



the Skyscraper

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April 2018

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

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**Skyscrapers
Board Meetings**
Third Monday of the Month
All Members Welcome

Phases of the Moon

Last Quarter Moon
April 8 07:18

New Moon
April 16 01:57

First Quarter Moon
April 22 21:46

Full Pink Moon
April 30 00:58

Friday, April 6, 7pm at Barus & Holley, Brown University, Room 190

LOCATION: Barus and Holley Building on the campus of Brown University, Room 190, at the corner of 184 Hope and George Streets.

Here is a web link from Brown with directions: <http://www.brown.edu/Departments/Physics/Ladd/directions/bh.html>

Elections Update

In accordance with Article V, §3 of the Constitution, "The officers [of the Society] shall be elected by secret ballot at the Annual Meeting". The slate presented by the Nominating Committee, including officers, members-at-large and junior trustee, was approved at the March meeting of the Society and ballots have been mailed by the Election Committee.

Members classified as Regular, Senior, Lifetime, and Contributing, in good standing as of October 2017, are eligible to vote and will receive an official ballot in the mail (USPS). The official ballot must be returned in a sealed envelope with the member's name on the outside. It may be mailed (USPS) to the mailing address on the ballot prior to the Annual Meeting or handed to a member of the Election Committee (Linda Bergemann or Francine Jackson) at the Annual Meeting. "Family" members will receive two ballots, one for each adult (over

18) member. Ballots of Family members must be returned in separate envelopes; if multiple ballots are received in a single envelope, neither will be valid.

Featured Presentation: NASA's Micro Observatory – imaging for the masses

Have you thought about astro photography, wished you could take astro images but don't know if you want to try it and don't want to put out all the money for a camera and EQ mount and imaging telescope? Do you wish you had a dark sky site in Arizona to image from. Well NASA's Micro Observatory is made for you. Jeff Padell will be giving a talk about what Micro Observatory is and how to use it to capture your own images as well as how to process them. This is an overview of the system and process and will be followed in the spring with an actual workshop on using and processing images from Micro Observatory.

Dues Reminder

Reminder: Dues are payable on April 1 for the next fiscal year. You can pay online on our website. (www.theskyscrapers.org) or download the membership renewal application to pay by check or cash. Please don't let your membership lapse.



President's Message

by Steve Siok

To my fellow Skyscrapers,

Wow, time goes by when you are having fun! I have certainly enjoyed being your president for the last two years. Skyscrapers has continued the tradition of being a vital, active group of amateur astronomers. Our meetings, when not compromised by the weather, have had a great group of speakers. Our observatory continues to be a destination for the public and for groups who want to view the skies. This summer, our Solar Eclipse day at Seagrave was attended by hundreds of people from all over the state. And our buildings, scopes and grounds have been expertly maintained by an extremely dedicated group of Trustees. We also initiated a Library Telescope Program with several town libraries and are revitalizing outreach to the public and

members. All of this was accomplished by members of your organization working together.

Steve Hubbard is capable and excited to take over the reins as President this year. I know his mission is to grow the organization, especially in regards to offering more to members and to the public. I ask you to join in working on this goal of outreach, bringing your passion for astronomy into the community and strengthening our family of observers and enthusiasts.

Please remember our traditions. Along with other local organizations - The Springfield Stars, ATMs of Boston, AAA of New York, the Aldrich Astronomical Society and others - we represent one of the longest running organized groups of amateur astronomers in America. That and the pride

of having access to our historic Alvan Clark telescope in it's completely refurbished condition should make everyone happy to be a Skyscraper.

So let's keep moving forward as a committed group towards our common goals: the enjoyment of observing, constantly keeping in touch with the latest discoveries and new resources, learning from experts and each other, and educating others about the joys of astronomy. These things need to be passed down to future generations.

Thank you for your support.



Steve Siok is president of Skyscrapers, Inc. See more at <http://www.theskyscrapers.org/steve-siok>

Astronomy Day
Saturday, April 21
Seagrave Observatory
Solar Star Party: 1-4pm
Night Sky Observing: 8-11pm

Observing & Understanding the Moon by Robert Reeves
Monday, April 23
Seagrave Observatory - 7pm
See page 11



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 **April 15** 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.

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The Sun, Moon & Planets in April

This table contains the ephemeris of the objects in the Solar System for each Saturday night in April 2018. Times in Eastern Daylight Time (UTC-4). Ephemeris times are for Seagrave Observatory (41.845N, 71.590W).

Object	Date	RA	Dec	Const	Mag	Size	Elong	Phase(%)	Dist(S)	Dist(E)	Rise	Transit	Set
Sun	7	1 03.1	6 43.4	Psc	-26.8	1917.6	-	-	-	1	06:18	12:48	19:18
	14	1 28.9	9 18.4	Psc	-26.8	1913.7	-	-	-	1	06:07	12:46	19:26
	21	1 54.9	11 45.9	Ari	-26.8	1910.1	-	-	-	1	05:56	12:45	19:34
	28	2 21.2	14 03.8	Ari	-26.8	1906.6	-	-	-	1.01	05:46	12:43	19:41
Moon	7	18 14.1	-20 30.7	Sgr	-12.0	1757.2	104° W	62	-	-	01:26	06:18	11:09
	14	23 56.8	-4 39.0	Psc	-9.4	1839.9	26° W	5	-	-	05:43	11:46	17:58
	21	6 22.1	19 56.8	Gem	-11.4	1972.2	65° E	29	-	--	10:31	18:06	01:39
	28	12 56.1	-1 37.2	Vir	-12.6	1892.3	155° E	95	-	-	18:18	00:10	05:54
Mercury	7	0 26.1	4 35.7	Psc	3.6	11.4	9° W	4	0.43	0.59	05:50	12:07	18:23
	14	0 18.2	1 42.8	Psc	1.9	10.6	19° W	16	0.45	0.63	05:25	11:33	17:40
	21	0 25.1	0 48.9	Psc	1.0	9.4	25° W	29	0.47	0.71	05:08	11:14	17:19
	28	0 44.0	1 50.7	Cet	0.6	8.3	27° W	41	0.46	0.81	04:56	11:06	17:16
Venus	7	2 24.2	14 04.4	Ari	-3.8	10.9	21° E	93	0.72	1.56	07:14	14:10	21:07
	14	2 57.8	16 58.4	Ari	-3.8	11.1	23° E	92	0.72	1.53	07:08	14:16	21:25
	21	3 32.2	19 31.4	Tau	-3.8	11.3	25° E	91	0.72	1.5	07:04	14:23	21:42
	28	4 07.5	21 39.3	Tau	-3.8	11.5	26° E	89	0.72	1.47	07:03	14:31	21:59
Mars	7	18 49.4	-23 27.4	Sgr	0.2	8.9	96° W	88	1.52	1.05	02:02	06:34	11:05
	14	19 05.6	-23 17.7	Sgr	0.0	9.4	99° W	88	1.52	0.99	01:50	06:22	10:55
	21	19 21.1	-23 04.5	Sgr	-0.1	10.1	102° W	88	1.51	0.93	01:37	06:10	10:44
	28	19 36.0	-22 48.7	Sgr	-0.3	10.8	106° W	88	1.5	0.87	01:23	05:57	10:32
1 Ceres	7	8 48.1	30 33.1	Cnc	8.0	0.6	109° E	96	2.56	2.06	12:19	20:30	04:40
	14	8 52.1	29 57.0	Cnc	8.2	0.6	103° E	96	2.56	2.14	11:59	20:06	04:13
	21	8 57.2	29 16.4	Cnc	8.2	0.6	97° E	96	2.56	2.23	11:41	19:44	03:47
	28	9 03.3	28 31.9	Cnc	8.3	0.5	92° E	96	2.56	2.31	11:23	19:23	03:21
Jupiter	7	15 19.5	-17 02.0	Lib	-2.2	43.1	145° W	100	5.42	4.56	22:05	03:03	08:02
	14	15 16.9	-16 51.5	Lib	-2.3	43.7	153° W	100	5.41	4.5	21:34	02:33	07:33
	21	15 13.9	-16 39.5	Lib	-2.3	44.1	160° W	100	5.41	4.46	21:02	02:03	07:03
	28	15 10.6	-16 26.4	Lib	-2.4	44.5	168° W	100	5.41	4.42	20:31	01:32	06:33
Saturn	7	18 39.1	-22 14.7	Sgr	0.5	16.8	98° W	100	10.07	9.88	01:46	06:22	10:59
	14	18 39.5	-22 14.3	Sgr	0.4	17.0	105° W	100	10.07	9.76	01:18	05:55	10:32
	21	18 39.5	-22 14.2	Sgr	0.4	17.2	112° W	100	10.07	9.65	00:51	05:28	10:05
	28	18 39.2	-22 14.4	Sgr	0.4	17.3	119° W	100	10.07	9.54	00:23	05:00	09:37
Uranus	7	1 44.1	10 12.4	Psc	5.9	3.4	11° E	100	19.89	20.87	06:47	13:26	20:06
	14	1 45.6	10 21.0	Psc	5.9	3.4	4° E	100	19.89	20.89	06:21	13:00	19:40
	21	1 47.2	10 29.6	Psc	5.9	3.4	2° W	100	19.89	20.89	05:54	12:34	19:15
	28	1 48.7	10 38.1	Ari	5.9	3.4	9° W	100	19.89	20.88	05:28	12:08	18:49
Neptune	7	23 06.7	-6 41.7	Aqr	8.0	2.2	32° W	100	29.94	30.79	05:11	10:49	16:27
	14	23 07.6	-6 36.6	Aqr	8.0	2.2	39° W	100	29.94	30.72	04:44	10:23	16:01
	21	23 08.4	-6 31.9	Aqr	7.9	2.2	45° W	100	29.94	30.64	04:17	09:56	15:35
	28	23 09.1	-6 27.6	Aqr	7.9	2.2	52° W	100	29.94	30.55	03:50	09:29	15:08
Pluto	7	19 31.6	-21 27.0	Sgr	14.3	0.2	86° W	100	33.54	33.59	02:34	07:15	11:55
	14	19 31.7	-21 27.2	Sgr	14.3	0.2	93° W	100	33.54	33.48	02:07	06:47	11:28
	21	19 31.8	-21 27.7	Sgr	14.3	0.2	100° W	100	33.55	33.37	01:40	06:20	11:00
	28	19 31.8	-21 28.3	Sgr	14.3	0.2	106° W	100	33.55	33.25	01:12	05:52	10:33

April Lyrids Meteor Shower & Moon and Planet Highlights

by Dave Huestis

March winds bring April showers. Everyone is familiar with that phrase. But we had more than our fair share of wind and rain in February! Yes, February ended up being the warmest February since records were kept beginning in 1906. Then March roared in like a lion with nor'easter Riley. Then a second nor'easter slammed southern New England a week later. These weather extremes are the new normal as global warming runs amuck. It certainly challenges amateur astronomers to conduct any observing sessions. And the public outreach programs at the local observatories do suffer from the lack of cloud-free skies.

However, having said that, I'm hoping for one shower in April. It's the annual April Lyrids meteor shower which peaks during the early morning hours between midnight and dawn on the 22nd. It's been several months since we've experienced a decent display of shooting stars. The Lyrids are the oldest known shooting star display, having been observed by Chinese astronomers on March 16, 687 BCE. Being an old display, the number of meteors populating this stream of particles has greatly diminished. About 10-15 meteors per hour can be counted from dark sky locations.

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. A

first quarter Moon will set around 1:38 a.m. EDT, so it will not interfere with the midnight to dawn peak of the Lyrids.

The Lyrids appear to radiate outward from an area of sky on the Lyra-Hercules border near the bright star Vega, which will be about 45 degrees (halfway between the horizon and zenith) above the eastern horizon at midnight and well placed for observing. Let your eyes roam the heavens while facing this general direction. Remember, even though you can trace back the dust train left by a Lyrid meteor back to the radiant point, members of this shower can appear anywhere in the sky. The Lyrids are a fairly narrow stream of particles, so don't expect many to be seen before or after peak night.

We still must wait a month or so before the local observatories can begin to showcase the planet Jupiter through their telescopes. However, if you do find yourself out under the stars viewing the Lyrids, look about 22 degrees above the southern horizon around 2:00 a.m. and you'll see bright Jupiter as he ascends the sky. On April 1st he will rise around 9:30 p.m.

There are several other beautiful sky scenes to view during April as well. On the 2nd and 3rd you can observe the conjunction (close approach) of Saturn and Mars about 16 degrees above the southeastern horizon at 4:00 a.m.

On the 3rd you can also observe the

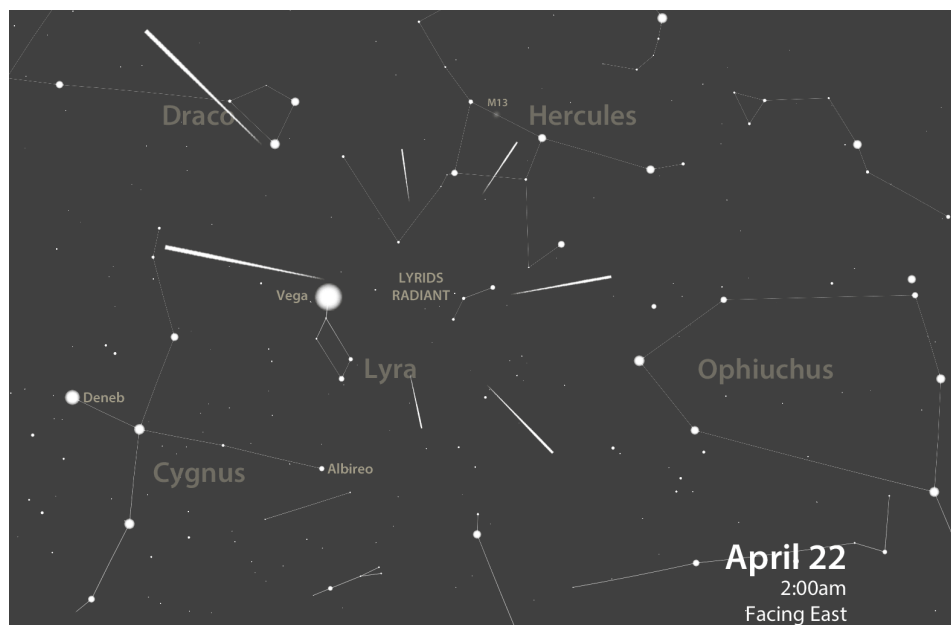
waning gibbous Moon approximately five degrees to the upper right of Jupiter. Four days later on the 7th the Moon will join Saturn and Mars within the constellation of Sagittarius, just above the teapot handle and lid asterism. We'll have to wait a few more months before Saturn and Mars can be observed during the public observing sessions at the local observatories. However, if you have your own telescopes, and you don't require much beauty sleep, then by all means select a clear morning and begin exploring these fascinating worlds. I'll highlight each one in a future column...especially Mars, as at the end of July he will be at his closest distance to the Earth for this year, about 35.8 million miles. Mars should put on a good show.

Another stunning sky scene will greet folks after sunset on April 17. A waxing crescent Moon will be below and to the left of brilliant Venus. This will be a nice photo opportunity, so snap a few images if the sky is cloud-free.

And finally, on April 30, Jupiter will be about six degrees to the left of the Full Moon. Each full moon has several names associated with it. Here in the United States many of them were bestowed by Native Americans. For April that includes Pink, Egg and Fish.

When the skies are clear be sure to visit the local observatories to explore the splendor of the heavens. 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 clear 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 Thursday night. Frosty Drew Observatory (<http://www.frostydrew.org/>) in Charlestown is open every clear Friday night.

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>

Our Responsibility to be Defenders of the Night

by Francine Jackson

I'm sure by now that all of you have heard the quite obnoxious "instruction" sent out by every bus in Rhode Island's transit authority system. Each time its front wheels begin a turning motion, everyone outside of it hears, "Caution: The bus is turning." And, it appears that the buses don't have to make a complete 90-degree turn for this to happen; even a slight change in the position of the front wheels will create this to resound all around the area. As a person who recently got a flat tire one morning in Providence's Kennedy Plaza, by the time AAA was able to rescue me from this constant background noise, I was working on buying stock in Advil.

Apparently, the reason the buses are having to remind the public that these several-ton behemoths are doing this comes from an incident where a young girl walked into a bus while engrossed in her cell phone; however, she did not do this with aRIPTA bus, but with one of the other companies that stop in the center of the city. And, yet, for some reason, it was determined, as an apparent knee-jerk reaction, that this one isolated event should never occur with a

state form of transportation, so each bus is now equipped with the equivalent of a teacher reminding all that a huge body is beginning to move in a direction different from that it is traveling.

It is sad that many decisions are based on such events, on one occurrence that seems to create a spectacular chain of events. Granted, the loss of life is a tragedy, but to change the entire way an apparently perfect functioning form of transportation must work, especially one not involved with the actual event, seems rather excessive. But, in looking around, how often does something like this really happen?

One way in which it doesn't seem to be is when an area formally dark and serene is suddenly overpowered by lighting. In towns, especially those in a region formally dark, a person moving in suddenly decides the neighborhood is too dark, and insists on adding lighting, often under the guise of "safety." After all, it's dark, and darkness breeds crime and unsafe conditions, right? This thinking has been refuted many times, and only creates an unnecessary brilliance where the darkness had previously been.

Unfortunately, it seems as if the Seagrave neighborhood is losing its dark. Big boxes and strip malls seem to want to be adding to their luster by announcing their presence as brightly as possible. This extra lighting, and more that surely will follow, could spell a potential disaster for our observatory.

As stewards of the night, it should be our responsibility to perform a "knee-jerk reaction" with respect to the future lighting that is happening within our skies. Whether it is an organization-wide effort, or a group of members coming together, it is time Skyscrapers, Inc., works to protect its sky, for without it, we would have observatory buildings housing telescopes that will be unable to impart the magic of deep-sky wonders.



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>



U.S. East Coast at Night (NASA, International Space Station, 01/29/12).

February & March Reports

Report of the February 26 2018 Skyscrapers Executive Committee Meeting:

In attendance: Francine Jackson, Kathy and Steve Siok, Lloyd Merril, Ian Dell'Antonio, Steve Hubbard, Tom Thibeault, Jim Hendrickson, Linda Bergemann, Jeff Padell

Upcoming meetings / Ian Dell'Antonio: We have March and April speakers, not one for May yet. Meredith Hughes will talk on Star Forming Disks on March 3, Cara Battersey of UCONN will be our speaker on Friday, April 6, which is also our annual meeting.

Special meeting: Robert Reeves from the Texas Star Party will be our speaker at a special meeting on Monday April 23. He will be speaking on Lunar imaging and processing.

Nomination Committee: There is a full slate of officers proposed for 2018-2019. Steve Hubbard / Pres, Jim Hendrickson / 1st VP, Terry Turner / 2nd VP, Secretary / Kathy Siok, Treasurer / Matt Ouellette, Trustee / Jim Crawford, Members at Large / Bob Janus and Tracy Prell. Linda Bergemann and Francine Jackson will be coordinating the sending out of ballots.

Membership Renewals: Kathy Siok asked if we could have a renewal form instead of a membership form. We have 86 paid memberships so far comprised of single and family members. Lloyd: we need to get payments from people earlier in the year to avoid double payments and confusion.

Trustees: The items recently donated to us have almost all been inventoried and evaluated. The trustees are working on categorizing the society's property into such sections at maintenance, historical items and so forth.

AstroAssembly, September 28 + 29 2018: Kathy Siok reported that there are no speakers yet, basics such as the community center and caterer are in place.

All Sky Fireball Network Camera Proposal / Grant request: Ian Dell'Antonio reported that the proposal for this had been submitted to NASA. We don't expect an answer other than perhaps requests for clarification until this summer.

Star Parties: Francine Jackson resigned as the contact point between us and individuals or groups asking for us to provide star parties.

Outreach committee: Linda Berge-

mann reported that we should do something for Astronomy Day, April 21. This evolved into a more general discussion about membership retention and that suggestion that we need a membership committee. Steve Hubbard offered to head this up and Tracy Prell, Lloyd Merrill, Jim Hendrickson, Linda Bergemann and Francine Jackson all volunteered to help.

Next Meeting: Monday, March 19, 7pm hopefully at Seagrave Observatory.

Respectfully submitted, Steve Hubbard Secretary

Report of Executive Board Meeting, Ladd Observatory, March 19 2018

Future Speakers: Cara Battersey, proposed April speaker has stopped responding for 3 weeks. We need a backup plan.

There will likely still be snow at Seagrave Observatory by April meeting. Ian Dell'Antonio will look into our using one lecture halls in one of the buildings at Brown University for our April meeting.

There was a reminder that Robert Reeves who heads up the Texas Star Party will be in the area and give us a special presentation on Monday April 23 on imaging the Moon.

We expect that the snow and mud should be cleared up enough at the observatory for us to use the facilities.

Elections: Francine Jackson reported that ballots were mailed out on March 18. There was some discussion around the standing rules for election and nominating committees initiated by Linda Bergemann. Linda will mark up an outline of suggestions for a future meeting.

Trustees: The trustees have met recently and outlined an extensive list of repairs and improvements to undertake this year. This list has been prioritized in order of importance/ need.

The recently donated telescopes and related items have been about 95% inventoried. It will be recommended that the society keep a few of the items for use by members and for outreach efforts. This will leave a number of items that will be evaluated and priced out for sale. Perhaps at Astroassembly. Bob Horton volunteered to help with the value evaluation.

Outreach: Linda Bergemann and Francine Jackson have met. They suggest a focus on Astronomy Day, International Observe the Moon Night and the Library Telescope

Cash Flow YTD 2017 4/1/2017 through 2/28/2018

Category	4/1/2017-2/28/2018
INFLOWS	
Astro Assembly Income	
Banquet	1,200.00
Doations	7.00
Grill	273.00
Raffle	547.00
Registration	1,680.00
TOTAL Astro Assembly Income	3,707.00
Donation	
Library Telescope Program	1,150.00
Memory of Kent Cameron	545.00
Misc Donation	1,400.60
TOTAL Donation	3,095.60
Dues	
Family	960.00
Junior	30.00
Regular	1,150.00
Senior	710.00
TOTAL Dues	2,850.00
Star Party Donations	135.00
TOTAL INFLOWS	9,787.60
OUTFLOWS	
Astro Assem Exp	
Banquet	
Caterer	747.50
Reception	28.00
TOTAL Banquet	775.50
Grill	144.85
Misc	59.46
Printing	43.50
Refreshments	
Friday PM	33.96
TOTAL Refreshments	33.96
TOTAL Astro Assem Exp	1,057.27
Corporation, State Fee	22.00
Outreach	
Library Telescope Program	1,165.67
TOTAL Outreach	1,165.67
Property Insurance	2,537.00
Trustee Expense	
Capital Equipment	730.00
Property Maintenance	2,049.33
TOTAL Trustee Expense	2,779.33
Utilities	
Electric	260.13
Internet	809.89
Porta-John	778.95
Propane	80.25
TOTAL Utilities	1,929.22
TOTAL OUTFLOWS	9,490.49
OVERALL TOTAL	297.11

initiative. It was suggested that we work to provide solar observing on Astronomy Day from 2 to 4 pm.

AstroAssembly: The basics as far as the Community Center and caterer are set as is the date.

We need to get going on locking in speakers. A theme was discussed. It was mentioned that this year would be the 50th anniversary of Apollo 8 and perhaps we could do a Moon or Moons theme. Kathy Siok asked for anyone with speaker ideas to please get in touch with her as soon as possible.

Respectfully submitted, your humble society secretary, Steve Hubbard

Galaxy Pair in Ursa Major

Messier 81 and 82

by Glenn Chaple for LVAS

Messier 81 ("Bode's Galaxy; Magnitude 6.9; Size 27' X 14')

Messier 82 ("Cigar Galaxy"; Magnitude 8.4; Size 11' X 4')

When preparing a list of sky objects to show with my telescope at public star parties, I tend to avoid galaxies. To the uninitiated observer, a galaxy has the appearance of a hazy blob – for all the world, nothing more than fog remaining when someone breathed on the eyepiece. Even the great Andromeda Galaxy (Messier 31) fails to awe the first-time viewer.

I make an exception where the galaxies M81 and M82 are concerned. Sure, they're still "faint fuzzies," but the two are just 38 arc-minutes apart and appear together in the same low-power field. The sight of an oval-shaped patch (M81) next to a spindle-shaped one (M82) is intriguing at the very least.

M81 and M82 lie about 12 million light years distant. M81 is a spiral galaxy whose 90,000 light year diameter makes it slightly smaller than our Milky Way. Small aperture telescopes reveal the nucleus, while a 6-inch instrument will begin to show hints of the spiral arms. M82 is smaller, with a diameter of some 37,000 light years. For many years, M82 was thought to be an irregular galaxy. Recent studies hint at a spiral structure, the irregular appearance a result of an accelerated amount of star formation perhaps due to the gravitational influence of M82.

To locate M81 and M82, center your finderscope on an area marked by a line drawn from Phecda (gamma [γ] Ursae Majoris) through Dubhe (alpha [α] Ursae Majoris) and extended an equal distance beyond. A careful sweep with the finderscope or the main scope with a low-power eyepiece in place should reveal the two.

In the spring of 1993, a supernova was discovered in M81, reaching a peak magnitude of 10.5. In January, 2014, M82 got its turn, producing a supernova (2014J) that also reached magnitude 10.5.

If you live in a truly dark sky area (we're talking about a place with a limiting magnitude in the order of 7.0!), try to see if you can pick out M81 with the unaided eye. A handful of amateur astronomers have accomplished this eagle-eyed feat, most notably Astronomy columnist Stephen James O'Meara.

M81 and M82 were discovered by the German astronomer Johann Elert Bode on December 31, 1774, then independently by the French comet-hunter Pierre Méchain 5 years later. Méchain reported the pair to his contemporary Charles Messier, who observed and cataloged them in early 1781.

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

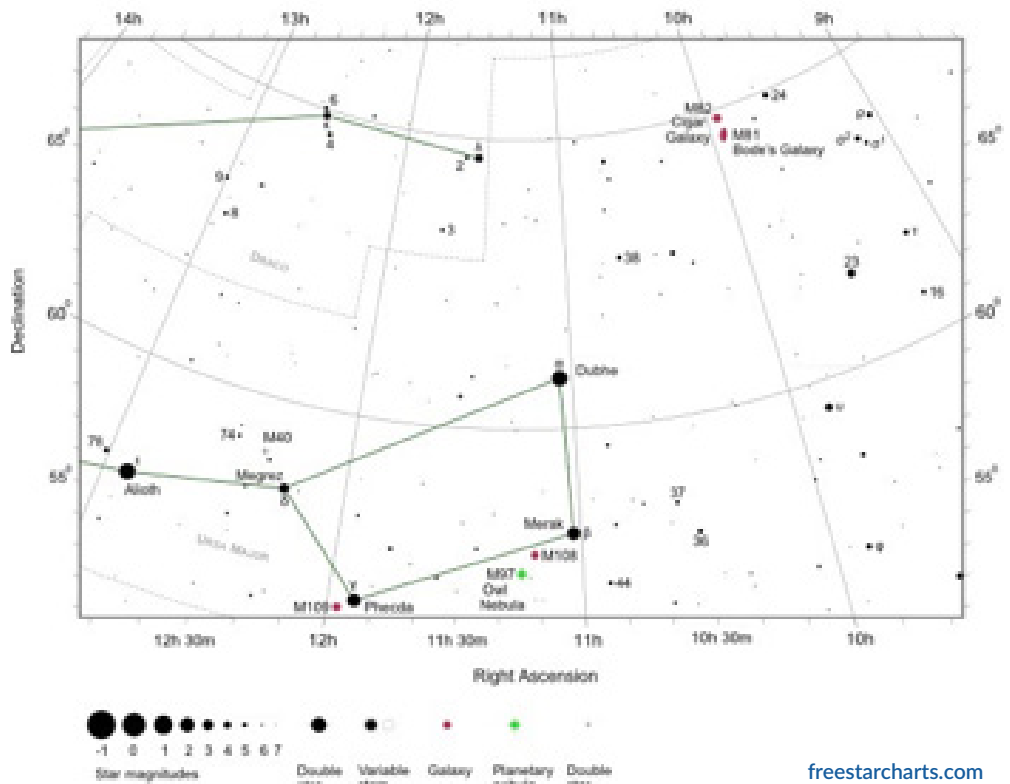


M82 by Mario Motta M.D.



M81 by Mario Motta M.D.

Messier Finder Chart for M81 Bode's Galaxy and M82 Cigar Galaxy
Also shown M40, M97 Owl Nebula, M108 and M109



freestarcharts.com

Image Gallery

Hortensius Domes on the lunar terminator, March 26 by Bob Horton.



Stephen Hawking

January 8, 1942 - March 14, 2018

A sad day indeed with the passing of noted physicist Stephen Hawking. Bob Derouin shared this photo from a lecture at Brown University in November 1989.



Moon, Venus & Mercury Conjunction: March 18



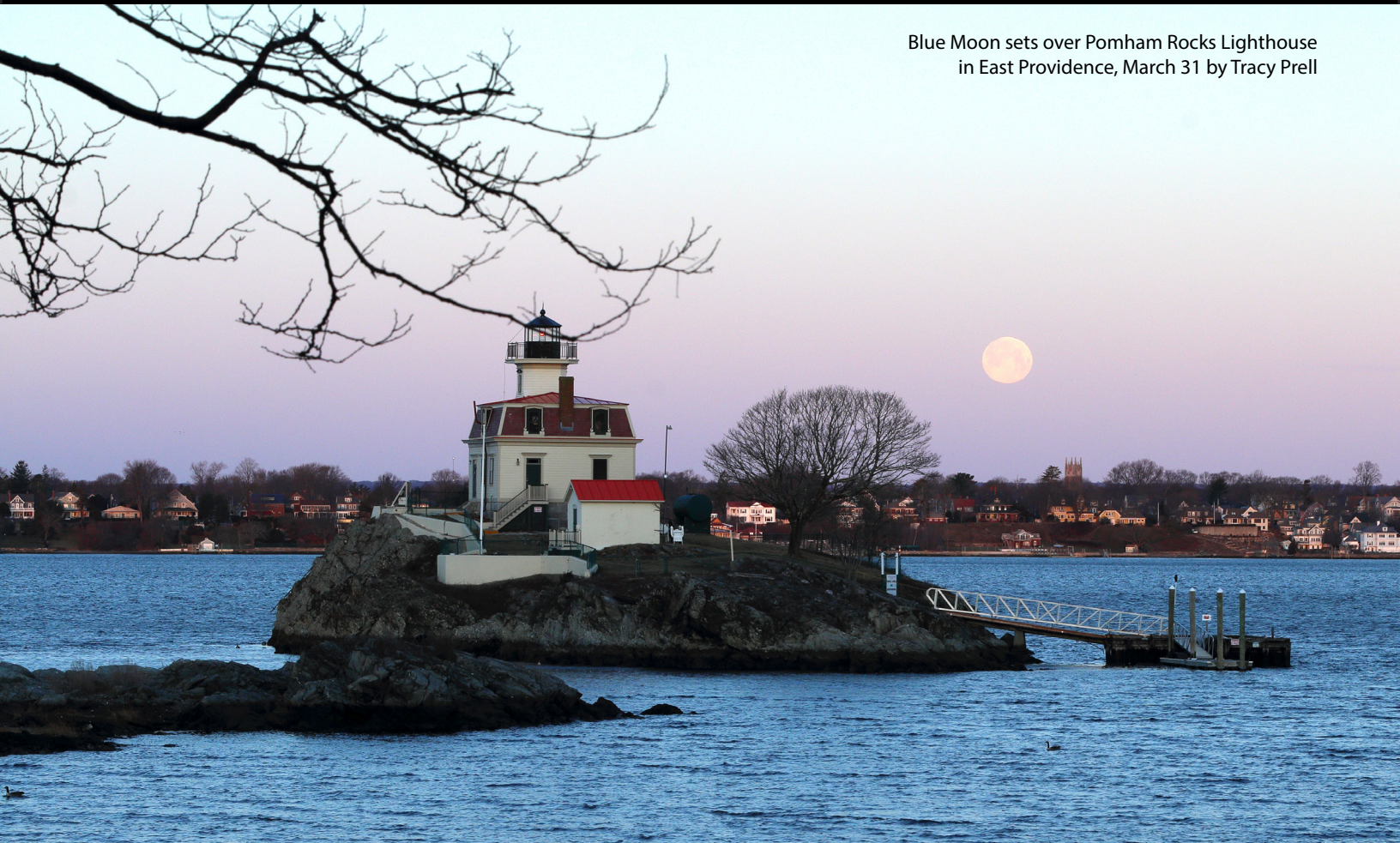
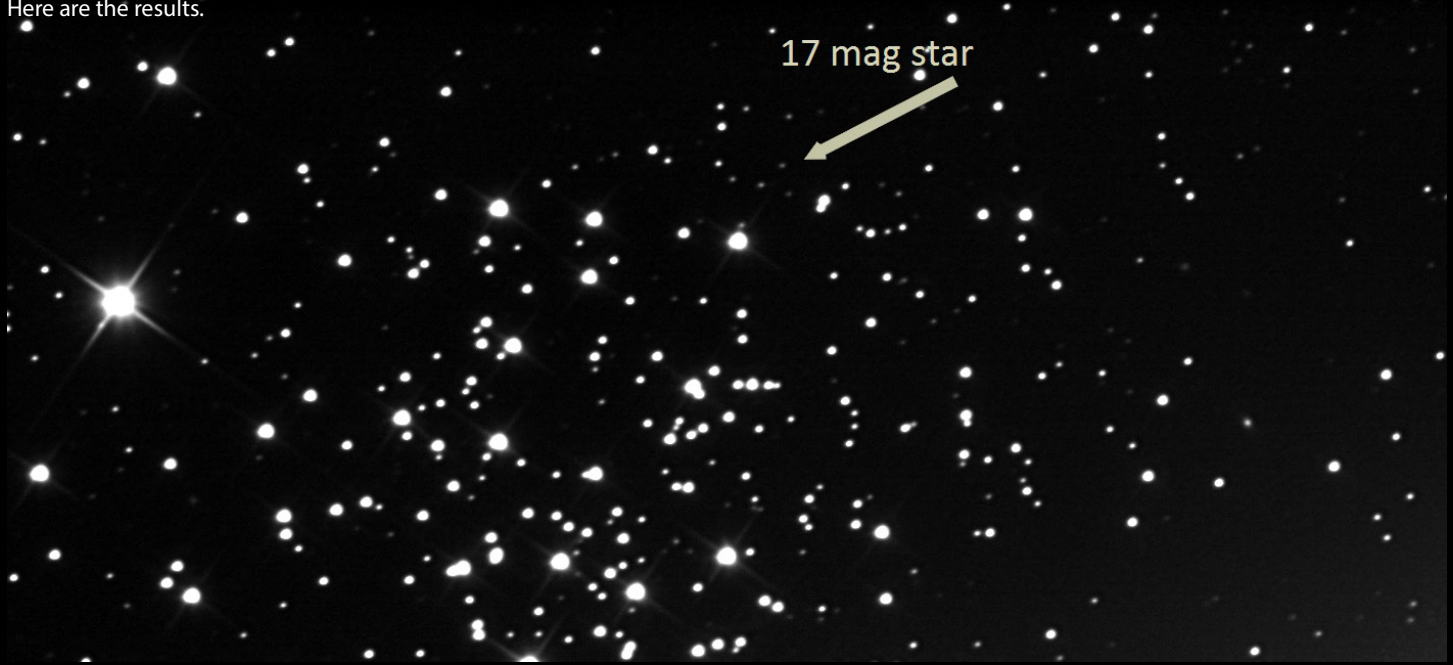
Canon 7D, f/2.8, 1/15 sec, ISO1600, fl-126mm, captured raw. Moon is around 23 hours new and makes almost a straight line with Venus and Mercury. Image by Lloyd Merrill.



Moon, Venus & Mercury conjunction captured from the East Side of Providence. Image by Jim Hendrickson.

17th magnitude star imaged with a 6-inch f/9 RC. In March 1989, *Sky & Telescope* published an article requesting amateur astronomers to send in observations of the faintest star seen in open cluster M67. A very detailed photo of M67, with star magnitudes, was included in the article. With my 10" dobsonian, I was able to observe 14th magnitude stars at high magnification. Now that I do all of my observing with cameras, I always wondered how faint could I see with a camera. Here are the results.

Telescope used: GSO 6" f/9 RC
Camera used: ZWO ASI174 monochrome
120 x 20 second exposures were taken and stacked using Astro Art software.
The faintest star I found was 17th magnitude.
Image by Conrad Cardano



Blue Moon sets over Pomham Rocks Lighthouse
in East Providence, March 31 by Tracy Prell



Observing & Understanding the Moon by Robert Reeves

Monday, April 23, 7pm at Seagrave Observatory

Robert Reeves has been exploring the moon since 1958 and took his first lunar photograph in 1959. In 1975 he acquired a Celestron 8 telescope, which he still uses today. Reeves also uses a Celestron 11, a Sky-Watcher 180mm Maksutov, and a 20-inch Sky-Watcher Stargate Dobsonian telescope for lunar photography from his Perspective Observatory located in central Texas.

In 1984 Reeves began publishing articles about astrophotography in Astronomy magazine. Since then Robert has published over 250 magazine articles and 175 news-

paper columns about astronomy. His articles have appeared in Sky and Telescope, Astronomy, Deep Sky, Deep Sky Journal, Amateur Astronomy, and The Astrograph. In 1994 Reeves published his first book, The Superpower Space Race, followed by The Conquest of Space, co-authored with Fritz Bronner. In 2000, Robert published Wide-Field Astrophotography, followed by Introduction to Digital Astrophotography in 2005 and Introduction to Webcam Astrophotography in 2006.

Although Robert Reeves is an accomplished deep sky astrophotographer, his

current passion is re-popularizing the Moon within the amateur astronomy community. Robert has perfected image processing techniques that allow the amateur astronomer, using modest equipment, to exceed the quality of earth-based professional lunar photographs taken during the Apollo era. Reeves enjoys speaking to astronomy conventions and spreading his passion for the Moon.

His presentation will be on Observing, Understanding, Lunar Image Capture and Processing.

For Sale: Lunt 35 mm H α Solar Telescope Deluxe Package

The Lunt Solar Systems LS35THa dedicated Hydrogen-alpha telescope is the most compact 35 mm etalon system currently available. An unobstructed, front mounted 35 mm etalon provides a bandpass of <math><0.75</math> Angstroms. Prominences and some surface detail can quickly be viewed through this very portable single stack system.

Original cost was \$700, which did not include the case and eyepiece.

I am asking \$400.

Interested? Contact Conrad Cardano email cardanoc@verizon.net

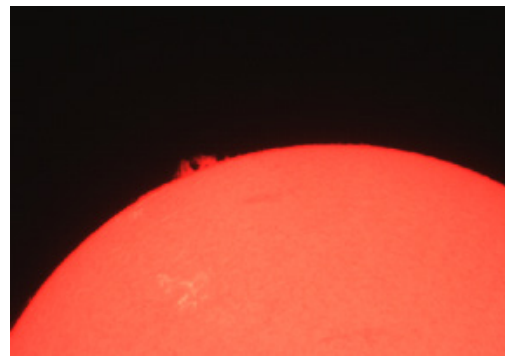


Photo taken with this scope using eyepiece projection and a iNova video camera.

Items include:

- LS35THa Telescope Assembly
- 6 mm Blocking Filter
- Mounting Rings with Standard Base
- Mounting Base with 1/4-20 photo-tread
- TeleVue Sol Searcher finder
- 8-24mm zoom eyepiece
- Deluxe foam-lined carrying case





Measuring the Movement of Water on Earth

By Teagan Wall

As far as we know, water is essential for every form of life. It's a simple molecule, and we know a lot about it. Water has two hydrogen atoms and one oxygen atom. It boils at 212° Fahrenheit (100° Celsius) and freezes at 32° Fahrenheit (0° Celsius). The Earth's surface is more than 70 percent covered in water.

On our planet, we find water at every stage: liquid, solid (ice), and gas (steam and vapor). Our bodies are mostly water. We use it to drink, bathe, clean, grow crops, make energy, and more. With everything it does, measuring where the water on Earth is, and how it moves, is no easy task.

The world's oceans, lakes, rivers and streams are water. However, there's also water frozen in the ice caps, glaciers, and icebergs. There's water held in the tiny spaces between rocks and soils deep underground. With so much water all over the planet—including some of it hidden where we can't see—NASA scientists have to get creative to study it all. One way that NASA will measure where all that water is and how it moves, is by launching a set of spacecraft this spring called GRACE-FO.

GRACE-FO stands for the "Gravity Recovery and Climate Experiment Follow-on." "Follow-on" means it's the second satellite mission like this—a follow-up to the original GRACE mission. GRACE-FO will use two satellites. One satellite will be about 137 miles (220 km) behind the other as they orbit the Earth. As the satellites move, the gravity of the Earth will pull on them.

Gravity isn't the same everywhere on Earth. Areas with more mass—like big mountains—have a stronger gravitational pull than areas with less mass. When the

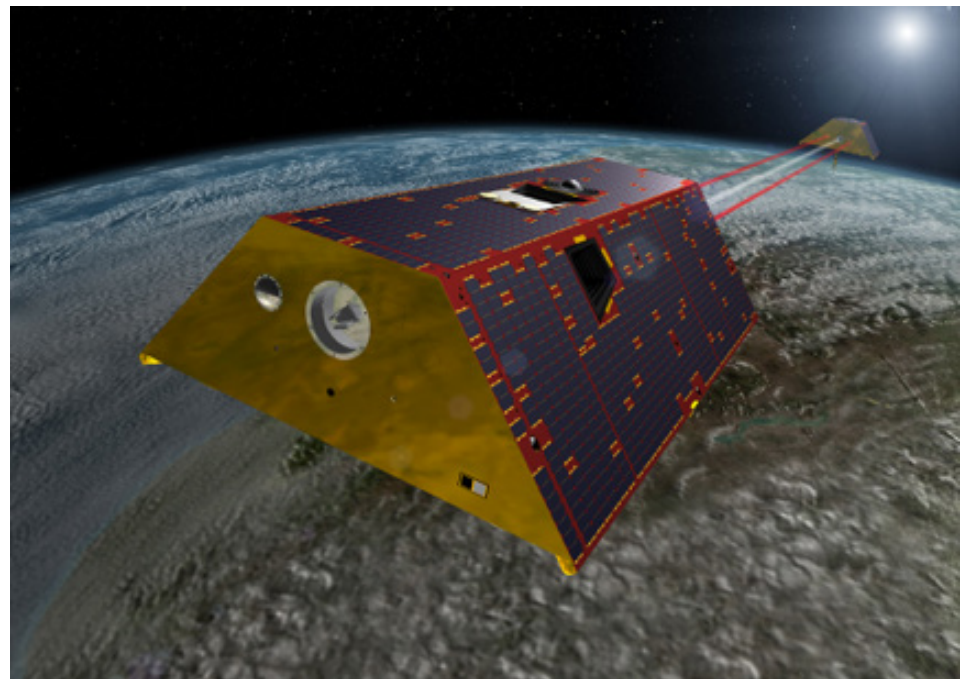
GRACE-FO satellites fly towards an area with stronger gravitational pull, the first satellite will be pulled a little faster. When the second GRACE-FO satellite reaches the stronger gravity area, it will be pulled faster, and catch up.

Scientists combine this distance between the two satellites with lots of other information to create a map of Earth's gravity field each month. The changes in that map will tell them how land and water move on our planet. For example, a melting glacier will have less water, and so less mass, as it melts. Less mass means less gravitational pull, so the GRACE-FO satellites will have less distance between them. That data can be used to help scientists figure out if the glacier is melting.

GRACE-FO will also be able to look at how Earth's overall weather changes from year to year. For example, the satellite can monitor certain regions to help us figure out how severe a drought is. These satellites will help us keep track of one of the most important things to all life on this planet: water.

You can learn more about our planet's most important molecule here: <https://spaceplace.nasa.gov/water>

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!



An artist's rendering of the twin GRACE-FO spacecraft in orbit around Earth. Credit: NASA

Proposed Bylaws Amendment

Steve Hubbard has proposed the following amendment to the Bylaws, to be voted at during the annual meeting. A copy of the Constitution and Bylaws is included in this issue for reference.

"The board of trustees shall not discard, sell or otherwise dispose of any item of property listed within the society's inventory lists without first bringing a list of such property under consideration to the board of directors for review and approval. Final permission to discard, sell or otherwise dispose of such listed property will require a majority vote of the board of directors."

Constitution

ARTICLE I: NAME

The name of this Society shall be "Skyscrapers, Inc. (Amateur Astronomical Society of Rhode Island)."

ARTICLE II: OBJECT

The object of this Society shall be to educate the membership and general public on matters pertaining to astronomy. It shall be an educational, nonprofit organization.

ARTICLE III: LEGAL STATUS

This Society is incorporated as an educational not-for-profit corporation under the laws of the State of Rhode Island, conforming to IRS Section 501(c)(3).

ARTICLE IV: MEMBERSHIP

- §1 Membership classes in this Society shall be Junior, Regular, Family, Senior, and such other classes as are specified in the By-Laws.
- §2 An applicant for Junior, Regular, Family, and Senior shall submit the standard form of Membership application together with noted dues, shall be proposed by an existing member at a regular meeting, and shall become a member upon receiving a favorable majority vote at a subsequent regular meeting of the Society.
- §3 Junior members shall be persons under 18 years of age, and upon reaching 18 years of age shall automatically become Regular members without payment of additional dues for the dues year in which this occurs. Junior members shall be entitled to all the privileges of Regular members except those of voting and holding office (except such office as is specifically designated for Junior Members).
- §4 Regular members and Senior members shall have the privilege of voting and holding office. Regular members must be 18 years of age or older; senior members must be 65 years of age or older.
- §5 Family members shall be Regular members who pay the additional dues prescribed. They shall be entitled to all the privileges of Regular and Senior members. Family membership provides voting privileges for (2) two individuals over 18 years of age, who are to be listed individually on the membership list.
- §6 Honorary membership may be conferred upon any person for unusual and outstanding accomplishment in science. It may be conferred upon a non-member for outstanding contribution to the Society. Honorary membership is conferred by unanimous vote of those present at any Annual Meeting, the name having been proposed at a previous regular meeting of the Society.
- An honorary member shall have all the privileges of a Regular member except those of voting and holding office. This membership shall be for life and no dues shall be required.
- §7 Membership in this Society shall provide all classes the right to have guests attend and participate in all membership functions excluding activities requiring vote by the membership.
- §8 Membership Dues in this Society are as listed within the

Membership Application.

- §9 An individual may hold more than one class of membership simultaneously.

ARTICLE V: OFFICERS

- §1 The officers shall consist of a President, First Vice- President, Second Vice-President, Secretary and Treasurer. Their duties shall be such as are implied by their respective titles, and as prescribed by the By-Laws.
- §2 Qualifications. Officers must have been voting Members for at least one year prior to nomination.
- Nominees for an office should have experience in the area of responsibility of the office. This may be a result of one's job or previous successful experience in a similar position in another organization. Nominees may be asked to provide this information upon the request of the nominating committee.
- §3 The officers shall be elected by secret ballot at the Annual Meeting for a term of one year or until their successors are elected and take office. A majority of valid ballots cast shall be required to elect.
- §4 No member shall hold the same office for more than two consecutive full terms.
- §5 Vacancies occurring in office may be filled by appointment of the President until successors are elected at the next annual Election and take office. Should the president resign, the First Vice-President, with the assistance of the remaining board members should conduct the business of the Society until the elections at the next annual Election.

ARTICLE VI: MEETINGS

- §1 The Annual Meeting shall be held in April of each year at the call of the President. The membership shall be notified 10 days in advance thereof.
- §2 Regular meetings shall be held at the call of the President
- §3 Special meetings may be called by the President or on a petition directed to the Board of Directors and signed by any 10 voting eligible members. The call shall state the pending business and no other business shall be transacted. The call shall be provided to the membership at least 10 days in advance of the special meeting.

ARTICLE VII: BOARD OF DIRECTORS

There shall be a Board of Directors, whose membership and powers shall be as prescribed by the By-Laws.

ARTICLE VIII: BOARD OF TRUSTEES

There shall be a Board of Trustees, whose membership and powers shall be as prescribed by the By-Laws.

ARTICLE IX: AMENDMENTS

The Constitution may be amended at any regular meeting by two-thirds (2/3) vote of all voting eligible members present, provided said amendment has been presented in writing and read at a previous regular meeting, and a notice incorporating

said amendment has been provided to the membership

ARTICLE X: BUDGETS AND EXPENDITURES

- §1 The President and Board of Directors shall present a proposed yearly operating budget for membership approval at the annual meeting, or other subsequent duly called meeting.
- §2 The Board of Directors shall have the authority to approve unbudgeted expenditures only if these expenditures can be accommodated without exceeding the approved budget, in which latter case the approval of the Society is required at a duly constituted meeting thereof.
- §3 The Board of Directors shall have the authority to approve any expenditure deemed necessary to protect the assets of the Society during emergency situations. When an emergency situation occurs, the Board of Directors is required to inform the Society of the nature of the emergency, the steps taken to protect the property of the Society, and the amount of money that was spent, at the next monthly meeting.

ARTICLE XI: CODE OF CONDUCT

Any individual that violates Local, State, or Federal Law, or conducts themselves in any behavior that compromises the reputation of the Society, will be referred to a disciplinary board consisting of the Board of Directors and the Board of Trustees.

Bylaws

ARTICLE I: FISCAL YEAR & DUES

- §1 The fiscal year shall be from April 1 through the following March 31. The dues year shall be the same as the fiscal year.
- §2 Dues are payable on April 1 for the dues year then beginning. The annual dues shall be set out in the Membership Application (revised annually). Persons applying for membership during the months of April through December pay the above stated annual dues for the current fiscal year (April – March). Persons applying for membership during the months of January through March pay the above stated annual dues, but their membership extends through the next fiscal year. Persons making donations over and above their membership dues shall be called Contributing Members. Four distinguished categories of Contributing Members shall be designated: Sponsors (\$60); Supporters (\$100); Patrons (\$250); and Benefactors (\$500).
- §3 The Secretary shall, with the approval of the Board of Directors, drop from membership any member who is three months or more in arrears. Members who are not current with their dues may not vote.

ARTICLE II: OFFICERS

- §1 The regular term of all Officers, Members-at-Large and Junior Trustee shall commence at the adjournment of the April meeting.
- §2 The President may at any time appoint such additional officers, chairmen and committees as may be required. The terms of all of these (except, as appropriate, special committees) shall expire

with the term of the appointing President. The President shall be, ex officio, a member of all committees.

§3 In the absence of the President the First Vice-President shall assume the duties of the President. In the absence of both, the second Vice-President shall assume the duties of the President.

§4 The President shall:
1. Preside over all meetings of the Society and Board of Directors meetings.

2. Establish an operating budget, with the assistance of the Board of Directors, for approval by the members of the Society, per Article X of the Constitution.

3. Oversee the business and legal responsibilities of the Society.
4. Be the official spokesperson for the Society.

§5 The 1st Vice President shall:
1. Provide programs for monthly meetings.
2. Assist the President in communicating to the general public the activities of the Society.

§6 The 2nd Vice President shall:
1. Act as the Chairperson of the AstroAssembly Committee.
2. Submit a proposed operating budget for AstroAssembly to the Board of Directors prior to the Annual Meeting.

3. Have the authority to direct the Treasurer to pay any expenses associated with the operation of AstroAssembly, providing said expenses have been given prior approval by the Society, per the approved operating budget, as defined by Article X of the Constitution, or by motions approved by the members of the Society at any regular monthly meeting.

§7 Submit a report of all expenses and income from AstroAssembly at the December monthly meeting.

§7 The Secretary shall:
1. Take the minutes of all meetings, regular, special, Annual and Board of Directors, and submit a written report to be published in the Skyscraper newsletter.

2. Maintain an accurate, classified list of the membership of the Society. Membership Applications shall be submitted to the Secretary who shall transmit the attached dues to the Treasurer.

3. Notify applicants for membership of their election or rejection.
4. If required by the President, notify all additional officers, chairmen and committees of their appointment.

5. Send all required notices to the membership.
6. In general, conduct the correspondence of the Society.

7. Have custody of the records of the Society.
§8 The Treasurer shall:
1. Pay on his/her authority any routine bills for periodic, recurring expenses as defined by the operational budget, per Article X of the Constitution.

2. Pay any other non-recurring bills that have been approved.
3. Keep an itemized account of all receipts and disbursements and submit a written report to be published in the Skyscraper newsletter.

4. Submit an annual report of all receipts and disbursements for the past fiscal year at the Annual Meeting. Auditors appointed by the President shall audit this report, and the report of

the auditors shall be submitted at the next regular monthly meeting.

ARTICLE III: BOARD OF DIRECTORS

§1 The Board of Directors shall consist of the President, First Vice-President, Second Vice-President, Secretary, Treasurer, two Members-at-Large, and the Immediate Past President (who shall not have a vote).

§2 The Members-at-Large shall be elected at the Annual Meeting, and their terms shall be the same as those of the officers.

§3 The powers of the Board of Directors shall be:
1. To advise the President and assist in carrying out the duties of the office.
2. To take any action that might be taken by the Society, unless such action is reserved to the Society at Large in the Constitution or By-Laws.

§4 The Board of Directors shall meet at the call of the President or on application of any two members. The President shall be, ex officio, chairman.

§5 Any Officer, Committee Member and/or appointed Board Member upon the termination of their duties or vacancy of position shall immediately turn over all Society records, property, files, documents, policies, etc. to the President for transmittal to the appropriate party.

ARTICLE IV: BOARD OF TRUSTEES

§1 The Board of Trustees shall consist of three Trustees, the term of each to be three years. No Trustee shall serve two consecutive terms. One Trustee shall be elected each year at the Annual Meeting. The Trustee with the longest continuous service shall be the Senior Trustee and serve as the Chairperson of the Observatory Committee.

Vacancies occurring in office shall be filled by the Trustees in consultation with the President. That appointment will serve out the remaining term of the vacated office. Should the Board of Directors disagree with the appointment, that decision may be overturned. See Section 3 below.

§2 The Board of Trustees shall have custody of the grounds, structures and equipment belonging to the Society. They may at any time establish or amend rules for use of said grounds, structures and equipment, and establish policies for members comprising the Observatory Committee. They may at any time grant or withdraw permission to individuals to use the grounds, structures and all equipment belonging to the Society.

§3 The Board of Trustees shall be responsible to the Society. Decisions of the Board of Trustees may also be overruled by five members of the Board of Directors, all voting in the affirmative.

§4 The Board of Trustees shall conduct an annual inventory of equipment and property belonging to the Society, and submit said inventory list to the Board of Directors prior to the Annual Meeting.

the transaction of business at any meeting as defined in Article VI of The Constitution. At no time shall the lack of a quorum prevent those present from proceeding with the program of the day or evening.

ARTICLE VI: RULES OF ORDER

§1 The rules contained in Robert's Rules Of Order, Revised shall govern the Society in all cases to which they are applicable and in which they are not inconsistent with the Constitution and By-Laws.

§2 When a vote is called for, only voting eligible members may vote. Membership classes conferring the right to vote are enumerated in ARTICLE IX: DEFINITIONS.

ARTICLE VII: DISSOLUTION

Upon dissolution of the corporation (an act which can only be ordered by an open vote of two-thirds of the Board of Directors and confirmed in a duly constituted meeting by the membership of the Society by secret ballot two-thirds of the members present voting in the affirmative, or by order of a court of competent jurisdiction, the Board of Trustees shall after paying or making provisions for the payment of all liabilities of the corporation as determined by the Board of Directors, arrange for the disposal of all of the assets of the corporation in such a manner as to comply with, or to such organization or organizations organized and operated exclusively under, Section 501(C)(3) of the Internal Revenue Code of 1954.

ARTICLE VIII: AMENDMENT

These By-Laws may be amended as necessary by secret ballot at any regular or duly called special meeting, sixty percent (60%) of the quorum present and qualified to vote assenting.

ARTICLE IX: DEFINITIONS

§1 Where the terms NOTICE, PROVIDE, MAIL, or the past tenses thereof, appear in the Constitution or By-Laws such NOTICE and the act of making the notice available (MAIL and PROVIDE) include communication by US Postal service, Federal Express or another express courier, and email.

§2 Voting Eligible Members are those classified as Regular, Senior, Lifetime, and Contributing Members.

§3 Contributing Members. Contributing Members have made financial contributions beyond their regular dues. Four distinguished categories of Contributing Members shall be designated: Sponsors (\$60); Supporters (\$100); Patrons (\$250); and Benefactors (\$500).

§4 Lifetime Members. Lifetime membership may be bestowed upon a member for outstanding service to the Society by recommendation of the Board of Directors and approval by the voting eligible members. A Lifetime member is not required to pay dues, but has all the rights and privileges of a Regular member.

ARTICLE V: QUORUM

Twelve (12) voting eligible members shall constitute a quorum for

Membership

Name _____

Address _____

City _____

State _____ Zip _____

Phone _____

Email _____

How did you hear about us? _____

Membership Dues

All renewals are due on 1 April for the beginning fiscal year. Dues received from new members after 1 April will be applied to the current fiscal year. Dues received from new members during the months of January through March are applied to the remainder of the current fiscal year and the whole of the next fiscal year.

Today's date: _____

	Annual Dues (choose one category)	
Junior	<input type="checkbox"/>	\$15
Regular	<input type="checkbox"/>	\$50
*Family	<input type="checkbox"/>	\$60
Senior	<input type="checkbox"/>	\$25
Contributing	<input type="checkbox"/>	\$

(any amount in excess of annual dues is gratefully accepted as a donation)

*The Name of the primary family member is listed above. Please identify on separate paper the name, address, email and phone number of the second family member. The second member shall have voting rights during election cycles if 18 years of age.

Total \$ _____
(Make check payable to Skyscrapers, Inc.)

Mail to:
Skyscrapers, Inc.
47 Peeptoad Road
North Scituate, RI 02857

Proposed Budget: 2018-19

Category	Budget
INCOME	
Astro Assembly	3,700
Dues	3,100
Donations	1,000
Sale of Equipment	1,400
Star Party Donations	300
TOTAL INCOME	9,500
EXPENSES	
Astro Assem Exp	1,500
Contingency	258
Corporation, State Fee	22
Domain Name	20
Donation	50
PayPal Fees	50
Outreach	150
Postage and Delivery	50
Property Insurance	2,600
Refreshment Expense	100
Trustee Expense	2,500
Utilities	2,200
TOTAL EXPENSES	9,500
OVERALL TOTAL	0

As agreed by eBoard on 03/19/2018

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.
- 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.



47 Peeptoad Road
North Scituate, Rhode Island 02857