

Sky WAA tch



Image Copyright: Mauri Rosenthal

Rosette Nebula

In an attempt to image a wider field of the sky than his telescope provides, Mauri Rosenthal tried attaching a 135mm SLR lens to his cooled Starlight Xpress SX-694C astro-camera. The screw mount Pentacon lens – relegated to a closet for the past 35 years – worked well enough to deliver this image of the Rosette Nebula when piggybacked on a guided Questar telescope in Mauri's Beech Hill yard. He used PixInsight to integrate this Ha-LRGB composite from about four hours of 10 minute sub-frames, collected over two nights in January using light pollution and Ha filters. For scale, the "donut hole" of the nebula which is 50 light years across, appears to us about two-thirds the area of the moon.

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Events for March

WAA March Lecture

"I Thank My Lucky Stars"

Friday March 4th, 7:30pm

Leinhard Lecture Hall,

Pace University, Pleasantville, NY

Al Nagler, founder and CEO, Tele Vue Optics, Inc. will relate how a kid from the Bronx, with a love for astronomy, went on to create optical systems that bridged astronaut training with products to enhance the visual impact of our wondrous universe.

Al Nagler is an optical designer best known for his innovative wide-field eyepieces and versatile compact refractors. He also designed visual displays for the Gemini and Apollo Lunar Module simulators. Al will cover his high school telescope project, and how it eventually lead to his prizes at the Stellafane convention, his designs of the NASA simulators, and how that encouraged him to develop the "Nagler" eyepiece and start Tele Vue Optics. He will also show some prototypes of new equipment introduced at the 2016 Winter Star Party. Free and open to the public. [Directions](#).

Upcoming Lectures

Pace University, Pleasantville, NY

Our speaker for April 1st will be Mr. Alan Witzgall. His presentation is entitled "A Tale of Two Meteorites: an untold tale of Apollo and the Stardust Revolution." Free and open to the public.

Starway to Heaven

Saturday March 5th, Dusk.

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

This is our scheduled Starway to Heaven observing date for March, weather permitting. Free and open to the public. The rain/cloud date is March 12th. **Important Note:** By attending our star parties you are subject to our rules and expectations as described [here](#). [Directions](#) and [Map](#).

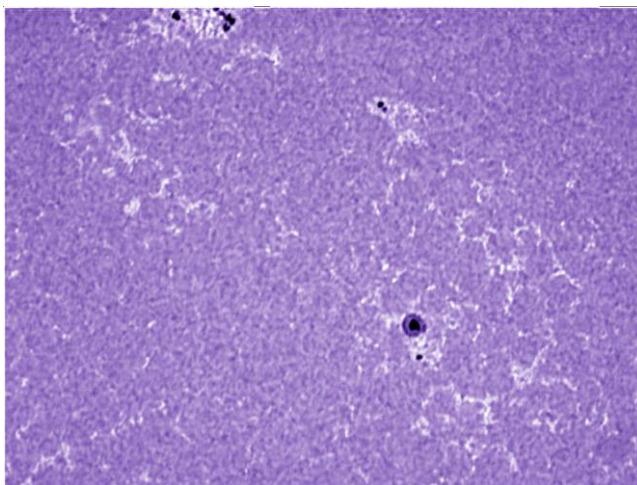
Renewing Members. . .

Orlando Gonzalez - Croton on Hudson
Cliff Wattley - Ridgefield
Jonathan Gold - Ossining
John Markowitz - Ossining
Douglas Towers - Yonkers
William Sawicki - Bronx

Join WAA at NEAF, April 9-10th Rockland Community College, Suffern, NY

WAA will have a booth at the [Northeast Astronomy Forum](#), to be held at Rockland Community College on Saturday, April 9th and Sunday, April 10th. This is the nation's premier astronomy show, with a vast diversity of exhibitors, vendors, equipment, lectures by leading astronomy figures and, weather permitting, the famous Solar Star Party.

We need volunteers to staff our booth. It's an opportunity to meet and chat with fellow club members and other astronomy enthusiasts, and to help recruit new members to the club. It also is a place where you can store your swag while attending lectures or other events. Last year 20 club members participated, we recruited new members and we made many new friends. Put NEAF in your calendar now.



Courtesy of John Paladini is this solar image using a Quark Ca-H filter and a Williams Optics 66mm scope.

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

Almanac

For March 2016 by Bob Kelly

Where did all the planets go?

After that lovely line of bright planets in January and February, it seems like the planets have taken off like a team of skydivers after they complete their formation flying. Venus is so low in the morning sky I haven't seen it above the trees lately. Mercury is racing around behind the Sun for a superior conjunction on the 23rd. Jupiter has crossed over to the evening sky. That leaves Mars and Saturn to keep our attention before dawn this month.

We get closest to Jupiter for the year on the 8th, so for the whole month waiting until Jupiter gets high above the horizon is well worth the wait with any size telescope. If you can pick out some of Jupiter's spots, their movement makes Jupiter's 10-hour rotation period very noticeable. Jupiter's satellites flit to and fro around the planet; sometimes we can catch two shadows at once on the planet's cloud tops. The best times in prime time are on the 7th and 14th, with a late night show on the 21st/22nd. Check an almanac for details.

What's Declination got to do with anything, anyway? This is a word typically part of the language of the astronomer with the equatorial telescope, but negative declinations are all the rage among the bright planets. Only Jupiter, among the brightest five, has a positive declination. Mercury, Venus, Mars and Saturn, in order of declination, are all below the celestial equator, making them lower in our skies, and higher in more southern skies. By comparison, Jupiter seems to soar across our midnight sky this month, reaching heights above the horizon's hazes by mid-evening.

Mars is getting larger all the time as we near closest approach at the end of May. That's not surprising, since Mars is the closest planet to Earth through the end of summer. (Mercury, briefly, is nearly as close as Mars when it transits the sun in May.) While Mars is still very small, even in a telescope, careful observers might see some variations in its other hue, and even a glimmer of the north polar cap, shrunk during its summertime. Mars gets 30 degrees above our horizon – highest just before dawn.

Saturn doesn't get too high for us, either, but its rings seem to encircle the planet, tilted 26 degrees toward us. See if the rings have two distinct shades of white. Titan is still viewable in a small telescope, but the



Mar 1



Mar 8



Mar 15



Mar 23

fainter, closer in, moons are more difficult to see due to the brightness of the open rings. Iapetus is further out than Titan and tilted 15 degrees more than the rings and other moons, so it escapes the glare of Saturn. This month, Iapetus, at magnitude +11, scoots south of Saturn on its way to greatest western elongation in early April. Iapetus' bright side comes round to face Earth at western elongation, reaching 10th magnitude.

On March 13th, Daylight Time starts, resetting sunrise at 7:20am, back to winter solstice-ish darkness for our morning commutes. It does make Saturn and Mars' highest visibility in the southern sky more accessible to the sleepy morning observer. Daylight time also makes the winter constellations skip westward across the sky from last month's locations. Along with Jupiter, it's like someone hit the record player, causing the needle to skip (does anyone still have vinyl records?).

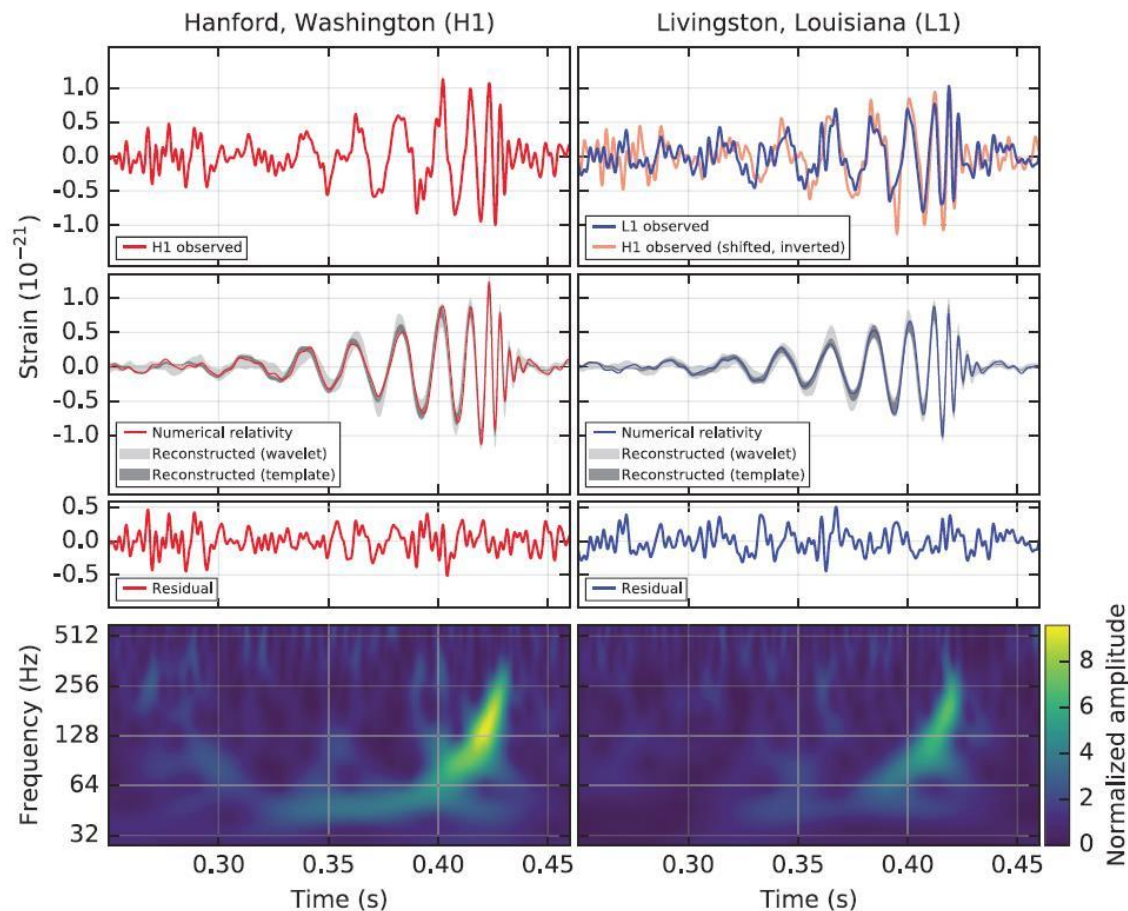
Mars and Saturn hang low with Antares in the Scorpion, cautiously approaching each other. If you hold your hand out at arm's length, can you spread out your hand and wear Saturn and Mars like yellow and red jewels on your thumb and pinky?

Jupiter and the nearly full Moon make a bright pair on the 21st. The new Moon's invisible alignment with Sun on the 9th, with perigee a day later, enhances high and low tides from the 10th through the 13th.

The International Space Station streaks across pre-sunrise skies from the 3rd through the 27th. Then it's back in the post-sunset skies starting on the 29th.

This wouldn't be an almanac unless we noted the time of the spring equinox at 0430 UTC on the 20th. Also, there's a wonderful total solar eclipse on the other side of the world on the 9th their time, with a partial eclipse for Hawaii and parts of Alaska that occurs on the 8th after the total eclipse in Indonesia on the 9th. This apparent time travel is courtesy of the International Date Line bisecting the Pacific Ocean. The full Moon turns (very slight) shades of gray during a penumbral eclipse on the 23rd for the Pacific Rim. In other news, I've heard rental cars are selling out during August 2017 along the path of the Total Solar Eclipse that will cross the USA. What's going to happen when most of North America shows up in the narrow path of the eclipse?

Gravity Waves



From the paper “Observation of Gravitational Waves from a Binary Black Hole Merger” by Abbott, et. al., Physical Review Letters 2/12/16

FIG. 1. The gravitational-wave event GW150914 observed by the LIGO Hanford (H1, left column panels) and Livingston (L1, right column panels) detectors. Times are shown relative to September 14, 2015 at 09:50:45 UTC. For visualization, all time series are filtered with a 35–350 Hz bandpass filter to suppress large fluctuations outside the detectors’ most sensitive frequency band, and band-reject filters to remove the strong instrumental spectral lines seen in the Fig. 3 spectra.

Top row, left: H1 strain. Top row, right: L1 strain. GW150914 arrived first at L1 and 6.9 (+0.5/-0.4) ms later at H1; for a visual comparison, the H1 data are also shown, shifted in time by this amount and inverted (to account for the detectors’ relative orientations).

Second row: Gravitational-wave strain projected onto each detector in the 35–350 Hz band. Solid lines show a numerical relativity waveform for a system with parameters consistent with those recovered from GW150914 [37,38] confirmed to 99.9% by an independent calculation based on [15]. Shaded areas show 90% credible regions for two independent waveform reconstructions. One (dark gray) models the signal using binary black hole template waveforms [39]. The other (light gray) does not use an astrophysical model, but instead calculates the strain signal as a linear combination of sine-Gaussian wavelets [40,41]. These reconstructions have a 94% overlap, as shown in [39].

Third row: Residuals after subtracting the filtered numerical relativity waveform from the filtered detector time series. Bottom row: A time-frequency representation [42] of the strain data, showing the signal frequency increasing over time.

Strange Brew, Episode 3: The Search for More Beer

Larry Faltz

From time to time, a few of us get together for “WAA Sci-Fi Night,” often graciously hosted by long-time WAA’er Bill Newell, who I think has seen every science fiction movie, TV program and cartoon ever made. We usually see a full-length feature movie preceded by some shorter tidbits: episodes of primitive but ever-optimistic 1950’s space TV series like “Rocky Jones, Space Ranger” (every once and a while someone like Robert Duvall appears in a bit part) or cartoons like “The Jetsons,” which are even more inane than you remember. Over a period of years we watched the 12 episodes of “Gene Autry and the Phantom Empire,” where the singing cowboy is kidnapped and taken to a highly scientific, robot-infested subterranean kingdom run by an evil Mae West look-alike. The rest of the plot is equally incomprehensible.

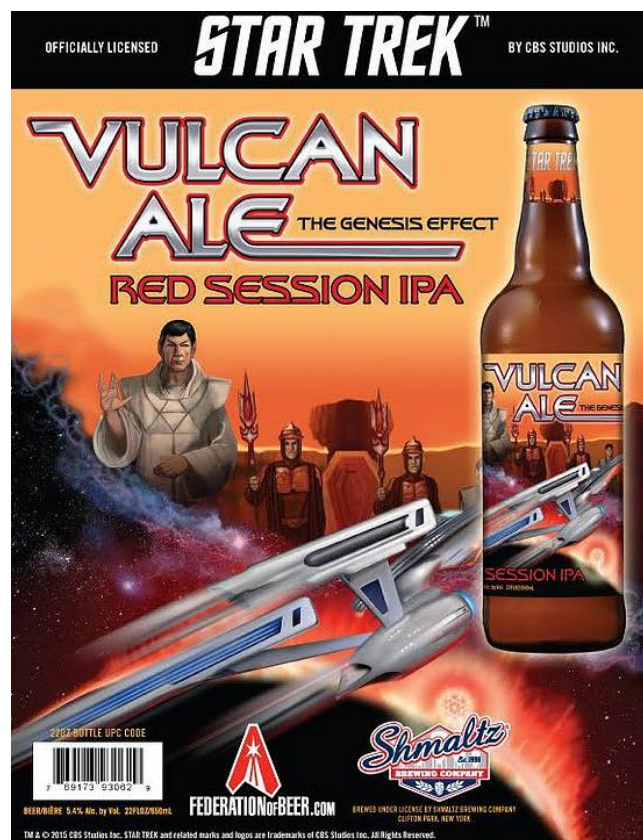


Santa Claus about to be kidnapped by Martians

Over the years we’ve screened great films like *Forbidden Planet*, B-movie classics like *Earth vs. the Flying Saucers* and *This Island Earth*, and utter bombs like *Queen of Outer Space* (starring the fascinatingly untalented Zsa Zsa Gabor). Available technology limited us to showing the DVDs on medium-sized TV screens, but for the most recent event in early December 2015, Bill, assisted by WAA members Bill Forsyth (video) and Charlie Gibson (audio), projected the image from a Blu-Ray DVD onto a large wall-mounted white fabric screen, with audio routed through a high quality sound system. The feature was none other than the original *Star Wars* (recall that it was actually subtitled “Chapter 4: A New Hope”), chosen in honor of the opening of the latest offering in the *Star Wars* franchise. The audience’s total familiarity with the film didn’t diminish our enjoyment of

many of its classic segments, the famous bar scene in particular, although the attack on the Death Star at the end seemed too long and less exciting than when first viewed, with the endless repetitions of “Red Leader....Blue Leader....” just sounding silly. But the large, clear image brought back memories of our original viewing experiences in the summer of 1977.

As an *amuse-bouche*, the evening started with the camp classic, *Santa Claus Conquers the Martians* from 1964. Named one of the worst films of all time, recognition that it richly deserves, this movie has been parodied on numerous occasions, including once being the butt of the late, lamented Mystery Science Theater 3000. In 2011, a staged version of the flick was given in Las Vegas. The audience was supplied with foam tomatoes to throw at the live cast. Pia Zadora, who was 8 years old when she played a Martian child in the film, reportedly was in the audience. Mostly the film was just dumb, albeit funny in the parts that were not always intended to be funny, and not funny in the parts intended to be funny, which made it even funnier.



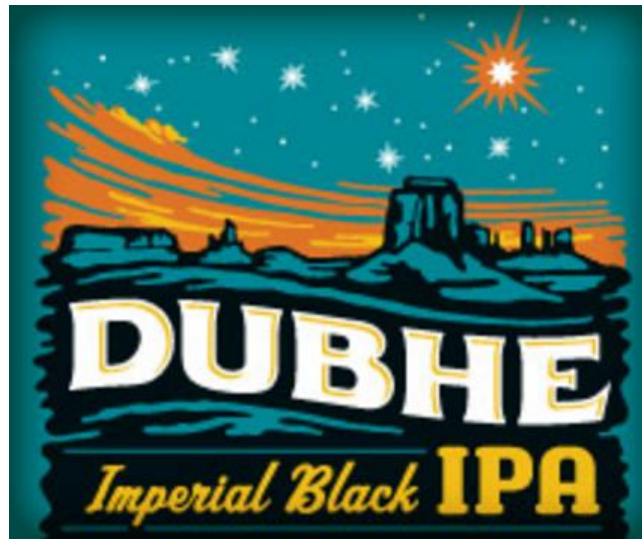
Needless to say, the films are accompanied by chips, pizza and brews. Elyse and I researched our contribution to the evening by scouring the Half Time beer emporium in Mamaroneck for space-themed beers. As I mentioned in an earlier article on beer and astronomy, there are quite a few astronomy-related beer monikers, most from small, boutique breweries that usually don't get wide distribution. We found new brews that weren't mentioned in my earlier articles.

The Vulcan, Alberta brewer Federation of Beer, mentioned in the September 2015 newsletter, puts out a "Vulcan Ale" and we found a few bottles of it, now subtitled "The Genesis Effect" (they subtitle beers now?) The label shows Mr. Spock giving you the "Live Long and Prosper" sign and a picture of the Enterprise (which is, of course, *not* a Vulcan vessel). On the label there are a couple of other Vulcan figures that brought back the memory of "Amok Time," the TOS (The Original Show) episode where Spock gets all weird because he is under the influence of the Vulcan androgenic hormone explosion known as the *pon farr*, a form of male estrous I guess, and has to mate or die. As might have been expected for a 1960's TV series, he ends up neither mating nor dying. "Vulcan Ale" is an India Pale Ale brewed under license by the Schmaltz Brewing Company near Albany, NY, which sells a "He-Brew" family of beers with the tag line "The Chosen Beer." Among their inventory is "Chanukah in Kentucky" ale and "Jewbilation," a mixture of 10 malts and 9 hops. Maybe they picked up the Vulcan Ale because (the late) Leonard Nimoy and William Shatner are Jewish. As my grandmother would say, "zei gezunt" (Yiddish for "be healthy"). A good thought when downing a beer.



We found large bottles of "Horseheads Orion" IPA, brewed in upstate New York in the town of Horseheads not far from the famed Finger Lakes burg of

Watkins Glen. The beer was formerly known as "Nebula". The label shows the shadow of a horse's head, some vague nebulosity and some stars (nothing resembling Orion), but not an image of [Barnard 33](#), the official designation of the actual Horsehead Nebula in Orion.



Another IPA came from the Uinta Brewing Company of Utah, named "Dubhe" in honor of Alpha Ursae Majoris in Big Dipper, which appears on the label. I often use Dubhe as an alignment star for my Celestron CPC800. House Bill 140, 1996 Utah Code, named Dubhe as Utah's "Centennial Star." Utah became a state in 1896, and Dubhe was said to be 100 light years away, so the legislators figured that they should do important government work by acknowledging that the state was celebrating its centennial illuminated by photons that originated when it joined the Union. Unfortunately the latest measurements put Dubhe at 123 (± 2) light years away, which means the centennial was bathed in light that originated in 1873, not 1896. Not a whole lot noteworthy happened in Utah in 1873, except for the founding of the Zion Bank by Brigham Young. When asked if the state really needed a state star, Rep. Marda Dillree, R-Farmington, sponsor of the bill, admitted perhaps not, "but Utah has a diverse population with a multitude of interests." Actually Utah is one of the least ethnically and religiously diverse states in the US. As an example of the difficulty non-Mormon faiths have in Utah, some years ago a Lutheran church on the corner of 400 East and 400 South (yes, those are real downtown Salt Lake City street names) closed for lack of a congregation and became a sushi restaurant, Ichiban. I've eaten there twice. I suppose that if they're eating sushi in Utah, a thousand miles from the ocean, there's hope. It is a

culinary transformation, perhaps, of the famous Mormon legend of the locusts and the seagulls.



The Valley of the Gods Bed & Breakfast is the tiny structure left of center.

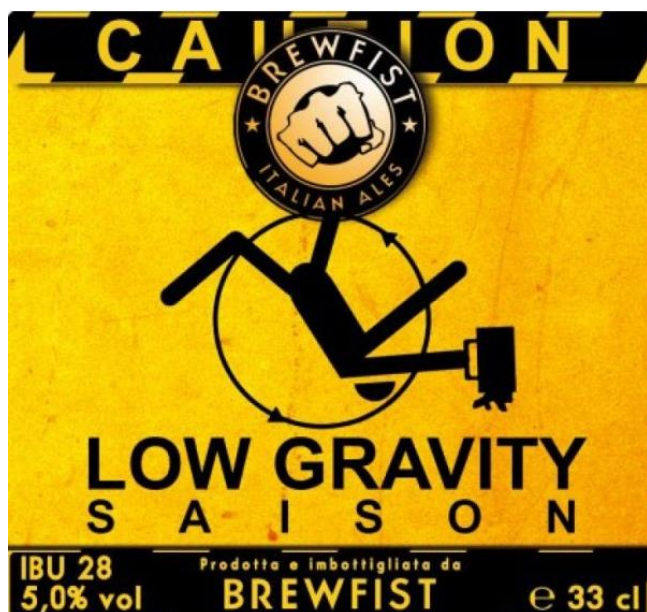
Keeping with the astronomical theme, Utah has also designated M44, the Beehive Cluster, as its official “astronomical symbol” (an actual beehive, accompanied by the word “Industry”, is on the Utah state flag). Said the *Salt Lake City Tribune* in 1996: “This symbol, composed of a hive of stars, transposes our beehive symbol to a new and grand level as we enter our second century as a group of people living in a place where we can still see, with our own eyes, the beautiful and dim features of the starry universe.” This, at least, is true. Utah, outside of the conurbation around Salt Lake City (including Ogden, Murray, Sandy, Orem and Provo), is indeed a pretty good place to view the night sky, with many dark sites in the mostly undeveloped and scenically beautiful state. Elyse and I spent some time twenty years ago at a remarkable place, the [Valley of the Gods Bed and Breakfast](#) near Mexican Hat (population 31) in the southeast corner of the state. It’s the only structure in 685,000 acres of a Bureau of Land Management tract and some 12 miles from the nearest neighbor. The skies at this isolated but congenial 4-bedroom B&B are stunning. The Valley of the Gods is about 30 miles north of the more famous Monument Valley. The photo above was taken from the top of Cedar Mesa, 1,100 feet above the valley floor (which is at 5,500 feet elevation). In the 1990’s, the B&B was owned by a wonderfully cordial, hospitable and cultured gay couple, Lee and Gail, but they’ve since sold it to Gary and Claire Dorgan, who maintain its sophisticated yet rustic charm. It’s really

off the grid: solar and wind power, trucked-in water for washing and showering, bottled water for drinking and cell phone signals only, if you’re lucky. It’s an amazing place in an astonishingly scenic and dramatic part of the United States, and a perfect observing site. Bring a small telescope or binoculars, or even just your eyes.



Back at Half Time, we found “Space Man” India Pale Ale (what is it with the concordance of IPA’s and space themes?) from the Italian company Brewfist. This also comes in a grapefruit variety. The company also makes a “Space Frontier” grape IPA and a “Low Gravity” saison beer.





The moderately well-known Harpoon Brewery of Boston and Windsor, Vermont ferments a series of UFO beers. These are mostly flavored wheat beers, a taste a little too fussy for my palate. Half Time had bottles of the white wheat beer version of UFO (brewed with orange peel) and it was favorably reviewed by the Sci-Fi Night audience member who imbibed it.



Colbert on Sloane Square, Chelsea, London

I'm always on the hunt for astronomy-themed beers. Sometimes they grab my attention when I least expect it. Elyse and I were in London in January and we stopped for refreshment at one of our favorite watering holes, the brasserie *Colbert* on Sloane Square in Chelsea. It was too cold to take an outside table, so we sat at the bar, where Elyse spied "Meteor" beer medallions on two tap handles. Meteor is an ancient Alsatian brewery, the 3rd largest in north-east France (it was founded in 1640, but the name Meteor only came into being in 1925). They make a variety of beer types, most notably traditional pilsner and lager. A small amount is said to be exported to the US. We'll have to look for it.



The badge on the draught lever at Colbert (LF)

From one of my on-line astro-beer searches, I came upon Vostok Space Beer. This Australian brew, made

by 4-Pines Brewing Company, is described as being engineered to drink in space. The Vostok web site explains:

WHAT HAPPENS WHEN YOU DRINK BEER IN SPACE?

Beer aficionados will notice two differences when drinking in space. First, the sense of taste is reduced due to mild swelling of the tongue. Second, drinking beers can be uncomfortable—bubbles do not rise to the top, because there is no “top” in space. Gasses and liquids don’t like to separate. So if you have to burp, you will burp both beer and bubbles.

HOW HAS THIS CHANGED THE RECIPE?

Any space beer must be high in flavor and low in carbonation. We are looking into other effects as well, such as certain nutrient transferal properties of beer which can ease certain stresses during long duration space-flight.

Vostok is an Irish Stout. It was tested in several zero-gravity parabolic flights on February 26, 2011. “Professional microgravity researchers” drank 150 ml (6 ounces) of beer from a specially engineered container built by Saber Astronautics and were then subject to biometric evaluation. No ill effects were noted. The intended market for this beer is the “thousands of rejoicing, happy space fans booked on suborbital flights.” The company explains, “Let’s face it, some of these intergalactic (*sic*) holidaymakers will want the option to enjoy a brew while looking at our big Blue Globe.” Vostok, of course, was the name of a Soviet space capsule from the 1960’s.



The 4-Pines company has embarked on a technology project to develop a space-capable beer bottle, so that drinkers don’t have to suffer the ignominy of sucking the fluid out of plastic squeeze tubes. Their goal is to create “a beer bottle concept that would not only adhere to strict space regulations (such as materials e.g. no glass allowed) and brewing requirements (sanitisa-

tion (*sic*), filling etc) but also to encase the Saber engineered insert to facilitate beer extraction from the bottle in zero gravity.” If they can invent the zero-gravity toilet, they ought to be able to pull this off.

In September 2013, the well-known Dogfish Head Brewery (Milton, Delaware) brewed a “Celest-jewel-ale” that was made “with lunar meteorites that have been crushed into dust, then steeped like tea in a rich, malty Oktoberfest,” the brewery wrote on its website. This beer was served for a few weeks exclusively at Dogfish Head’s brewpub in Rehoboth Beach, Delaware, dispensed with “koozies” made by the high-tech materials company ILC Dover, fabricators of space suits for NASA. These were probably the only beer “koozies” ever made from Goretex, Kevlar, Mylar and Nomex! My niece Courtney worked for Dogfish Head in 2014 and lived in Rehoboth Beach (of blessed memory: I had a share in a weekend house there in the summer of 1977 when I was working at the National Institutes of Health in Bethesda, Maryland) but she was apparently too late for this concoction or the swag associated with it. She did get me a Dogfish Head baseball cap. Cotton and polyester, though.



The high-tech “koozie” surrounding a glass of Dogfish Head “Celest-jewel-ale”

If you missed my previous articles on beer and astronomy, they’re in the [May 2015](#) and [September 2015](#) SkyWAatch newsletters. Drink long and prosper! ■

The Closest New Stars To Earth

Ethan Siegel

When you think about the new stars forming in the Milky Way, you probably think of the giant star-forming regions like the Orion Nebula, containing thousands of new stars with light so bright it's visible to the naked eye. At over 400 parsecs (1,300 light years) distant, it's one of the most spectacular sights in the night sky, and the vast majority of the light from galaxies originates from nebulae like this one. But its great luminosity and relative proximity makes it easy to overlook the fact that there are a slew of much closer star-forming regions than the Orion Nebula; they're just much, much fainter.

If you get a collapsing molecular cloud many hundreds of thousands (or more) times the mass of our sun, you'll get a nebula like Orion. But if your cloud is only a few thousand times the sun's mass, it's going to be much fainter. In most instances, the clumps of matter within will grow slowly, the neutral matter will block more light than it reflects or emits, and only a tiny fraction of the stars that form—the most massive, brightest ones—will be visible at all. Between just 400 and 500 light years away are the closest such regions to Earth: the molecular clouds in the constellations of Chamaeleon and Corona Australis. Along with the Lupus molecular clouds (about 600 light years distant), these dark, light-blocking patches are virtually unknown to most sky watchers in the northern hemisphere, as they're all southern hemisphere objects.

In visible light, these clouds appear predominantly as dark patches, obscuring and reddening the light of background stars. In the infrared, though, the gas glows brilliantly as it forms new stars inside. Combined near-infrared and visible light observations, such as those taken by the Hubble Space Telescope, can reveal the structure of the clouds as well as the young stars inside. In the Chamaeleon cloud, for example, there are between 200 and 300 new stars, including over 100 X-ray sources (between the Chamaeleon I and II clouds), approximately 50 T-Tauri stars and just a couple of massive, B-class stars. There's a third dark, molecular cloud (Chamaeleon III) that has not yet formed any stars at all.

While the majority of new stars form in large molecular clouds, the closest new stars form in much smaller, more abundant ones. As we reach out to the most distant quasars and galaxies in the universe, remember that there are still star-forming mysteries to be solved right here in our own backyard.

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Image credit: NASA and ESA Hubble Space Telescope. Acknowledgements: Kevin Luhman (Pennsylvania State University), and Judy Schmidt, of the Chamaeleon cloud and a newly-forming star within it—HH 909A—emitting narrow streams of gas from its poles.

