

Sky WAA tch



Supermoon

John Paladini took this image of the Moon through an 80 mm apo refractor and a canon camera (1/2000 second exposure). The image captures the so-called Supermoon, which fell on June 23rd this year. This was the largest full moon of the year and results from the coincidence of the full moon and the lunar perigee--that is the Moon's closest approach to the Earth in its elliptical orbit. The Supermoon this year is 30% brighter and about 13% larger than the average full Moon.

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Events for July 2013

Upcoming Lectures

Lienhard Lecture Hall

There will be no lectures in July or August. Lectures will resume with the annual Amateur Night, where members will present on topics of interest. Amateur Night is tentatively scheduled for September 6th.

Starway to Heaven

Saturday July 6th, Dusk

**Meadow Picnic Area,
Ward Pound Ridge Reservation,
Cross River, NY**

This is our scheduled Starway to Heaven observing date for July, weather permitting. Free and open to the public. The scheduled rain/cloud date is July 13th. Participants and guests should read and abide by our [General Observing Guidelines and Disclaimer](#).

Annual WAA Picnic

Saturday July 20th, 1:30 pm

**Trailside Museum,
Ward Pound Ridge Reservation,
Cross River, NY**

The annual picnic is a members-only event restricted to WAA members (and their families). Come enjoy the solar viewing, fellowship and food. So we can plan food and drinks, please RSVP to:

eblasts@westchesterastronomers.org.

Sky & Telescope Magazine Discount

There is a discount available to club members for *Sky & Telescope* Magazine--\$34.95/yr. Contact Paul Alimena for details at waa-membership@westchesterastronomers.org.

Members Classified

As a service to members, the WAA newsletter will publish advertisements for equipment sales and other astronomy-related purposes. Ads will only be accepted from WAA members and must relate to amateur astronomy. Please keep to 100 words, include contact info and provide by the 20th of the month for inclusion in the next issue. The newsletter is subject to space limits; so ads may be held to subsequent issues. The WAA may refuse an ad at its sole discretion. In particular, price information will not be accepted. Members and parties use this classified service at their own risk. The Westchester Amateur Astronomers (WAA) and its officers accept no responsibility for the contents of any ad or for any related transaction.

Send classified ad requests to:

waa-newsletter@westchesterastronomers.org.

Call: 1-877-456-5778 (toll free) for announcements, weather cancellations, or questions. Also, don't forget to periodically visit the [WAA website](#).

WAA APPAREL

Charlie Gibson will be bringing WAA apparel for sale to WAA meetings. Items include:

- Caps, \$10 (navy and khaki)
- Short Sleeve Polos, \$12 (navy).



A Clear Midnight

This is thy hour O Soul, thy free flight into the wordless,
Away from books, away from art, the day erased, the lesson done,
Thee fully forth emerging, silent, gazing, pondering the themes thou lovest best.
Night, sleep, and the stars.

Walt Whitman

Almanac

For July 2013 by Bob Kelly

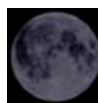
“It’s lonely in outer space”, so the song goes, and Saturn is a great example, the ringed globe hanging out in Prime Time with none of the other bright planets to keep it company. But what a sight Saturn is for our hungry telescopes! This month, a small slice of the shadow of Saturn is visible to us, projected on the rings. We see the shadow because Saturn is off to the side, relative to the Earth, in its orbit around the Sun.

Venus is way low in the western sky, trying to get some attention, barely a fist-width above the horizon after sunset. It’s not going to get much higher above the horizon for the rest of the year, but you can watch Venus get slowly larger and slightly out of round as it swings from behind the Sun toward us. Best views are still in the late afternoon sky. It’s a wonderful surprise to come across that tiny, brilliant dot in a blue daytime sky, as long as you have the Sun blocked by an opaque, immovable object. Speaking of the Sun, more sunspots have been showing up, showing signs that the Sun is rebounding toward a second peak of activity that might last into early 2014.

The morning sky is where it’s happening, low down in the east above where the Sun makes its grand entrance every morning. Mars is not the brightest of the bunch, holding at magnitude +1.5. Find Mars with binoculars and compare with reddish Aldebaran ten degrees to Mars’ upper right.

Jupiter joins Mars this month, the King of the Planets showing up its smaller cousin. Even being more than twice as far away, Jupiter still looks almost ten times larger than Mars. Jupiter moves by Mars as it passes within a degree on the 22nd, on its way into the morning horizon muck. If you have a clear eastern horizon to see this show, watch out for Mercury, below Mars later in July, rapidly getting brighter than Mars, but just never quite getting as high in the sky.

Also on the 21st and 22nd, in the evening, the star Regulus is less than a degree from Venus. Early in the month, Leo the lion imitates the diving horse of the last century at the New Jersey shore, appearing to plunge into the twilight each night.



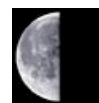
Jul 8



Jul 16



Jul 22



Jul 29

Pluto, a popular used-to-be-planet, virtually tied for the title of largest Kuiper Belt object, is up all night in July. At magnitude +14 in a crowded star field, you’d need a ten-inch or larger telescope to see Pluto. Pluto shows itself by moving slowly from night to night against the background stars. The New Horizon probe is lined up for its 2015 trip through the bull’s eye formed by Pluto’s five moons, now that observations have given scientists some assurance that New Horizon won’t hit damaging dust particles while passing through at 31,300 miles per hour.

If you wait until well after dusk, darkness brings the opportunity to explore the star fields and nebulae of Sagittarius and Scorpius, low in the south, but at their highest for the year in summer. This is where a good star chart can give us directions to wonderful sights we often don’t get to see.

The Earth is furthest from the Sun on July 2nd, but you should still wear sunscreen, with the Earth only 3½ percent further from the Sun than in January.

Did you miss the Supermoon? Try again about July 22nd. The Moon’s closest approach for July is only 1,400 kilometers further away than in the famous June ‘Supermoon’. Closest approach is only a day before full Moon, so we’ll still have a nice, large moon to photograph, and higher than normal high tides and lower than normal low tides. To see the tides changes for July’s full Moon, check out <http://tidesandcurrents.noaa.gov/> for tide predictions and observations. Also, on the 21st and 22nd, the Moon’s South Pole will be tipped toward the Earth, giving us a good view of the rough terrain caused by the numerous impacts that shaped the region. With high power, you can get lost in those hills, where someday, access to perpetual Sun on the mountain tops and water in perpetually shadowed craters may make the forbidding terrain an extraterrestrial home for humans. Did you see the lunar occultation last month? Me neither. A brighter star gets run over by the Moon this month. Check an almanac or astronomy magazine for details on how to see it, after midnight on the 20th. Spica almost gets run over by the Moon on the 15th,

and the Moon keeps a respectful distance from Saturn as it passes by on the 16th. You may spot the Moon lurking in the vicinity of Venus and Leo from the 10th through the 12th and near Mars and Aldebaran from the 4th to the 6th.

Are you ready for your 900 million mile close up? On the afternoon of July 19, the Cassini spacecraft will be taking our photo while Saturn blocks the glare of the Sun. From behind Saturn, Earth will only be a pixel or

two wide, even with Cassini's telephoto lens, but North America will be facing Saturn at that time, so smile for the spacecraft!

When the Sun sets over the Sea of Tranquility this month, it will be the 543rd sunset since Apollo 11 lifted off from Tranquility Base in July 1969. How many more sunsets will a forlorn lunar module descent stage have to wait for its dedication as the first international, interplanetary Park?

Articles and Photos

Starway to Heaven Star Party, June 1, 2013

Larry Faltz, WAA President

Although it had been rather hot and humid for the previous 3 days, the evening of the June star party looked promising, with clear skies and moderate temperatures. The skies were not at their optimal transparency, and so there wasn't an abundance of faint stars for naked eye viewing, but steady seeing made Saturn and its brighter moons excellent objects in any scope. Elyse Faltz took the census around 9:30 pm, when the sky was dark enough for observing to begin; we apologize for not including in this report a couple of folks who came later.

Everett Dickson brought a Bushnell 60 mm refractor and two pairs of binoculars, Optic 1050 and Barska 20 x 50. Arthur Linker brought his Celestron Omni XLT 102 refractor (f/9.8) with ED glass on a Super Polaris mount. Another fine refractor was Eva Anderson's Televue NP101 refractor with its wide-field Petzval optics (f/5.4) on a solid TV Gibraltar alt-az mount. Valerie and Kirsten and their family were newbies who brought a 70mm Bushnell f/12.8 refractor on a simple alt-az mount, asking for help to learn how to use it. For first light we managed to get it on Saturn at about 81x, to the family's great delight. Sadly, it's not the kind of scope that has much utility for anything other than the moon, Saturn or Jupiter, and even those it showed with difficulty. Although the image was quite reasonable, any touch made it shake like the dickens, providing a reminder of how important a stable mount is for satisfying viewing through any optics. And an alt-az scope at high power means manually chasing the object across the sky with adjustments every few seconds, and more shaking.

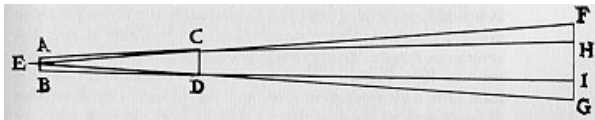
There were two nice Dobsonians, Gary Miller's very fine 12.5" Obsession and Tom Crayns' solid 10" Meade. These scopes showed Saturn well and picked up some deep sky objects through the evening. Ron Guldner and his son Jeremy brought a

Celestron Nexstar 130 SLT, a small reflector on a go-to drive. The SCT contingent consisted of Dave Butler with his venerable Meade 8" LX-90, Harry Butcher with a Celestron Nexstar 5, Alex Meleney with an 8" Meade LX-200, and Karen Seiter with her Meade LX-90. Now there's a story behind Karen's scope. During recent star parties she's had some trouble getting it to work properly. She was ready to pack it in when Gary Miller came over and suggested that she use the factory reset function in the hand control, since maybe the electronics had gotten all confused by whatever changes had agglomerated as she struggled to make it behave in previous viewing sessions. Sure enough, this fixed the problem. She was able to align and the LX-90 started making excellent go-to's. So remember: When in doubt, reboot!

The MallinCam contingent of video astronomers consisted of Albert Ferrari (8" Meade LX-200 and MallinCam Xtreme) and me (Locutis, the 8" Celestron CPC800 and MallinCam Color Hyper Plus). In the friendly techno-superiority competition inherent in the gearhead world, Locutis has many more wires than Al's scope (I don't think he's given it a name yet) but strongly in his favor was that he was running two video screens, one a direct output from the camera and one through his laptop for image capture. Because the Xtreme does all its adjustments from the computer, he could observe sitting, while I have to throw switches and manipulate the on-scope screen as the instrument shifts position, and thus do most of my observing standing. Al was spending a good bit of time refining the camera settings and making the sometimes complex adjustments that the MallinCam requires, but after some false starts he obtained some really beautiful images, particularly later in the session of M16, the Eagle Nebula, with the

famed “Pillars of Creation” easily seen as fingers of darkness against glowing red hydrogen gas. I got Locutis set up early, and once the sky settled down I took advantage of accurate go-to’s and managed a whole bunch of objects: galaxies M51 (Whirlpool), M81 (Bode’s), M82 (Cigar, with its reddish center of active star formation), M104 (Sombrero), NGC4632 (Whale, with the 12.4 mag Pup easily seen next to it), M87 and many galaxies in Markarian’s Chain in the Virgo cluster but most notably M84 and M86), globulars M3 and M5, planetary nebulas M97 (Owl), M57 (Ring) and later in the evening M27 (Dumbbell), and emission nebulas M16 (Eagle), M17 (Omega) and M8 (Lagoon).

WAA equipment wizard John Paladini made rounds throughout the evening helping out users, particularly making a software suggestion that got Al’s setup humming. There were a substantial number of visitors, including a rather knowledgeable troop of scouts. The temperature never dropped enough for dew to form, a rare gift on a good night, which kept Al and me observing until after midnight.



Galileo, *Sidereus Nuncius*, 1610

Preparing this report, I had some thoughts about Everett Dickson’s Optic binoculars. I wasn’t familiar with this brand, and went on-line to look them up. It turns out that they are being sold on TV with the breathless enticement that they allow the user “to see up to 35 miles!” I hope Everett got a look at M81, which should have been visible in the binos as a very faint fuzzy patch, because if he did he would have jumped that claim by a factor of over 10^{19} . M81 is 11.8 light-years distant, which is 69.2 billion billion [10^{18}] miles (more properly 69.2 quintillion miles, less frequently “examiles”). Of course, the claim “You can see up to 69 quintillion miles!” would not have been comprehensible or believable to potential buyers (and it’s not even true...use the binos in a very dark area, observe M87, and you’ve increased the distance to 350 quintillion miles). The other enticing claim on the “as sold on TV” ad for this instrument is that it gives “up to 1000% magnification!” Of course, as 10x binoculars, it gives *exactly* 1000% magnification. I’m reminded of Disraeli’s “There are lies, damned lies and statistics” and Mr. Spock’s

order, on one of the original *Star Treks*, “Increase magnification by one to the twelfth power!” There are perfectly good optics out there such as the Optic 1050’s that hardly need to make silly claims. Even when true, and they usually are, they don’t really enlighten. The boxes of beginner telescopes are often decorated with claims such as “600 power magnification,” which would be useless in a 60mm refractor in our atmosphere no matter how good the optics. The seller’s object is to sell as much as possible: that’s just business and one of business’ strategies, understandable if uncomfortable to some, is based on PT Barnum’s observation that “There’s a sucker born every minute.” After all, the main ethic of business is *caveat emptor*. There are more unknowledgeable people out there than knowledgeable ones and they seem more likely to respond if the truth is cast as an amazing revelation using truthful words, a.k.a. “hype,” perhaps simply words on a vocabulary list just one grade above their level.

The best example of this is a famous ad for Bayer Aspirin. In 1964, the *Journal of the American Medical Association* published the results of a research study that compared dozens of different brands of aspirin. The results were that all of them were exactly the same. Someone at Bayer’s advertising agency came up with what has to be the greatest true but public-fooling advertising claim of all time: “Bayer Aspirin is *Unsurpassed!*” Of course it was unsurpassed. It was the same as every other one! But the ad worked, and Bayer sales jumped. Bayer Aspirin’s real claim to fame, and it’s not a trivial one, is that it was the first chemically synthesized mass-produced drug (1899), initiating the modern era of pharmaceuticals. But if the society depicted in Orwell’s dystopian novel *1984* finally comes to pass, we should date the beginning of its language “Newspeak” to that advertisement.

One of our responsibilities as amateur astronomers and members of WAA is to teach the interested public enough for them to understand the capabilities of optical instruments and how to evaluate them in light of what their needs and interests might be and what the local viewing opportunities and conditions are. But many first scopes are bought on impulse, or with the hope that it will interest a child in science and learning when there are few other stimuli in that direction either in school or in the household. It’s a laudable goal, but it’s unlikely to work as an isolated strategy. We do need to try, but we will still reach many folks one scope too late.

“Stars over the Harbor” at Wainwright House, Rye, June 14th

Larry Faltz

Wainwright House, located in an exclusive area of Rye near Long Island Sound, bills itself as “a learning center dedicated to inspiring greater understanding through body, mind, spirit and community.” Peggy Hill, the House’s interim director, contacted WAA in May about the possibility of doing an outreach event on the property. Peggy had been Executive Director of the Rye Arts Center back in 2009 when RAC mounted a very successful exhibition of images from the Hubble Space Telescope, which notably opened with a presentation by WAA on astrophotography.

The event was called “Stars over the Harbor” and was widely publicized in the local media, with WAA given prominent billing. The last-minute forecast called for cloudy weather clearing later in the evening, but this time the weatherman smiled on us and around 7:30 pm the skies cleared with excellent transparency. Peggy had asked that I give a lecture prior to the viewing. So at 8:15 in their large party tent (which was going to host a wedding the next afternoon) I spoke about our activities in the club, gave a little scientific background about astronomy and projected images of the moon, planets and deep sky objects. I also talked about how these would appear in our telescopes. At least 50 people attended the lecture and more showed up for the viewing at 9:15.



Our viewing area, looking west

Wainwright House is situated on a peninsula jutting south from the mainland, separated from the Marshlands Conservancy to the west by an inlet.

Although there are trees on the property, there was enough exposure to allow decent viewing from the lawn west of the House. The area has little street lighting and the house and grounds lights were turned off during our event. Polaris cleared the trees to the north, and Saturn, at 32 degrees altitude, was above any obstructions to the south.

Club members came out in force, bringing a variety of instruments that added to the interest and educational value of the evening. Bob Kelly brought his 8” Orion dobsonian. He thoughtfully brought a full-aperture mylar solar filter and showed sunspots to the early attendees. He also pointed out Mercury and Venus just after sunset. Paul Alimena brought his Astroscan and also had binoculars on a parallelogram mount. Dave Butler brought his 8” Meade SCT, a scope that I am sure holds the WAA record for outreach events. Sharon Gould viewed through her 90mm Celestron Maksutov. Claudia and Kevin Parrington also brought a 90 mm Mak. Eva and Erik Andersen came with their elegant TV 101 NP, which just that day had been fitted with a TeleVue Sky Tour object computer to assist with pointing. I brought my 8” Celestron SCT. Charlie Gibson was there to assist, encourage and point out the stars.

A beautiful 5-day old crescent moon and Saturn were the main targets, the brightest objects visible during the lengthy period of twilight this time of year. Both were wonderful in every scope. Most of the attendees had never seen either object in a telescope before, and their astonishment and appreciation was quite thrilling. About 45 minutes after we started viewing, the moon ducked behind some trees at the edge of the inlet (to the disappointment of many), but Saturn stayed visible for the whole event. Later on, I was able to show globular clusters M13 and M3, galaxies M82 and M82 and planetary nebulae M57 (Ring) and NGC6543 (Cat’s Eye), as well as a few double stars (Polaris, Albireo, Alcor/Mizar and Rasalgethe). Dave Butler showed open cluster M39. Higher magnification helped bring out the contrast in the faint deep sky objects, a challenge since it never got very dark. By 10:45, the crowd had thinned and we headed home after a very successful outreach event.

World Science Festival Re-cap by Claudia Parrington

Kevin and I were able to take part in the 2013 World Science Festival recently. We attended the event "Dance of the Planets: An Evening Under the Stars". This was a great event which enabled non-astronomers to view through telescopes and listen to speakers present on astronomy. The event took place at Brooklyn Bridge Park right by the water. We set up our scope early and took advantage of the view of the Brooklyn Bridge, the Statue of Liberty and the Majestic Freedom Tower. While waiting for it to become dark, we met many members from the Amateur Astronomers Association of New York (www.aaa.org) as well as a few people from The Astronomical Society of New Haven, Inc. (www.asnh.org).



Kevin and Claudia



The Naglers

One of the evenings many highlights: Kevin and I were able to meet Al Nagler who was with his wife viewing with his TeleVue 85mm. Just meeting him, made our night. He said that if Kevin had his original 13mm nagler, he would have signed it. I had never met him, and he was just so down to earth.

There were a variety of different scopes at the event. We had

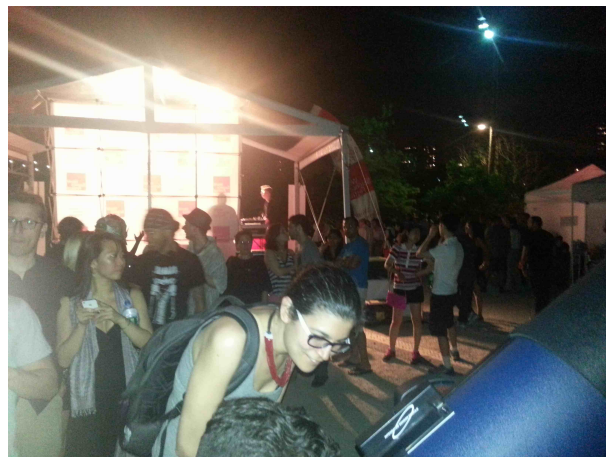
my Meade 8" Light Switch and my Celestron SLT 90mm. AAA had many members there with their scopes. Surayah White – Meade ETX 125, Joseph White, Orion Astroview 90mm; Joseph "Jupiter Joe" Martinez – Celestron SLT 90mm and a Solar scope (forgot the name), Katherine Cintron – Meade ETX 125ec, Azrin Hassan - Meade ETX 80, Tony Hoffman - Stellarview 4 inch refractor, Rori Baldari - Sky Watcher 100mm refractor, Carey Horwitz - Stellarview 90 refractor and John Benfatti - Celestron Nextstar 8". ASNH had their president and vice-president Greg and Cheryl Barker with their 18" Dobsonian and Allan Sacharow with his Takahashi FS 128 5" telescope. Celestron also set up some scopes for viewing. They had their CPC 1100 HD which was a big hit and they also had their 6" Sky Prodigy.

Once the first few objects came into the sky, everyone went to aligning their scopes. My Light Switch is a great telescope because I do not have to align it. Instead I just flip a switch and it aligns itself. This is normally the case but with all the light pollution, I had two failed alignments so I had to just manually align it the third time. While I was aligning my scope, the other scopes around me all had Saturn in view. Saturn seemed to be the only thing that everyone was viewing due to the light pollution. AAA members were all used to this light pollution so it worked out for them. It was a great turnout and there were people everywhere. By the time my scope was functioning, there was a long line of people waiting to see Saturn. The reactions that we heard were great. There was one person who thought I had a sticker on my scope with Saturn; they just couldn't believe that they were looking at the real thing. When people were looking at my other scope, the SLT 90, they were impressed that they were able to see a great image from a small scope.

While we were busy viewing, there were speakers that were discussing astronomy. There was Mario Livio who is an internationally known astrophysicist, a best-selling author and a popular lecturer. His popular book *The Golden Ratio: The Story of Phi, the World's Most Astonishing Number* won the Peano Prize for 2003, and the International Pythagoras Prize for 2004, as the best popular book on mathematics. Other speakers included astrophysicist Emily Rice, who is an assistant professor at the College of Staten Island, City University of New York and a research associate in the department of astrophysics at the American Museum of Natural History; Meg Schwamb who is an

astronomer and planetary scientist. She is currently a National Science Foundation (NSF) astronomy and astrophysics postdoctoral fellow at Yale University's Center for Astronomy and Astrophysics (YCAA). These speakers discussed astronomy with the crowd and responded to questions.

This event was something that we took part of in 2011 and we were happy that we returned and look forward to 2014. Hopefully we can get more representation from WAA members.

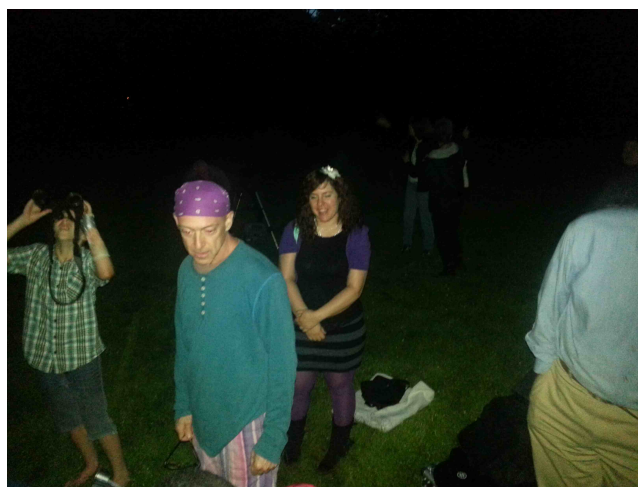


Viewing at the World Science Festival

Moon Over Hastings ***by Claudia Parrington***

Kevin and I participated in an event called the "Moon Over Hastings", part of the Discover the Rivertowns Weekend that took place June 8-9, 2013. The Weekend included music, arts, walking tours, dance, theater and astronomy. Iris Dudman had contacted WAA to see who could help out and then Kate Washton met us at the field. Where we live the sky didn't look promising but when we got to Hastings-on-Hudson, it was clear skies. It didn't get dark until closer to nine but there was a small crowd that waited to see through the scopes. We had my Meade 8 inch Light Switch which was a big hit and my Celestron 90mm SLT. The main thing we were able to see was Saturn. The people that viewed it were amazed that they were able to see its rings. We used our Meade 4000 series 24-mm-8mm zoom lens and we were able to see about two of Saturn's moons (some people were

able to see three). There was someone from the Andrus Planetarium in Yonkers that asked to see a few different things so we looked at Alberio and we were able to see the blue and gold colors. We also looked at M15, the Hercules Cluster which was also a big hit. There were a lot of trees so we couldn't see many things but it was great despite that. The mayor of Hastings was also there, Peter Swiderski, which we thought was great. We learned that Hastings-on-Hudson is such a small community that everyone seems to know each other. As people were arriving, they were greeted with someone they already knew. Kate has she said that they try to do this weekend event about twice a year. We enjoyed ourselves and hope to have other WAA members join us next time in October.



Participants at the Moon Over Hastings

High-energy Spy by Dr. Martin C. Weisskopf

The idea for the Chandra X-Ray Observatory was born only one year after Riccardo Giacconi discovered the first celestial X-ray source other than the Sun. In 1962, he used a sounding rocket to place the experiment above the atmosphere for a few minutes. The sounding rocket was necessary because the atmosphere blocks X-rays. If you want to look at X-ray emissions from objects like stars, galaxies, and clusters of galaxies, your instrument must get above the atmosphere.

Giacconi's idea was to launch a large diameter (about 1 meter) telescope to bring X-rays to a focus. He wanted to investigate the hazy glow of X-rays that could be seen from all directions throughout the sounding rocket flight. He wanted to find out whether this glow was, in fact, made up of many point-like objects. That is, was the glow actually from millions of X-ray sources in the Universe. Except for the brightest sources from nearby neighbors, the rocket instrument could not distinguish objects within the glow.

Giacconi's vision and the promise and importance of X-ray astronomy was borne out by many sounding rocket flights and, later satellite experiments, all of which provided years-, as opposed to minutes-, worth of data.

By 1980, we knew that X-ray sources exist within all classes of astronomical objects. In many cases, this discovery was completely unexpected. For example, that first source turned out to be a very small star in a binary system with a more normal star. The vast amount of energy needed to produce the X-rays was provided by gravity, which, because of the small star's mass (about equal to the Sun's) and compactness (about 10 km in diameter) would accelerate particles transferred from the normal star to X-ray emitting energies. In 1962, who knew such compact stars (in this case a neutron star) even existed, much less this energy transfer mechanism?

X-ray astronomy grew in importance to the fields of astronomy and astrophysics. The National Academy of Sciences, as part of its "Decadal Survey" released in 1981, recommended as its number one priority for large missions an X-ray observatory along the lines that Giacconi outlined in 1963. This observatory was eventually realized as the Chandra X-Ray Observatory, which launched in 1999.

The Chandra Project is built around a high-resolution X-ray telescope capable of sharply focusing X-rays onto two different X-ray-sensitive cameras. The focusing ability is of the caliber such that one could resolve an X-ray emitting dime at a distance of about 5 kilometers!

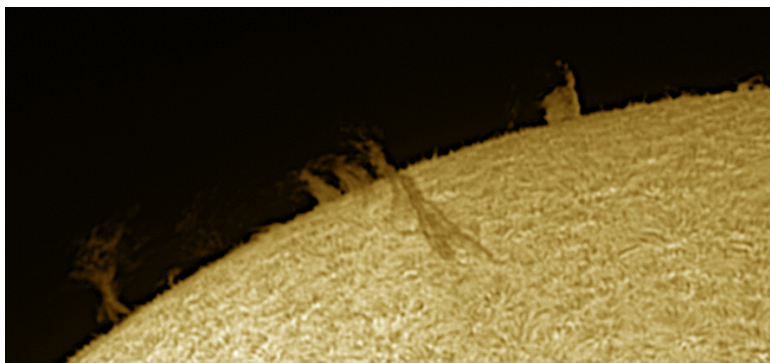
The building of this major scientific observatory has many stories.

Learn more about Chandra at www.science.nasa.gov/missions/chandra. Take kids on a "Trip to the Land of the Magic Windows" and see the universe in X-rays and other invisible wavelengths of light at spaceplace.nasa.gov/magic-windows.

Dr. Weisskopf is project scientist for NASA's Chandra X-ray Observatory. This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

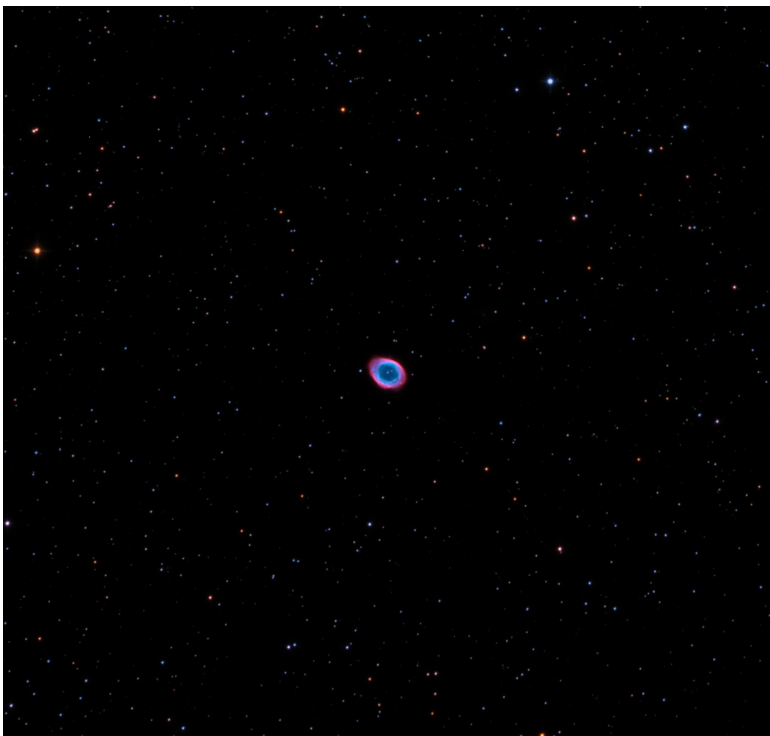


Composite image of DEM L50, a so-called superbubble found in the Large Magellanic Cloud. X-ray data from Chandra is pink, while optical data is red, green, and blue. Superbubbles are created by winds from massive stars and the shock waves produced when the stars explode as supernovas.



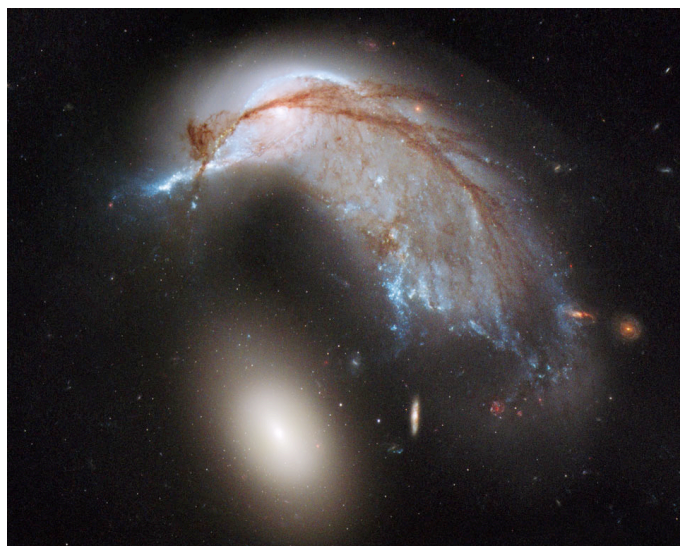
◀ Solar Prominence

Courtesy of John Paladini is this image of a solar prominence taken with a Chameleon Point Grey camera through a 60mm Lunt solar telescope. Prominences occur where the Sun's magnetic field reduces heat flow to a region, lowering its temperature. Hotter gas surrounding the region then contains the gas in the prominence allowing the structure to form and persist.



◀ Ring Nebula

Olivier Prache took this 16-hour image of M57--the Ring nebula in Lyra--through his Hyperion 12.5" astrograph using an M116803 camera. Notes Olivier: not necessarily the best fit for this scope given the object size but I wanted to see where this could lead. IC1296 is barely visible at about 2' off M57 but, at Mag 15.5, even 16 hours are not enough to bring it out fully.



◀ Porpoise Galaxy

Just a few hundred million years ago, NGC 2936, the upper of the two large galaxies shown was likely a normal spiral galaxy. But then it got too close to the massive elliptical galaxy NGC 2937. Dubbed the Porpoise Galaxy for its iconic shape, NGC 2936 is not only being deflected but also being distorted by the gravitational interaction. Perhaps a similar fate awaits our Milky Way galaxy as it faces a collision with the larger Andromeda galaxy in the distant future.

Image Credit: [NASA](#), [ESA](#), and [The Hubble Heritage Team \(STScI/AURA\)](#)