



BACK BAY observer

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

EPHEMERALS september 2013

09/05, 7:30 pm
BBAA Monthly Meeting
TCC Campus, VA Beach
Building J, Rm. JC-12

09/07
Nightwatch
Chippokes State Park
Surry, VA

09/13, 8:00 PM
Garden Stars
Norfolk Botanical Gardens

09/17, Dusk - 11:00 pm
Boardwalk Astronomy
VA Beach Boardwalk at 24 St.

09/27
Skywatch
Northwest River Park



Looking Up!

Editor's Note: This month's Looking Up column was written by Observer Editor, Paul Tartabini. President Courtney Flonta will return as the regular author.

You've got to love those rare summer nights that are cool, devoid of humidity and crystal clear. BBAA members Bill McLean, Matt Young and myself were treated to such a night August 4th on the Peninsula at York River State Park (YRSP). In the words of Bill, "it was like, DUDE and then it was like WHOA, then it was, SERIOUSLY?"

Whoa, indeed! We had only one short time where the cloudiness of the Milky Way "expanded" (if you catch my drift), so we all laid back and drifted off... After a short power nap, skies were crystal clear again, and then some!

We had fun with the Sagittarius Messiers that are so beautiful but so elusive around my home due to haze and sky glow. We Checked out **M7** (best view was in Bill's image-stabilized binoculars), admired the obvious butterfly shape of **M6** in Matt's 10" dob, and were treated to a stunning view of the **Trifid Nebula** with the dust lanes clearly visible in my 8" dob with an Ultrablock filter.

One highlight was seeing **Comet Lemon**, which was close to the star **Beta Cephei** that night and readily apparent in the dark YRSP skies, even at magnitude 10.5. Matt and I compared views of the comet which showed a small, fuzzy coma, and shared fond memories of past comets gone by and the hope of ones to come, (yes, **Comet ISON**, we're talking to you).

Spectacular views and camaraderie under the stars are what it is all about. Until next time...

Respecte Ad Astra, *Paul Tartabini*

CONTENTS

Ephemerals	1
Looking Up	1
NASA Space Place	<u>2</u>
Meeting Minutes	<u>3</u>
Book Review	<u>4</u>
Boardwalk Astronomy	<u>7</u>
Calendar	<u>8</u>

Inventing Astrophotography: Capturing Light Over Time

By Dr. Ethan Siegel

We know that it's a vast Universe out there, with our Milky Way representing just one drop in a cosmic ocean filled with hundreds of billions of galaxies. Yet if you've ever looked through a telescope with your own eyes, unless that telescope was many feet in diameter, you've probably never seen a galaxy's spiral structure for yourself.

In fact, the very closest large galaxy to us — Andromeda, M31—wasn't discovered to be a spiral until 1888, despite being clearly visible to the naked eye! This crucial discovery wasn't made at one of the world's great observatories, with a world-class telescope, or even by a professional astronomer; it was made by a humble amateur to whom we all owe a great scientific debt.

Beginning in 1845, with the unveiling of Lord Rosse's 6-foot (1.8 m) aperture telescope, several of the nebulae catalogued by Messier, Herschel and others were discovered to contain an internal spiral structure. The extreme light-gathering power afforded by this new telescope allowed us, for the first time, to see these hitherto undiscovered cosmic constructions.

But there was another possible path to such a discovery: rather than collecting vast amounts of light through a giant aperture, you could collect it over time, through the newly developed technology of photography. During the latter half of the 19th Century, the application of photography to astronomy allowed us to better understand the Sun's corona, the spectra of stars, and to discover stellar and nebulous features too faint to be seen with the human eye.

Working initially with a 7-inch refractor that was later upgraded to a 20-inch reflector, amateur astronomer Isaac Roberts pioneered a number of astrophotography techniques in the early 1880s, including "piggybacking," where his camera/lens system was attached to a larger, equatorially-mounted guide scope,

allowing for longer exposure times than ever before. By mounting photographic plates directly at the reflector's prime focus, he was able to completely avoid the light-loss inherent with secondary mirrors. His first photographs were displayed in 1886, showing vast extensions to the known reaches of nebulosity in the Pleiades star cluster and the Orion Nebula.

But his greatest achievement was this 1888 photograph of the Great Nebula in Andromeda, which we now know to be the first-ever photograph of another galaxy, and the first spiral ever discovered that was oriented closer to edge-on (as opposed to face-on) with respect to us. Over a century later, Andromeda looks practically identical, a testament to the tremendous scales involved when considering galaxies. If you can photograph it, you'll see for yourself!



The Great Nebula in Andromeda, the first-ever photograph of another galaxy. Image credit: Isaac Roberts, taken December 29, 1888, published in *A Selection of photographs of Stars, Star-clusters and Nebulae*, Volume II, Universal Press, London, 1899.

Astrophotography has come a long way, as apparent in the Space Place collection of NASA stars and galaxies posters at:

<http://spaceplace.nasa.gov/posters/#stars>

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:
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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 September 5 meeting will be held at TCC in Virginia Beach, Building J, Room JC-12 at 7:30 PM.

Directions available at www.backbayastro.org

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

August 1, 2013 BBAA Meeting Minutes

We had a very interesting, albeit unusual, BBAA meeting tonight. Due to a mixup in coordination and communication, an alternate location for TCC was not arranged for the August meeting. When someone asked, "Where is the meeting", Jeff Goldstein replied, "TCC room JC13". Since Jeff is a part-time instructor at TCC, some of us took his word for it, and went to TCC.

When I got there about 7:15 PM, I found President Courtney Flonta sitting on a bench outside the building. A few minutes later, Tom Flatley showed up, then Mike Pettry, Leigh Anne Lagoe, Ben Loyola, and Jeff Goldstein. We had an impromptu discussion there on the

plaza, sitting on the wooden benches. Then Jeff spotted a security guard, showed him his TCC ID, and got us in the door and into a conference/classroom.

Courtney called the "meeting" to order about 7:45 PM. Bill Holmes wheeled in a few minutes later, and brought with him two door prizes. Courtney put the name of each attendee in a hat, and had a member draw two names. Leigh Anne Lagoe won a green laser pointer and Ben Loyola got a solar-powered battery charger.

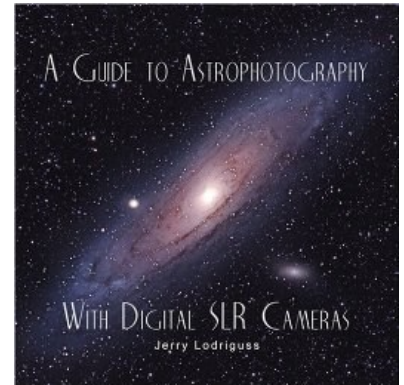
[Continued on page 6](#)

Book Review | Jason Tackett

A Perfect Introduction for a Greenhorn Astrophotographer

A Guide to Astrophotography with Digital SLR Cameras, by Jerry Lodriguss

(Astropix LLC, 350pp, \$29.13 new on Amazon)



Let me begin by confessing that, prior to reading this book, I was a greenhorn astrophotographer with only a handful of stellar photons under my belt collected 10 years ago on a few rolls of 35 mm film.

My journey into the modern era of DSLR astrophotography began with the purchase of a modified Canon 1000D DSLR camera on Astromart and the book, *A Guide to Astrophotography with Digital SLR Cameras*, by Jerry Lodriguss. Now I am proud to say that I am a book-smart greenhorn, ready to tear into this exciting hobby. In short, this book was the perfect introduction, given my skill level and impatience to begin. I feel as though Lodriguss has saved me years of frustrating trial and error with his thorough, yet concise guidebook.

To start, the format of this book is non-traditional. It is a book on CD-ROM in the form of cleanly formatted and easy to navigate HTML pages. Though I prefer printed books, several aspects of the HTML format serve the content very well. For instance, Lodriguss capitalizes on webpage mouse-over capabilities allowing the reader to switch back and forth between images with various noise levels or at different stages of processing by simply hovering their mouse over the image. Similar comparisons in print books are nowhere near as effective where images are separated, making subtle differences difficult to recognize.

The greatest benefit of the HTML format, however, is its impact on the authors' prose. Lodriguss adopts the format of modern professional web pages by organizing text into short, easy to digest paragraphs with a bulleted list of main points at the end of each section, making the content quick to read and easy to remember. The pedagogical

style employed by Lodriguss rivals that of my best graduate level college professors.

The book contains six chapters which cover everything including the equipment needed for DSLR astrophotography, details of how digital cameras work (i.e., why we should care so much about signal and noise), the logistics of imaging with or without a telescope and a solid introduction to image processing techniques.

Being an impatient novice, I immediately paid special attention to the sections on DSLR cameras and the equipment needed for astrophotography. Lodriguss gives an enlightening survey of DSLR camera attributes relevant to astrophotography (bit depth, dynamic range, camera noise, etc.) and explains the camera settings required for imaging. Since stock DSLR cameras contain a filter which blocks long wavelength light and makes photographing near-infrared hydrogen-alpha emission nebula difficult, a special section explains modification options that can be performed professionally or by yourself that overcome this limitation. Internet links are provided to specific modification services to save the reader from hapless Googling.

My favorite part of this section is the fantastic table Lodriguss provides comparing the attributes of dozens of Canon and Nikon DSLR cameras. He also gives the best advice possible: "Pick a budget and stick to it." This advice led to my decision to buy a used Canon 1000D since, as Lodriguss argues, noise and other limitations in modestly priced modern

[*Continued on page 5*](#)

Book Review, continued from page 6

DSLR cameras can be overcome by the effort and experience of the astrophotographer.

It's a good thing that I didn't spend all of my money on a top of the line camera because I still needed to budget oodles of cash for all the other gear necessary to even begin imaging through my telescope - a topic which Lodriguss covers thoroughly. That chapter explains what to consider when choosing tripods, camera lenses, telescope mounts, telescopes, accessories and image processing software. Even better, recommendations are given at various price-points, along with links to reputable vendors. Again, I thank the author for sparing me nights of Googling the internet abyss.

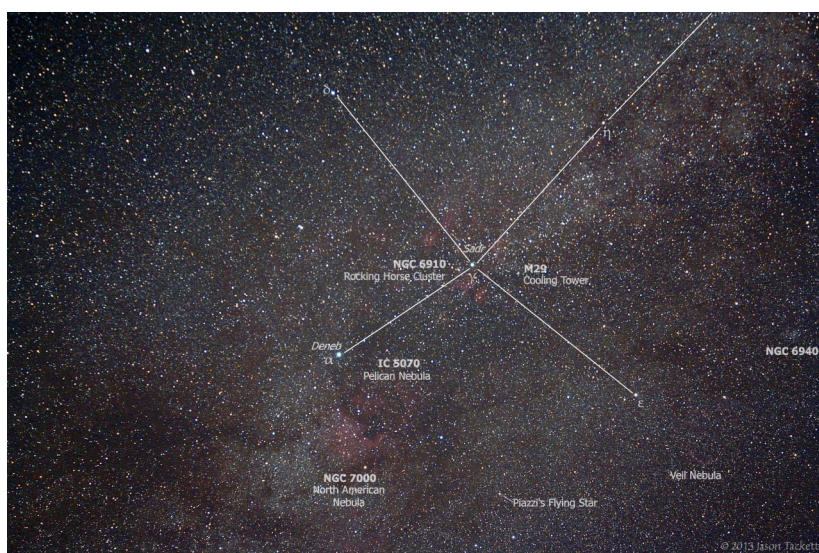


Image by Jason Tackett. Acquired from York River State Park on July 6, 2013. Canon DSLR 1000D, full-spectrum modified, 18mm aperture @ f/5.0, integration time 30 minutes, ISO 1600.

The section on accessories is very useful because it takes the mystery out of rookie questions like, "how the does the camera attach to my telescope?" and "where the heck am I going to find power for my laptop and all of this gear to image for 8 hours in the remote Arizona desert?"

More advanced considerations like telescope guiding options and the use of optical filters are also provided, again with specific recommendations. While reading this chapter I felt my wallet growing lighter by the minute as I wondered how many years of college tuition my daughter might be able to live without. To my relief, Lodriguss tamed my worries by suggesting three packages at different levels of financial commitment complete with lists of all the gear one would need to begin. Granted, even with the most modest package this is still an

expensive hobby, but having a list protects you from wasting money by buying the wrong gear.

An entire chapter is dedicated to how digital cameras work, which is appropriate given that DSLR astrophotographers spend extensive effort squeezing as much information as possible from just a few bits of signal buried in a mountain of noise and sky glow. Sources of signal and noise are clearly specified before the final section in the chapter, "Dealing with Unwanted Signals and Noise," explains how to use dark, bias and flat frames to mitigate these effects and improve the all-important signal-to-noise ratio. This section is an incredibly practical guide on how to mitigate these unwanted effects, complete with mouse-over images showing images before and after applying calibration frames.

Of course, all astrophotography begins with actually taking pictures. Lodriguss, who always keeps the novice in mind, introduces the logistics of astronomical imaging by the skill level required - from basic level images of the moon, sun and star trails, to intermediate-level piggy back and eyepiece projection, to advanced-level long-exposure prime focus astrophotography with a telescope. Recommended settings for ISO, f/ratio, and exposure length are given for each skill level and target, providing a rookie like myself with useful guidance on where to begin.

The advanced astrophotography section is the core of the book and is the most enlightening part. Specific camera settings are given and the drift polar alignment method description is particularly clear.

In DSLR astrophotography, many short duration images are combined to produce an equivalent long duration exposure after calibrating with many dark, bias and flat frames. Lodriguss explains the relationship between these images and sorts out the logistics of acquiring them, thus untangling a complicated affair into a series of manageable tasks. He even wraps the whole presentation together into a printable cheat sheet with bulleted lists for everything. This cheat sheet alone is worth the cost of the book!

[Continued on page 6](#)

Book Review, continued from page 6

Image processing is where the fun really begins in astrophotography. Lodriguss breaks this chapter down by skill level, similar to the image acquisition chapter, starting with a tutorial on basic image enhancement that demonstrates fundamental image processing steps for a single image to compensate for sky glow, sky color, vignetting, and other imperfections.

The tutorial in the advanced image processing section delves into image calibration and stacking of multiple sub-exposures of the galaxy **M33** and gives a solid introduction into the fundamental image processing techniques used to stretch and enhance even the faintest nebulosity into Astronomy Picture of the Day quality.

A huge benefit of the CD-ROM format is that all of the sub-exposures and support frames for both

tutorials are included on the CD for practice, so I was able to follow along with the tutorial and learn hands-on. The tutorials are also included as videos on the CD-ROM.

Altogether *A Guide to Astrophotography with Digital SLR Cameras* is a superb introduction to DSLR astrophotography that sufficiently describes the theory behind the art, delivers specific recommendations on equipment required and strategically takes the reader step-by-step through the logistics of image acquisition and image processing in a clear and concise manner.

After reading this book I feel empowered to begin this exciting and (so I've been told) gratifying hobby with a well-devised plan. I rate this book with the highest regard and recommend it to anyone interested in pursuing DSLR astrophotography.

August Meeting Minutes, continued from page 3

Ben Loyola has been active for several years searching for asteroids and other near earth objects and reporting them to the Minor Planet Center. He reported that his most recent contact with MPC has been discouraging. The director of the Minor Planet Center, Timothy Spahr, has told him they are no longer accepting any submissions from amateur astronomers unless they are using at least a half-meter telescope (about a 20-inch aperture), because they have most of their data coming from space satellites and large telescope arrays. When offered a donation of support to the MPC, Spahr said they accept no contributions less than \$10,000. Ben has a Skype session scheduled for Friday 8/2/13 to speak directly to Mr. Spahr.

Several members made suggestions for future meetings. Suggestions included: another workshop, perhaps a hands-on demo of washing a mirror; Jeff suggested a "binocular" night -- a session to show and explain what can be done with binoculars of different sizes and types, and then an outdoor binocular observing session; another member mentioned that there are numerous outreach presentations in the possession of various club members, and that it would be a good idea to consolidate them and make them available to all in the club, through a "library" collection; it

was suggested that George show another one or more of his PowerPoint outreach presentations so club members may see some of the things we present to the public for outreach. Courtney took notes and will discuss these with the other officers.

When asked, George stated he has the club's Personal Solar Telescope, and has used it for outreach at Old Donation School and Pungo-Blackwater Library. Ben suggested that the club invest in a clock drive and mount for it. Courtney says she has a 5-inch reflector with electronic drive that she needs to dispose of. It is available to try with the PST, so she will bring it to the next meeting. Ben offered to modify the mount, if needed, so it could be used with the PST. When other members mentioned that they too had excess equipment, Bill Holmes suggested we have a "swap meet" at a future meeting, where people bring in items that are useful, but no longer needed, and make them available to members who may be able to use them. Ben suggested that the club get a subscription to Sky & Telescope magazine and bring each monthly issue to the meeting to give to a new or inexperienced member or visitor.

Minutes taken by George Reynolds

Boardwalk Astronomy, July 2013 | Kent Blackwell

About a dozen of us set up telescopes along the Virginia Beach boardwalk on Tuesday, July 23, 2013. The weather prior to that evening had been very unsettled, and in fact a chance of thunderstorms were predicted that night. Those thunderstorms never materialized, nor did any clouds. It was beautifully clear all night.

Chuck Jagow had his solar telescope set up late in the afternoon and later his Orion 14" telescope. Large crowds always gather to look through his telescopes.

Mark Gerlach brought along a large pair of binoculars while the twins, Tommy and Chris, set their sights on the pretty double star **Alcor** and **Mizar**.



My telescope was aimed at **Saturn**. It was my intention to show the public several objects but we were never able to move the scope from the ringed planet. The line of people seemed to



never end. I don't know what I would have done if it wasn't for Roy Diffrient helping. In fact, he

never seemed to get a break. Of course with a non motor-driven telescope objects have to be re-centered after each person looks. Everyone, and I mean everyone, was so enamored by what they saw. The standard response from people was, "No way! That's a picture, right?" Two girls even remarked that it looked like a "sticker".



Not only was the sky clear but the atmosphere was exceedingly steady. Although the **Moon** was only one day past full it was still a gorgeous sight in Mark's large binoculars.

Nick Anderson showed people several objects they probably have never even heard of before. First up was **M 57**, The Ring Nebula. Then he centered the globular clusters **M 13** and **M 92**.

Overall it was a thrill-packed evening. Hundreds of people got to look through large telescopes. Most had never even looked through any telescope before, much less quality instruments. One girl from Ohio told me that was the most thrilling thing of her entire vacation to Virginia Beach.

I'm looking forward to next month's Boardwalk Astronomy. It's always rewarding to share views of celestial objects to those who never had the opportunity to see such sights in the sky .



September 2013

BBAA Events	Special Outreach	Astronomical Events
9/05 BBAA Monthly Meeting	9/08 VA Beach SPCA	9/05 New Moon
9/07 Nightwatch @ Chippokes State Park	9/13 Galaxy Hunt @ Princess Anne Library	9/12 First Quarter
9/13 Garden Stars @ NBG		9/19 Full Moon
9/17 Boardwalk Astronomy		9/26 Last Quarter
9/27 SkyWatch @ Northwest River Park		9/27 Comet ISON within 2 deg of Mars

Sneak Peek into October



Thu 10/03/2013 BBAA Monthly Meeting, TCC Campus, 7:30 pm
 Sat 10/05/2013 Nightwatch at Chippokes State Park, Surry VA.
 Fri 10/11/2013 Garden Stars at Norfolk Botanical Gardens, 7:30pm
 Fri 10/25/2013 Skywatch at Northwest River Park
 Thu 10/31—Sun 11/02 East Coast Star Party, Coinjock, NC