CONSTELLATION

the official publication of Bucks-Mont Astronomical Association, Inc

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Getting the most out of your telescope

– ***by Dwight Dulsky***

Although you may think this article is going to be laden with technical jargon and tips to mechanically keep your telescope in tip top shape – alas I will probably disappoint you on that front. This article will address those "other" issues which can make or break a night of star observing.

The first is to have **realistic expectations** about what you are going to see through *your* telescope. Most beginners are very disenchanted when what they see through their eyepiece does not look like that pretty picture on the box the telescope came in. The sooner you get over this, the better you will appreciate what your eyes are really seeing.

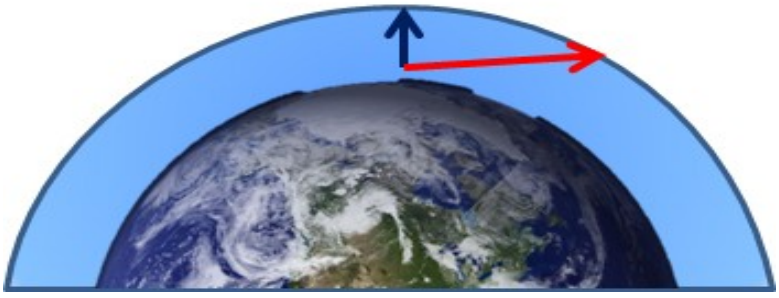
what BMAA member Brad Miller sees with his scope-mounted camera

more like what you will see through your scope

what NASA sees with the Hubble telescope

There are **a lot of variables** in observing. The quality of the image you see on any given night can change dramatically from past observing sessions of that same object.

- Altitude: How high an object is above the horizon can affect how you see it. Objects below 20 degrees are often blurring and rolling due to turbulence, dust and humidity present in the atmosphere. You are looking through a lot more air when looking out as opposed to looking up.



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Bucks-Mont Astronomical Association, Inc

General Meeting Minutes

June 2016

Location: Upper Dublin Lutheran Church, 411 Susquehanna Road, Ambler PA 19002
Meeting called to order by Gary Sprague at 7:30p. In attendance: 19 members and guests
Officers present: Gary Sprague and Dwight Dulsky (co-presidents), Lee Zager (vice-president), Ed Radomski (treasurer), and Robert Mittel-Carey (secretary)

- Gary reviewed the June calendar
- June 11th astronomy course at Souderton Mennonite Home postponed
- June 16/17 Northampton Park Jupiter watch
- Tohickon boat launch re-opened
- No starwatches planned for August
- Ed provided a treasurer's report
- Montco Observatory update: college found funds for a new Astrophysics 1600 mount which is in place and awaiting counterweights.
- Mercury transit review; several members' photos were shared along with a sketch by Gary showing the transit at different times.
- Review of Bernie's May challenge

- **Main topic: Deep Sky Observing**

Bernie shared several great tips on getting the most out of visual deep sky observing. Lots of great info, and part 2 will be presented at a later meeting.

Respectfully submitted,
Robert Mittel-Carey, secretary

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2016 BMAA Officers:

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Lee Zager, Vice President
Robert Mittel-Carey, Secretary
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Bucks-Mont Astronomical Association, Inc

General Meeting Minutes
July 2016

Location: Upper Dublin Lutheran Church, 411 Susquehanna Road, Ambler PA 19002
Meeting called to order by Gary Sprague at 7:30p. In attendance: 20 members, guests and 2 first-timers
Officers present: Gary Sprague and Dwight Dulsky (co-presidents), Ed Radomski (treasurer), and Robert Mittel-Carey (secretary)

- Gary reviewed the July - August calendar, upcoming events and planning
- Dwight discussed the Club picnic and starwatch at Nockamixon on July 30 (rain date 8/6), and the 2017 solar eclipse – what to do, etc.
- Igor shared another great set of photos highlighting several nebulas, galaxies, and an impressive 1 second video of an ISS solar transit; along with a comparision of the ISS to an Imperial TIE Fighter (from Star Wars).
- Gary shared another segment of "25 Years Ago" highlighting the launch of Sputnik and John Glenn's space flight.
- Ed provided a Treasurer's report

- **Main topic: Telescopes, Getting the Most Out of Them**

Dwight presented great information for newcomers and veterans alike on some of the key topics to be concerned with when buying and using a telescope. - *see Dwight's article in this issue [-ed]*

Respectfully submitted,
Robert Mittel-Carey, secretary

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Co-Presidents' Message

With the Solar Eclipse just a little over a year away, we thought it would be good to really make this momentous event a big focus next year. Not just with special plans for August 21, 2017, but a little at each meeting from January to August. Obviously, this will not be the only thing we will do, but it deservedly should be a great opportunity to educate ourselves and the public.

We would like to get some BMAA members who have an interest in solar astronomy and/or who are interested in just helping plan out activities and topics, and to meet to discuss ideas.

We especially invite some of the newer members to jump into this - you don't need to be a solar expert or have loads of astronomy experience.

– ***Dwight and Gary***

Addendum

This is a good opportunity for me to share with all of you my eclipse website:

http://NationalEclipse.com.

The site has been up for about a year now, and we're starting to get mentions in some of the early media stories about the eclipse. The website is really just something I do for fun, as a hobby, but as we get closer to 8/21/17, I expect traffic will start picking up significantly (currently, about 100 hits a day).

– ***Dave Clark***

- BMAA co-presidents Dwight Dulsky and Gary Sprague, and member Dave Clark provided this [-ed]

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- Seeing: On any given night the upper atmosphere can be calm and serene, while on other nights turbulent air aloft can cause variations in the "refractive index" of the column of air you are trying to look through. Even though it may seem clear and calm at the surface, those twinkling stars will be bouncing around in your telescope. Although twinkling stars may be pretty and romantic, they are the bane to visual earth bound astronomers.
- Your local light pollution: Neighborhoods, yards, parks all pretty much have some light pollution issues. Try to set up far away from light sources or at least try to block them by setting up in the shadows. There are also special filters that you can screw on your eyepiece that are designed to block the wavelength of light given off by common outdoor lighting.
- Your equipment and set up: If you own a few different scopes and eyepieces the combinations of what you see, magnifications and field of view will vary. Each of my scopes has their strengths and weaknesses. In time you will learn to pick the right scope for a given night depending on what you want to attempt to observe. If you are running an electronic "go-to" scope the fastidiousness of your setup routine will either leave you doing cart wheels across the observing field or banging your head on your tripod.

Buy reasonable equipment – Many people begin and end this hobby by purchasing the "toy" telescopes from the big box department stores or online retailers. There are certain attributes in observing that will totally frustrate someone trying to find and look at the treasures buried in the night sky. The sub $300 telescope price range basically buys you a telescope package that is lacking on almost every critical front. Although they have all the parts of the more expensive telescope packages, the robustness, quality and precision are all weak. There are certain things you just can't compromise on and still enjoy this hobby.

- Cheap scopes almost always have flimsy tripods that jiggle your image at the slightest vibration. Quality scopes have rock solid tripods to mount your scope on.
- The mount is what connects your scope to the tripod and enables it to move. Bargain basement mounts are usually mostly plastic with plastic gearing and may lack smooth slow motion controls. Some of these mounts are more just push to move, which almost always is difficult to keep objects centered in the view of the eyepiece.
- If you have only experienced the jerky loose focuser on cheap equipment, then you will be in for a treat when you wrap your fingers around a well machined two speed rack and pinion focuser. As soon as you feel that buttery smooth action, you will understand the difference.
- Obviously the quality of the optical glass lenses can have a major impact on the sights you will see through your scope. Higher end scopes will have lenses manufactured to a much higher degree of clarity and fewer distortions than the cheaper lenses.
- Control of your scope can happen several ways from manual control to motor controlled go-to type systems. The important issue here is you want smooth, precise action. Quality scopes go where you want them, stop on a dime and track well (if motorized). Cheap scopes often have jerky movements and a lot of "play" in the drivetrain that causes the object to bounce out of view once you take your hands off of the controls.
- The overall fit and finish of plastic components vs carbon fiber or aluminum, all figures in to a sturdy instrument that will hold up to the test of time vs something you will probably just put to the back of a closet.
- Better systems offer more flexibility to add desired accessories.

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- Telescope packages seem to come in three main price ranges.
  $79 - $300 Poorly constructed – not recommended
  $300 - $2000 At $300 you can start to buy a small well-made telescope. There are many systems available all across the $300-$2000 price range. Most of these scopes will be up to 8" in aperture, but you can also score some larger dobsonian style scopes in this price range, too.
  $2000 and up Usually folks who venture into this territory are looking for high quality optical systems and ultra-precise mounts plus other components. The sky is the limit as one moves from high quality "consumer" gear into the realm of professional research grade equipment.

Once you finally get a good scope, spend some quiet time with the instruction manual. Here you will learn some of the critical steps in assembling and using your scope. If the manual seems daunting, ask for some help from your local astronomy club. We are always glad to help a newcomer trough the trials and tribulations of setup and start up. Half of the battle is getting your equipment right and the other half is figuring out what all those stars in the sky are called!

Do some pre-planning before a night of observing. Most observing nights include a few different observing objectives There is a wealth of planetarium-like software and apps available to help you see what targets are available and when they are best viewed[1]. Also, prepare for the cooler night air and ways to protect your scope from a dew dampening experience which is very common in the northeast. Unless you are safely in your own backyard, try to observe with others. Some of the better observing sites are also in rather remote areas. Observing in a small group is nice and offers built in backup should someone run into trouble.

Get into a routine. Most of us are "Journeymen Astronomers" that travel to various locations to observe and image. Amateur astronomy unfortunately requires a lot of equipment in most cases. It is easy to forget something when packing the car for an evening of stargazing. Keeping a checklist taped to your main telescope box is one way to make sure you are not out in the middle of nowhere and realize you left your counterweight at home on the front porch - it happens. This may seem daunting at first, but get comfortable setting up your telescope in the dark or with red lights. Remember it is a "no-no" to be using white light flashlights in an observing area where others are trying to dark adapt their eyes. One of the first things I always do once my scope is on the mount is to align my main and finder scopes or red-dot finder. It doesn't take long and makes for a much more pleasant night finding things when your finder and main scope agree with what they are pointed at.

Get comfortable and be patient. It takes time to learn the night sky. It took me about two years to get a grasp of the main constellations and some of the names of the brighter stars. Our mind is very good at recognizing patterns once we see them. If you look at the star maps and then find those patterns in the sky a few times, it will get burned into your memory and those random points of light will eventually become old familiar friends.

Learn about your equipment. Every telescope has strengths and weaknesses in what it can bring to your eyes. Exploit your scope on the things it can do well.

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Learn about the objects you are seeing. Part of the fun of amateur astronomy is what you will learn along the way. In a related topic, come out and participate in starwatches. Too many beginners think they have to be an "expert" to share their scope with the general public. One of the things I did early on was to make it a point to look up the answers to questions people asked me at starwatches. It is amazing what knowledge you will acquire in just one season.

Ask questions. One of the best benefits of belonging to an astronomy club is you have a vast pool of seasoned astronomers who have all been through a long learning curve and started out where you are today. There are many facets to amateur astronomy and the skies are constantly offering up new and interesting things for us to see and discover. Be in it for the long haul and you will have a lifetime of memories of things few seldom see.

[1] http://www.skymaps.com is a website where you can download and printout current monthly starmaps which show the sky for that month, planet positions and popular targets to see naked eye, through binoculars and with small telescopes.

- BMAA co-president Dwight Dulsky gave this presentation at the July 2016 General Meeting [-ed]

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Some of the speakers and presentations from this year's Northeast Astronomy Forum (NEAF) are available on YouTube, including a talk about next year's Solar Eclipse. They can be viewed at:

http://rocklandastronomy.com

- BMAA member Francesca Santini and her husband attended NEAF and provided this info [-ed]

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Editor's Note

The CONSTELLATION is your BMAA club newsletter and its success depends solely on your input. Please submit articles to me at: **constellation@bma2.org**. I am trying to maintain a quarterly publication cycle, on or about the Solstices and Equinoxes with supplements as required. Thanks.

– ***Scott Petersen, editor***

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Space Place

June 2016

Hubble's bubble lights up the interstellar rubble

-by Ethan Siegel

When isolated stars like our Sun reach the end of their lives, they're expected to blow off their outer layers in a roughly spherical configuration: a planetary nebula. But the most spectacular bubbles don't come from gas-and-plasma getting expelled into otherwise empty space, but from young, hot stars whose radiation pushes against the gaseous nebulae in which they were born. While most of our Sun's energy is found in the visible part of the spectrum, more massive stars burn at hotter temperatures, producing more ionizing, ultraviolet light, and also at higher luminosities. A star some 40-45 times the mass of the Sun, for example, might emits energy at a rate hundreds of thousands of times as great as our own star.

The Bubble Nebula, discovered in 1787 by William Herschel, is perhaps the classic example of this phenomenon. At a distance of 7,100 light years away in the constellation of Cassiopeia, a molecular gas cloud is actively forming stars, including the massive O-class star BD+60 2522, which itself is a magnitude +8.7 star despite its great distance and its presence in a dusty region of space. Shining with a temperature of 37,500 K and a luminosity nearly 400,000 times that of our Sun, it ionizes and evaporates off all the molecular material within a sphere 7 light years in diameter. The bubble structure itself, when viewed from a dark sky location, can be seen through an amateur telescope with an aperture as small as 8" (20 cm).

As viewed by Hubble, the thickness of the bubble wall is both apparent and spectacular. A star as massive as the one creating this bubble emits stellar winds at approximately 1700 km/s, or 0.6% the speed of light. As those winds slam into the material in the interstellar medium, they push it outwards. The bubble itself appears off-center from the star due to the asymmetry of the surrounding interstellar medium with a greater density of cold gas on the "short" side than on the longer one. The blue color is due to the emission from partially ionized oxygen atoms, while the cooler yellow color highlights the dual presence of hydrogen (red) and nitrogen (green).

The star itself at the core of the nebula is currently fusing helium at its center. It is expected to live only another 10 million years or so before dying in a spectacular Type II supernova explosion.

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Image credit: NASA, ESA, and the Hubble Heritage Team (STScI/AURA), of the Bubble Nebula as imaged 229 years after its discovery by William Herschel.

Visit **spaceplace.nasa.gov** to explore Space and Earth science!

- Space Place is provided to local astronomy clubs by NASA [-ed]

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Space Place

July 2016

Venus and Jupiter prepare for their close-up this August

- by Ethan Siegel

As Earth speeds along in its annual journey around the Sun, it consistently overtakes the slower-orbiting outer planets, while the inner worlds catch up to and pass Earth periodically. Sometime after an outer world—particularly a slow-moving gas giant—gets passed by Earth, it appears to migrate closer and closer to the Sun, eventually appearing to slip behind it from our perspective. If you've been watching Jupiter this year, it's been doing exactly that, moving consistently from east to west and closer to the Sun ever since May 9th.

On the other hand, the inner worlds pass by Earth. They speed away from us, then slip behind the Sun from west to east, re-emerging in Earth's evening skies to the east of the Sun. Of all the planets visible from Earth, the two brightest are Venus and Jupiter, which experience a conjunction from our perspective only about once per year. Normally, Venus and Jupiter will appear separated by approximately 0.5º to 3º at closest approach. This is due to the fact that the Solar System's planets don't all orbit in the same perfect, two-dimensional plane.

But this summer, as Venus emerges from behind the Sun and begins catching up to Earth, Jupiter falls back toward the Sun, from Earth's perspective, at the same time. August 27, all three planets—Earth, Venus and Jupiter—will make nearly a perfectly straight line.

As a result, Venus and Jupiter, at 9:48p Universal Time, will appear separated by only 4 arc-minutes, the closest conjunction of naked eye planets since the Venus/Saturn conjunction in 2006. Seen right next to one another, it's startling how much brighter Venus appears than Jupiter; at magnitude -3.80, Venus appears some *eight times brighter than* Jupiter, which is at magnitude -1.53.

Look to the western skies immediately after sunset on August 27th, and the two brightest planets of all —brighter than all the stars—will make a dazzling duo in the twilight sky. As soon as the sun is below the horizon, the pair will be about two fists (at arm’s length) to the left of the sun’s disappearance and about one fist above a flat horizon. You may need binoculars to find them initially and to separate them. Through a telescope, a large, gibbous Venus will appear no more distant from Jupiter than Callisto, its farthest Galilean satellite.

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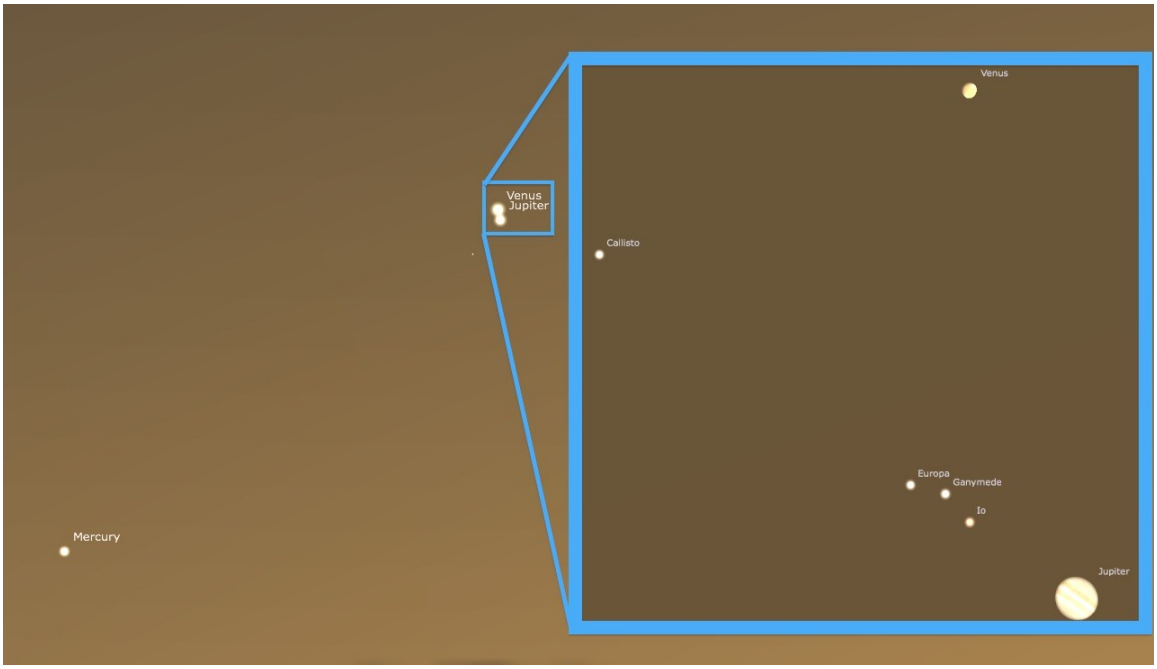

Image credit: Ethan Siegel, created with Stellarium, of a small section of the western skies as they will appear this August 27th just after sunset from the United States, with Venus and Jupiter separated by less than 6 arc-minutes as shown. Inset shows Venus and Jupiter as they'll appear through a very good amateur telescope, in the same field of view.

To teach kids more about Venus and Jupiter, visit the NASA Space Place webpages titled “All About Venus” [http://spaceplace.nasa.gov/all-about-venus/en/] and “All About Jupiter” [http://spaceplace.nasa.gov/all-about-jupiter/en/].

Visit **spaceplace.nasa.gov** to explore Space and Earth science!

- Space Place is provided to local astronomy clubs by NASA [-ed]

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BMAA Member Registration Form

☐ Renewal
☐ New Member

Name _____

_____

Address _____

_____

_____

Telephone

Home _____

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E-Mail _____

Dues are **$30.00** for an individual or **$40.00** for a family membership (more than one person at same address).

Make check payable to **BMAA and send to:**

BMAA
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36 Far View Road
Chalfont PA 18914

If you would prefer to register and pay using **PayPal** do not use this form**.** On the **PayPal** website send your payment to treas@bma2.org . Send it as a "purchase of goods" so that I receive your address. In the Email section make the subject"Dues" include your telephone # and your preferred Email address in the message area.

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