the Skyscraper

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March 2016

AMATEUR ASTRONOMICAL SOCIETY OF RHODE ISLAND ⋆ 47 PEEPTOAD ROAD ⋆ NORTH SCITUATE, RHODE ISLAND 02857 ⋆ WWW.THESKYSCRAPERS.ORG

In This Issue:

Phases of the Moon

New Moon
March 9 01:54

First Quarter Moon
March 15 17:03

Full Worm Moon
March 23 12:01

Last Quarter Moon
March 31 15:17

Friday, March 4, 7:00pm
at North Scituate Community House

Dark Matter Decaying in an Expanding Universe by Gordon Blackadder

Observations show that the Universe is expanding. General relativity tells us that what the Universe is made of determines how fast the Universe expands. One of the largest components of the Universe is dark matter, but despite its abundance we know remarkably little about it. If dark matter decays, if it breaks up into smaller and faster particles, that changes what the Universe is made of and could measurably affect the speed of the expansion.

Gordon Blackadder is a PhD candidate at Brown University. Originally from Scotland, UK, he studied theoretical physics at the University of St Andrews. His research with Prof. Savvas Koushiappas has focused on modeling and constraining Decaying Dark Matter.

President's Message

by Bob Horton

Our March meeting marks the start of the nominating process to choose new officers, members at large, and a trustee.

The Nominating Committee, chaired by Ed Haskell, has spent the last couple of months looking for members interested in taking on the responsibilities of running our Society in the coming year. If you are personally interested in being considered for any office, or would like to nominate someone else, please contact Ed at haskell.ed@gmail.com as soon as possible.

At the March meeting, the Nominating Committee will be presenting their

recommended slate of nominees for the elections, which will be held at the Annual Meeting in April. Any member in good standing and over 18 years of age may run for office. After the Nominating Committee presents their nominees, the floor will be open for anyone to be nominated by another member. Once all nominations have been made, the nomination process will be closed and the names of candidates will be listed on a ballot that will be mailed to every member in good standing, at least 10 days before the Annual Meeting in April.

March also marks the time that the Board of Directors submits an operating budget to the membership for approval. This budget will be introduced under New Business, and we will explain the various categories of expenditures and income. A discussion and vote on the budget will happen under Old Business at the April meeting.

I hope to see all of you at the March meeting.

Clear Skies, Bob Horton

Friday, March 11: Welcome the Season of Spring with Cosmic Colors at the University of Rhode Island Planetarium

University of Rhode Island Planetarium
Upper College Road, Kingston, RI
Friday, March 11th, 2016 6:00 P.M.
Contact: Francine Jackson: 401-527-5558

As the new season of spring begins, thoughts turn to the beautiful colors of the springtime flowers. But, how are we able to view these varied colors? What causes them? Cosmic Colors, an introduction to the way we see and feel, by means of the electromagnetic spectrum, will take you back to the days of Sir Isaac Newton, to the surface of Mars, and every place in between, to show you the origins and importance of such everyday phenomena as X rays, microwaves and infrared waves, and their relation to the colors we love so much.

Cosmic Colors, a planetarium program for audiences of all ages, will be shown at the URI Planetarium, Upper College Road, on the URI campus, at 6:00 P.M. Admission, to benefit the URI Planetarium Memorial fund, is $5.00. Cosmic Colors will be preceded by a 6-minute award-winning presentation on light pollution, Losing the Dark, and will be followed by a live segment showing the Skies above the URI campus.

Come and see the beauty of color!

The University of Rhode Island Planetarium is available for programs of many varied topics of astronomical interest for all age groups. For more information, please call 401-527-5558.

The Skyscraper is published monthly by Skyscrapers, Inc. Meetings are held monthly, usually on the first or second Friday or Saturday of the month. Seagrave Memorial Observatory is open every Saturday night, weather permitting.

Directions
Directions to Seagrave Memorial Observatory are located on the back page of this newsletter.

Submissions
Submissions to The Skyscraper are always welcome. Please submit items for the newsletter no later than **March 18** to Jim Hendrickson, 1 Sunflower Circle, North Providence, RI 02911 or e-mail to jim@distantgalaxy.com.

E-mail subscriptions
To receive The Skyscraper by e-mail, send e-mail with your name and address to jim@distantgalaxy.com. Note that you will no longer receive the newsletter by postal mail.

The Precession of the Equinoxes

by Francine Jackson

One of the problems in trying to introduce the public to the sky is having the North Star, Polaris, so "dim." It's been written about, sung about, and traditionally treated as if it should be a beacon brighter than anything else overhead. But, for those who are fairly disappointed, don't despair: In only 13,000 years, we should be sailing the seas by the light of Vega, the brightest star of Lyra, the Harp.

The understanding of why this will happen isn't new; in fact, Hipparchus suggested changes were happening in the sky over two millennia ago. But, of course, the infamous question is why? What brings the sky to such an occurrence? And, for us oldsters, reverting back to the 1970's hippie revolution, what does that have to do with the Age of Aquarius?

The Earth is inclined about 23½ degrees from the vertical, believed in part to be a result of the Earth's interaction with a Mars-sized body, which propelled material from our early planet. Though much of that material returned to Earth, the particles that didn't fall back coalesced into our neighbor satellite. This interaction also resulted in the Earth undergoing the tilt that is still a part us today.

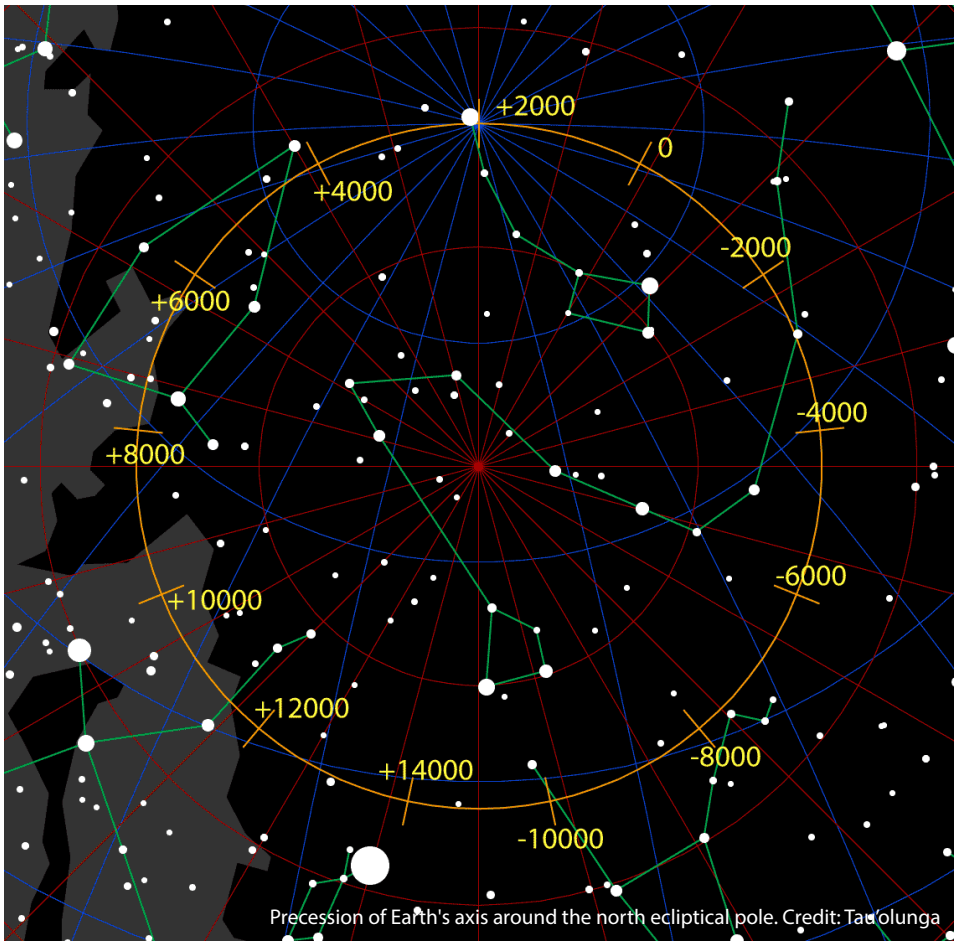
Most importantly for us, the Earth's tilt is responsible for our seasonal change; without it, we would have virtually the same weather conditions all year-round. However, that 23½ degrees, though constant, doesn't just stay in the same place at all times. Like a top, or a coin being spun, the orientation of the Earth slowly moves around, creating an approximate 47-degree circular movement with respect to the vertical. For the Earth to undergo this entire motion takes just under 26,000 years. Therefore, in a human lifetime, the change occurring overhead is negligible, just seconds of arc. But, looking backwards, some of you might recall learning of the historic time frame, thousands of years ago, when Polaris, which is at the end of the Little Dipper's handle (or Little Bear's tail), wasn't the North Star, as it is today; instead, it was Thuban, part of the body of Draco, the Dragon.

The locations of the celestial north (and south) pole positions aren't the only noticeable points. We have astrology to thank us for reminding us of this. Thousands of years ago, when the horoscopes were created, they were done so with respect to the position of the vernal equinox, the intersection of the celestial equator (ours extended to the sky) and the ecliptic (the Sun's apparent path across the celestial sphere) as the Sun appeared to travel from below the celestial equator to above it. This gave us longer daylight periods, and hence, more sunlight to warm the Earth, allowing the beginning of the planting season – spring. It was noted that where this intersection was located was within the region of the constellation Aries, the Ram, the so-called "first point of Aries."

However, as thousands of years have gone by, the process of precession has moved that intersection point to Pisces, the Fishes, making all our astrological signs off by one. And, to make matters worse, that vernal equinox point is now low within Pisces, ready to move again, into the next constellation in line, Aquarius. Although it will be several hundred years before the actual change occurs, you might want to dust off your tie-dyes and get your flower gardens ready for the next major change in the astronomical (and astrological) settings. Oh, and start growing your hair – it will need to be "shining, gleaming, streaming. . ." et al.

In addition, as the location of the Sun at the different positions will change, so will the times we will be observing our seasonal constellations. In one-half the precessional time, about 13,000 years, we will not have to freeze to enjoy what some consider their "favorite" star pattern, Orion, the Hunter. Instead of being our sign of winter, Orion will reign during the warm, summer months. And, Vega, long part of our summer sky, will be the closest star to the north celestial pole, still not the brightest, but much more so than Polaris, and easier to direct the public toward the direction north.

Francine Jackson is Skyscrapers Public Relations Spokesperson, writes the weekly newsletter for Ladd Observatory and serves as planetarian at the University of Rhode Island. See more at http://theskyscrapers.org/francine-jackson



Precession of Earth's axis around the north ecliptical pole. Credit: Tau'olunga

Prime Time for Observing Jupiter

by Dave Huestis

It's been a few months since any of the naked-eye planets have been visible during convenient evening hours for casual stargazers. From mid-November into early 2016, amateur astronomers who wished to view Venus, Saturn, Mars, Jupiter, and a brief and low appearance of Mercury, had to do so during the early morning hours before sunrise. For those of you whose work and family commitments prevented such exploration, the drought of planets in the evening sky is about to end.

The first planet to be well-placed for scrutiny will be the largest world in the solar system—Jupiter. On March 1 this massive planet (you could fit 1,321 Earths within its volume) will rise above the eastern horizon around 6:00 p.m. I suggest waiting an hour or so for Jupiter to ascend higher before you begin to observe it with a telescope. Since Jupiter will be the brightest object in this area of the sky, you shouldn't have any difficulty in finding it.

Jupiter as seen on August 2, 2009. Shadow of Europa (Europa in transit in front of Jupiter disk), Ganymede on right, Io of left, GRS also visible. Photo by Tom Thibault.

However, what may first catch your eye before Jupiter increases in altitude will be the blue white star Regulus, the constellation Leo's brightest star. In sky lore Regulus marks the position of the lion's heart. It also marks the terminus of a star pattern or asterism known as the sickle, seen as a backwards question mark. The sickle represents the head, mane and shoulders of the lion. Jupiter will be located down and to the left of Regulus, under the lion's hindquarters. See accompanying star map for reference.

This favorable prime time appearance of Jupiter is ideal, for on March 8 Jupiter will be at opposition (opposite the Sun in the sky) and at its closest distance to the Earth this year at approximately 412,296,186 miles. Jupiter will be visible all night. And in fact, we'll be able to observe Jupiter through until mid-August, when it will be low in the west at sunset, requiring a very good western horizon to view. That leaves us five good months to watch the ever changing Jovian system.

Telescopic observations of Jupiter began on January 7, 1610, by Galileo Galilei using a lens 1.5 inches in diameter with a magnification of only 20X. He immediately noticed three little stars in the planet's vicinity. At first he thought they were background stars, but after careful observation he deduced they were orbiting Jupiter. You can read about Galileo's discovery in his own words in a brief work titled, Sidereus Nuncius, or The Starry Messenger, published on March 13, 1610. His observations of Jupiter's satellites begins on page 17 of this document: http://homepages.wmich.edu/~mcgrew/Siderius.pdf

Galileo's telescopic work and the calculations that followed proved the Copernican theory's Sun-centered orbital dynamics of the solar system, still controversial for the time. The planets orbited the Sun, just as Jupiter's moons orbited about him. Galileo concluded in The Starry Messenger, "…for now we have not one planet only revolving about another, while both traverse a vast orb about the Sun, but our sense of sight presents to us four stars circling about Jupiter, like the Moon about the Earth, while all of them together with Jupiter traverse a great orb moving around the Sun in the space of twelve years."

You can relive Galileo's discovery of Jupiter's moons, now known as the Galilean satellites, using even a small "department store" refractor. Also easily observed will be Jupiter's bands and zones, which give the planet a striped appearance. Larger instruments may also reveal the Great Red spot, a centuries old storm in Jupiter's cloud tops. Use whatever optical aid you have at hand, but if you wish to marvel at the beauty of Jupiter and all it has to offer, then set aside some time to visit one of the local observatories for a splendid visual experience.

Here's what one could expect to see over a period of a few nights. Just like Galileo, one of the first things that will catch your eye will be the Galilean moons. They are: Io, Europa, Ganymede and Callisto. When several of the Galilean moons are visible at the same time, they often appear in a straight line, parading around Jupiter in the plane of its equator. This astrophysical arrangement presents many interesting phenomena for us earth-bound astronomers to observe. (For those of you who love facts, Jupiter has 63 known moons total, the majority of which cannot be seen visually with even large amateur telescopes in a dark sky.)

When a moon passes in front of Jupiter and casts a shadow onto the Jovian cloud tops, it is called a shadow transit. Besides seeing the satellite's shadow, you may also see the bright disk of the satellite traversing Jupiter's clouds at the same time, though this event is more difficult to observe. A moon may also pass behind the planet, which is called an occultation. Jupiter's shadow can even eclipse a satellite as well; gradually the moon will either blink out or reappear. Also, it's fun to watch all four moons line up on one side of the planet. I love to watch Jupiter over an extended period of time during the course of one evening because the view is dynamically changing as you watch.

While you can be pleasantly surprised at the eyepiece of a telescope by any of these satellite events during a random observing session, you can use the following website to plan ahead to ensure you experience a special Galilean satellite event (http://www.skyandtelescope.com/wp-content/observing-tools/jupiter_moons/jupiter.html).

Next it's time to look at Jupiter's disk, the ball of the planet. Jupiter is a large planet so even a small telescope will show a keen-eyed observer much detail. The more prominent dark bands/belts and lighter zones in Jupiter's cloud tops can easily be seen. Though the Great Red Spot (GRS), an almost 400-year-old storm, is not as red (some observers describe it as salmon colored) as it once was many years ago, it should be fairly easy to see if it has rotated into view.

However, since its discovery the GRS has shrunk by 50%, and in more recent years its oval shape has become more circular. Some astronomers speculate that the storm may be dissipating. Only time will tell. A six-inch telescope or larger may be needed to catch a glimpse of it. Keep in mind that Jupiter rotates once in ten hours, making it possible to see the entire planet in one or two nights of observing. You can visit the following website to determine when favorable views of the Great Red spot will occur: http://acquerra.com.au/astro/software/jupiter.html.

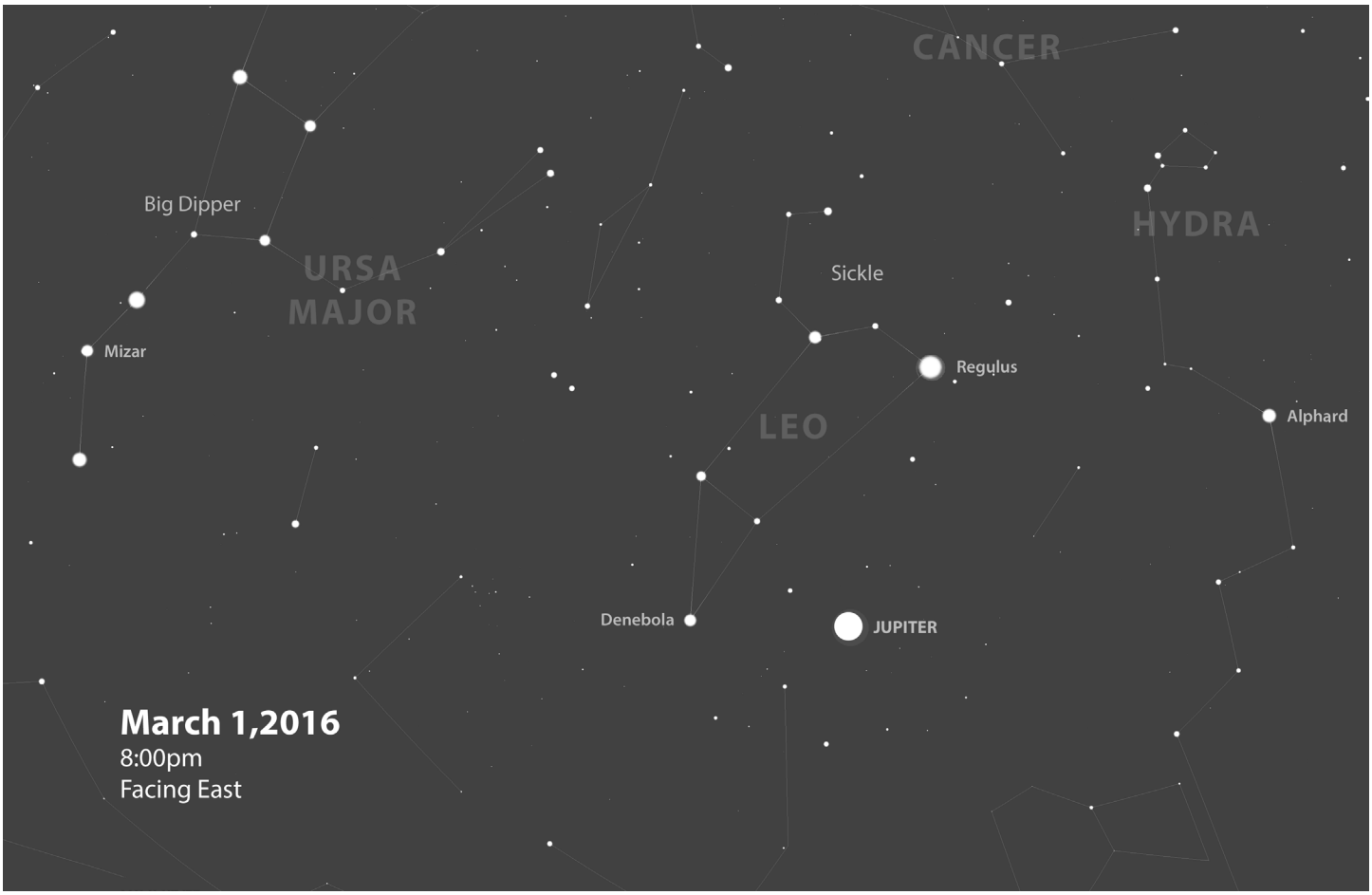
Once Jupiter rises high enough to be viewed from the local observatories, it will be the focus of attention for several months. Only the Moon will be able to draw attention away from Jupiter. That is until the beginning of June when Mars, then Saturn, will return to the early evening sky for us to view. By Jove, get out there and enjoy one of the great visual pleasures that a telescope can provide.

Incredible views of Jupiter and his moon's are available for your viewing pleasure at each of the facilities listed below. Seagrave Memorial Observatory (http://www.theskyscrapers.org/) in North Scituate is open every clear Saturday night. Ladd Observatory (http://www.brown.edu/Departments/Physics/Ladd/) in Providence is open every Tuesday night. The Margaret M. Jacoby Observatory at the CCRI Knight Campus in Warwick (http://www.ccri.edu/physics/observatory.htm) is open every clear Wednesday night. Frosty Drew Observatory (http://www.frostydrew.org/) in Charlestown is open every clear Friday night. Snow or ice can force closures, so please check the respective websites for any cancellation notices before venturing out for a visit. Also, opening times change during March because on the 13th at 2:00 a.m. we spring ahead one hour to daylight saving time (DST), also known as eastern daylight time (EDT). Verify the schedules on the websites as well.

And finally, the vernal equinox, (spring) begins on March 20 at 12:30 a.m. EDT.

Keep your eyes to the skies.

Dave Huestis is Skyscrapers Historian and has been contributing monthly columns to local newspapers for nearly 40 years. See more at http://theskyscrapers.org/dave-huestis



The Sun, Moon & Planets in March

This table contains the ephemeris of the objects in the Solar System for each Saturday night in March. Times are in Eastern. Daylight Saving time begins on March 13. Time calculated for Seagrave Observatory (41.845N, 71.590W).

Object	Date	RA	Dec	Const	Mag	Size	Elong	Phase(%)	Dist(S)	Dist(E)	Rise	Transit	Set
Sun	**5**	23 04.2	-5 58.2	Aqr	-26.8	1935.0	-	-	-	0.99	06:13	11:57	17:42
	12	23 30.0	-3 14.1	Psc	-26.8	1931.4	-	-	-	0.99	06:02	11:55	17:50
	19	23 55.7	0 28.3	Psc	-26.8	1927.8	-	-	-	1.00	06:50	12:53	18:58
	26	0 21.2	2 17.2	Psc	-26.8	1924.0	-	-	-	1.00	06:38	12:51	19:06
Moon	**5**	19 25.7	-17 39.3	Sgr	-11.0	1860.2	54° W	21	-	-	03:42	08:50	14:02
	12	2 03.8	8 30.3	Psc	-10.5	1996.8	41° E	12	-	-	08:22	15:18	22:22
	19	8 41.0	14 10.6	Cnc	-12.4	1851.4	130° E	82	-	-	15:30	22:29	05:20
	26	14 10.2	-9 46.4	Vir	-12.5	1761.2	153° W	94	-	-	21:14	02:50	08:20
Mercury	**5**	22 08.7	-13 43.4	Aqr	-0.4	5.1	16° W	90	0.45	1.31	05:49	11:04	16:19
	12	22 54.1	-9 20.4	Aqr	-0.7	5.0	11° W	95	0.42	1.35	05:51	11:22	16:54
	19	23 41.4	-3 58.1	Aqr	-1.3	5.0	5° W	99	0.38	1.36	06:51	12:41	18:34
	26	0 30.9	2 14.4	Cet	-1.8	5.1	2° E	100	0.34	1.33	06:50	13:04	19:19
Venus	**5**	21 33.9	-15 20.3	Cap	-3.8	11.2	24° W	92	0.73	1.51	05:21	10:28	15:35
	12	22 07.8	-12 39.1	Aqr	-3.8	11.0	22° W	93	0.73	1.54	05:16	10:34	15:52
	19	22 41.0	-9 40.9	Aqr	-3.8	10.8	21° W	94	0.73	1.57	06:11	11:39	17:09
	26	23 13.5	-6 29.9	Aqr	-3.8	10.6	19° W	95	0.73	1.59	06:04	11:44	17:26
Mars	**5**	15 50.7	-18 48.5	Lib	0.2	9.0	105° W	90	1.61	1.04	23:51	04:43	09:34
	12	16 01.0	-19 23.5	Lib	0.0	9.6	110° W	91	1.61	0.97	23:36	04:26	09:15
	19	16 10.0	-19 54.0	Sco	-0.2	10.3	115° W	91	1.60	0.90	00:20	05:07	09:54
	26	16 17.6	-20 20.3	Sco	-0.3	11.1	120° W	92	1.59	0.84	00:02	04:47	09:32
1 Ceres	**5**	23 14.2	-13 30.1	Aqr	9.0	0.3	8° W	100	2.97	3.95	06:52	12:06	17:19
	12	23 24.5	-12 26.6	Aqr	9.0	0.3	9° W	100	2.97	3.95	06:31	11:48	17:06
	19	23 34.8	-11 23.4	Aqr	9.1	0.3	12° W	100	2.97	3.94	07:10	12:31	17:53
	26	23 45.0	-10 20.7	Aqr	9.1	0.3	16° W	100	2.97	3.92	06:49	12:14	17:39
Jupiter	**5**	11 21.0	5 48.1	Leo	-2.3	44.3	176° W	100	5.43	4.44	17:46	00:09	06:32
	12	11 17.6	6 09.9	Leo	-2.3	44.3	176° E	100	5.43	4.44	17:14	23:38	07:02
	19	11 14.3	6 30.9	Leo	-2.3	44.2	168° E	100	5.43	4.45	17:42	00:07	06:33
	26	11 11.1	6 50.5	Leo	-2.3	43.9	160° E	100	5.43	4.48	17:10	23:36	06:03
Saturn	**5**	17 00.2	-21 00.1	Oph	0.5	16.6	89° W	100	10.02	9.99	01:09	05:52	10:34
	12	17 01.0	-21 00.5	Oph	0.4	16.8	96° W	100	10.02	9.87	00:43	05:25	10:07
	19	17 01.5	-21 00.3	Oph	0.4	17.0	102° W	100	10.02	9.76	01:16	05:58	10:40
	26	17 01.7	-20 59.7	Oph	0.4	17.2	109° W	100	10.02	9.65	00:48	05:31	10:13
Uranus	**5**	1 09.1	6 41.4	Psc	5.9	3.4	34° E	100	19.97	20.79	07:33	13:59	20:26
	12	1 10.5	6 49.6	Psc	5.9	3.4	27° E	100	19.97	20.85	07:06	13:33	20:00
	19	1 11.9	6 58.3	Psc	5.9	3.4	20° E	100	19.97	20.90	07:40	14:07	20:34
	26	1 13.3	7 07.1	Psc	5.9	3.4	14° E	100	19.97	20.93	07:13	13:41	20:09
Neptune	**5**	22 46.2	-8 40.2	Aqr	8.0	2.2	5° W	100	29.96	30.95	06:06	11:37	17:08
	12	22 47.2	-8 34.3	Aqr	8.0	2.2	12° W	100	29.96	30.93	05:39	11:10	16:41
	19	22 48.1	-8 28.5	Aqr	8.0	2.2	19° W	100	29.96	30.90	06:12	11:44	17:15
	26	22 49.1	-8 22.9	Aqr	8.0	2.2	25° W	100	29.96	30.86	05:45	11:17	16:49
Pluto	**5**	19 12.9	-20 51.5	Sgr	14.3	0.2	58° W	100	33.05	33.57	03:21	08:04	12:47
	12	19 13.5	-20 50.9	Sgr	14.3	0.2	65° W	100	33.06	33.47	02:54	07:37	12:20
	19	19 14.0	-20 50.4	Sgr	14.3	0.2	72° W	100	33.06	33.36	03:27	08:10	12:53
	26	19 14.4	-20 50.0	Sgr	14.3	0.2	78° W	100	33.07	33.25	03:00	07:43	12:26

Planetary Nebula in Gemini

NGC 2392 "Eskimo Nebula"

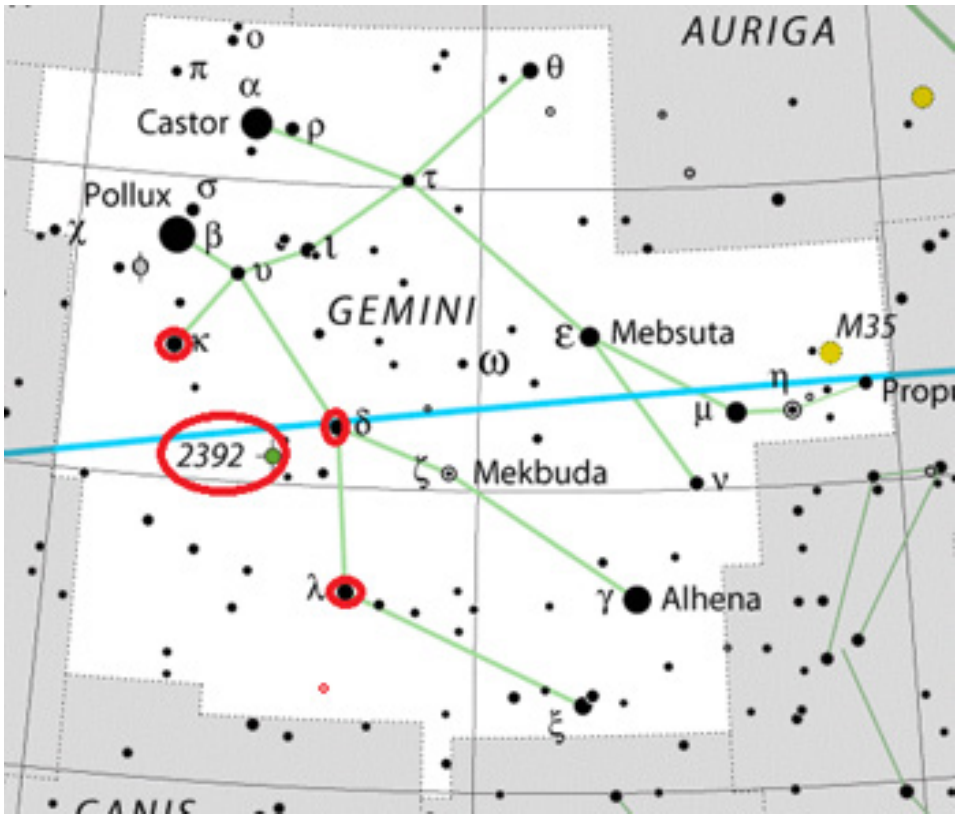
by Las Vegas Astronomical Society

NGC 2392, the Eskimo Nebula is a bright planetary nebula located in Gemini halfway between the stars Kappa (κ) and Lambda (λ) Geminorum and near the 4th magnitude star Wasat (Delta [δ] Geminorum). It pairs with an 8th magnitude star located 100 arc-seconds away. The nick-name comes from the nebula's appearance, when viewed with medium to large-aperture scopes, to a person's face surrounded by a fur-lined parka.

The Eskimo Nebula was discovered by William Herschel in 1787. Estimates of its distance vary – one source suggests a distance of 2900 light years, which corresponds to a true diameter of .68 light years. If a NASA figure of 5000 light years is correct, the Eskimo Nebula is over one light year across.

The purpose of the LVAS Observer's Challenge is to encourage the pursuit of visual observing. It is open to everyone that is interested, and if you are able to contribute notes, drawings, or photographs, the LVAS will be happy to include them in our monthly summary. If you would like to contribute material, submit your observing notes, sketches, and/or images to either Roger Ivester (rogerivester@me.com) or Fred Rayworth (queex@embarqmail.com). To find out more about the LVAS Observer's Challenge or access past reports, log on to lvastronomy.com/observing-challenge.

Image by Mario Motta, M.D.



constellation-guide.com (IAU and Sky&Telescope magazine)


Mar
Saturn
Moon
Venus
Mercury

All five naked-eye planets visible in the morning sky, February 6, 2016 at Beavertail State Park. Above, Bob Horton captured several images and composited them together. Left, Jim Hendrickson captured this detailed view of the waning crescent Moon rising with Venus and Mercury.

The Closest New Stars To Earth

by 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 Chameleon 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.

This article is provided by NASA Space Place. With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology. Visit spaceplace.nasa.gov to explore space and Earth science!

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.

Skyscrapers, Inc. Membership Renewal

Name _____

Address _____

_____

City _____

State _____ **Zip** _____

Phone _____

Email _____

Membership Dues

		Annual Dues (choose one category)
Junior (13-17)	❑	*$15*
Regular	❑	*$50*
Family	❑	*$60*
Senior (65+)	❑	*$25*
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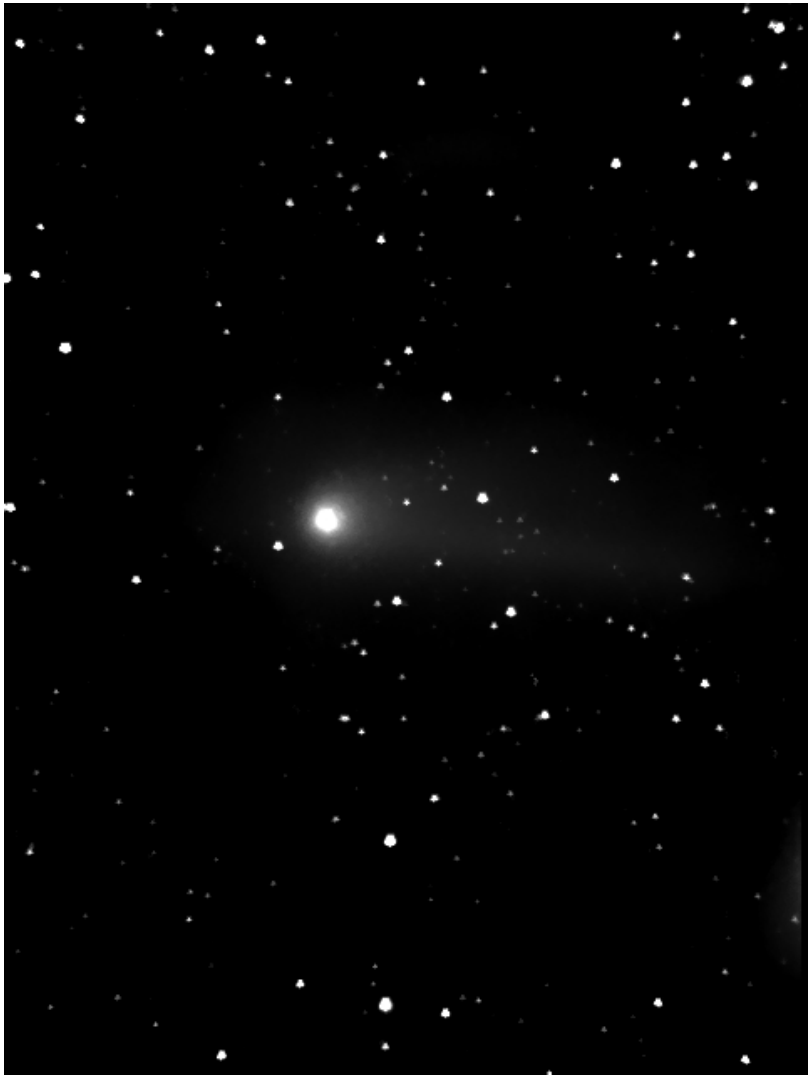

Comet Catalina was about magnitude 7 on February 22, not far from the Little Dipper. Conrad Cardano took this photo with a Skyris CCD video camera. It is a compilation of thirty 30second exposures through an ES 102mm refractor processed with Astro Art.

Directions to Seagrave Memorial Observatory

www.theSkyscrapers.org

From the Providence area:
Take Rt. 6 West to Interstate 295 in Johnston and proceed west on Rt. 6 to Scituate. In Scituate bear right off Rt. 6 onto Rt. 101. Turn right onto Rt. 116 North. Peeptoad Road is the first left off Rt. 116.

From Coventry/West Warwick area:
Take Rt. 116 North. Peeptoad Road is the first left after crossing Rt. 101.

From Southern Rhode Island:
Take Interstate 95 North. Exit onto Interstate 295 North in Warwick (left exit.) Exit to Rt. 6 West in Johnston. Bear right off Rt. 6 onto Rt. 101. Turn right on Rt. 116. Peeptoad Road is the first left off Rt. 116.

From Northern Rhode Island:
Take Rt. 116 South. Follow Rt. 116 thru Greenville. Turn left at Knight's Farm intersection (Rt. 116 turns left) and follow Rt. 116. Watch for Peeptoad Road on the right.

From Connecticut:
• Take Rt. 44 East to Greenville and turn right on Rt. 116 South. Turn left at Knight's Farm intersection (Rt. 116 turn left) and follow Rt. 116. Watch for Peeptoad Road on the right.
• or • Take Rt. 6 East toward Rhode Island; bear left on Rt. 101 East and continue to intersection with Rt. 116. Turn left; Peeptoad Road is the first left off Rt. 116.

From Massachusetts:
Take Interstate 295 South (off Interstate 95 in Attleboro). Exit onto Rt. 6 West in Johnston. Bear right off Rt. 6 onto Rt. 101. Turn right on Rt. 116. Peeptoad Road is the first left off Rt. 116.

SKYSCRAPERS INC.

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