



BACK BAY observer

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

EPHEMERALS January 2015

1/08, 7:30 pm
BBAA Monthly Meeting
Virginia Beach Planetarium
Plaza Middle School, VA Beach

1/10, 5:00 PM
Skywatch
Northwest River Park

1/17, 4:00 PM
Nightwatch
Chippokes Plantation
Surry, VA

1/31, 7:00 PM
4-H Space Camp
Airfield 4-H Center
Wakefield, VA



Looking Up!

Happy New Year! I would like to thank everyone for making the BBAA successful in 2014, and I would really like to keep the momentum up for 2015. I'm open to any ideas that you may have that will help us educate and grow our club.

Just a reminder, in 2015 our Skywatch events will be held on Saturdays. This will make it easier for us to get out to the site. We will not have to deal with afternoon work traffic or early winter starts. We will actually be setting up 90 minutes early and offer our help with folks who have new scope and equipment that they need a little help with. I hope the club members take advantage of this and come out to enjoy the evenings with us.

On the NASA JPL Night Sky Network (NSN), we have received two more educational resource kits with some nice visual aids to use in our quest to "bring astronomy to Hampton Roads". We now have The Magnetic Sun Kit and the Space Rocks Kit. Both come with 3ft x 3ft interactive posters that we can use at our events. I'll be showing them off at our January meeting. We earn these kits by holding outreach events and using the NSN resources. After logging the event we get credit for using their resources and then they send us a new kit.

2015 looks like it will be a great year for the BBAA. I hope to see you out at our events this year. The more we have come out, the more we can support. Until next month, *Jim Tallman*

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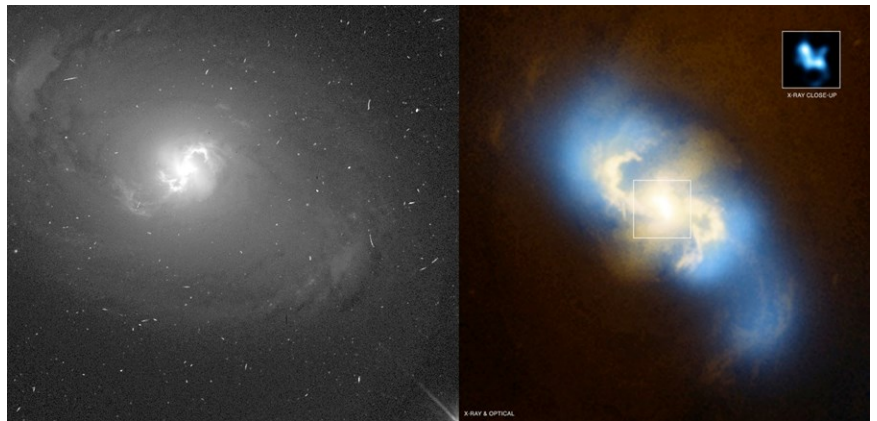
Minor Mergers Have Massive Consequences for Black Holes

By Dr. Ethan Siegel

When you think of our sun, the nearest star to our world, you think of an isolated entity, with more than four light years separating it from its next nearest neighbor. But it wasn't always so: billions of years ago, when our sun was first created, it very likely formed in concert with thousands of other stars, when a giant molecular cloud containing perhaps a million times the mass of our solar system collapsed. While the vast majority of stars that the universe forms—some ninety-five percent—are the mass of our sun or smaller, a rare but significant fraction are ultra-massive, containing tens or even hundreds of times the mass our star contains. When these stars run out of fuel in their cores, they explode in a fantastic Type II supernova, where the star's core collapses. In the most massive cases, this forms a black hole.

Over time, many generations of stars—and hence, many black holes—form, with the majority eventually migrating towards the centers of their host galaxies and merging together. Our own galaxy, the Milky Way, houses a supermassive black hole that weighs in at about four million solar masses, while our big sister, Andromeda, has one nearly twenty times as massive. But even relatively isolated galaxies didn't simply form from the monolithic collapse of an isolated clump of matter, but by hierarchical mergers of smaller galaxies over tremendous timescales. If galaxies with large amounts of stars all have black holes at their centers, then we should be able to see some fraction of Milky Way-sized galaxies with not just one, but multiple supermassive black holes at their center!

It was only in the early 2000s that NASA's Chandra X-ray Observatory was able to find the first binary supermassive black hole in a galaxy, and that was in an ultra-luminous galaxy with a double core. Many other examples were discovered since, but for a decade they were all in ultra-massive, active galaxies. That all changed in 2011, with the discovery of two active, massive black holes at the center of the regular spiral galaxy NGC 3393, a galaxy that must have undergone only minor mergers no less than a billion years ago, where the black hole pair is separated by only 490 light years! It's only in the cores of active, X-ray emitting



Images credit: NGC 3393 in the optical (L) by M. Malkan (UCLA), HST, NASA (L); NGC 3393 in the X-ray and optical (R), composite by NASA / CXC / SAO / G. Fabbiano (X-ray) and NASA/STScI (optical).

galaxies that we can detect binary black holes like this. Examples like NGC 3393 and IC 4970 are not only confirming our picture of galaxy growth and formation, but are teaching us that supermassive relics from ancient, minor mergers might persist as standalone entities for longer than we ever thought!

Check out some cool images and artist reconstructions of black holes from Chandra: <http://chandra.harvard.edu/photo/category/blackholes.html>

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 Feb. 5, 2014 meeting will be held at TCC in Virginia Beach, Building J, Rm JC-13 (or nearby room) 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

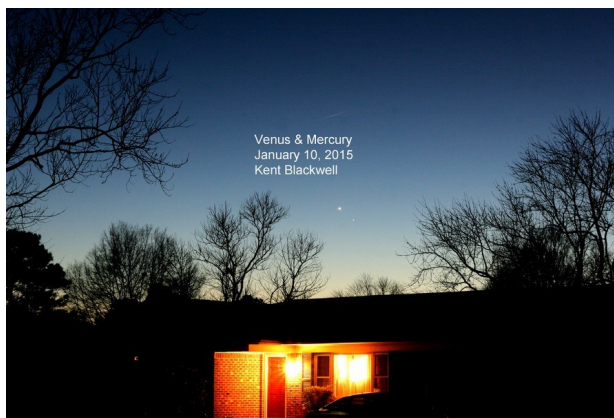
The Observer's Corner



The Moon on Christmas Night

Details: December 25, 2014 with 5" Takahashi Refractor, Canon T3i, G-11 Mount.

Image by Jim Tallman.



Venus and Mercury

"Hopefully everyone saw the near conjunction of Venus and Mercury. The Two were beautifully placed on January 10, 2015 in the western sky."

Image taken January 10, 2015 by Kent Blackwell.

Getting Started in Astronomy

Lesson 3

by George Reynolds

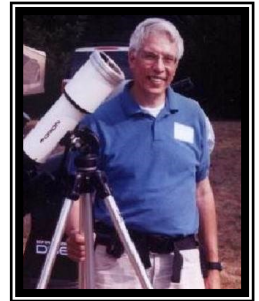
Editor's Note: Over the past few months BBAA Vice President, George Reynolds has made three presentations on various aspects of "Getting Started in Astronomy." George presented the third installment of this series at the January meeting and has been kind enough to provide supporting material that covers some of the topics from that talk.

Amateur astronomy has so many different aspects to it that pretty much everyone has something to learn. As George states in the article, there is a well of experience in our club that all of us are free to draw from whenever we want. It is actually one of the benefits of belonging to an astronomy club, so don't hesitate to ask questions. George's email is listed on page 3 along with the other officers. In addition, the club has a [web page](#), a [Night Sky Network site](#) and a [Yahoo Group](#) that each provide different ways to ask questions and interact with other club members. Not only that, but the club's monthly Skywatch and Nightwatch events are excellent opportunities to get hands on advice in the field with actual equipment from more experienced members.

In Lesson 1, we talked about getting binoculars, a planisphere and star chart, and learning the constellations. In Lesson 2, we briefly touched on the types of telescopes, aligning the finder, making a list, keeping a log, and some software programs. Today we will go into a bit more detail on how to get started using your telescope, how to determine time and distance, and a bit about astronomy "outreach". For those who may have missed the first two lessons, we will review some of those basics to get you started stargazing.

If you have questions, or there is something you don't understand, by all means, ASK! Don't feel bad (or "dumb") about asking questions. That's how you learn. I have often said that the fastest way to learn stargazing is to hang around these experienced club members, watch what they do and listen to what they say. Ask them questions. Pick their brains. We were not always this "smart" or knowledgeable about astronomy. We all had to start somewhere. So there is nothing wrong with being a "newbie" or a "greenhorn". If you attend BBAA events like Skywatch, Boardwalk

Astronomy, monthly meetings, and outreach events, you will quickly catch on, and you will be able to impress others with what you know.



First some review: Finder devices. Just as a hunter uses the sights on his rifle, or even a riflescope, the "star hunter" needs an aiming device on his telescope. There are various types of finders, such as the standard finderscope (which often gives you a reversed image), or the "RACI" finderscope (which stands for "Right Angle Correct Image"). Both of these finderscopes are low-power, wide-angle refractors which have crosshairs like a riflescope, to center your "target" object. Then there are the non-magnifying, or "one-power" finders, like the Telrad, the Rigel Quikfinder, and the red dot finder. Some amateur astronomers use a green laser pointer mounted on the telescope as a finding device.



There are many techniques for finding celestial objects, and it seems everyone has their preferred method. Pictured here are four options mentioned in the article. Clockwise from top left: red dot finder, Telrad, standard "straight-through" finder scope, and Right angle correct image (RACI) finder scope. A good place to try out different finders is at a monthly observing session like Skywatch.

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Getting Started in Astronomy, continued from [page 4](#)

As stated in Lesson 2, no matter what kind of finder you use, it is critical that the finder and the optical tube be pointing in exactly the same direction. So here are the steps to follow when you set up for an observing session.

- **Unpack your equipment and set up your telescope.** If a refractor, a Newtonian reflector, or an SCT, set it on its tripod. If a Dobsonian reflector, place the optical tube assembly (OTA) on the Dobsonian mount. Get into a routine, and practice doing it the same way once you have it down, so you can do it quickly, without forgetting items you need.
- **Align the finder.** Pick an object in the distance and center it in the eyepiece of the telescope (not the finder). Then adjust your finder so the same object is in the center of the finder. When both views agree, the finder is pointing along the same axis as the OTA, though you may need to adjust or “tweak” it slightly during an observing session.
- **Set up your other equipment.** (If applicable.) You may want to use a small folding table, or work off the tailgate of your SUV, to hold your star chart, observing list, eyepieces, and other items, like your red flashlight and binoculars.

Start Observing. Now that you are set up, what next? Here are some suggestions:

- Get your bearings. Figure out where you are and where the constellations are.
- You may want to use a compass, or look for the setting sun, to determine the directions: North, South, East, and West. If it is already dark, locate the North Star, using the “pointer stars” in the Big Dipper.
- Use your planisphere to determine which constellations are up, and where they are in the sky, once you have got your bearings.
- Your list of objects to observe should include, at a minimum, the constellation that each object is in.
- Consult your star chart (or computer, iPad, or iPhone app) to determine the approximate location of your target object in its constellation. Use your red flashlight on the dimmest usable setting to read your star



A good planisphere is a necessity for any serious astronomer. Be sure to get one customized to the latitude that you will be observing from.

charts and your notes.

- Look for “landmarks”, or reference points, like bright stars, patterns of stars, etc., that will guide you to your target.
- Your binoculars can help you identify those patterns, so you can then find them in your finderscope or other finding device.
- Center the object (or its suspected location, if you cannot see it) in the finder. If you have aligned your finder, the object should be in or near the field of view (FOV) of your eyepiece.
- Look in the eyepiece. Focus if necessary so that stars are pinpoints, not “blobs” of light.
- If you don’t see the desired target object, slowly pan back and forth or tilt up and down to attempt to identify the reference points, then zero in on the target object.
- If you’re not sure you see it, ask a more experienced observer for help. I remember when I first saw Uranus in my old 8-inch Dob. I thought it was there in my eyepiece, but I wasn’t sure. I asked a gentleman next to me if he could find it for me in his “goto” scope, a Meade LX-90, and he graciously obliged. When I looked in his eyepiece, I identified the same reference stars I had in my scope, with Uranus right where it should have been. I re-checked my scope, and sure enough, I had found Uranus. A feeling of accomplishment resulted from that small success

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Getting Started in Astronomy, continued from [page 5](#)

Don't forget to log your stargazing efforts. Keep a record of the date and time, location, weather and seeing conditions, telescope and eyepiece(s) used.

If you are searching for a faint object but were unsuccessful, log that information as well. It may help you the next time you try to find that object. You can get ideas on how to keep a log in the basic astronomy books listed at the end of this lesson: NW 96-98, TBAG 154-155 & 265 (sketching), and the back pages of OITH v 5.2.

Finish your observing session. Your observing session doesn't have to be long. Better to get out under the stars briefly than to NOT do it, for fear you don't have the time. When you finish, put everything away in an orderly manner.

- Find the best routine, and follow it so you will not forget anything. You may have noticed that when you ask another astronomer if he/she wants some help packing up, he or she will politely refuse your assistance. That is because that person knows where everything goes, and has a certain order, or routine, for putting equipment away.
- After all observing is done, you can turn on your white flashlight (if you are alone, or if ALL the others have finished observing) so you can see to put away your gear. If others are still observing when you leave, please use your red light so as not to disturb them.

- Modify your car's lights to be less obtrusive. You can put red cellophane over the dome lights inside your car, or if possible, switch them OFF so the lights will not come on when you open the doors. Use your parking lights when entering or leaving a dark site if others are there. If you can turn off your car's "automatic" headlights, do so. Others will appreciate it.

Prepare for your next session. When you get home, put away your gear where it will be accessible and convenient for when you go out again. I can't tell you how many times I have had to search for my binoculars, because I had failed to put them back in the same place every time. The same goes for your star charts and books. Keep them handy so you can refer to them before you go out again. You can even consult the charts AFTER observing, to confirm your observations and the locations of the things you saw. (Like looking at a map of the town after driving around, to see where you have been.)

Do your homework. Amateur astronomy is more fun when you know what you are doing, you know what to look for, and you know what you are looking at. You can learn a lot from the other club members, but you don't see them every day. On the other hand, you can benefit from books which you can have at hand to read, either from the public library or your own personal library. It cannot be emphasized enough that you should dig into the references below and read them actively and thoroughly in order to learn and appreciate the thrill of astronomy

Basic Astronomy References (and shorthand abbreviations):

Objects in the Heavens v. 5.2 (OITH) by Peter Birren

Nightwatch (NW) by Terence Dickinson

The Backyard Astronomer's Guide (TBAG) by Terence Dickinson and Alan Dyer

Turn Left at Orion (TLAO) by Guy Consolmagno and Dan Davis

Observer's Handbook (annual) by the Royal Astronomical Society of Canada (RASC)

Two January Sights You Don't Want to Miss!

Comet C/2014 Q2

One fun thing about our hobby is that there is always something going on in the heavens. This month is no different!

As most of you know, we were all gifted with a special "Christmas Comet" this year when Comet C/2014 Q2 began to brighten faster than expected in mid-December. You might remember the name Comet Lovejoy from late 2013 when Comet C/2013 R1 Lovejoy upstaged the much-talked-but-not-quite-worth-the-hype, Comet ISON. Well, this is a different Comet Lovejoy. In fact, it is the fifth comet discovered by Terry Lovejoy, an amateur astronomer from Australia. He spotted it while searching through images he took back in August, when it was only 15th magnitude.

Not only is Comet C/2014 Q2 still visible in January 2015, it is a stunning beauty that, as of

mid January, can be glimpsed naked eye from a dark site and looks quite nice from anywhere in binoculars. In even a small telescope it is gorgeous and shows its tail quite nicely. But, time is running out. As my astronomy planning computer program, SkyTools3, states in its synopsis on Comet C/2014 Q2:

In the following 30 days this object is obvious visually from January 20-29, and again from February 6 on, with the best view coming on January 23. During this period it will fade rapidly and will reach peak altitude of 83° on January 26.

So don't delay, if you haven't already, get out and [take a look](#). And whether you've seen it for yourself or not, you'll enjoy these superb images of Lovejoy taken by BBAA members, Kent Blackwell and Chuck Jagow.



Chuck Jagow patiently waited for Lovejoy to clear the wall of his observatory in his lovely image of Comet C2014 Q2 Lovejoy taken on Dec. 30, 2014 (left). Kent Blackwell was also busy imaging the comet on Jan. 10, 2015 as you can tell in his delightful image that shows faint traces of a tail beginning to become evident (right).

Triple Shadow Transit on Jupiter, Early Morning Jan. 24

One of the fun aspects of watching the march of Jupiter's Moons is observing when they cast their miniature black shadows onto the looming face of Jupiter. In the early hours of January 24 (1:29 to 1:51 a.m. EST) there is a chance to 'triple' the fun when the shadows of Europa, Callisto and Io all appear at once in a rare triple shadow transit.

In addition, this year it is possible to observe Jupiter's moons occulting and casting their shadows on each other! This only occurs every 6 years. Check out this [Sky and Telescope article](#) for more details.



Jupiter, Io and Europa taken on Dec. 26, 2014 at 6:15 AM by Jim Tallman. 5" Takahashi refractor, Canon T3i, G-11 mount.



January 2015

BBAA Events	Special Outreach	Astronomical Events
1/08 BBAA Monthly Meeting		1/04 Full Moon
1/10 Skywatch @ Northwest River Park	1/21 Landstown High School Astronomy Club Meeting	1/13 Last Quarter Moon
		1/20 New Moon
1/17 Nightwatch @ Chippokes Plantation	1/31 4-H Space Camp, Airfield Center, Wakefield	1/26 First Quarter Moon

Sneak Peek into February

Thu 2/05/2015 Monthly Meeting, TCC, 7:30 pm
 Sat 2/14/2015 Skywatch at Northwest River Park, 5:45 pm
 Sat 2/21/2015 Nightwatch at Chippokes State Park, Surry VA.
 Fri 2/27/2015 Garden Stars at Norfolk Botanical Gardens, 7:00 pm

