

Sky **WAA** tch

The Monthly Publication of the Westchester Amateur Astronomers

December 2009



Season's Greetings

Doug Baum supplied the above image of the Cone, Christmas Tree and Fox Fur Nebulae. It is a 30 minute exposure with an H-alpha filter shot through a Takahashi FSQ-106 EDXII with a QSI532wsg CCD camera.

The Christmas Tree Cluster, also known as NGC 2264, is located in the constellation Monoceros. It is roughly 2,500 light years away. It is an open cluster of stars embedded in a diffuse nebula. To the left, atop the Christmas tree, is the well known Cone Nebula. The Cone Nebula region contains much dust which blocks light from the emission nebula and open cluster NGC 2264 behind it. The Fox Fur Nebula, to the lower right of the tree, has a strange shape originating from fine interstellar dust reacting in complex ways with the energetic light and hot gas being expelled by the young stars.

Events for December 2009

➤ Monthly Meetings

"NASA's Planck Mission--Teleconference"

Friday December 4th, 7:30PM

Andrus Planetarium

Hudson River Museum, Yonkers

Our speaker is Dr. Charles R. Lawrence, Project Scientist for the Planck Mission and JPL astrophysicist. He will discuss the Planck Mission that is mapping the cosmic background radiation. The Mission seeks to provide insight on the inflationary universe hypothesis as well as the Hubble constant. Free and open to the public.

➤ *Starway to Heaven*

Saturday, December 12th, 6:30-9:00PM

Meadow Picnic Area, Ward Pound Ridge Reservation, Cross River

This is our scheduled Starway to Heaven observing date for December, weather permitting. Free and open to the public. The scheduled rain/cloud date is December 19th.

New Members. . .

Peter Tricarico, Sleepy Hollow

Renewing Members. . .

Bob Kelly, Ardsley

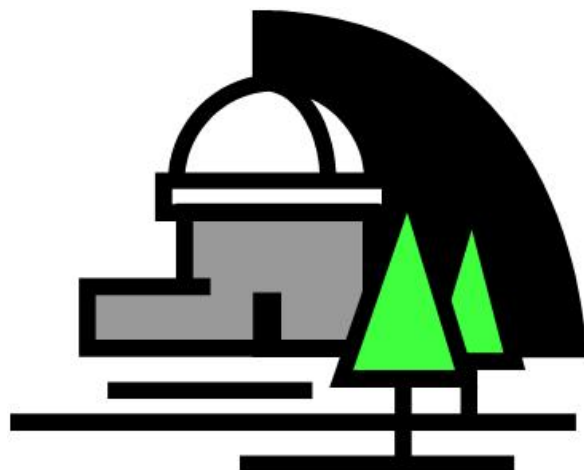
Matthew Fiorillo, Bedford

Robert Rehrey, Yonkers

Daniel Poccia, Cortlandt Manor



Bob Kelly took this Near-Sky photo of two Sun-Dogs, with a parking sign blocking the Sun. Sundogs form as sunlight is refracted by hexagonal plate-like ice crystals with diameters larger than 30 micrometers and their flat faces horizontally oriented. Sundogs are visible when the sun is near the horizon and on the same horizontal plane as the observer and the ice crystals.



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

Viewing Report: Lunt Solar Systems Hydrogen-Alpha 60mm Double-stack Scope

By Larry Faltz

The sun puts out an enormous amount of light at all visible wavelengths, most of which comes from the photosphere. Although you can see the surface and sunspots with a white-light "solar filter" on any scope, to observe details and to see solar prominences along the sun's edge you need to view the chromosphere, a thin hot layer above the photosphere composed mostly of hydrogen. The best way to do this is to look at a single wavelength of light, the hydrogen alpha line at 6562.81 Ångstroms. To do this, you can use a special type of filter called a Fabry-Perot etalon. Such filters have been available to amateurs for about 10 years. The etalon has two very precisely parallel plates in combination with energy-blocking filters and transmits the H α line with a bandpass of less than 1 Å, blocking all other wavelengths. Stacking two etalons can get the bandpass down to 0.5 Å, increasing the contrast and detail.

My first experience with hydrogen alpha solar astronomy was at NEAF in 2002. Coronado Filters brought a few of their new consumer scopes, and I was so impressed I ordered a 40 mm f/10 "Maxscope" (now SolarMax) which came 8 months later. I enjoyed the views but the relatively small image called for something better, what with a new solar cycle about to begin.

In 2008, Lunt Solar Systems announced production of new H-alpha scopes. David Lunt is the son of the original Coronado owners (Coronado was sold to Meade in the mid-2000's) and is making newly designed H α scopes in Tucson, where Coronado was originally located. I ordered my scope in June 2008 and waited 17 months for it to arrive. It has a 60 mm singlet lens of 500 mm focal length, f/8.3, and a tunable internal etalon. (Singlets are OK for this application because chromatic aberration is irrelevant when you are dealing with a single wavelength of light.) The second etalon is 50 mm in diameter and screws on the front of the scope. I upgraded to

a Feathertouch focuser and a larger blocking filter, which gives a larger field of view. Current prices are available from Lunt at: <http://www.luntsolarsystems.com/>.

The scope itself is beautifully machined. It comes in two nice aluminum cases, a large one for the scope itself and a small one for the second etalon. Both have firm foam die-cut inserts. It arrived in mid-October and after the requisite cloudy period due to the New Scope Curse, Sunday October 25th dawned crystal clear. About 10:30 am I went over to the parking lot at the Scarsdale Pool for an unobstructed view of the sun (there were too many trees around my house in Larchmont and too many soccer-playing kids at the Quaker Ridge School). I used my Giro-2 mount with Tech2000 driver, which is a "track-and-train" drive. It sits on a Tech2000 Quick-Draw pier, lightweight, stable and easy to setup. I bolted a dovetail onto the scope's clamshell and mounted a Televue Sol-Searcher finder.



With a 25mm Coronado CEMAX eyepiece (20x), the view was stunning. There was a bright active region (sunspot) near the center of the disc, the surface was covered by fine granulations and several small prominences around 8-9 o'clock. Tuning the etalon (by rotating a small wheel on the scope's housing) gave the expected modulations to the image.

Because the image size was larger than the Coronado 40mm, solar detail was quite a bit more impressive.

Soon after I started looking, a small satellite crossed the face of the sun. I took this to be a good omen, recalling the auspicious overflights of eagles at important Imperial Roman events frequently recounted in Suetonius' "The Twelve Caesars".

After tuning the scope's etalon to what I took to be the optimum position, I screwed the 50 mm "double-stack" etalon onto the front and refocused. The system's bandpass is reportedly 0.55 Ångströms. This etalon has its own tuning wheel, and after a couple of turns the image jumped out of the scope with astonishing contrast. The surface of the sun was covered with innumerable fine spiculations, the active region was even more impressive and as the tuning was varied the prominences became even more distinct. There were a couple of filaments in the lower left quadrant. The image was only a little dimmer and slightly redder than with a single etalon, but the contrast enhancement was so substantial that those differences were unimportant.

Then I switched to my Denkmeier II binoviewer with dual 25 mm CEMAXes. I used Denkmeier's Lunt bino adaptor, which I got at NEAF in 2009. It's essentially a low-power Barlow that replaces the front tube of the diagonal blocking filter and allows the binos to come to focus with a slight increase in magnification, about 1.3x. With the lowest and mid-range PowerSwitch settings (giving 28x and 48x respectively) it gave an excellent image, perhaps not exactly as sharp as with a single eyepiece but much easier and relaxing to view. I also tried a pair of 18mm CEMAXes (39x with the lowest PowerSwitch setting) and these also gave smashing views. I didn't try the PowerSwitch at its highest magnification; I generally find the resolution at that setting to be worse than switching to shorter focal length eyepieces. I've got pairs of CEMAX 12's and TMB 9's but didn't use them this time out.

When viewing in daylight it really helps to use a black view camera shroud wrapped around your head and the eyepiece to improve

contrast by eliminating stray light and to keep your pupils as dilated as possible. Passersby may find the sight rather strange, but it works.

As you move the image around in the field of view and play with the tuning, different parts of it change subtly in contrast and resolution. This seems especially true of the double-stack scenario, because the physics of the filters depend mightily on their geometry. The various tilts, focus, field curvature and magnification all have effects on the contrast and resolution. In particular, the settings that optimize the surface view are generally not quite the same as the settings that optimize the limb prominences, although on occasion I did seem to be able to lock in both at the same time. But the primary image is so good that these variations are merely interesting rather than problematic.



The sun is our star. Its energy is responsible for all life on earth. It's a worthy subject for astronomers, and it's much more interesting at the H α bandwidth than in unfiltered light. If you're interested, one good way to check out a variety of scopes is to go to the solar viewing event at NEAF next April. If the weather is good, dozens of different H α scopes will be on display for your viewing enjoyment. And of course, one nice thing about solar viewing is that as the observing session wears on, you don't stay up past your bedtime!

Note: Remember; NEVER look at the Sun without special filters specifically designed for solar viewing. Permanent eye damage will result!

Constellation Corner

By Matt Ganis

Normally in this column we talk about the mythology of the constellations and occasionally we'll drop into the some of the interesting facts about the stars that comprise them. But as we look at the constellations (or any of the stars in our sky) are they all the same? Far from it. This month, lets take a look how we classify stars and point out a few of them in our winter sky.

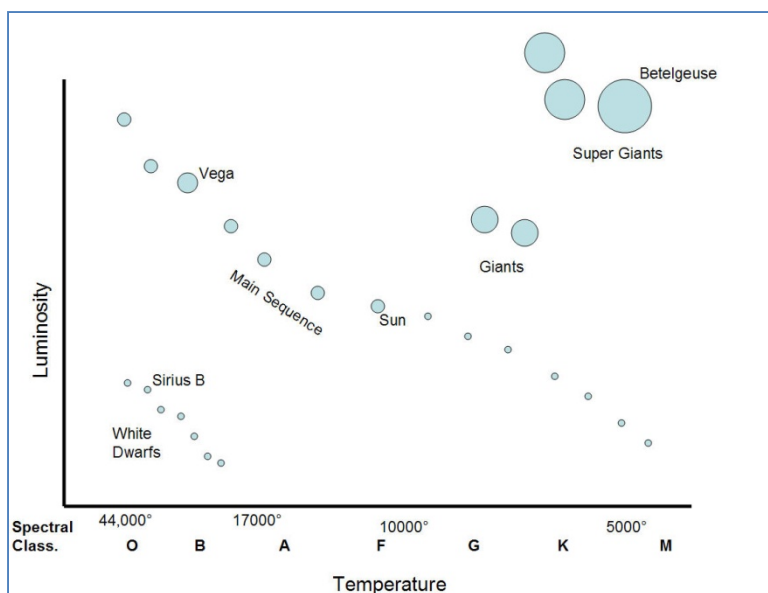
One way to classify stars is to use a graph that astronomers call the Hertzsprung–Russell diagram (or HR for short). This graph shows the relationship between a star's luminosity (brightness) versus its spectral types (or its effective temperature). The HR diagram helps astronomers to understand the relationships and differences between stars. It is something of a "lifecycle" diagram in that it shows stars of different ages and in different stages of their life, all at the same time.

We can use this graph to determine the approximate "age" of a star by where its plotted on the HR diagram. If a star lies along the "Main Sequence" it's a relatively young star, while those that are in the White Dwarf stage are nearing death and the "Giants" would be considered "Middle Age" by human standards.

Astronomers will generally classify stars using the familiar lettering system: OBAFGKM (you can remember this by using the phrase "Oh Be a Fine Gal/Guy and Kiss Me"). These letters are based on a temperature scale (see the bottom of the HR diagram), combined with types of elements that are present around certain stars. For example, "O" stars are the hottest and the "M" stars are the coldest. An "O" star contains large amounts of helium while B stars contain primarily helium and hydrogen.

So when you go outside this winter and you gaze at Orion and his faithful Dog, Sirius – look a little closer. Looking at Orion, the star in the left shoulder (actually Orion's Right shoulder) is Betelgeuse. This star is a red supergiant (again, referring to the diagram), and one of

the largest and most luminous stars known (if the star were at the center of our solar system its surface would extend out to between the orbits of Mars and Jupiter). Of course, if you look toward Canis Major and the bright star Sirius you'll get a double treat! Even though our eye perceives bright Sirius as a single star is actually a binary star system (two stars in orbit around each other) which consists of a white main sequence star (an "A" star) named Sirius A, and a faint white dwarf star called Sirius B.



Want to see a Main Sequence star? Go out during the day and look up! Our Sun is a relatively young star, still in the prime of its life, located right in the middle of the Main Sequence branch of the HR diagram!

Almanac

For December 2009 by Matt Ganis



Dec 2



Dec 8



Dec
16



Dec
24

Wow....another year over, and new one just beginning (to paraphrase John Lennon). But, before we discuss what's happening in our December skies, let me wish you all very happy and healthy holiday season!

As we turn the calendar page and move into December, we find the the planet Mars visible in our evening skies. The little red planet rises around 9:00pm at the start of the month and since it rises so early, the planet will be visible in our nighttime sky all night. If you really like to observe Mars, this is good time to enjoy the views! Mars will be coming into Opposition in January of 2010 so the views should only get better. Mars will also brighten over the course of December, going from a magnitude of -0.1 to a -0.7.

The planet's disk won't be huge in a telescope, a mere 14 arcseconds in diameter as opposed to the 25 arcseconds in 2003 but still a nice view. Remember opposition occurs when a planet is opposite the Sun in the Earth's sky (or to put it another way, opposition occurs when the Earth is positioned between the planet and the Sun).

Later in the evenings (or should I very early in the morning) Saturn will begin rising into our December skies in the constellation of Virgo. It's not the brightest object in our skies, shining at a meager +1.0 magnitude, but it should still give us a decent show. The planet is also rising quickly which means by the end of the month it will be entering our skies around 11pm (rather than 1:30am).

"Catch it while you can" – that's the phrase this month when it comes to Jupiter! The "king" of our solar system is quickly approaching the

western horizon. One treat for those of you that love conjunctions: Jupiter will pass less than 0.6° from Neptune around the 21st of December. It should make for a nice little Christmas/ Chanukah present for us.

One last meeting (you know how I love conjunctions) – Look for the moon to cover up some of the Pleiades on the evening of December 28th (around 7 to 10pm EST).

The Geminid meteor shower occurs around December 13th/14th this year (which is late Sunday evening into Monday morning). New Moon this year allows the coverage to occur the entire night. Sunday morning, December 13 and Monday evening, December 14 could be worth watching as well. The Geminids are

medium-speed meteors. Most of them don't leave glowing trains, but the brighter ones are often colored (yellow, green and blue are most common).

Finally to close the year out, there is a Blue Moon on the December 31st. For those that have never heard that term, a Blue Moon, it's when two full moons occur in any

calendar month. A Blue Moon occurs only about once in 2½ years on average. The term (in its modern usage) has nothing to do with the Moon's actual color but perhaps that's where the phrase "Once in a blue moon" comes from.

