# BACK BAY observer

The Official Newsletter of the Back Bay Amateur Astronomers
P.O. Box 9877, Virginia Beach, VA 23450-9877


## EPHEMERALS september 2014

9/04, 7:30 pm
BBAA Monthly Meeting
TCC Campus, VA Beach
Building J, Rm JC-13

9/05, 8:00 PM
Garden Stars
Norfolk Botanical Garden

9/12, 7:30 PM
Star Hike
Northwest River Park

9/19, 7:00 PM
Skywatch
Northwest River Park

9/27, 6:00 PM
Nightwatch
Chippokes Plantation
Surry, VA

## Looking Up!

Well it is September again and the days are getting shorter and the nights are longer. Every morning it is a little later before it gets light out. Personally I like the cooler weather for observing, no bugs or sweat to deal with.

This month we have the Club meeting on the 4th where Leigh Anne will demonstrate the new Night Sky Network (NSN) tool kit we received. It is a pretty cool kit with models of the solar system and a few other surprises. On the 5th there is the Garden Stars event at the Norfolk Botanical Gardens and the on the on the 12th will be the NWRP Star Hike followed by Skywatch on the 19th.

Other astronomical events this month are:

- **Sept. 5:** Venus passes 0.7 degrees from the bright star Regulus
- **Sept 8:** The final Full "Super" Moon at 9:39 EDT, just 22 hours after perigee
- **Sept 15:** Comet C/2013 V5 Oukaimeden may reach +5.5 magnitude for southern hemisphere observers.
- **Sept 22:** The Autumn Equinox occurs at 22:29 EDT.

Also, a reminder to all BBAA members, November is election month for the BBAA. Please start thinking about who you would like to nominate for office. We will take initial nominations at the October meeting.

Until next time, keep looking up!

*Jim Tallman*

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# August 7, 2014 Meeting Minutes

The August meeting was called to order at 7:34 PM in Plaza Middle School's Kiva Auditorium in Virginia Beach by vice president George Reynolds.

**Members in attendance were:** Robert Beuerlein, Brenda Butler, Mark Gerlach, Dean Giangregorio, Mary Giangregorio, Pete Goulart, Michael Hiser, Chuck Jagow, Jeff Klein, Leigh Anne Lagoe, Curt Lambert, Ben Loyola, Daniel Pelzel, Vincent Pendleton, Bruce Powers, George Reynolds, Melvin Spruill Jr., Kevin Swann, Paul Tartabini, and Bird Taylor.

**Guests** were Christopher Aubright, Brooke Buonomo, Jason Buonomo, Michael Connly, Brenda Lamb, Shelby Lamb, Zachary A. Lamb, and Charlene Webster.

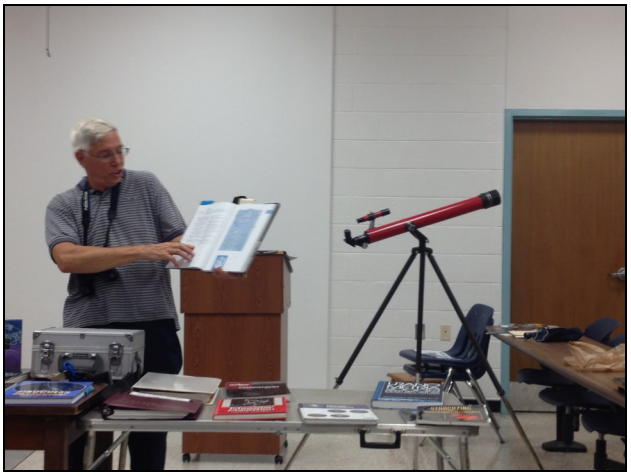
- **Treasurer's Report:** Chuck Jagow reported that there is $957.79 in the General Fund and $889.67 in the Scholarship Fund, for a total of $1847.46. 94 total members, 88 general members. All members in good standing.
- **Scholarship Report:** Ben Loyola read a 'thank you' letter from Isaac Tan, the recipient of the $1500 scholarship.
- **Old Business:** The July club picnic was a success. Due to the BBAA logging events through the Night Sky Network, we have received our first Outreach Kit, which we can use at future outreach events.

**Observing Reports:**

- 96X Fest Rockin' with the Stars in June had torrential downpours, lightning, and high winds. Fortunately no major damage to equipment.
- Michael Hiser recommends watching Melvin Spruill's time-lapse video on the BBAA Facebook page.
- Boardwalk Astronomy #4 was a success.
- Guest Chris Aubright visited dark sky location, Cherry Springs, in Pennsylvania and highly recommends it for viewing.
- Michael Hiser reported that a campground near Quimby on the Eastern Shore is dark and set up well for viewing .

**Astronomy 101:**

- Vice President, George Reynolds, discussed the basics of observational astronomy. He encouraged learning the night sky with binoculars and a planisphere, explained the drawbacks of a department store telescope, and touched on some of the different types of telescopes.
- The question, "What's the Best Telescope to buy?" was answered with, "The one you're going to use."
- Only "scratching the surface" of astronomy, he discussed red lights, adjusting the finder scope, keeping a log, joining a club, light pollution, and more. Q&A followed.
- Two Sky & Telescope magazines were given away to our guests.
- Meeting adjourned at 9:02PM .



*George Reynolds shows one of the many books from his large collection. A dreaded "department store telescope scope" (i.e., what not to buy) is seen in the background. (pictures by Bruce Powers)*

**Minutes taken by Secretary Leigh Anne Lagoe**

Note: Minutes were modified due to space constraints. Full minutes can be viewed at http://backbayastro.org/minutes/2014-08-minutes.pdf

*George models his red Astro Goggles.*

The Back Bay Amateur Astronomer's
# Observer

The BBAA Observer is published monthly; the monochrome version is mailed to members who do not have internet access. Members who do have Internet access can acquire the full color version on the Internet at **http://www.backbayastro.org/observer/newsletter.shtml**

Please submit articles and items of interest no later than the date of the monthly meeting in order to be in the next month's edition.

Please submit all items to: bbaa.newsletter@gmail.com or BBAA Observer, P.O. Box 9877, Virginia Beach, VA

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## BBAA Meetings

The BBAA meet the first Thursday of every month except for July. While school is in session, we meet at the VA Beach TCC Campus. The Sept. 4, 2014 meeting will be held at TCC in Virginia Beach, Building J, Rm JC-13 (or nearby room) at 7:30 PM. Directions are on our Night Sky Network page.

## BBAA Internet Links

BBAA Website
www.backbayastro.org

Yahoo! Groups
tech.groups.yahoo.com/group/backbayastro

BBAA Observer Newsletter
www.backbayastro.org/observer/newsletter.shtml

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# Observer's Corner

### UNEXPECTED VISITOR

Kent Blackwell

*"This image looks as if it might be a UFO, but in reality it is a shot I took of an Iridium Flare #41 as it drifed across the eastern portion of the constellation Cygnus."*

Details: Canon 20Da, 34mm f/4.5 Sigma lens, 34 second exposure at

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# A Journey to the Trifid Nebula

*By Jason Tackett*

My interest in astrophotography began in the summer of 1990 when my mother bought me my first telescope and an issue of Astronomy Magazine, bearing a picture of the awe-inspiring Trifid Nebula. This billowing magenta cloud of hydrogen gas, separated into three flower-like lobes by light-absorbing dust blooming beneath an electric blue curtain of reflected starlight absolutely amazed me. I spent hours admiring that image and decided that one day I would take a picture just like it.

*The Trifid Nebula, imaged by the author on July 25, 2014 near New Kent, Virginia. 136 minute exposure using Canon 1000D DSLR, Astronomik CLS-CCD filter, Explore Scientific 127 mm apochromatic refractor, processed with PixInsight .*

As it happened, I was just beginning middle school so my interest wandered more towards girls and music, but the allure of astrophotography always remained in the corner of my mind. Just after high school I picked up a 35mm film camera at a garage sale and captured wide field views of the starry sky from rural locations in my home state of Kansas before the camera suddenly broke. By then I had started college, which came with a vow of poverty, so my dream of imaging the night sky would have to wait until another time.

In early 2014 when I became involved with the active amateur astronomy clubs in our area I decided that the time was now. I feverishly began researching, accumulating gear and eventually imaging every clear night. Every session was a practice run for the Trifid Nebula.

Since I had set my expectations so high, I had planned on waiting until I had developed some mastery of the hobby, but with summer rocketing by and the Trifid approaching the meridian earlier each night, I decided to just go for it on an unexpected clear night in late July. Paul Tartabini and I threw together a plan that Friday afternoon to observe at dark site northwest of Williamsburg and I knew this may be my only chance before next year .

As the sun set, a bounty of stars revealed themselves like shimmering gems while I framed and focused the Trifid in my camera. Though the sky transparency was pristine, the seeing was poor, which I knew would fatten the stars slightly in each image. Since the Trifid was initially above the light dome of Williamsburg, I attached a light pollution filter to my camera and, for the first time with a deep space object, I chose ISO800 to help retain star colors which often become anemic at higher ISO.

As a consequence of these choices, my subframe exposure lengths were 10 minutes each, which I have begun to regard as big-boy exposure lengths; none of that 60 second kid stuff like they do in the suburbs.

After starting the imaging session on my laptop, I kicked back in a reclining chair and idly poked around Sagittarius and Scorpio with my binoculars while the shutter clicked away.

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# Journey to the Trifid, continued from page 4

Paul and I marveled at the bright Milky Way overhead, and every now and then he graciously offered me a peek through his scope. Though I had planned to image the Trifid for the entire night, clouds rolled in around 2:30 a.m., shutting us down. We packed up our gear and I headed home with nearly two and a half hours of exposure time on my most coveted object, anxious to begin processing.

Over the past year I have learned a lot about image processing, and I threw every trick I have learned at this image. The software I use, called PixInsight, provides a powerful suite of processes which gives results that some argue are unattainable by other programs.

At first sight of the integrated image I knew the data was good, even without processing. The emission nebula popped out easily with a mild stretch and the nebulae colors were vivid.

"Stretching" is imager parlance for making the faintest stuff brighter so it is more readily seen alongside the stuff that was already bright to begin with; i.e., you "stretch" the faint values to brighter values, replicating the eye's logarithmic response to brightness variations. However, all the stretching necessary to reveal faint nebular structure can cause stars to bloat and lose their color. Since I worked so hard to capture stars color during acquisition, I sought to keep them during processing using a technique developed by Vincent Peris of the PixInsight team. I created two copies of the unstretched image — one that was stretched strongly, to reveal the nebula, and the other stretched with a special script called *MaskedStretch,* which gradually stretches the image and retains smoothly varying star brightness profiles and, most importantly, star color! Once I had these two stretched images, I transferred the colorful stars from the one to the image with the nicely stretched nebula on the other.

Of course the "star" of the show is the Trifid Nebula itself! I worked to emphasize the dark dust lanes that separate the Trifid into its striking flower-like lobes. Using two PixInsight processes, *HDR Multiscale Transformation* and *Local Histogram Equalization,* helped me add definition to the dust lanes masterfully, revealing large and small scale details in the emission nebula. These processes work by exaggerating small differences in brightness, allowing more structure to be seen which might otherwise be undetectable by the human eye.

I am especially proud of how I brought out the faint blue reflection nebula that surrounds this object by making a mask from the blue channel to select this subtle nebulosity and applying gentle contrast curves to bring it up from the background. Though I have not mastered image processing by any means, I do get the sense from the final product that I have come a long way since my humble beginnings less than a year ago.

All told, I am quite happy with the final image. The Trifid Nebula and supporting cast of stars are bright and colorful. I absolutely love the hue of the blue reflection nebula which is even prettier than I remember from the cover of Astronomy Magazine all those years ago.

But, wait! Where is the pinkish-magenta color that this object is known for? The red from the emission nebula should blend with the blue

*Continued on page 6*

*Dark dust lanes and details after the initial non-linear stretch (left) are emphasized using HDR Multiscale Transform and Local Histogram Equalization processes (middle). Additional contrast curves and color saturation accentuate detail in the final image (right).*

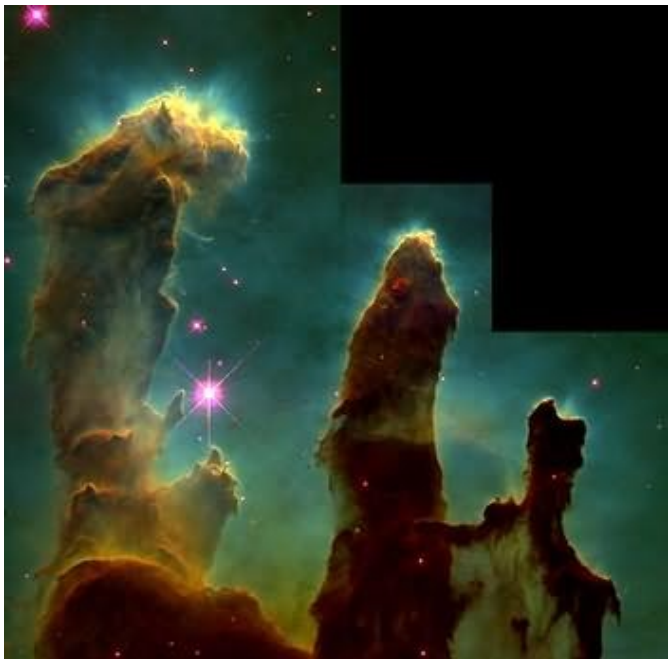
reflected starlight, producing that lovely magenta, but mine is red like any old HII region. What happened?

I spent a fair amount of time searching for the missing magenta in the final image and in the initial color calibration steps, but could never find it. I also considered whether atmospheric extinction and the bandpass of my light pollution filter conspired to zap the subtle blue that would have otherwise blended with the red H-alpha emission, but I am not entirely convinced that is the case. A close look at the processing images above does reveal hints of pink and magenta *before* the barrage of histogram tweaks, noise reduction and color saturation. So my suspicion is that, by strongly saturating the colors, I washed out the subtle magenta, which was a weak contributor in my case.

One solution to my missing magenta problem would be to selectively saturate the magenta hue earlier in processing to make it pop out, but I do not like that remedy at all. I could artificially dial in any color I want, but that goes against the philosophical goal which guides all that I hope to accomplish. I want to show the beauty that nature has given us, not attempt to fabricate something which is better, because I do not believe we can ever outdo what is already there.

Accomplished astrophotographer Rogelio Bernal Andreo calls this philosophy preserving the "documentary value," because we want to document what our cameras capture in a scientific sense. Though this may seem at odds with our desire to add an artistic flare to the composition, these two goals (aesthetic vs. documentary) cannot be separated entirely because art is an expression of the human condition and astronomical images provide context for human's place in the universe.

Think back to the Hubble Pillars of Creation image. There is something powerful in those pillars that harkens to the stone pillars bracing the halls of the Library of Alexandria, home to all of the wisdom of the ancient world. There is something about that glowing sea of



*Hubble Pillars of Creation in M16. Credit: NASA, ESA, STScI, J. Hester and P. Scowen (Arizona State University)*

hydrogen gas and simple elements that reminds us of the warm nutrient-rich waters from which we were born millions of years ago. That image reminds us that the universe is our home. It is our artistic side - our human side which feels this connection with the rest of the universe.

Great astronomical images speak to our humanity, and there is no need for a human to add anything more because we are already present in the composition. Just put Mother Nature on a stage and she will amaze you all by herself.

So can I check "take a picture of the Trifid Nebula" off my life list? Is my image one of the greats? Well, no, not quite. Even though I have a strong philosophical goal for my work, I am still developing the skills to bring this goal to fruition. When art students enter graduate school, they are expected to have mastered the working fundamentals of their medium – painters should know how to paint. Instead, they spend their effort developing and realizing a thematic vision for their work. Given my battle with magenta, I am probably only an undergraduate sophomore by this metric.

Honestly though, it is the prestige with which I hold this object that I must satisfy.

Continued on page 7

## Journey to the Trifid, continued from page 6

The only way I could check this one thoroughly off my life list is with a dedicated odyssey to a dark southern location where the skies are calm and the Trifid flies high in the night sky.

During my last year of high school I had planned to visit the McDonald Observatory in Texas for my senior trip, but I never went as my life path instead chose to meander haphazardly like a rivulet down a mountain slope, searching for the headwaters. Perhaps this would be the appropriate way to tie the dream born in my youth with my desire to create something timeless in adulthood. But this journey will have to wait until next summer. The autumn lineup of deep sky objects are rising higher each night awaiting their turn on the stage. I'll give them their due in the meantime.

View more of Jason's fascinating images on his AstroBin page:
http://www.astrobin.com/users/jtackett

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## Observer's Corner, continued from page 3

### ◀ CELESTIAL GRANDEUR

Kent Blackwell

*"This is a lovely view of the constellations Aquila and Scutum. See if you recognize any of the stars. The summer Milky Way is revealed in all its glory."*

Details: Canon 20Da, 28mm f/4.5 Sigma lens, 3 minute exposure at ISO 1600.

### ◀ FLASH IN THE DIPPER

Kent Blackwell

*"Here's a shot of The Big Dipper. I decided to stop the exposure and reshoot the picture. What I didn't realize at the time was that I captured a quick Perseid meteor. Look in the center right of the picture and see if you can spot it."*

Details: Canon 20Da, 34mm f/4.5 Sigma lens, 34 second exposure at ISO 1600.

# September 2014

| BBAA Events | Special Outreach | Astronomical Events |
|---|---|---|
| 9/04 BBAA Monthly Meeting | | 9/8 Full Moon |
| 9/05 Garden Stars @ Norfolk Botanical Gardens | 9/12 Star Hike @ Northwest River Park | 9/15 Last Quarter Moon |
| 9/19 Skywatch @ Northwest River Park | | 9/22 Fall Equinox |
| | | |
| 9/27 Nightwatch @ Chippokes Plantation | | 9/24 New Moon |

## Sneak Peek into October

Thu 10/02/2014 Monthly Meeting, TCC, 7:30 pm
Fri 10/10/2014 Skywatch at Northwest River Park, 6:30 pm
Sat 10/25/2014 Nightwatch at Chippokes State Park, Surry VA.

NASA's Space Place

# Droughts, Floods and the Earth's Gravity, by the GRACE of NASA

*By Dr. Ethan Siegel*

When you think about gravitation here on Earth, you very likely think about how constant it is, at 9.8 $m/s^2$ (32 $ft/s^2$). Only, that's not quite right. Depending on how thick the Earth's crust is, whether you're slightly closer to or farther from the Earth's center, or what the density of the material beneath you is, you'll experience slight variations in Earth's gravity as large as 0.2%, something you'd need to account for if you were a pendulum-clock-maker .

But surprisingly, the amount of *water content* stored on land in the Earth actually changes the gravity field of where you are by a significant, measurable amount. Over land, water is stored in lakes, rivers, aquifers, soil moisture, snow and glaciers. Even a change of just a few centimeters in the water table of an area can be clearly discerned by our best space-borne mission: NASA's twin Gravity Recovery and Climate Experiment (GRACE) satellites.

Since its 2002 launch, GRACE has seen the water-table-equivalent of the United States (and the rest of the world) change significantly over that time. Groundwater supplies are vital for agriculture and provide half of the world's drinking water. Yet GRACE has seen California's central valley and the southern high plains rapidly deplete their groundwater reserves, endangering a significant portion of the nation's food supply. Meanwhile, the upper Missouri River Basin—recently home to severe flooding—continues to see its water table rise.

NASA's GRACE satellites are the only pieces of equipment currently capable of making these global, precision measurements, providing our best knowledge for mitigating these terrestrial changes. Thanks to GRACE, we've been able to quantify the water loss of the Colorado River Basin (65 cubic kilometers), add months to the lead-time water managers have for flood prediction, and better predict the impacts of droughts worldwide. As NASA scientist Matthew Rodell says, "[W]ithout GRACE we would have no routine, global measurements of changes in groundwater availability. Other satellites can't do it, and ground-based monitoring is inadequate." Even though the GRACE satellites are nearing the end of their lives, the GRACE Follow-On satellites will be launched in 2017, providing us with this valuable data far into the future. Although the climate is surely changing, it's water availability, *not* sea level rise, that's the largest near-term danger, and the most important aspect we can work to understand!

*Learn more about NASA's GRACE Mission here:*
http://www.nasa.gov/mission_pages/GRACE/

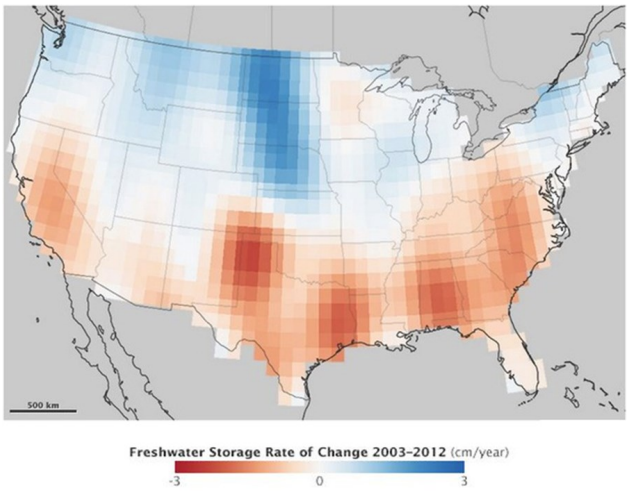


*Image credit: NASA Earth Observatory image by Jesse Allen, using GRACE data provide courtesy of Jay Famigleitti, University of California Irvine and Matthew Rodell, NASA Goddard Space Flight Center. Caption by Holli Riebeek.*