—Moon at perigee  
 Jupiter appears stationary  
 Venus 0.6° south of Saturn  
**October 16**—Saturn 7° north of Moon  
 Venus 7° north of Moon  
**October 18**—New Moon 1:33 a.m.  
**October 21**—Antares 1° south of Moon  
 Orionid Meteor Shower  
**October 22**—Orionid Meteor Shower  
 IYA October Galilean Nights  
**October 23**—IYA October Galilean Nights  
**October 24**—IYA October Galilean Nights  
 Mingo Public Star Party  
 Wagman Public Star Party  
**October 25**—First quarter Moon 8:42 p.m.  
 Moon at apogee  
**October 27**—Jupiter 3° south of Moon  
 Neptune 3° south of Moon  
**October 30**—Uranus 6° south of Moon



**Amateur Astronomers Association of Pittsburgh, Inc.**

*Founded June 9, 1929 by*

*Chester B. Roe and Leo J. Scanlon*

**2009-2010 Executive Officers:**

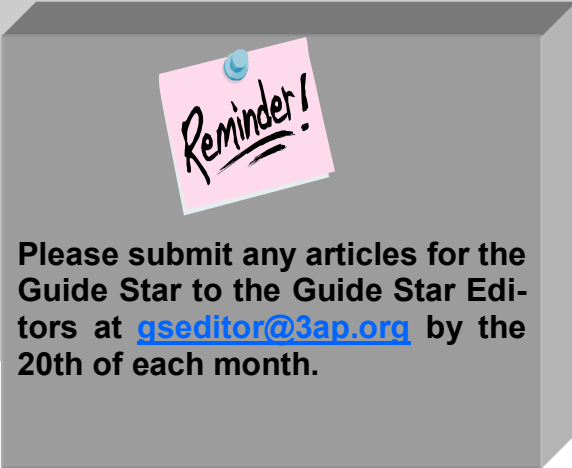
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**AAAP Member Dues\*:**

AAAP Dues:	\$24.00
Junior Member (under 18):	\$15.00

**\*Basic Procedure for Paying Dues:**

1. Make check payable to "AAAP Inc."
2. Send check to Michael Meteney, Treasurer,  
1070 Sugar Run Road; Venetia, PA 15367-1514



**\*\*Some websites may need to be copied and pasted in your browser to view them\*\***

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