

# *Sky* **WAA** *tch*

*The Monthly Publication of the Westchester Amateur Astronomers*

*January 2010*



## *A Winter Rose*

Doug Baum supplied the above image of the Rosette Nebula in Monoceros. It is a 30 minute exposure with a Takahashi FSQ-106 EDX and QSI 532wsg CCD camera using an 5nm AstroDon H-alpha filter.

The Rosette (designated NGC 2237-2239 and 2246) is a large H-II region associated with the open cluster NGC 2244. Such regions of ionized hydrogen coincide with areas of active star formation. The Rosette is over one-degree in diameter and is about 2500 light years away.

# Events for January 2010

## ➤ Monthly Meetings

"It Moves. . ."

Friday January 8<sup>th</sup>, 7:30PM

Andrus Planetarium

Hudson River Museum, Yonkers

Our speaker is Sam Storch, a frequent guest lecturer at local planetariums and a professor at Nassau Community College. Sam will provide a creative roundup of interesting images from the world of astronomy, highlighting the phenomenon of motion. Free and open to the public.

## Upcoming Lectures

On February 5<sup>th</sup> we will have Brother Novak, who will address "Is There Life on Mars?" On March 5<sup>th</sup> David High, a NASA Solar System Ambassador will speak on the the Chandra X-Ray Space Telescope. The time and location of future meetings will be announced.

## ➤ Starway to Heaven

Saturday January 9<sup>th</sup>, 6:30-9:00PM

Meadow Picnic Area, Ward Pound Ridge Reservation, Cross River

This is our scheduled Starway to Heaven observing date for January, weather permitting. Free and open to the public. The scheduled rain/cloud date is January 16<sup>th</sup>.

## Renewing Members. . .

Larry & Elise Faltz - Larchmont

Maida Family - Port Chester

Rob & Melissa Baker - West Harrison

James Cobb - Tarrytown

Jay Friedman - Katonah

David Butler - Mohegan Lake

Matt Ganis - Carmel

Theodore Keltz - New Rochelle

## PRODUCT REVIEW

*Astronomy Technology Today* has written a review of the Binocular Photo Machine (the BIPH). The review is available at: <http://nightvisionastronomy.com/>



Credit: NASA, ESA, and the Hubble SM4 ERO

*Many spiral galaxies have bars across their centers. Even our own Milky Way Galaxy is thought to have a modest central bar. Prominently barred spiral galaxy NGC 6217, pictured above, was captured in spectacular detail in this recently released image taken by the newly repaired Advanced Camera for Surveys on the orbiting Hubble Space Telescope.*

**Call: 1-877-456-5778** (toll free) for announcements, weather cancellations, or questions. Also, don't forget to periodically visit the WAA website at: <http://www.westchesterastronomers.org/>.

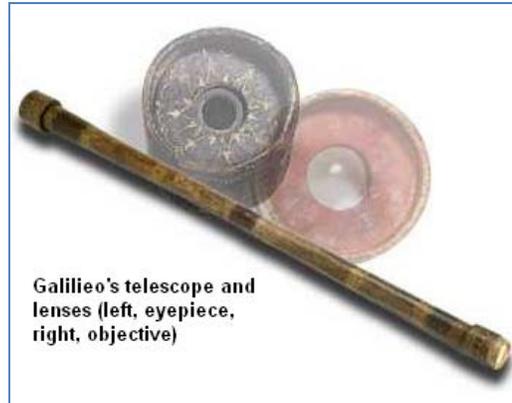
Westchester Amateur Astronomers, Inc., a 501(c)(3) organization, is open to people of all ages with the desire to learn more about astronomy. The Mailing address is: P.O. Box 44, Valhalla, New York 10595. Phone: 1-877-456-5778. Meetings: Andrus Planetarium, Hudson River Museum of Westchester, 511 Warburton Ave., Yonkers. Observing at Ward Pound Ridge Reservation, Routes 35 and 121 South, Cross River. Annual membership is \$25 per family, and includes discounts on *Sky & Telescope* and *Astronomy* magazine subscriptions. Officers: President: Mike Virsinger; Vice President: Charlie Gibson; Vice President Programs (lectures): Pat Mahon; Treasurer: Doug Baum; Vice President Membership: Paul Alimena; Vice President Field Events: David Butler; Newsletter: Tom Boustead.

# Articles and Photos

## Some Brief Thoughts on Galileo Galilei (1564-1642)

By Larry Faltz

We've just finished the International Year of Astronomy, celebrating the 400th anniversary of the first views of the heavens through a telescope. Although the telescope was invented two years earlier in Holland, the Italian Galileo was the first to turn it skyward. One of his two remaining telescopes was exhibited at the Franklin Museum in Philadelphia last year. It is remarkably frail, a 4-foot long thin tube covered in paper, with a 2" objective stopped down to less than an inch (to improve resolution), giving 14x magnification. Its two imperfectly ground lenses gave a blurry image in a narrow field of view, but good enough to change the human race's view of the universe forever.



Galileo's telescope and lenses (left, eyepiece, right, objective)

In the fall of 1609, Galileo viewed the moon, finding mountains, craters and maria, and he found that the Pleiades and the Milky Way had many more stars than could be seen with the naked eye. These observations ran counter to the Ptolemaean viewpoint of a fixed celestial sphere that had held sway for 1500 years and meshed with the doctrine of the all-powerful Catholic Church. In January 1610, Galileo observed the planet Jupiter. Over the course of several nights, he noticed that small "stars" near the planet changed positions on either side, and he correctly deduced that they were orbiting Jupiter. This was a further challenge to Ptolemy, who held that all celestial bodies must circle the Earth.

He published his observations in March 1610 in Latin in a pamphlet called *Sidereus Nuncius* (The Starry Messenger). An English translation of this seminal work with the original illustrations is at: [www.bard.edu/admission/forms/pdfs/galileo.pdf](http://www.bard.edu/admission/forms/pdfs/galileo.pdf).

The most profound of his observations, the decisive evidence that Ptolemy's geocentric view was wrong, was his observation of the phases of Venus in September 1610. This proved the heliocentric theory of the solar system, which was first

suggested by Aristarchus about 250 BC, ignored by Ptolemy, and re-expounded in Copernicus' *De revolutionibus orbium coelestium* in 1543.

Galileo's other great contributions (among a raft of significant ideas) were the proof of the uniform acceleration of falling bodies, romantically but probably apocryphally illustrated at the Leaning Tower of Pisa, and the concept of inertia, which he elucidated some years before Newton published his laws of motion. He is also credited with explaining the motion of the pendulum. If you visit the very

beautiful Pisa Cathedral, the guide will point out the chandelier and explain how, during a boring church service, Galileo watched that very same chandelier swing in a draft while counting his own pulse. Sadly, you are no longer allowed to climb to the top of the Leaning Tower, but I was able to do it in 1985 and it was a major thrill to think I was walking in the great man's footsteps (even if the story was apocryphal).

Galileo's Observations of Jupiter (as drawn in the *Starry Messenger*)

1/7	*	*	○	*
1/8			○	* * *
1/9	*	*	○	
1/11	*	*	○	
1/12		*	○	*
1/13	*		○	* *

Galileo's struggle with and persecution by the church, which began in 1616 and culminated with his trial for heresy in 1633, has been retold many times. When I was in grammar school in the 1950's, the science curriculum underwent a radical amplification in the aftermath of Sputnik, and astronomy naturally was a big part of what we were taught. Galileo was held up for us as a model of inquisitiveness and rationality, a victim of prejudice and orthodoxy, and an avatar of science's struggle with ignorance during its birth in the 16th and 17th centuries (a struggle it amazingly and

sadly still experiences today). I was not surprised when my P.S. 96 and Bronx High School of Science classmate Dava Sobel wrote *Galileo's Daughter* in 1999, one of the most readable biographies of this remarkable, important and perhaps ultimately tragic individual, the man who was the first telescope-using amateur and professional astronomer, called by Einstein and Hawking "the father of modern science". I highly recommend Dava's book.

## Sunglasses for a Solar Observatory By Patrick Barry

In December 2006, an enormous solar flare erupted on the Sun's surface. The blast hurled a billion-ton cloud of gas (a coronal mass ejection, or CME) toward Earth and sparked days of intense geomagnetic activity with Northern Lights appearing across much of the United States.

While sky watchers enjoyed the show from Earth's surface, something ironic was happening in Earth orbit.

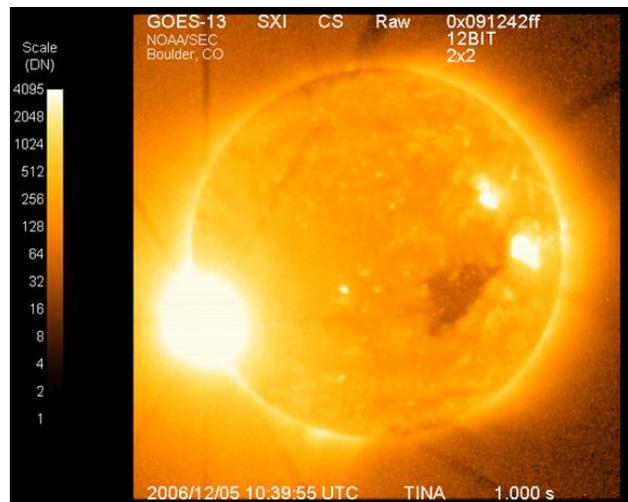
At the onset of the storm, the solar flare unleashed an intense pulse of X-rays. The flash blinded the Solar X-Ray Imager (SXI) on NOAA's GOES-13 satellite, damaging several rows of pixels. SXI was designed to monitor solar flares, but it must also be able to protect itself in extreme cases.

That's why NASA engineers gave the newest Geostationary Operational Environmental Satellite a new set of sophisticated "sunglasses." The new GOES-14 launched June 27 and reached geosynchronous orbit July 8.

Its "sunglasses" are a new flight-software package that will enable the SXI sensor to observe even intense solar flares safely. Radiation from these largest flares can endanger military and civilian communications satellites, threaten astronauts in orbit, and even knock out cities' power grids. SXI serves as an early warning system for these flares and helps scientists better understand what causes them. "We wanted to protect the sensor from overexposure, but we didn't want to shield it so much that it couldn't gather data when a flare is occurring," says Cynthia Tanner, SXI instrument systems manager for the GOES-NOP series at NASA's Goddard Space Flight Center in Greenbelt, Maryland. (GOES-14 was called GOES-O before achieving orbit). Shielding the sensor from X-rays also reduces the amount of data it can gather about the flare. It's like stargazing with dark sunglasses on. So NASA engineers must strike a balance between protecting the sensor and gathering useful data. When a dangerous

flare occurs, the new SXI sensor can protect itself with five levels of gradually "darker" sunglasses. Each level is a combination of filters and exposure times carefully calibrated to control the sensor's exposure to harmful high-energy X-rays. As the blast of X-rays from a major solar flare swells, GOES-14 can step up the protection for SXI through these five levels. The damaged sensor on GOES-13 had only two levels of protection—low and high. Rather than gradually increasing the amount of protection, the older sensor would remain at the low level of protection, switching to the high level only when the X-ray dose was very high. "You can collect more science while you're going up through the levels of protection," Tanner says. "We've really fine-tuned it." Forecasters anticipate a new solar maximum in 2012-2013, with plenty of sunspots and even more solar flares. "GOES-14 is ready," says Tanner.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with NASA.



*X-9 class solar flare December 6, 2006, as seen by GOES-13's Solar X-ray Imager. It was one of the strongest flares in the past 30 years.*

# Constellation Corner

By Matt Ganis

Happy New Year everyone! Can you believe its 2010 already? It's amazing how fast time flies. As some of you may know, I keep all of the articles I write for the newsletter on my laptop (for reference) and it's amazing to see that this is the start of the 6th year for me writing these columns!! It really does seem like just yesterday that I started.

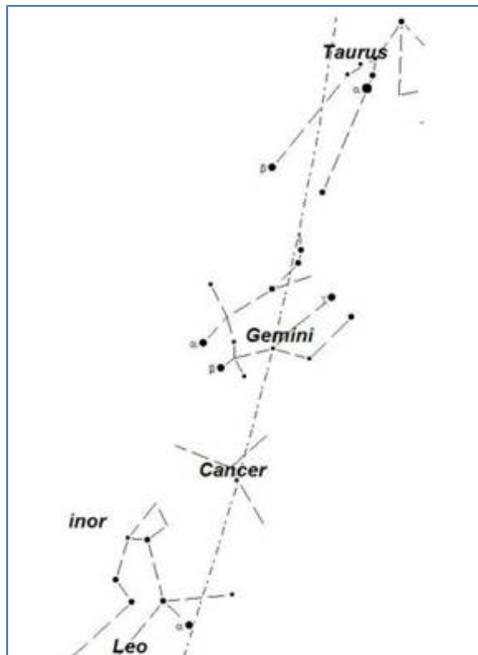
When I brought up my copy of "The Sky" to get ready for this month's column, I was struck by the view to the east and the "lineup" of constellations along the ecliptic in the sky. I thought it might be fun to have a look at the constellations that lay along this important reference line in our sky this month. Obviously the constellations don't change over the course of a year, just which constellations are visible.

To review, remember the ecliptic is the plane of the Earth's (and most of the other planets) orbit around the Sun. Over the course of a year, the sun appears to trace a path in the sky along the ecliptic. As it traverses this path, the Sun will travel through the constellations of the Zodiac that lie along the ecliptic.

This month we find Leo "The Lion" rising from the eastern horizon. Leo is fairly recognizable constellation which is depicted as a crouching lion facing westward. Its distinctive head and Lion's mane is marked by what is commonly referred to as "the sickle" (a group of stars which look like a backwards question mark or sickle used for harvesting grain or cutting hay).

Moving "up" along our reference line into the Zenith we next come across the constellation of Cancer "The Crab". This isn't the most discernible constellation in our skies being depicted by a sort of lopsided "Y" just above Leo (and below Gemini). The mythology of the crab centers more on loyalty and persistence rather than heroics. According to

the legend, the crab was placed in the heavens after biting Hercules' toes during a contest with the Hydra, (one of Hercules' infamous labours). In so doing the crab sacrificed its life. Hera was so impressed with the creature's loyalty and refusal to submit before death that she set it among the stars as a sign of respect.



Continuing westward, we come to the constellation of Gemini "The twins" high in our skies this month. The twin brothers, Castor and Pollux, are famous for fighting in the Trojan war in an effort to bring their sister home to her husband. According to legend Pollux was so overcome with sorrow when his mortal brother died, he begged Jupiter to allow Castor to share his immortality. Jupiter, acknowledging the heroism of both brothers, consented and reunited the pair in the heavens.

Continuing our trek along the ecliptic, we come upon the constellation of Taurus "The Bull" taking up over 800 square degrees in the sky (the 17th largest constellation). According to myth, Taurus represents the "bull-form" taken on by Zeus when he became enamored of Europa, the princess of Phoenicia. The princess Europa was very impressed by the beauty and gentleness of the bull. The two played together on the beach and eventually Europa climbed onto the bull's back, and he swam out to sea with her. Zeus took her to Crete and revealed his true self and later married her. We could complete this "trip" by continuing on to the west and into Aries and then Pisces, but as luck would have it, I'm almost out of room. I do hope you've enjoyed our little journey, I know I did. It was a quick look into the lives of a few of our celestial neighbors.

# Almanac

For January 2010 by Matt Ganis



Jan 7



Jan 15



Jan 23



Jan 30

As we enter into 2010, we enter into the season of Mars. There's a few close conjunctions with moon (which seems to happen quite a bit – either that, or its one my favorite events so I seem to look for them). There isn't a whole lot of excitement up there this month, but a quick glimpse of Saturn wipes away all the boredom (at least for me). Let's have a look:

January opens with Mars rising in the east, around 7pm. It will be glowing at an impressive magnitude (-0.8). The view of the little planet should only improve as the month goes on. By January 20th Mars will be rising about 5:30pm and will have brightened to an apparent magnitude of -1.22 as it rises higher into the sky. At month's end, Mars will be at opposition, rising around sunset and staying in the sky all night. Remember, opposition is the position of two celestial bodies where their longitude differs by 180°, or a configuration in which Earth lies on a straight line between the Sun and a planet or the moon. On January 27th Mars will make its closest approach to the Earth and will appear its biggest and brightest since 2008 (No, don't believe the Internet propaganda about Mars being as big as moon, you'll still need a telescope – but it should be a spectacular view). So like I said at the beginning, this is really “the season of Mars”.

Not to be outdone, beautiful Saturn rises into our skies a little later at night, around 11:30pm at the start of the new year. It's not overly bright, shining at a magnitude of only +0.87. But by the end of the month, Saturn will rise around 9:30pm – making a decent object to view from about 10:30pm throughout the night.

Better hurry if you want to see Jupiter. The “Big Guy” is quickly heading to the western horizon – setting by 7pm at the end of the month. This is the planet's last “hurrah” for awhile – so catch it while you can.

The moon is a little interesting this month. On the 11th it will occult the bright star Antares in the constellation of Scorpius. It won't happen until around sunrise. But Antares is bright

enough, that it might make for an interesting view. It's interesting that Mars will be at its closest approach this month, as the moon will be too. At 1:18am on the 29th, the Moon will be about 7% closer to the Earth than normal, it may make the full moon look a little larger, but like the Mars “urban legend” don't expect a dramatic difference.

Finally (and I know this is out of order, date-wise) but on January 2nd – 4th you might want to see if you

catch a few of the Quadrantids. Although the Quadrantids are a major shower, they are seldom observed. One reason is weather. The shower peaks in early January when the northern winter is in full swing. Storms and cold tend to keep observers inside. However, this year, they peak just a few days after the full moon, so the skies will be a bright and make this a really strong shower. The Meteors will appear to radiate from a point just below the star in the end of the dipper's handle, just to the “left” of Bootes.

So I hope you all had a wonderful holiday and Happy New Year (and wonderful year of astronomy!!!)

