



the Skyscraper

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April
2012

Amateur Astronomical Society of Rhode Island ★ 47 Peepoad Road ★ North Scituate, Rhode Island 02857 ★ www.theSkyscrapers.org

April Meeting with Professor Brandon Murakami

Friday, April 13, 7:30pm

Seagrave Memorial Observatory

Rare Muon Decay in the Large Hadron Collider era

Membership
renewals are due
See renewal form on page 15

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The muon is a particle differs from electrons only by virtue of having roughly 200 times the electron's mass and being unstable, but is otherwise identical. 100% of experimentally observed muon decays result in an electron and two neutrinos, another exotic particle. Meanwhile, the primary mission of the Large Hadron Collider is to observe and measure the properties of the Higgs boson, a particle responsible for generating all known particle masses and bestowing light with its fundamental properties. A compelling technical problem with the Higgs boson requires solutions with hypothetical particles that lead to predictions of rare muon decays. Specifically, muons are generically predicted to decay to an electron and photon -- a phenomena marked by the absence of the usual accompanying neutrino

Professor Murakami is a theoretical particle physicist. Particle physics is the study of the fundamental behavior of the matter and energy particles that govern nature. His primary role in this research field is to make theoretical predictions for particle physics experiments, such as the Large Hadron Collider (LHC) -- a 17 mile accelerator that collides protons with Big Bang-like energies. The LHC is hypothesized to be capable of creating never-before-seen fundamental particles. Other primary research interests involve "lepton flavor violation," "CP violation," and "cold dark matter." These technical terms roughly translate to rare decays of exotic particles, analyzing the difference between matter and anti-matter, and attempting to understand the mysterious matter that composes a large fraction of matter in our universe, respectively.

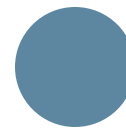
Phases
of the
Moon



6



13



21



29

Other notable events: Venus passes the Pleiades on the 3rd. Mercury is at greatest western elongation on the 18th. Venus is at greatest illumination on the 30th. Saturn is at opposition on the 15th.

Seagrave Memorial Observatory
is open to the public

weather permitting

April 7 & 14: 8:00-10:00 pm
Beginning April 21: 9:00-11:00 pm



President's Message

Tom Thibault

First, let me thank all of you for your support over the last two years as your President. It has been your support that has made my term so enjoyable and rewarding. It seems like only yesterday I became a member of this wonderful organization. While my active interest in astronomy has been rather short when compared to that of other long-time members, I have found the willingness of our members to advise their fellow astronomers invaluable to my continued interest and advancement in astronomy.

Prior to joining the organization, my interest was a somewhat solitary pursuit. My days were spent soaking in all the information relating to astronomy I could learn from magazines, books, and the web. When evening arrived I found myself, for the most part, alone behind the eyepiece. I found

this time as my sanctuary, and the stressful activities of the day would melt away.

Over time I found I wanted to share my love of astronomy with others as well. Astronomy is a broad subject with many branches of interest. What better way to expose yourself to these than to meet and discuss with those with similar interests who are actively involved.

This was the reason I joined Skyscrapers. After researching the organizations in the area, Skyscrapers seemed to be the best fit for me. As luck had it, Chris, an acquaintance of my wife Lisa and I, told us that her husband Bing was a Skyscrapers member. Bing invited me as his guest to a Skyscrapers Monthly Meeting. I joined Skyscrapers following that meeting and have been a member ever since. What I have found is a wonderful group of individuals with a deep love of astronomy. The long and deep history of the society is matched by the sum of its membership. Skyscrapers are individuals that range from the casual observer to those that have a wealth of knowledge in specific and or varied aspects of astronomy.

My advice to all current members and



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

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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 23** 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.



those considering membership is to make the most of what Skyscrapers has to offer. I personally have a somewhat outgoing personality and find it easy to approach people. Those that do not, I would urge to make that effort. I have found our members to be very friendly and happy to share their experience with anyone whom inquire of it.

I began as a strictly visual observer, and over the years, have expanded to Astrophotography. I have found the advice and knowledge of a number of our members invaluable in improving in this endeavor. Our membership is diverse with members of all aspects of astronomy and willing to share with others. We all have an interest in continuing the success of our organization. It takes all of us to accomplish this, so participation by our membership will insure the continuing success of Skyscrapers.

Professor Tim Barker returned in March as our featured speaker. Professor Barker's presentation of the Apollo Missions was well received. Professor Barker's previous presentation was a hands-on event, and we were provided with another at our March Meeting. Professor Barker set up a microscope for everyone to view NASA's thin-sliced lunar samples. He also displayed a number of full samples from other heavenly bodies from our solar system. Thank you, Professor Barker for another great presentation.

Our business meeting followed. Nomination Committee Chairperson Dave Huestis announced the committee's nominations and also accepted nominations from the floor. Dave was followed by the

presentation of the proposed revisions to our Constitution and Bylaws, Membership Dues structure, and our 2012-2013 Operating Budget. All received motions for discussion and vote at our April Meeting. Copies of the March presentation and supporting documents are available on our web site and hard copies will be available at the April Meeting to aid in your decision.

I am looking forward to seeing all of you at our April 13 Meeting. We have a full agenda: our featured speaker will be Professor Brandon Murakami of Rhode Island College. Professor Murakami will provide us all with some insights into the

world of particle physics and the work surrounding this field of science.

Our business meeting will follow and will include discussions and vote in regards to our Membership Due structure, 2012/2013 Operating Budget, and Constitution and Bylaws. The results of our Annual Elections will also be announced resulting in the installation of our society's newly elected administration.

While this will be my last Monthly Meeting as President, I look forward to continuing as an active member of this great organization.

Clear Skies

April's monthly meeting on April 13th at Seagrave Observatory will include our annual elections and discussion and vote regarding our membership dues structure, 2012/2013 operating budget, and revisions. To assist you on these matters, links to the following PDF documents.

www.theskyscrapers.org/content6738.html

2012-2013 Operating Budget.PDF is a copy of the presentation presented during the business portion of our March meeting. It includes the nomination committee's recommendations. The reasons for the revisions to the constitution and bylaws and instructions on the use of the additional documents being provided. The proposed membership dues, 2012/2013 operating budget, and a copy of the election committee report. The election committee report defines the standing rules that govern the process in which our elections are run and requirements for voting.

Revised Constitution and Bylaws – Color Coded-2.PDF contains a copy of the proposed revised constitution and bylaws color coded for clarity. (see instructions within 2012/2013 operating budget document)

Revised Constitution and Bylaws – Color Coded-2-explanations.PDF contains a brief description, line by line of the changes.

Astronomical Events Determine Easter Observance

Dave Huestis

The motion of the heavens is a precise clock and calendar that can be used to determine when to celebrate special events. One doesn't have to observe the sky for too long a period of time to notice the cyclic phases of the Moon, or the changing position of the Sun relative to the horizon over the course of a year.

It should therefore not be surprising that many religions celebrate special events that are connected to the clockwork of the heavens. For instance, Christians celebrate Easter every year, but the date for the celebration changes. Since we can barely even remember birthdays and anniversaries that

always occur on the same date, it's time for me to enlighten you with the facts of how the date of Easter is determined.

Think back to Easter celebrations of years past. Was it cold or snowy and you had to bundle up? Or, were spring outfits proudly worn amidst warming sunlight and returning songbirds? Why these extremes of weather? Well, if the date for the celebration of Easter occurred on the same Sunday every year, our fickle New England weather could easily account for the differences in attire.

However, in some years Easter can occur as early as March 22 or as late as April 25. Why this range? The varying date for the

observance of Easter is determined by astronomical circumstances. And in 2012 Easter is celebrated almost midway between these two dates, on April 8.

The story began many moons ago when the Christian Church first developed. Since this holy day was determined in conjunction with Passover, Easter often fell on a weekday. However, in 352 A.D. the Council of Nicaea declared that it should always fall on a Sunday. They determined that Easter would fall on the first Sunday after the Full Moon on or next after the vernal equinox (spring... March 20 or 21). However, if the Full Moon occurs on a Sunday, Easter is celebrated on the following Sunday. This scenario happened in 2001.

This year the vernal equinox was on Tuesday, March 20, at 1:13 am, EDT. The Full Moon on or after that date occurs

on Friday, April 6 (also Good Friday). Therefore, Easter is celebrated on Sunday, April 8.

People aren't as observant of sky happenings these days as they once were long ago. Light pollution in and surrounding urban areas has blocked all but the brightest stars

and planets from view. The Milky Way galaxy, our own island universe, can now be seen to best advantage only from dark rural skies.

Let's not lose our connection to the stars from which we were born. Proper lighting can promote safety if effectively installed.

Keeping stray light from polluting the night sky will allow starlight to shine down from the heavens. Then maybe folks will begin to notice and appreciate the beauty of the starry heavens once again.

Have a happy Easter, and remember to keep your eyes to the skies!

April Moon

Francine Jackson

For those of us who live near water, we should know that April's Full Moon is often called the Fish Moon, as the shad swim upstream this time of year to spawn. Also, we have to recall one of the ways our Moon proves useful waterwise: its creation of our tides. Who hasn't noticed the changing ocean as we've sat along the shore, or just listened to our local weathermen remind us about this daily cycle?

For those who live with a large yard, we can watch seeming everyday changes as the season of spring is now fully upon us; therefore, look up on our meeting night, weather permitting, and say hello to the Sprouting Grass Moon. Time to start sharpening our lawn tools.

And, of course, this Full Moon is the precursor to one of the year's movable feasts: Easter. Every year, this Sunday celebration changes date, based on this Full Moon in its relationship to the start of spring. Easter can not occur until the Sunday after the first full Moon that happens after our start of spring, the date of the vernal equinox, which for us is now on March 20th. And, for many of us, who try our best to determine images based on the Moon's surface features, this is an opportune time of year to try to forget about the traditional Man - look to see if you can recognize the Rabbit. He was placed on the Moon for his willingness to give himself as food to the homeless. And, of course, this bunny is a relative to a winter constellation that can still be viewed early in the evening low in the southwest, Lepus. Lepus (which those of you who have taken Latin might notice has a masculine suffix) is the only cuddly rabbit who lays eggs, giving rise to the myth of the Easter Bunny, and to our final designation of tonight's Full Egg Moon.

April Meteor Shower

Dave Huestis

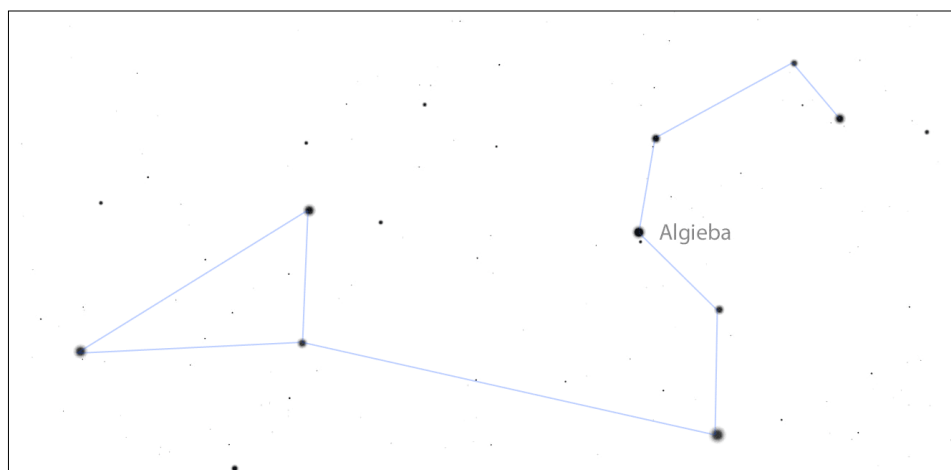
I haven't written about the April Lyrids for a few years now because the shower had been in decline, and the observing conditions were always poor to fair at best. Well, this year the shower peaks at around midnight on the night of April 21-22, and, best of all, the Moon will be New and will not blot out any of the meteors.

The Lyrids appear to radiate outward from an area of sky on the Lyra and Hercules border, which will be about 45 degrees (halfway between the horizon and zenith) above the eastern horizon at midnight and well placed for observing.

These swift and bright meteors disintegrate after hitting our atmosphere at a moderate speed of 29.8 miles per second. They often produce luminous trains of dust that can be observed for several seconds. Predicting the peak number of meteors per hour for this shower would be guesswork at best.

However, unless something unusual happens, you can perhaps expect to see about a dozen meteors during the peak time if you observe well away from city lights.

Good luck. We can only hope that clouds and rain showers won't spoil the view.



Double Star γ Leonis (Algieba)

Glenn Chaple's Sky Object of the Month

One of the finest double stars in the spring sky – indeed, in all the heavens – is gamma (γ) Leonis. Its proper name, Algieba, comes from the Arabic Al Jabbah (The Lion's Mane).

Discovered by William Herschel in 1782, Algieba is comprised of magnitude 2.4 and 3.6 stars currently separated by 4.6 arc-seconds. They form a slowly widening binary system with an orbital period estimated at between 5 and 6 centuries.

Algieba is easily located - it's the brightest

star (after Regulus) in the "Sickle" of Leo. The pair is marginally resolved in small-aperture telescopes with medium power. On an evening of steady seeing, I barely split Algieba with a 3-inch reflector at 60X. A clean split, however, requires a magnification of 100X or more.

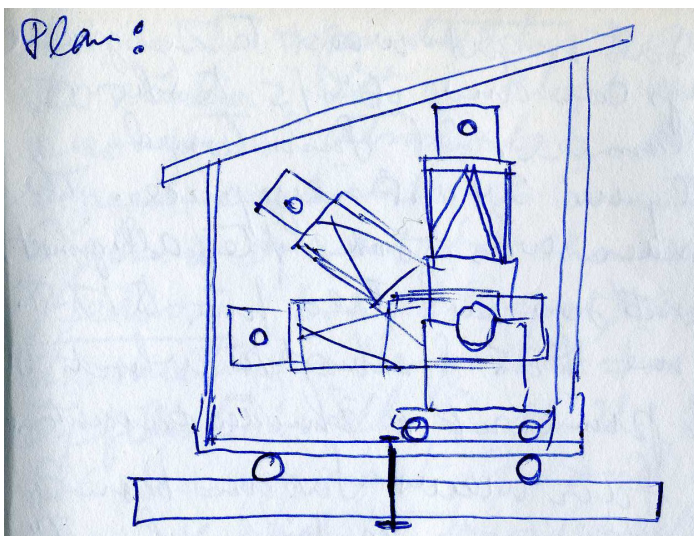
What makes Algieba so visually striking are its rich golden-yellow hues, indicative of its K0 and G7 spectra. Some observers note a slight greenish tinge to the companion. Do you agree?

Gerry Dyck

Building My Merry-Go-Round Observatory

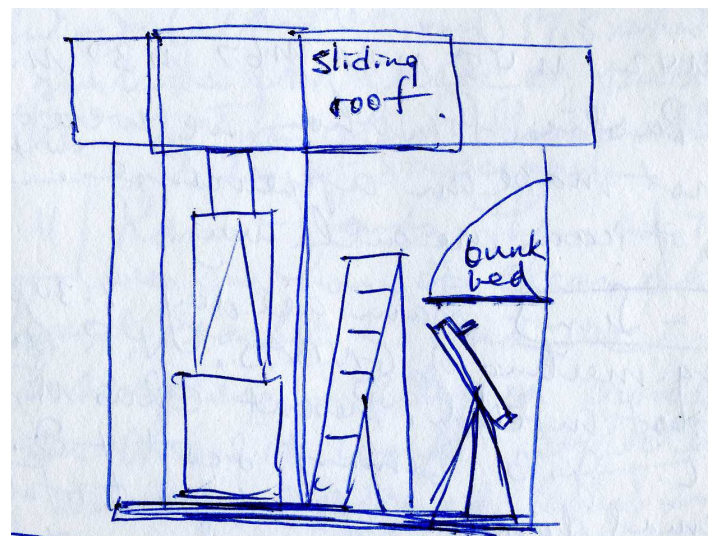
Having finished building my 17.5-inch Dobsonian in 1982, and having grown weary of schlepping it around by hand truck and two-wheel trailer (below), I determined to build a permanent home for my so-called “monster-scope.” This cumbersome rolling observatory made one nervous trip to Stellafane in 1983.

Previous visits to Delphos OH and Mt. Hopkins AZ had me “thinking in circles.” I made preliminary sketches in my log book (below) which showed the basic plan of my building. The side view (L) was an outgrowth of the altitude sweep of the telescope. The front view (R) shows the off-center roof slit with work and storage space. The unrealistic pull-down bed was wisely never realized (nor needed) and the storage space was never as big as imagined.

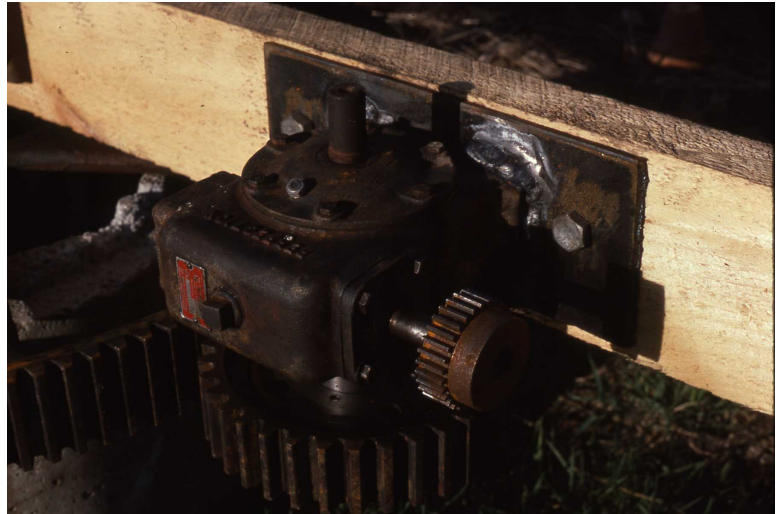


I was already off and running as a visual observer of variable stars, so the expectations I had for my observatory were simple:

- An all-mechanical set up specifically for visual work
- Protection from wind and stray light
- Short set-up time for ease of frequent usage
- A unique design that I could be proud of



A visit to a local junkyard in New Bedford set the direction of my further plans. There I found two meshing gears of 8- and 40-inch diameters. I envisioned the larger one anchored to a massive concrete foundation and the smaller one rotating around it, pulling the building along with it. It happened just so.



Above: L) the two junkyard treasures R) the smaller gear with reduction box attached to the center floor joist Below: L) the four balancing castors R) the floor serving as a merry-go-round entertainment for daughter and friends



I pre-fabricated and pre-painted the walls in the shade of an elm tree. Then, with the help of a neighbor, I attached the walls to the 8' x 8' rotating floor.



Above: L) Daughter Laura helps paint a wall R) a neighbor helps me raise the walls



L) Daughter Heidi stands in doorway R) Framing is done.



The floor-to-roof aperture was then covered by a sliding door and a sliding roof panel. The width of the opening is 36 inches, allowing for about 15 degrees of azimuth visibility without turning the building. The opening also allows viewing from zenith to horizon. After twelve weeks of construction I was able to celebrate first light with an observation of U Geminorum at outburst. It was the first of more than 155,000 variable star observations made from this facility, which has more than surpassed my expectations for a simple, sturdy and practical home base for my astronomical activities. I named it Stjernhaven – Norwegian for “star haven,”

while hundreds of woodland creatures have attempted to rename it “Maushaven.” It has continued to serve me well for twenty-seven years.

Only two revisions have been necessary. Firstly, after about five years the one-inch-thick plywood under-floor, upon which the castors run, began to splinter. It has now been reinforced (underlaid) with steel plating for smooth turning as well as greater longevity. Secondly, when the building was moved in 1991, I mounted it on a triangular foundation with two castors at each point. This has worked even better than the original four-point castor system.



L) The sliding door and roof panel in place. R) the crank and chain apparatus connected to the under-floor gear system



L) looking from the outside in, and R) looking from the inside out

Many visitors have been welcomed to my MGRO (merry-go-round observatory) during its twenty-eight-year life time. Perhaps the most illustrious of these was Clyde Tombaugh, the discoverer of Pluto. Rick Lynch arranged for him to be conducted on an afternoon tour of Skyscraper members' observatories during his 1987 visit to Seagrave Observatory. The visitation party

included Clyde and Patsy Tombaugh, Rick Lynch, Brian Magaw, Alan Hirshfeld and Helga Edvardsen (later Edvardsen-Dyck). "Uncle Clyde" had kind words for my construction plan and variable-star observing program and graciously made an entry into my observatory logbook, as seen below.



What a marvellous
 observatory. your variable
 star observations perseverance
 would have enabled you to have
 discovered Pluto. A wonderful
 idea & mechanism for turning
 your dome.

Sincerely
 Clyde W. Tombaugh
 Discovered the 9th planet,
 Pluto, on 18 Feb 1930

A few years later I showed my MGRO to a delegation of visitors from Nicaragua, on whom I was able to practice my broken Spanish. I cherish the architectural opinion of one twelve-year-old boy, who pronounced, "Es una casa muy estraña!" (It's a very strange building!). And so it is – worthy of showing to others via a 1/12 scale model which I sometimes take with me to astro-

nomical meetings. At the 100th anniversary meeting of the American Association of Variable Star Observers my model, my solar award and I were photographed (next page) by AAVSO member Al Holm.

All Skyscrapers members have an open welcome to visit our observatory in Assonet MA. Please contact me at 508-644-2419 or geraldpdyck@yahoo.com

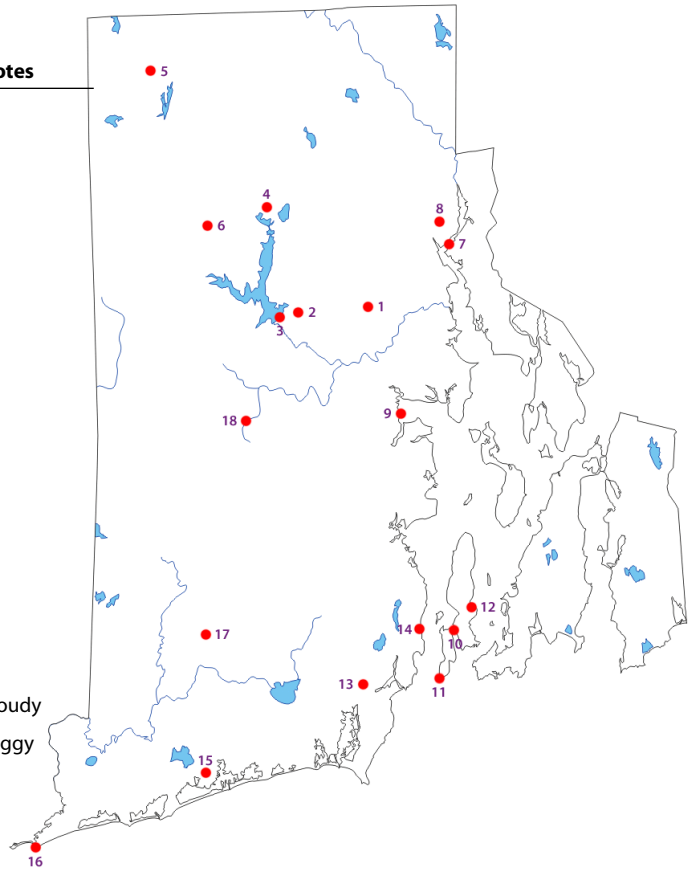


Globe at Night: Across Rhode Island

Scott MacNeill

Scott MacNeil of Frosty Drew Observatory traveled around Rhode Island on March 17-18 to participate in the 2012 GLOBE at Night citizen science campaign to measure the effects of light pollution on the night sky. He measured 18 different locations using a Unihedron Sky Quality Meter (SQM) and a visual estimate of the naked-eye limiting magnitude (NELM) at each site. The results are below.

Location	Town	SQM	NELM	Notes
1 12 Chaloner Court	Cranston	18.43	4.5	
2 Lawton Farm, Seven Mile Road	Scituate	19.09	4.5	
3 Scituate Reservoir on Scituate Ave.	Scituate	19.36	5	
4 Seagrave Observatory	Scituate	19.37	5	
5 Jackson Schoolhouse Rd.	Pascoag	20.16	5.5	
6 Bonniedale Farm, Snake Hill Road	Glocester	19.90	5.5	
7 India Point Park	Providence	17.64	3.5	
8 Ladd Observatory	Providence	17.66	3.5	
9 Chepiwanoxet Point	East Greenwich	19.27	4	
10 Mackerel Cove	Jamestown	19.42	5.5	
11 Beavertail	Jamestown	19.8	5.5	
12 North Bay View Dr.	Jamestown	19.31	4.5	
13 Old Mountain Field, Rt. 108	Wakefield	19.21	4.5	
14 URI	North Kingstown	18.97	4.5	
15 Frosty Drew Observatory	Charlestown	20.83	6.5	
16 Watch Hill	Westerly	20.46	6.5	
17 Washington County Fairgrounds	Richmond	19.90	4.5	Cloudy
18 Fish Hill Soccer Complex, Harkney Hill Rd.	Coventry	19.55	4.5	Maybe Foggy



March Reports

Ed Haskell, Secretary
Jim Crawford, Treasurer

Executive Committee Meeting Minutes February 27, 2012

The Executive Committee endured a long process of preparing the budget for 2012-2013. Every line item was examined and reduced if possible. Many items stimulated comprehensive discussions of alternative approaches that might prove less expensive. The Budget will be presented at the March and April meetings for membership approval.

The first dues increase since sometime in the 1990s were discussed at length and decided upon. They will be presented to the members at the March and April meetings for approval.

President Tom Thibault reviewed the presentation materials he intends to use at the March and April meetings to assist the members' understanding of the changes being proposed to the Constitution and By-Laws. A number of changes were made to avoid confusion or misunderstanding.

The mechanics of voting on all these issues was decided upon.

Respectfully submitted
Ed Haskell
Secretary

Meeting of March 2, 2012

The meeting was called to order by President Tom Thibault at 7:40 pm.

The evening's speaker was Dr. Timothy Barker who received his Ph.D. in Astrophysics at the University of California at Santa Cruz in 1974 and has been at Wheaton ever since. He has taught a variety of courses, including "The Universe," "The Solar System," "Extraterrestrial Life," "Observational Astronomy," "Ancient Astronomies, and "Frontiers of Astronomy." He has published articles on planetary nebulae, supernova searches, and active galaxies and is currently doing asteroid research and searching for Transient Lunar Phenomena. Along the way he has found the time to deliver outstanding presentations at Skyscrapers meetings.

The talk was entitled Samples from the Moon, and there literally were numerous rock and crystal specimens from our nearest heavenly neighbor. Dr. Barker wrapped

the examination of the specimens in a fascinating tale of the Apollo lunar missions complete with many anecdotes not previously heard by most members. It was a fascinating and entertaining exposition.

There were no amendments to the Secretary's Report and the Treasurer's Report will appear in the next newsletter.

The Trustees reported the Observatory would be closed tomorrow night due to expected rain.

Professor Brandon Murakami will be the speaker at the April 13th meeting and will talk about the Large Hadron Collider and its role in measuring the properties of the Higgs boson.

There was no Old Business.

President Tom Thibault presented the 2012-2013 Budget, and the revisions to the Constitution and By-Laws. Handouts were available at the meeting for examination by members prior to the second consideration of these matters at the April meeting.

Dave Huestis chaired the Nominating Committee whose report appears elsewhere in this issue of the Skyscraper. There were no nominations from the floor. The Elections Committee will mail ballots prior to the next meeting.



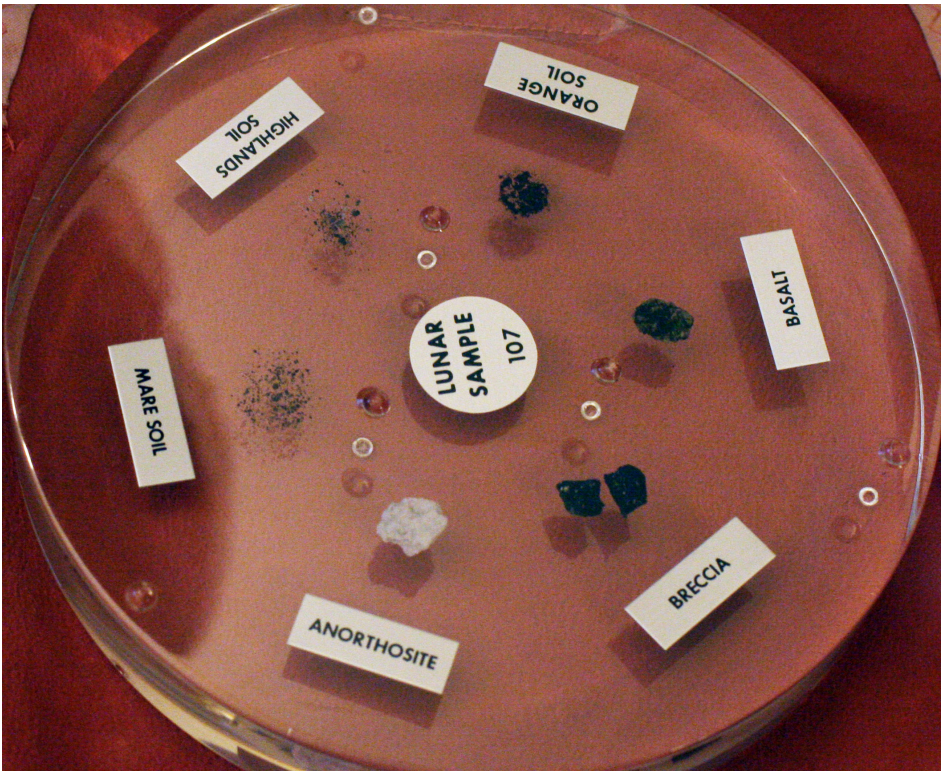
Motions were passed to accept these reports for further consideration and voting at the next meeting. A lengthy and useful discussion among several members on the topics above was conducted and many useful points for further discussion were identified.

The David Madura family membership was approved.

Meeting adjourned at 9:55pm
Respectfully submitted,
Ed Haskell, Secretary

Budget as of 3/20/2012

	2011-2012 Budget	Actual	Difference
INCOME			
Astroincome	\$3,500.00	\$4,001.50	\$501.50
Cookoutinc	\$500.00	\$404.00	-\$96.00
Donation, Other	\$300.00	\$675.00	\$375.00
Dues	\$3,075.00	\$2,350.00	-\$725.00
Interest Inc	\$125.00	\$59.27	-\$65.73
Starparty Donations	\$500.00	\$687.00	\$187.00
TOTAL INCOME	\$8,000.00	\$8,176.77	\$176.77
EXPENSES			
Astroexp	-\$2,750.00	\$2,431.88	-\$318.12
Cookoutexp	-\$423.00	\$374.30	-\$48.70
Corporation, State Fee	-\$22.00	\$22.00	\$0.00
Domain Name	-\$15.00	\$15.00	\$0.00
Donations	-\$50.00	\$50.00	\$0.00
Electric	-\$175.00	\$142.05	-\$32.95
Other Insurance, Property	-\$2,625.00	\$2,552.00	-\$73.00
Postage and Delivery	-\$225.00	\$96.62	-\$128.38
Presidents Fund	-\$150.00	\$25.00	-\$125.00
Printing and Reproduction	-\$140.00	\$14.45	-\$125.55
Propane	-\$375.00	\$80.25	-\$294.75
Refreshment Expense	-\$350.00	\$269.06	-\$80.94
Trustee Exp	-\$700.00	\$263.09	-\$436.91
TOTAL EXPENSES	-\$8,000.00	\$6,335.70	-\$1,664.30
Cash Assets			
Citizens	\$8,647.55		
Capital One	\$11,529.16		
Total	\$20,176.71		



These lunar samples returned from the Apollo missions were presented by Dr. Timothy Parker at the March meeting.

The Flame & Horsehead Nebula in Orion. Image by Bob Forgiel.



Tom Thibault's Heaven's View Observatory

Show Us Your Backyard Observatory

We are planning to publish a series of features on backyard observatories. Do you have a backyard observatory that you would like to feature in an upcoming issue of *The Skyscraper*? Please send your stories and photos to Jim@distantgalaxy.com.

Please send any observing reports and photos to Jim@distantgalaxy.com.

Transit of Venus at Mount Wilson June 3-5, 2012

John Briggs

The coming Transit of Venus on Tuesday, June 5, will be the last in our lifetime. A three-day program of special events, tours, and lectures will run at historic Mount Wilson Observatory above Los Angeles June

3-5. The program will include many speakers and will feature two lectures by noted historian of astronomy Professor Owen Gingerich of Harvard University. Activities will begin at the Mount Wilson Auditorium at 10:00 AM June 3. Besides special tours of the Observatory, the schedule will include an optional evening open house at nearby Stony Ridge Observatory with its 30-inch reflector. The 60-inch Mount Wilson reflector will be available for visual observations on the evening of June 4. Visiting Mount Wilson requires an approximately 40-

minute drive from the foothill town of La Canada, California, where hotels and motels are available. On June 5 the lecture program will be limited and organized mainly for the general public, allowing participants with portable telescopes to set up and prepare for the transit, which begins in the mid-afternoon. For additional information about the event, contact Skyscrapers member John W. Briggs, who is collaborating to organize the event: john.w.briggs@gmail.com; phone 970-328-6228. The registration will be on-line and starting shortly.



The Planet in the Machine

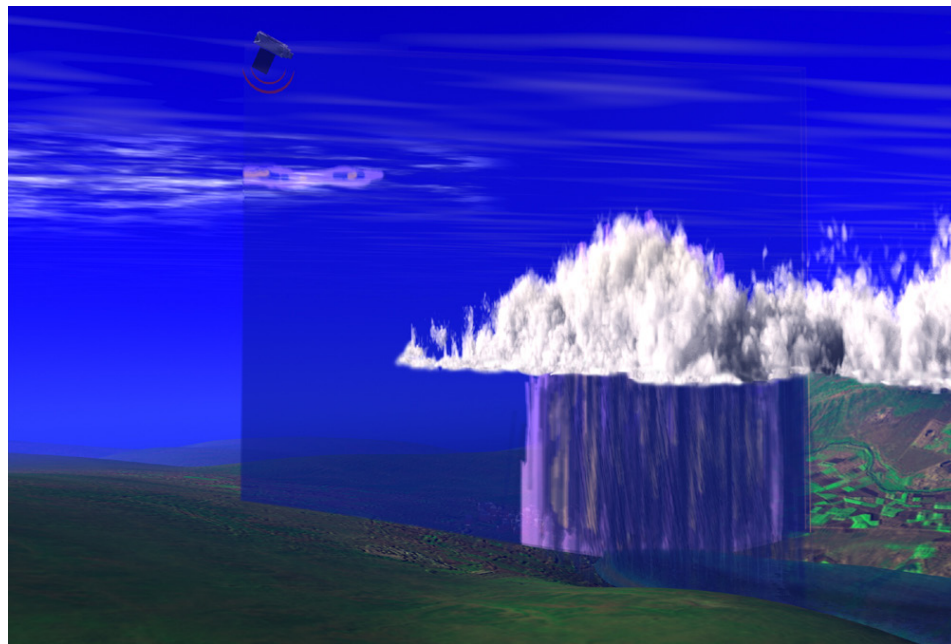
By Diane K. Fisher
and Tony Phillips

The story goes that a butterfly flapping its wings in Brazil can, over time, cause a tornado in Kansas. The “butterfly effect” is a common term to evoke the complexity of interdependent variables affecting weather around the globe. It alludes to the notion that small changes in initial conditions can cause wildly varying outcomes. Now imagine millions of butterflies flapping their wings. And flies and crickets and birds. Now you understand why weather is so complex.

All kidding aside, insects are not in control. The real “butterfly effect” is driven by, for example, global winds and ocean currents, polar ice (melting and freezing), clouds and rain, and blowing desert dust. All these things interact with one another in bewilderingly complicated ways.

And then there's the human race. If a butterfly can cause a tornado, what can humans cause with their boundlessly reckless disturbances of initial conditions?

Understanding how it all fits together is a relatively new field called Earth system science. Earth system scientists work on building and fine-tuning mathematical models (computer programs) that describe the complex inter-relationships of Earth's carbon, water, energy, and trace gases as they are exchanged between the terrestrial biosphere and the atmosphere. Ultimately, they hope to understand Earth as an integrated system, and model changes in climate over the next 50-100 years. The better the



CloudSat is one of the Earth-observing satellites collecting data that will help develop and refine atmospheric circulation models and other types of weather and climate models. CloudSat's unique radar system reads the vertical structure of clouds, including liquid water and ice content, and how clouds affect the distribution of the Sun's energy in the atmosphere. See animation of this data simulation at www.nasa.gov/mission_pages/calipso/multimedia/cloud_calip_mm.html.

models, the more accurate and detailed will be the image in the crystal ball.

NASA's Earth System Science program provides real-world data for these models via a swarm of Earth-observing satellites. The satellites, which go by names like Terra and Aqua, keep an eye on Earth's land, biosphere, atmosphere, clouds, ice, and oceans. The data they collect are crucial to the modeling efforts.

Some models aim to predict short-term effects—in other words, weather. They may become part of severe weather warning systems and actually save lives. Other models aim to predict long-term effects—or climate. But, long-term predictions are much more difficult and much less likely to be believed by the general population, since only time can actually prove or disprove their validity.

After all, small errors become large errors as the model is left to run into the future. However, as the models are further validated with near- and longer-term data, and as different models converge on a common scenario, they become more and more trustworthy to show us the future while we can still do something about it—we hope.

For a listing and more information on each of NASA's (and their partners') Earth data-gathering missions, visit <http://science.nasa.gov/earth-science/missions/>. Kids can get an easy introduction to Earth system science and play Earthy word games at <http://spaceplace.nasa.gov/ecosphere>.

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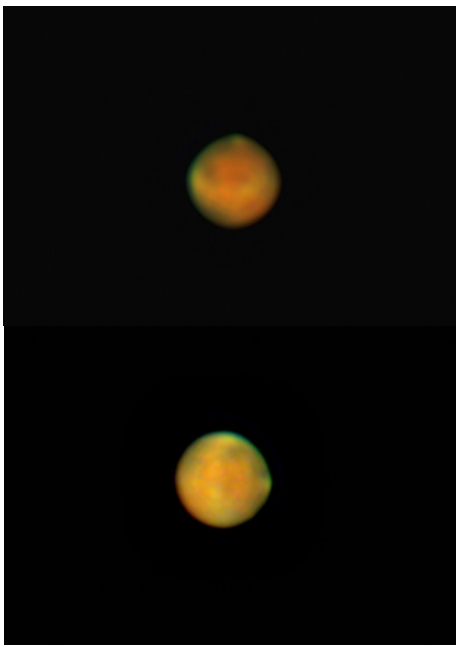
Supernova in M95

During the middle of March, much attention was given to M95, as well as M96 and M105, as during this time Mars was traversing across "Leo Trio." Coincidentally at almost the exact same time (from our perspective), a supernova was spotted in M95. A week of clear, dark skies provided many observing and imaging opportunities for both Mars, and the 13th magnitude supernova.

Bob Forgiel captured this image of M95 with supernova 2012aw on March 20.
3 exposures of 3 min
(image cropped)
12" LX200 & SBIG ST8300



Steve Hubbard made this 2 minute exposure on March 22. Mallincam thru 12" LX200. Light processing to bring up contrast and remove some of the noise.



Mars images by Tom Thibault



Comet Garradd image by Jim Hendrickson



Waxing Gibbous Moon, taken March 5 by Savvas Koushiappas
Telescope TV-102, at f8.6
Camera: Nikon D3100, in RAW
ISO: 100
Shutter Speed: 1/320 seconds
Processing: Apple Aperture 3

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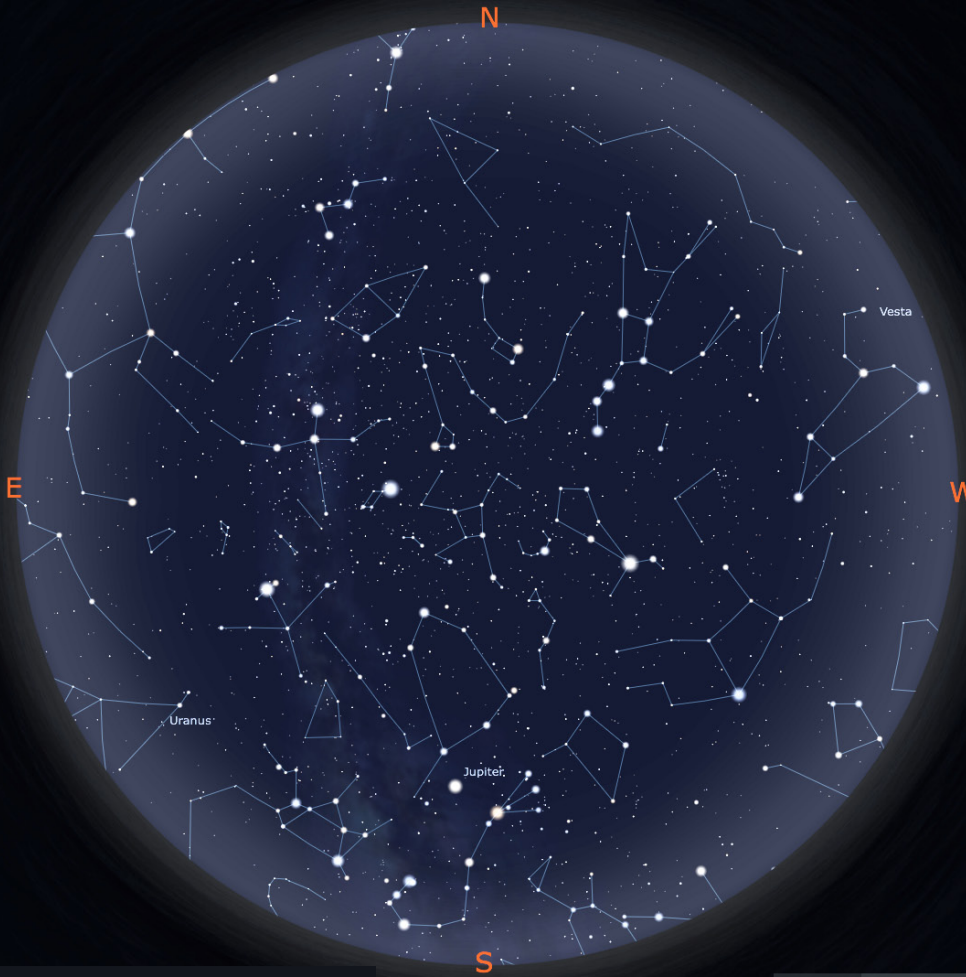
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The Sky above RMS Titanic

Countless stories of tragedy have been told over the past century since the sinking of RMS Titanic on April 15, 1912, but little has been said about what the sky looked like at that fateful hour. What we do know is that the sky was clear and the sea was calm. The Moon was a waning crescent (5.8% illuminated) contributing to the darkness that made it difficult to spot the iceberg. The only solar system object visible to the naked eye was Jupiter, which shone brilliantly about 8 degrees northeast of Antares and just before the meridian. Keen-eyed observers would have been able to spot Uranus just below beta Capricorn. Scorpius was well-positioned over the southern horizon, and Spica hung 20 degrees above the point on the horizon in the direction that Titanic was traveling. The heart of the Milky Way would have been prominent as the light from our home galaxy cast an ethereal glow over the tragic scene. The Great Hercules Cluster M13 was close to the zenith.

Directions to Seagrave Memorial Observatory

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.
- 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.



47 Peeptoad Road
North Scituate, Rhode Island 02857