

# The Mason-Dixon Astronomer



## October Meeting:

- Wed., October 14<sup>th</sup> – 7:00 pm  
Bear Branch Nature Center
- Member Presentations  
  
"Observatories and Eclipses"

## President's Message

October 2015 – Tony Falletta

### Astronomical Greetings!

October is upon us with warm days, cool nights and the fall colors on the trees. This is the time of year when observing sessions are complemented with hot apple cider or cocoa and the smell of wood burning in chimneys. Alas, winter approaches.

My observing this past month has been, overall, a fun time. There have been some clear nights when I've been home from work and have had some awesome stargazing. This is the time of year I enjoy peering out into space in the direction of Cygnus, Lyra and Vulpecula. I like to start at Cygnus the Swan. Near Deneb, in the opposite direction of Cygnus lies M39, a pretty open cluster. When I get to a dark enough sky, magnitude 4.7 M39 reveals itself to be a composed of about a dozen bright stars in the form of a triangle. Working to Deneb leads one the North America Nebula. Even though it has a magnitude of 4.8, you still need, in addition to dark skies, a low power eyepiece and a nebula filter. After my stop at



Deneb, I look down the body of the Swan to Sadr, the swan's breast. Near Sadr are a multitude of star clusters and M29, the Cooling Tower Cluster. I then run down the neck of the Swan to Albireo, one of my favorite double stars. My next stop is Vulpecula to see M27, the Dumbbell Nebula and then the Coat Hanger. I love showing people this asterism. It always puts a smile on their face and an "oh wow" comment too! My last stop is Lyra. M57, The Ring Nebula is fun to spot especially since it's not very bright. The Double Double near Vega is a wonderful end of the tour object. Many of the objects I hunt for look great in a telescope but this part of the sky is also excellent for binoculars. Many nights I have just laid back on my lounge chair with a jacket and my 10x50's in hand and got lost in space!

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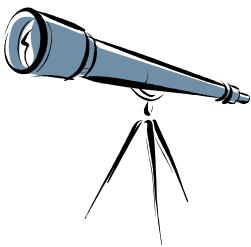


## October Meeting – Observatories and Eclipses

### Member presentations

In recent months two public observatories have been dedicated in Carroll County: The **Blaine F. Roelke Memorial Observatory** at Bear Branch Nature Center near Westminster, and the **Charlotte's Quest Nature Center Observatory**, located in Manchester. We'll show some slides and a couple of short videos from those dedications.

Also, anyone with photos from the September total lunar eclipse is invited to bring them along to share. (Preferred format is memory stick thumb drive or CD/DVD disk.)



### Upcoming Events From Our Calendars

- ❖ **Soldiers Delight Public Stargazing** October 10<sup>th</sup>, 8 p.m., at Soldiers Delight Natural Environment Area in Owings Mills
- ❖ **Monthly Meeting** October 14<sup>th</sup>, 7:00 p.m., at Bear Branch Nature Center (BBNC)
- ❖ **Planetarium Show** October 24<sup>th</sup>, 7:30 p.m., at Bear Branch Nature Center (BBNC)

### Join The Westminster Astronomical Society...

Joining WASI gives you a great opportunity to meet fellow astronomers and provides group memberships to the [Astronomical League](#) and the [International Dark-Sky Association](#). Additionally, benefits include access to our [Library](#) (over 500 astronomy-related books), the ability to borrow [club scopes](#), a subscription to the Astronomical League's *Reflector*, access to members-only observing sessions and sites, and club discounts on astronomical magazine subscriptions.

**Adult Membership is still only \$25 per year.**

**Junior Membership (under 18) is just \$5 per year**

<http://www.westminsterastro.org>

## President's Message

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Here at Bear Branch Nature Center, The Blaine Roelke Observatory is open for business. I hope you have had the opportunity to get checked out on the telescope. It's an incredible instrument to use. We still need get a few things for it but they are complimentary items to make the observatory easier to use.

Over in Taneytown, WASI member Erich Bender is continuing his efforts to get astronomy active in the Taneytown area. With Bollinger Park not yet transferred to the City, there have been alternative plans being explored. One idea is to host a regional star party near Taneytown where the skies are quite noticeably darker than here in the central Carroll County. Erich belongs to the Taneytown Rod and Gun Club whose property abuts some dark farmland. This has the potential to have a nice astronomical impact in the area. If we can get this together it would be designed to be an annual event. As more information becomes available I'll be sure to pass it on.

Lastly, up in Manchester, Wasi member Bob Clark continues to spearhead our other latest observatory site at Charlotte's Quest Nature Center. The 15" Discovery Dobsonian is there is at the ready so feel more than free to help out Bob and the staff.

Thanks for reading and enjoy the night!

I hope to see you at our next meeting.

Clear Skies

Tony Falletta

## Lunar II Guide ...

Robert Clark -25 June 2015 and 22 August 2015

When I was awarded the Lunar II pin there were a few "how to" questions asked. This little paper is intended to address those questions.

The Lunar II Astronomical League activity is a completely natural follow-on to the first lunar list. It even revisits a few of the objects from the first list but in greater detail. One of the incidental benefits of doing the Lunar II list is that it forces a review of the earlier material. You may actually remember material when you have studied it a second time and at a somewhat more advanced level.

There are a few special difficulties associated with the second list. It is the purpose of this little paper to provide a bit of guidance regarding some of the problems.

### Sketching:

Tasks requiring sketches may seem to be particularly daunting. The article by Raymond R. Thompson in the *Journal of the Royal Astronomical Society of Canada, Vol 56, No 5*, entitled "LUNAR SKETCHING" was very reassuring and helpful. It is available on the web. The fact that mine were accepted should be most reassuring. It is obvious that intent outranks talent. The articles by Erika Rix in *Astronomy* are helpful. The use of an artists stump is very helpful.

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## Lunar II Guide ...

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### Librations:

Tasks #84 and #85 require sketches or images showing libration. The list provided monthly by Charles Wood in *Sky and Telescope* provides 3 or 4 measurements of maximum libration each month. If you miss those due to your own lassitude or bad weather you are out of luck until next month – next issue of *Sky and Telescope*. A better reference is the Web page [svs.gsfc.nasa.gov/cgi-bin/details](http://svs.gsfc.nasa.gov/cgi-bin/details). It provides a movie of the wobbles and hourly measurements. With its' assistance there are relatively few nights when some sort of detectable libration is not available. A couple of beers can enhance or even induce the effect of the wobbles. The same web page provides crater names. Notice that there is no requirement that you catch libration at a maximum. Also there is no requirement that you define the position of maximum exposure in a very precise way. Only that it be identified and pictured. For example, I used variations in the exposed highland area east of Crisium as an indicator. If you use “thinning” of an edge area to illustrate a negative libration be careful that you are not mistaking a delimiter very close to the edge as libration. For example, one or two days after a full moon, when a sliver is in shadow, can look like negative libration in the area east of Crisium.

### Optional Targets:

Make use of optional targets to cover holes for targets with which that you have difficulty.

For Opt E I used old film camera type color filers. Some of the colors such as red work quite well as lunar filters in terms of adding contrast.

Personally, I was unable to resolve Davy Y, just couldn't be sure of it. That is the kind of situation that the optional objects are designed for. Likewise for one of the illuminations for the straight wall you have to detect it without much of a shadow I was unable to be sure that I was on it. These are all handy uses for the optional tasks.

### Magnification requirements:

Note that a few tasks may need as much as x100 but most work fine at x60 or x50.

### Images for reference:

Before searching for a particular feature arm yourself by examining as many images of that object as you can. The same object can look very different at only slightly varying illuminations.

Charles Wood's chart *Field Map of the Moon*.

Charles Wood's book *The Modern Moon*, his *Atlas of the Moon*.

The *British Astronomical Association, Lunar Section Circular*, and Internet sources such as *Lunar Republic* all provide pictures.

The BAA Lunar Section Circular is particularly useful in that it presents many, amateur produced pictures under a very wide variety of illuminations. These folks have a very special place in my admiration list in that they like long focus telescopes.



## Measure the moon's size and distance during the next lunar eclipse

By Ethan Siegel

The moon represents perhaps the first great paradox of the night sky in all of human history. While its angular size is easy to measure with the unaided eye from any location on Earth, ranging from 29.38 arc-minutes ( $0.4897^\circ$ ) to 33.53 arc-minutes ( $0.5588^\circ$ ) as it orbits our world in an ellipse, that doesn't tell us its physical size. From its angular size alone, the moon could just as easily be close and small as it could be distant and enormous.

But we know a few other things, even relying only on naked-eye observations. We know its phases are caused by its geometric configuration with the sun and Earth. We know that the sun must be farther away (and hence, larger) than the moon from the phenomenon of solar eclipses, where the moon passes in front of the sun, blocking its disk as seen from Earth. And we know it undergoes lunar eclipses, where the sun's light is blocked from the moon by Earth.

Lunar eclipses provided the first evidence that Earth was round; the shape of the portion of the shadow that falls on the moon during its partial phase is an arc of a circle. In fact, once we measured the radius of Earth (first accomplished in the 3rd century B.C.E.), now known to be 6,371 km, all it takes is one assumption—that the physical size of Earth's shadow as it falls on the moon is approximately the physical size of Earth—and we can use lunar eclipses to measure both the size of and the distance to the moon!

Simply by knowing Earth's physical size and measuring the ratios of the angular size of its shadow and the angular size of the moon, we can determine the moon's physical size relative to Earth. During a lunar eclipse, Earth's shadow is about 3.5 times larger than the moon, with some slight variations dependent on the moon's point in its orbit. Simply divide Earth's radius by your measurement to figure out the moon's radius!

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Even with this primitive method, it's straightforward to get a measurement for the moon's radius that's accurate to within 15% of the actual value: 1,738 km. Now that you've determined its physical size and its angular size, geometry alone enables you to determine how far away it is from Earth. A lunar eclipse is coming up on September 28th, and this supermoon eclipse will last for hours. Use the partial phases to measure the size of and distance to the moon, and see how close you can get!

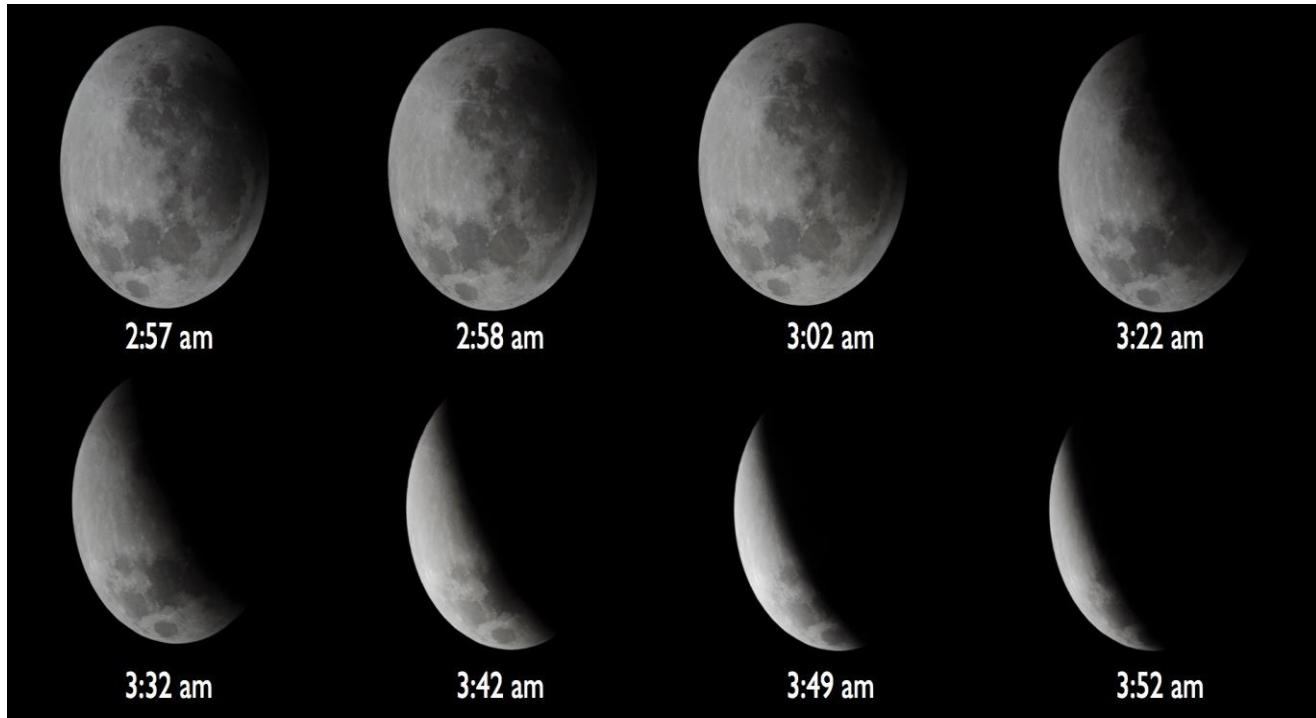


Image credit: Daniel Munizaga (NOAO South/CTIO EPO), using the Cerro Tololo Inter-American Observatory, of an eight-image sequence of the partial phase of a total lunar eclipse.