SkyWAAtch

The Monthly Publication of the Westchester Amateur Astronomers *October 2008*

North America Nebula

Doug Baum took this image of NGC 7000, the North America nebula in Cygnus. He employed an H-alpha filter (14nm band pass) and a QSI 532ws monochromatic CCD camera. The exposure was 2 x 300 seconds in H alpha with 4 Darks and 4 Bias frames calibrated at -20 degrees. Doug used a Takahashi FSQ-106 EDXII refractor, which has a 106mm aperture and a 530mm focal length (a four element petzval design). Note the "Wall" feature in the "Mexico" region of the Nebula.

NGC 7000 Facts: Also known as Caldwell 20, NGC 7000 is an emission nebula—a cloud of ionized hydrogen gas that emits light as the gas is excited by an embedded star (i.e.; a really big fluorescent bulb). The Nebula is approximately 1800 light yrs distant; some estimates place its diameter at nearly 100 light yrs.

Events for October 2008

➢ Monthly Meetings

"Binary Stars"
Friday October 3, 8:00PM
Andrus Planetarium
Hudson River Museum, Yonkers
Dr Dennis Dawson of Western Connecticut State University will share some of the results of his research on binary stars. Free and open to the public.

➢ Starway to Heaven

Saturday, October 4th, 7:00-9:00PM
Meadow Picnic Area, Ward Pound Ridge Reservation, Cross River
This is our scheduled Starway to Heaven observing date for October, weather permitting. Free and open to the public. The scheduled rain/cloud date is October 25th.

➢ Family Stargazing Night

Tuesday, October 21st, 7:00pm to 9pm.
George Washington Elementary School
3634 Lexington Ave
Mohegan Lake, NY
Arrive early to help with setup. Rain date is October 22nd.

➢ Halloween Fund Raiser

Friday, October 24th, 7:00pm to 9pm.
Lasdon Park
Take I-684 to exit 6, and head west on Route 35; the park entrance is three miles ahead on left. Arrive early to help with setup. Club members only.

Renewing Members. . .

John Paladini, Mahopac, NY; Doug Baum, Pound Ridge, NY; Tom Boustead, White Plains, NY; Mike & Ann Cefola, Scarsdale, NY: Ed Cronly, Bronxville, NY; Valerie & Christopher Doyle, Chappaqua, NY; Al Forman, Croton-on-Hudson, NY; James Frost, Rye Brook, NY; Nancy Maika, Pleasantville, NY; Michael Rinaldi, Scarsdale, NY

The Teapot by Jove

Bob Kelly took this 15 second exposure of Jupiter and Sagittarius looking like a teapot about to pour. He used a. tripod, no tracking, with his Canon A40. Notes Bob: "The tiny stars next to Jupiter are not its moons, although when I look at a magnified version of the original, Callisto may be the tiny dot to one side of Jupiter."

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: Charlie Gibson; Vice President: Michael Virsinger Vice President Programs (lectures): Pat Mahon; Treasurer: Doug Baum; Vice President Membership: Karen Seiter; Vice President Field Events: David Butler; Newsletter: Tom Boustead.

Articles and Photos Gallery

Extreme Starburst

By Dr. Tony Philips

A star is born. A star is born. A star is born.

Repeat that phrase 4000 times and you start to get an idea what life is like in distant galaxy J100054+023436. Astronomers using NASA's Spitzer Space Telescope and ground-based observatories have found that the galaxy gives birth to as many as 4000 stars a year. For comparison, in the same period of time the Milky Way produces only about 10. This makes J100054+023436 an extreme starburst galaxy.

“We call it the ‘Baby Boom galaxy,” says Peter Capak of NASA’s Spitzer Science Center at the California Institute of Technology in Pasadena, CA. "It is undergoing a major baby boom, producing most of its stars all at once. If our human population was produced in a similar boom, then almost all people alive today would be the same age."

Capak is lead author of a paper entitled "Spectroscopic Confirmation of an Extreme Starburst at Redshift 4.547" detailing the discovery in the July 10th issue of Astrophysical Journal Letters.

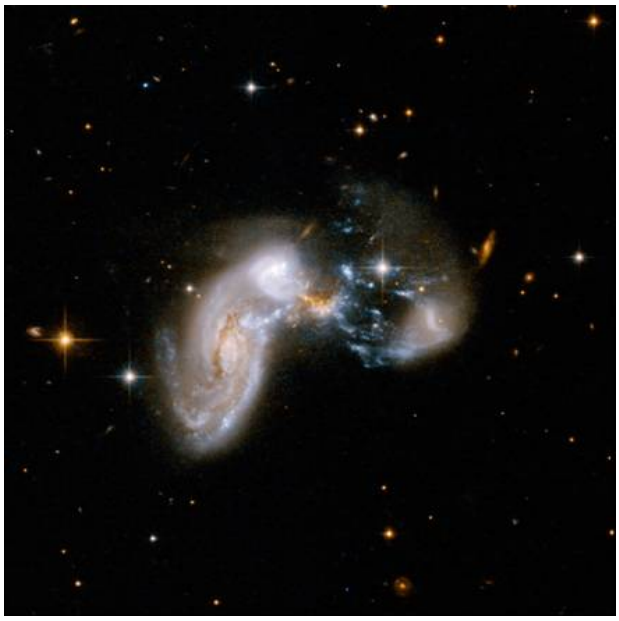
The galaxy appears to be a merger, a “train wreck” of two or more galaxies crashing together. The crash is what produces the baby boom. Clouds of interstellar gas within the two galaxies press against one another and collapse to form stars, dozens to hundreds at a time.

This isn’t the first time astronomers have witnessed a galaxy producing so many stars. “There are some other extreme starburst galaxies in the local universe,” says Capek. But the Baby Boom galaxy is special because it is not local. It lies about 12.3 billion light years from Earth, which means we are seeing it as it was 12.3 billion years ago. The universe itself is no older than 14 billion years, so this galaxy is just a youngster (Capak likens it to a 6-year-old human) previously thought to be incapable of such rapid-fire star production.

The Baby Boom galaxy poses a challenge to the Hierarchical Model of galaxy evolution favored by many astronomers. According to the Hierarchical Model, galaxies grow by merging; Add two small galaxies together, and you get a bigger galaxy. In the early years of the universe, all galaxies were small, and they produced correspondingly small bursts of star formation when they merged. “Yet in J100054+023436, we see an extreme starburst. The merging galaxies must be pretty large.”

Capak and colleagues are busy looking for more Baby Boomers “to see if this is a one-off case or a common occurrence.” The theory of evolution of galaxies hangs in the balance. Meanwhile… A star is born. A star is born. A star is born.

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



The “Baby Boom” galaxy loosely resembles the galaxy shown here, called Zw II 96, in this Hubble Space Telescope image. This galaxy is only 500 million light-years away, while the Baby Boom galaxy is 12.3 billion light-years away.

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/.

Review of Orion StarBlast 6" Newt
By Mike Cefola, Smokehouse Observatory, Vermont

I've wanted a small scope for a quick setup when I don't feel like rolling out the 18' Dob or sliding off the roof of the Smokehouse Observatory. Gary Seronick of *Sky & Telescope* recently did an enthusiastic review of the new Orion Starblast 6 tabletop scope, the 6 inch version of the Starblast 4.5. So I decided to give it a try.

The tube attaches to tube rings mounted on the base and scope is ready for action. Orion includes red dot finder and 10mm and 25mm Sirius plossl lenses. Factory collimation was very good as confirmed by my deluxe laser collimator as well as the tried and true in-out focus star test. The scope is F5 with 750mm focal length providing 75x and 30x respectively. For my observing tools I also used a 2x Shorty Barlow for 60 and 150 power as well as an Orion Ultra Block filter, which is the equivalent of a Lumicon basic deep sky filter. I brought with me to Vermont telrad finder chart books for all Messier objects plus a third book of popular NGC objects.

The viewing session took in the following objects—M31 (plus companions M32 and M110), NGC 404 (a neat little galaxy Jimmy Gondek turned me on to in same field of view as Mirach). This is a small object and can be obscured by the glare of the nearby star; so a keen eye is necessary. M13 was super at high power. I also managed to see quite clearly its little companion galaxy NGC 6207 in the same low power field. For M 57, I found low power with the 2x Shorty Barlow gave a nice size image. I tried a Nagler 4.8 but actually found the 25mm lens with Barlow to have more contrast while providing a bit brighter image. While in the region I checked out globular M56. The Veil was a pleasant surprise. With the Orion Deepsky filter at 60x (using the barlow) both east and west parts displayed nice detail for a 6" scope. M27 was bright and large and easy to see full roundness of the structure. Other globs and open clusters viewed included: M71, M34, M103, M52, Alberio, M33 (large but faint), NGC 6543 (Cat's Eye nebula--good at high power with a distinct disc); Kemble's Cascade and the Double Cluster were very nice at low power. NGC 891 was a real surprise. It is a very low surface brightness edge-on galaxy in Andromeda that is faint even in the 18" unless you use Doug Baum's BIPH which provided a spectacular view. I actually managed to pull it in with 25mm and Barlow and with averted vision saw it quite decently. All in all, I'm very pleased with my newest edition to the "Smokehouse" scopes.

Dave Butler took this image of the Swan Nebula in Sagittarius through his 8" Schmidt/Cass. This emission nebula/open cluster is about 4900 light yrs distant.

Doug Baum took this image of the Cocoon Nebula in Cygnus (aka Caldwell 19 or IC 5146). Doug's photo highlights the Dark nebula (or dust cloud) surrounding this emission nebula. This nebula is thought to be 3300 light years away.

Constellation Corner

by Matt Ganis

Looking up into our zenith (slightly to the west) during these Fall evenings we can catch a glimpse of the third brightest stars in our nighttime skies: Vega (it's actually the 5th brightest star in the sky when you consider the Southern stars, but it's in the "top three" here in "the North"). Vega is a classic white main sequence dwarf star which, like our Sun, is quietly going through it's nuclear fusion where hydrogen nuclei are fused into helium at high temperatures and pressures. Like our own Sun, Vega is about halfway through it's lifecycle, having approximately 400 million years left of "life". But what do we mean by this? Do stars really "live"? Do they "die"?

The life of a star is actually fairly boring. Stars form out of a nebula of dust and gas which is primarily composed of hydrogen (97%) and helium (3%). Within this nebula, there are varying regions where gravity causes this dust and gas to "clump" together. As these "clumps" gather more mass, their gravitational attraction to other atoms increases, pulling more atoms into the "clump". As the mass falls inward, this protostar begins fusing atoms together, generating intense heat, pushing "against" the in-falling mass. The energy the star gains (or creates in it's core) by fusing these atoms together keeps it from collapsing. If a star is massive enough, it will fuse heavier and heavier atoms, fusing hydrogen atoms to helium, helium to carbon, and then carbon to into "heavier" atoms such as iron.

Most of a star's life is spent fusing hydrogen into helium, a time in it's life we call the "Main Sequence". Our Sun has been doing this for approximately five billion years, and is expected to continue doing it for another five billion or so years (like I said earlier, half of it's lifetime). However, the stages a star will go through and how long it will last in each stage depends largely on the mass of the star, or how much gas and dust there was at the protostar stage. The more massive stars evolve quicker than lighter stars; so the lower the intial mass, the longer the star will live.

If the star is small enough (much less than the mass of our Sun), it will never get beyond the hydrogen burning stage (this is because its central temperature of the protostar never gets high enough to sustain the fusion of hydrogen like a regular star). Once such a star has used up most of its hydrogen, it will begin to cool and collapse into what is called a "brown dwarf" (or what I like to call a "failed star"). You can find some brown dwarfs in the Pleiades, the Sigma Orionis star cluster, and the Trapezium in Orion.

When stars like our Sun run out of hydrogen to fuse (or burn) the balance tips in the favor of gravity, and the star begins to collapse. In the process of compacting the star begins to heat up again and is able fuse what little hydrogen remains into Helium. This burning shell of hydrogen expands the outer layers of the star and when this happens, the star will become a "red giant"; in the case of our Sun, it will expand so big that Mercury will be completely engulfed by this bloating star. Stars with a mass close to that of our Sun (up to about five times the mass of our Sun) will eventually experience helium-to-carbon burning in their cores. These low to medium mass stars will eventually become a white dwarf. A White dwarf is surrounded by an expanding shell of gas in an object known as planetary nebula and marks the transition of a medium mass star from red giant to white dwarf.

High mass stars end their lives spectacularly. They, too go through a stage where they swell up (like the red dwarfs) though they swell even more than their lower-mass counterparts. This stage of a star's life is called the "red supergiant" phase. These stars are so large that their central temperature becomes high enough that further burning in their core will occur. As this process continues, the interior of the star no longer has any resistance to gravity and the star collapses. During this collapse, the outer layers of the star are blown off in a supernova explosion and the star becomes either a neutron star or into a black hole.

The interesting thing about this whole cycle is that the material blown off by these dying stars is rich with elements (carbon, oxygen, nitrogen, iron, copper, gold, etc). These far flung atoms eventually gets recycled back into Giant Molecular Clouds where they are used to form new stars, and possibly even planets! So, the cycle starts again...a true "circle of life" - but in our skies!

Almanac

For September 2008 by Matt Ganis

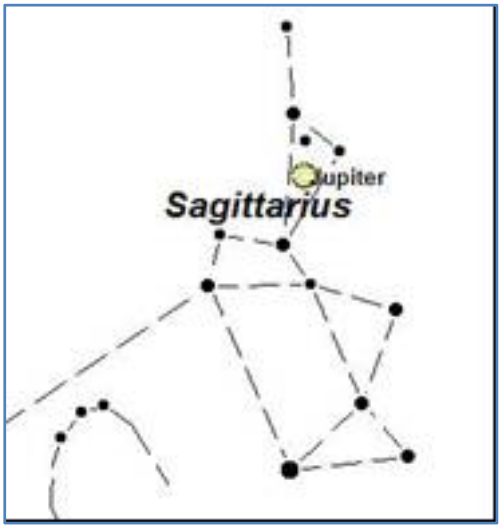
Oct 7 | Oct 14 | Oct 28 | Oct 30

On September 22nd when night and day are nearly of the same length, and the Sun crosses the celestial equator (moving in a southward direction) we approach the autumnal equinox: the first day of autumn. To me, the month of October really defines autumn: a time for pumpkin and apple picking, trick or treating and Harvest moons (The harvest Moon is a full Moon that is nearest to the autumnal equinox).

Often, the Harvest Moon seems to be bigger or brighter or more colorful than other moons. These effects have to do with the seasonal tilt of the earth. The warm color of the Moon shortly after it rises is an optical illusion, based on the fact that when the Moon is low in the sky, you are looking at it through a greater amount of atmospheric particles than when the Moon is overhead. The atmosphere scatters the bluish component of moonlight (which is really reflected white light from the sun), but allows the reddish component of the light to travel a straighter path to your eyes. Hence all Moons (and stars and planets) look reddish when they are low in the sky.

There are two meteor showers this month. On October 7th/8th the Draconid meteor shower (remnants of comet 21P/Giacobini-Zinner) arrives. This isn't typically an active shower, but it has been known to produce some spectacular views. The radiant point of the Draconid meteor shower almost coincides with the head of the constellation Draco the Dragon, in the northern sky. It should be easy to see some activity since the radiant is at its highest in the sky when darkness falls. The shower is definitely a "sleeper" producing only a handful of weak meteors per hour in most years. But watch out if this dragon comes alive! This shower has been known to spew forth hundreds, if not thousands, of meteors in a single hour. The Moon will be at first quarter this year during the shower's peak, so this "hard-to-predict" shower is worth checking out. Unlike most meteor showers, more meteors are likely to fly in the evening than the morning hours after midnight. Look northward on the evenings of October 7 or 8.

The second meteor shower of the month is the Orionids. These meteors tend to be fast, occasionally leaving persistent trains and can produce bright fireballs. They can, at times, exhibit a maximum of about 15 meteors per hour which, on a good night, can produce a decent "show". If you trace these meteors backwards, they seem to originate from the north of Orion's bright star, Betelgeuse. The peak of this shower is on October 20th and 21st. Unfortunately, this year, a last quarter Moon will disrupt the show just after midnight, which is when the Orionids are typically at their best. So while the Orionids are probably a "wash-out" this year keep an eye out, you may be pleasantly surprised!



Jupiter is rapidly approaching the Western horizon this month. At the start of October, look for "King" of our Solar System in the handle of the "teapot" (the constellation Sagittarius) in our South Western skies. Around 10pm on October 1st Jupiter is located about 17 degrees from the horizon, but by month's end, it's so close to the horizon, that you'll have a tough time finding it. So it want one last glimpse of this planet, get out there early in the month.

Even though one planet is leaving our skies, another takes its place. In the early morning, you can catch a glimpse of Saturn rising over the Eastern horizon at about 5am. The ringed planet is situated just "inside" the constellation of Leo near the Lion's hind foot.

One last event of note: On the evening of October 17th, the waning gibbous Moon will occult the Pleiades for the 5th time this year! If my calculations are right, watch a little before 7pm on the 17th as the moon passes in front of the star Maia in the Pleiades and reappears approximately 45 minutes later.