



the Skyscraper

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

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Friday, May 6, 7:00pm at Seagrave Memorial Observatory

Chasing Pluto's Shadow in the Great Southern Ocean by Dr. Michael Person

Just a year ago, we were all waiting for the space craft New Horizons to reach and return to us images of the dwarf planet Pluto. But just two weeks before this historic event, Pluto passed directly in front of – occulted - a star. This wasn't visible from here, but Dr. Michael Person, a planetary research scientist at MIT, led a trip to New Zealand aboard the flying observatory SOFIA, a unique, transformed 747 aircraft. From this, Dr. Person was able to learn about Pluto's atmosphere before New Hori-

zons reached its goal.

Dr. Person has been interested in planetary occultations since he began as an associate of Dr. Jim Elliot, the discoverer of Uranus's ring system in 1977. Having received his academic degrees from MIT, Dr. Person is the Director of the university's Wallace Observatory in Westford, Massachusetts. Come and hear him speak of his expedition, the SOFIA observatory, and the science learned from this occultation.

Book Auction: 75 Years of Skyscrapers

In December 2007, Dave Huestis and Jim Hendrickson published a history of our organization titled, "75 Years of Skyscrapers."

100 copies were printed during the first printing, and another 25 were produced for the 2nd printing. Both are hard cover volumes containing 180 pages.

A 1st printing, formerly the copy of long-time member John Hopf (1920-2011), is to be auctioned off during the May Skyscrapers monthly meeting. The opening bid is set at \$50. Bidding will commence during the Business meeting. If you cannot attend, you can email Dave Huestis (dhuestis@aol.com) with your maximum bid.

Phases of the Moon

New Moon
May 6 19:30

First Quarter Moon
May 13 17:02

Full Flower Moon
May 21 21:14

Last Quarter Moon
May 29 12:12



Seagrave Memorial Observatory
Open Nights

Saturdays at 9:00 pm
weather permitting

President's Message

by Steve Siok

Hello fellow Skyscrapers,

It is an honor to once again lead our society. Thank you all for your support.

The message I wish to share with you at this time is to thank our outgoing President, Bob Horton. Bob's two years as our president have been a time of stable growth and increased activity. Our membership has grown, our buildings and grounds have never looked better, support from our neighbors has allowed us to improve our Eastern and Northern horizons, we have increased our outreach events remote from Seagrave, we have instituted successful workshops for our new members and the public and we have continued the heri-

tage of our signature event, AstroAssembly. Bob's leadership has supported the efforts of all our officers and members and his calm demeanor has kept a strong hand on the wheel of this ship.

Thank you, Bob, for your leadership and guidance. And I am especially sure that the Planewave Project, instituted during your Presidency, will be the legacy of your success.

Respectfully, Steve Siok



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



Friday, May 13: Black Holes at the URI Planetarium

University of Rhode Island Planetarium
Upper College Road
Kingston, RI
Friday, May 13th, 2016
6:00 P.M.

Contact: Francine Jackson: 401-527-5558

Black Holes are some of the most amazing objects in our sky. Much has been written about them, but they still remain one of the most questioned topics in astronomy. What are they? Where do they come from? Should we be worried about them coming to Earth? The University of Rhode Island,

in cooperation with the Denver Science Center, will present Black Holes, Friday, May 13th at 6:00 P.M. In addition, a short program on light pollution will be shown, then The Skies of the URI campus, a live introduction to the night sky.

Admission is only \$5.00, to benefit the University of Rhode Island Planetarium Fund.

The University of Rhode Island Planetarium is located on Upper College Road, on the Kingston campus, across from the Art Center.



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 **May 20** 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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Spring 2016 Astronomy Workshop Series at Seagrave Observatory

One of the newer and more successful programs that Skyscrapers, Inc., has begun is its several-week workshop series. This is geared for both organizational members, and for the public who might want to get to learn about a specific topic in astronomy.

The spring series begins May 7th, and, with the exception of Memorial Day weekend, continues each Saturday afternoon at Seagrave Memorial Observatory, starting at 6:00 P.M.



May 7: The Sun & the Upcoming Mercury Transit by Ian Dell'Antonio

Ian Dell'Antonio will open Skyscrapers' springtime workshops with an introduction to our daytime star. In addition, he will explain how the planet Mercury will appear to move across, or transit, the Sun's surface on Monday, May 9th. As a transit of Mercury won't occur again for another three years, please make every effort to both learn more about this historic event and to determine how to very safely observe something that doesn't happen very often.



May 14: Astronomical Definitions by Steve Siok

To find your way around the sky you will need to know both celestial coordinates and time definitions. Let Skyscrapers President Steve Siok introduce you to many of the terms you will encounter as you look through the various celestial guides.



May 21: Observing the Sky & Light Pollution by Francine Jackson

Our resident planetarian Francine Jackson will introduce you to the beauty of the late spring/early summer sky, and remind you of the problems we face in attempting to observe this natural resource.



June 4: Globular Clusters by Steve Siok

You may know what a globular cluster is, but are you aware of where they are and how important they are with respect to the structure of our galaxy? Steve Siok will lead you in search of them within the late spring and summer skies.



June 11: Building a Backyard Observatory by Steve Hubbard

Skyscrapers member Steve Hubbard was tired of dragging his telescope in and out of his house to enjoy the sky, so he made his own backyard observatory. If you've ever thought about putting one in your own yard, Steve will speak of his experiences, and give you tips he learned that may prove helpful to you, also.

After each program, skies willing, stay and observe the sky with the organization's telescope, including the historic 8-inch Clark refractor. All programs are free for Skyscrapers members, and only \$5.00 for nonmembers. For more information contact Steve Siok ssiok@cox.net or Francine Jackson francine_jackson@brown.edu. Hope to see you all there!

Transit of Mercury: An Infrequent Astronomical Event

by Dave Huestis

People have a fascination with records. No, I'm not talking about audiophiles and music on vinyl. I'm referring to statistics on practically everything in the universe. We keep copious records on sports achievements and precipitation events just to name a couple. And when it comes to the world of astronomy, many folks get excited about events that don't happen every day, like lunar and solar eclipses, conjunctions of planets, and even record close encounters with Mars. Some of these events occur more frequently, but short sound bites in the media often infer their rarity.

A good example of a rare astronomical event was the pair of Venus transits in 2004 and 2012 (they occur in sets of two, eight years apart). Since Venus orbits between the Earth and the Sun it can be seen to pass directly in front of the solar disk and transit across the face of our star. This very unique astronomical phenomenon is so rare that in 2004 no one then alive had observed one. The immediate Venus transit predecessors occurred back in 1884 and 1882). And the next pair is not until 2117 and 2125! For a human lifespan, that is a rare event.

However, another planet can transit the Sun—Mercury. Though not as rare as Venus transits, transits of Mercury occur 12-13 times per century. The last one occurred on November 8, 2006, but unfortunately here in Southern New England we were clouded out. Luckily their increased frequency provides our next opportunity on Monday, May 9, when, weather permitting, we will be able to observe this fascinating event from start to finish.

Why don't we experience a transit of Venus or Mercury every time they pass between the Earth and the Sun (called inferior conjunction)? It all has to do with the orbits of these planets and our ever changing viewing angle. Most of the time they pass above or below the solar disk as seen from the Earth. This concept is simply stated here, but it took the greatest astronomical minds of the past to solve this great mystery. The process took much observation, dedication and deduction to organize the solar system design and celestial mechanics we have all come to know.

Before I provide the local observing cir-

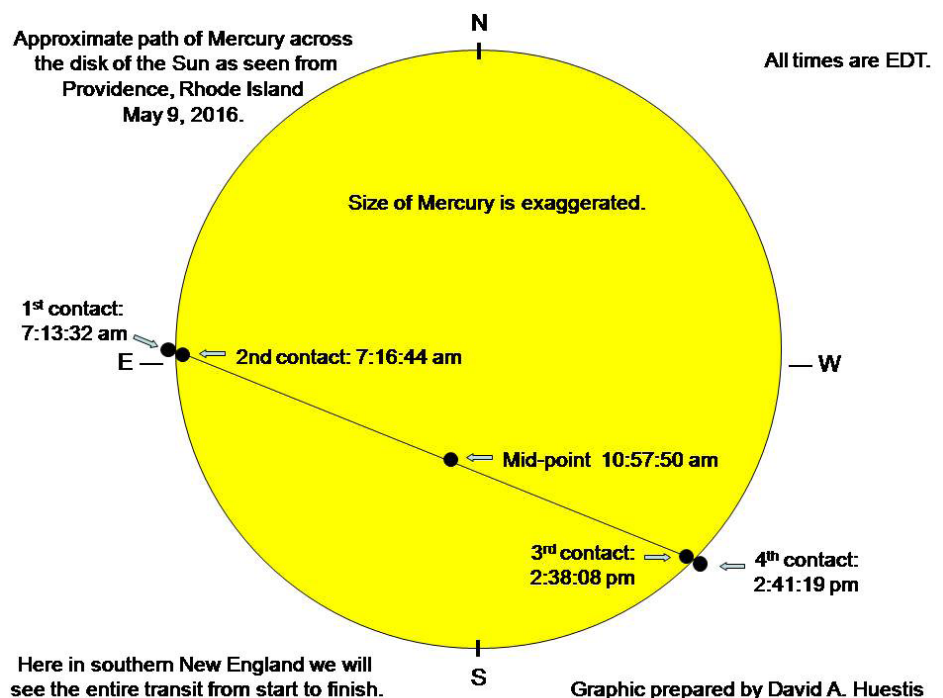
cumstances along with some guidance on how to experience this transit safely, I want to briefly review the historical record to understand why transits were once so important that expeditions were sent around the world to observe them.

In 1716, in trying to determine the distance to the Sun (called the astronomical unit - AU), Edmund Halley (1656-1742) suggested using transit timings from different locations on the Earth and applying simple geometry to determine that distance. Expeditions were sent around the globe to position observers to make precise measurements and timings to calculate the solar parallax. (This measurement is an apparent shift in the position of Venus' transit across the disk of the Sun due to its being observed from different locations on the Earth's surface.) Timing of the event was crucial, as was knowing one's position to a great degree of accuracy. Unfortunately bad weather plagued many an expedition (some things never change). Also, a phenomenon called the "black drop" effect made getting precise timings nearly impossible.

When Venus appears to touch the limb (edge) of the solar disk, this event is called first contact. It will appear as a little notch or bite has been taken out of the Sun. As the

planet moves farther onto the disk, just before Venus is fully in front of the Sun (called second contact), the "black drop" forms. It looks like a drip about to detach itself from a faucet, or like the shape of a teardrop, as a piece of the planet seems to elongate outward toward the blackness of space along the Sun's limb. If an observer was situated in a location to experience the beginning and the end of the transit, you had two opportunities to conduct timings. For just before third contact when Venus would begin to exit the solar disk, one could conduct a second timing. The "black drop" affected those timings as well.

The "black drop" effect can last for several seconds, depending upon atmospheric conditions, thereby preventing astronomers from obtaining precise timings of the beginning (ingress) and ending (egress) of a transit. Observations differed greatly, thereby throwing calculations off by millions of miles. Using Mercury transits for timings was even more difficult to accomplish, since Mercury's disk is about six times smaller than Venus. This means more magnification is required to time the event accurately, but increased magnification also increases distortion caused by the Earth's atmosphere. See this website for an exam-



ple of and explanation for the “black drop” effect: <http://www.am.ub.edu/twiki/bin/view/ServiAstro/FaqTrme>.

Unfortunately, for all intents and purposes, the use of transits to determine the scale of the solar system proved fruitless. The expeditions to faraway lands did provide valuable scientific discoveries in other disciplines, not to mention the exploration of our world. For example, if you want to follow up on just one of these expeditions, read about Captain Cook’s voyage and his involvement with the transit of 1769.

During the transits of 1874 and 1882, photography was the new method of acquiring data to determine the solar parallax and to make other discoveries. However, simpler methods had already revised the value for the AU to unparalleled accuracy, and although scientific expeditions were still funded for the purpose of research, very little new information was forthcoming. The one thing that did arise from the 1882 transit was an increased interest and excitement by the general public.

The same is true today. No new scientific knowledge is expected from observing Venus or Mercury transits. Despite their historical significance, transits have become mere curiosities for the average citizen. Regardless, amateur and professional astronomers have been eagerly preparing to observe the May 9 Mercury transit with properly filtered telescopes. It’s a unique event to experience when you know exactly what is occurring.

Before I provide the times for specific key transit moments, I must express several very important words of caution. Do not attempt to observe this event unless you are an experienced solar observer. Mercury is so tiny that you won’t be able to detect it in transit with the naked eye anyway, so don’t be tempted to try. Number 14 welders glass will not show Mercury either. DO NOT use exposed film of any kind. This method is not safe under any circumstance. In past columns I have instructed folks on how to build a solar eclipse viewer using a shoe box. This observing method also won’t work in this circumstance because the projected solar disk is so tiny that Mercury’s even smaller silhouette won’t be detectable.

If you have never observed the Sun before this event, don’t start now! Don’t risk your eyesight due to an oversight or an outright mistake. Even if you have one of those department store refractors that often come with small glass or plastic filters, do not be tempted to use them. They have been

known to shatter when exposed to the Sun’s concentrated image. (Many years ago when I first started out in astronomy, I had one of those glass/plastic filters shatter during a partial solar eclipse. Luckily I wasn’t looking through the eyepiece at the time.)

If you use the Sun projection method (using a telescope to project the Sun’s image on a white screen), remember to be very cautious if other folks, especially children, are nearby. You don’t want anyone accidentally stepping up to an unguarded eyepiece to take a look. And regarding eyepieces, do not use cemented eyepieces. Use only those that are air-spaced. Eyepieces have been ruined when the cement has melted due to the concentrated light collected by a telescope. Experienced astronomers use special filters that prevent more than 99.99% of the light from even entering the telescope. That includes the dangerous infrared wavelength as well.

Also, remember to block off your finder scope. I have seen observers singe their hair or clothes by failing to do so!!

Our location on the Earth’s surface will allow us to observe this transit in its entirety. From start to finish the transit will last just under seven and a half hours. That’s a long duration event to allow interested individuals to be able to view even a few minutes of Mercury’s passage across the solar disk.

Please note that all times with this article are provided in Eastern Daylight Time and have been specifically calculated for Providence. (Times do vary slightly by geographic location, so if you are going to be outside of the Southern New England area, you may want to check online for specifics.)

Locally the transit begins bright and early at 7:13:32 a.m. with the Sun about 17 degrees above the horizon. This is the moment of 1st contact when tiny silhouette of Mercury will begin to appear along the lower left (east) edge of the Sun approximately at the eight o’clock position. Because the Sun arcs across the sky depending upon geographic location, and because we live on the surface of a sphere, the beginning and ending positions will differ greatly from the accompanying graphic. It’s all a matter of perspective. It will take two minutes for Mercury to emerge fully onto the solar disk.

Just before it does so, a keen eyed observer should notice the “black drop” effect. Many members of Skyscrapers observed this “black drop” during Venus’ transit in 2004. High magnification will be necessary to see this effect due to Mercury’s small size. When Mercury is seen fully in front of

the solar disk is the time of 2nd contact at 7:16:44 a.m. The image of Mercury will be quite small and much darker and rounder than any sunspot.

Mercury’s motion will continue to carry it across the face of the Sun from east (left) to west (right). The mid-transit point will occur at 10:57:50 a.m. with the Sun 57 degrees above the southeast horizon. At 2:38:08 p.m. Mercury will reach the right edge of the Sun. This is 3rd contact. Just prior to this time an observer will once again have another opportunity to observe the “back drop” effect. Then at 2:41:19 p.m. Mercury will exit the solar disk completely. This event is called 4th contact. The Sun will then be about 55 degrees above the southwest horizon.

If you are not an experienced solar observer and wish to experience this transit, you may be able to do so at some of the local observatories. At the time of this writing during early to mid-April to meet deadlines, only Frosty Drew Observatory at Ninigret Park in Charlestown has an observing program scheduled (<http://frosty-drew.org/events.dc/show/event-420/>). If and when any of the others offer Mercury transit observing opportunities, I will email the media with the details.

And heavens forbid the skies are cloudy here on May 9. I’m sure there will be many websites streaming the event live. I agree that watching online sites is not the same as experiencing the transit firsthand, but if the weather doesn’t cooperate, you may have no choice but to pull up a chair in front of your computer screen and watch the progress of the event. This course of action is also an option if you can’t observe it safely yourself or can’t travel to an organized observing program. Should the opportunity pass you by for any reason, you won’t have to wait long for the next transit of Mercury, which we will see here in its entirety as well on November 11, 2019.

Good luck in observing this interesting astronomical phenomenon, and remember to keep your eyes safe.

And, just in case you’re wondering what the current value of the astronomical unit is, it’s 92,955,807.3 miles, plus or minus about 10 feet!

Keep your eyes to the skies.



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

The Sun, Moon & Planets in May

This table contains the ephemeris of the objects in the Solar System for each Saturday night in May. Times are in Eastern. Time calculated for Seagrave Observatory (41.845N, 71.590W).

Object	Date	RA	Dec	Const	Mag	Size	Elong	Phase(%)	Dist(S)	Dist(E)	Rise	Transit	Set
Sun	7	2 57.6	16 52.2	Ari	-26.8	1901.9	-	-	-	1.01	05:34	12:42	19:52
	14	3 25.0	18 40.6	Tau	-26.8	1899.0	-	-	-	1.01	05:26	12:42	19:59
	21	3 52.8	20 13.4	Tau	-26.8	1896.3	-	-	-	1.01	05:20	12:42	20:06
	28	4 21.1	21 29.4	Tau	-26.8	1893.9	-	-	-	1.01	05:15	12:43	20:12
Moon	7	3 10.2	12 41.2	Ari	-6.0	2000.7	5° E	0	-	-	06:29	13:40	20:58
	14	9 53.4	10 10.9	Leo	-11.9	1847.3	93° E	53	-	-	13:13	19:55	02:29
	21	15 19.8	-14 17.1	Lib	-12.5	1780.6	169° E	99	-	-	19:51	01:01	06:08
	28	21 21.2	-13 26.5	Aqr	-12.2	1854.3	109° W	66	-	-	00:37	06:02	11:33
Mercury	7	3 13.4	18 37.8	Ari	4.1	11.9	4° E	1	0.44	0.57	05:43	12:54	20:04
	14	2 59.1	15 34.5	Ari	3.7	12.1	7° W	2	0.46	0.56	05:14	12:12	19:10
	21	2 51.4	13 21.1	Ari	2.2	11.2	16° W	10	0.47	0.6	04:48	11:38	18:29
	28	2 56.4	12 55.0	Ari	1.3	9.9	22° W	22	0.46	0.68	04:27	11:17	18:07
Venus	7	2 26.3	13 19.2	Ari	-3.8	9.9	8° W	99	0.72	1.71	05:19	12:12	19:06
	14	3 00.0	16 06.6	Ari	-3.8	9.8	6° W	99	0.72	1.72	05:14	12:18	19:23
	21	3 34.6	18 34.2	Tau	-3.8	9.8	5° W	100	0.72	1.73	05:11	12:25	19:40
	28	4 10.1	20 38.0	Tau	-3.8	9.8	3° W	100	0.72	1.73	05:10	12:33	19:57
Mars	7	16 18.4	-21 45.8	Sco	-1.7	16.9	160° W	99	1.54	0.55	21:23	02:02	06:41
	14	16 10.0	-21 45.9	Sco	-2.0	17.7	169° W	100	1.53	0.53	20:47	01:26	06:05
	21	15 60.0	-21 40.9	Sco	-2.1	18.3	178° W	100	1.52	0.51	20:10	00:48	05:27
	28	15 49.4	-21 31.6	Sco	-2.1	18.6	173° E	100	1.51	0.5	19:25	00:05	04:45
1 Ceres	7	0 44.0	-4 29.7	Cet	9.3	0.3	39° W	99	2.96	3.67	04:41	10:27	16:14
	14	0 53.4	-3 37.8	Cet	9.3	0.3	43° W	99	2.96	3.61	04:20	10:09	15:59
	21	1 02.5	-2 48.5	Cet	9.3	0.4	48° W	98	2.95	3.54	03:58	09:51	15:43
	28	1 11.5	-2 02.0	Cet	9.3	0.4	52° W	98	2.95	3.47	03:37	09:32	15:27
Jupiter	7	11 00.4	7 50.6	Leo	-2.1	40.0	116° E	99	5.44	4.91	14:11	20:41	03:12
	14	11 00.5	7 48.8	Leo	-2.0	39.2	110° E	99	5.44	5.01	13:43	20:14	02:44
	21	11 01.1	7 43.6	Leo	-2.0	38.4	103° E	99	5.44	5.12	13:17	19:47	02:17
	28	11 02.2	7 35.1	Leo	-1.9	37.6	97° E	99	5.44	5.23	12:51	19:21	01:50
Saturn	7	16 55.8	-20 47.6	Oph	0.1	18.1	152° W	100	10.03	9.13	21:56	02:39	07:22
	14	16 53.9	-20 44.5	Oph	0.1	18.2	159° W	100	10.03	9.08	21:27	02:10	06:53
	21	16 51.9	-20 41.2	Oph	0.1	18.3	166° W	100	10.03	9.04	20:57	01:40	06:24
	28	16 49.7	-20 37.8	Oph	0.0	18.4	173° W	100	10.03	9.02	20:27	01:11	05:55
Uranus	7	1 22.1	8 00.3	Psc	5.9	3.4	25° W	100	19.96	20.87	04:34	11:05	17:36
	14	1 23.5	8 08.4	Psc	5.9	3.4	31° W	100	19.96	20.82	04:07	10:38	17:10
	21	1 24.8	8 16.0	Psc	5.9	3.4	38° W	100	19.96	20.75	03:40	10:12	16:44
	28	1 26.0	8 23.1	Psc	5.9	3.4	44° W	100	19.96	20.68	03:13	09:46	16:18
Neptune	7	22 53.6	-7 56.8	Aqr	7.9	2.2	65° W	100	29.96	30.37	03:03	08:36	14:10
	14	22 54.0	-7 54.1	Aqr	7.9	2.3	72° W	100	29.96	30.26	02:36	08:09	13:43
	21	22 54.4	-7 52.0	Aqr	7.9	2.3	78° W	100	29.96	30.14	02:08	07:42	13:16
	28	22 54.7	-7 50.5	Aqr	7.9	2.3	85° W	100	29.96	30.03	01:41	07:15	12:49
Pluto	7	19 14.6	-20 51.8	Sgr	14.2	0.3	119° W	100	33.09	32.59	00:15	04:58	09:41
	14	19 14.3	-20 52.8	Sgr	14.2	0.3	126° W	100	33.1	32.49	23:47	04:30	09:13
	21	19 13.9	-20 53.9	Sgr	14.2	0.3	133° W	100	33.1	32.4	23:20	04:02	08:45
	28	19 13.4	-20 55.3	Sgr	14.2	0.3	140° W	100	33.11	32.32	22:52	03:34	08:17

Spiral Galaxy in Coma Berenices

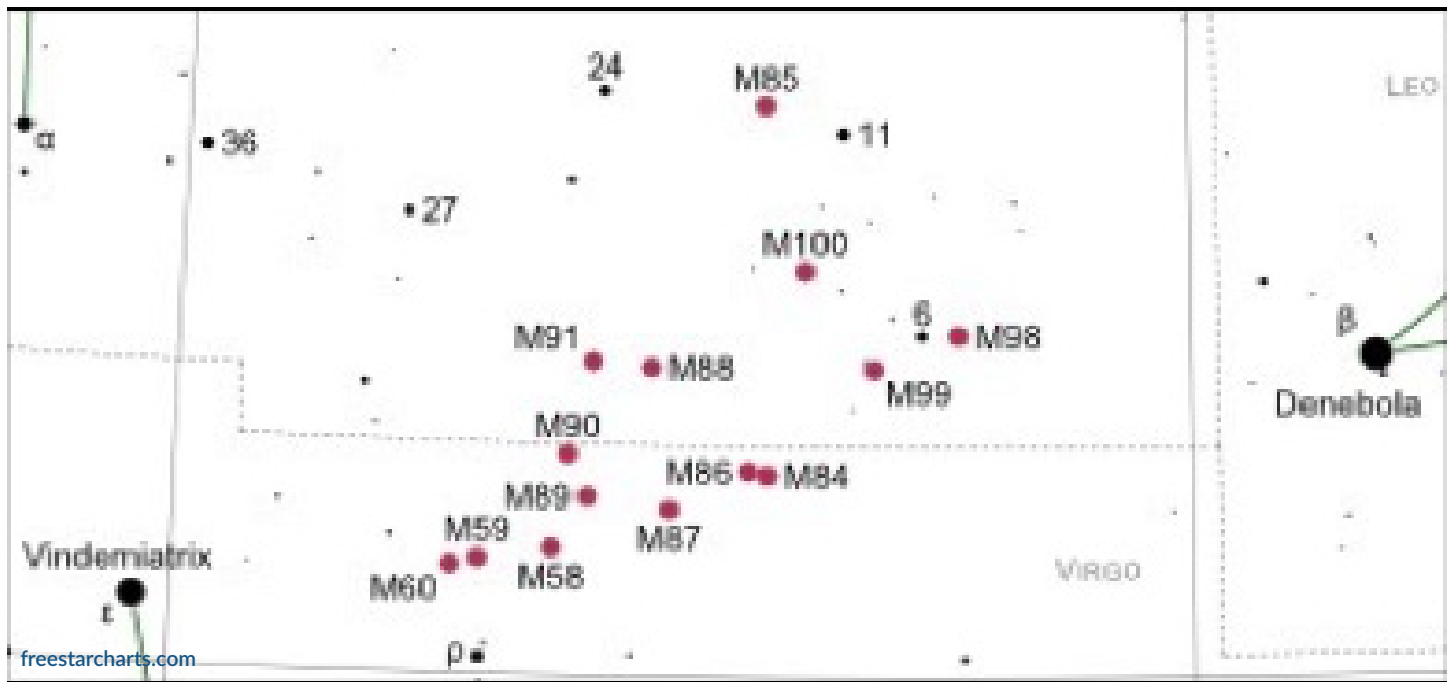
M100

Magnitude – 9.5, Dimensions – 7' x 6')

by Las Vegas Astronomical Society

M100 was discovered, along with M98 and M99, by Pierre Mechain on March 15, 1781 and catalogued by Messier the following month. Though relatively bright in magnitude, M100 is low in surface brightness. A face-on spiral like the notoriously difficult M33 in Triangulum and M74 in Pisces, M100 is nevertheless visible in small-aperture scopes as a ghostly averted vision object. A member of the Coma/Virgo Galaxy Cluster, M100 is about 55 million light years away. In April of 1979, long time Observer's Challenge contributor Gus Johnson visually discovered a 12th magnitude SN in M100. Johnson was given credit for the discovery of 1979C.

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



Star Party Update

Saturday, March 26: Cub Scouts Visit Seagrave

It was certainly not a typical public viewing night on March 26th at Skyscrapers when we had a large group of Cub Scouts from our local area arriving Hollywood-style in several limousines. It was really a sight to see...how cool is that? Scouting has really changed since I was a Girl Scout and maybe I should consider re-joining again. Additionally, we had an influx of public visitors as well certainly packing the house that night. Our volunteers came out in full force in true Skyscraper tradition, opening our observatories, aligning our telescopes and putting on a great show for everyone.

The scouts were so thrilled to look through our large telescopes providing them the opportunity to view the planet Jupiter, its moons, nebulae and double stars... most of them for the very first time. Their many smiling faces and excitement became a contagion that spread to their parents and scout leaders as well. All of the children and adults were now anxiously standing in line waiting to be amazed by the power of our 1878 8" Alvan Clark refractor housed in the Seagrave Memorial Observatory. They also visited our other telescopes such as our 12" Meade Schmidt Cassegrain and our 12" Patton reflector in their respective roll-off roof observatories providing a different at-

mosphere and perspective in viewing the night sky. It was like traveling through a time-portal from walking a few feet from our Seagrave Observatory to our newer telescopes which are much smaller, more powerful and their ability to use computer and CCD technology to capture every nuance that it's sensor detected.

Skyscrapers volunteer Steve Hubbard had our 12" Schmidt-Cassegrain telescope connected to a CCD imager and computer showing the scouts and the general public how we capture the images of the night sky and how scientists process these images with computer software to extract every detail of whatever object it is aligned too.

Everyone that peered through the eyepiece of one of our telescopes experienced our beautiful solar system, a cocoon of spectacular colorful planets and moons, and of course the rest of our wonderful and beautiful Universe. The scouts, their parents, and the general public had many questions for our volunteer astronomers that were expertly answered. Everyone certainly enjoyed themselves that night but most importantly they all learned something about our fascinating night sky which they were able to take home with them! They will always remember those exciting and wonderful moments at Skyscrapers which they will certainly share with their families and friends.



Our Skyscrapers volunteers such as Bob Horton, Jim Hendrickson, Steve Hubbard, Kent Cameron and others that night enjoyed sharing their knowledge and experience because of their passion and love of astronomy. Their volunteerism helps to empower our children...our future generation by igniting their interest in searching for answers to the many unanswered questions about our Universe. Just think for one moment, if one child that visited Skyscrapers became so interested in astronomy, that he or she could possibly become the next Edwin Hubble or Henrietta Swan Leavitt making new and exciting discoveries that would be for the betterment of all humanity! Volunteerism could make this a reality.

It only takes the simple act of someone offering some of their personal time to make such a difference in people's lives, most importantly for our children. Of course none of our volunteers are paid in the monetary sense, but they are paid back in a way that no amount of money could ever offer them. Our volunteers received the self-satisfaction that knowing by giving some of their time put many smiles on people's faces. Also, by sharing their knowledge and experience provided the scouts and the public with valuable information that they never knew before about our solar system and the Universe. Our educational outreach program creates the foundation for our children and adults to question and search for answers about the world we live in and our place in our grand Universe! Volunteerism is priceless and it's effects will live on in the hearts and minds of those that it touched.





Thursday, April 14: Newport Art Museum

Four members of Skyscrapers, Bob Napier, Jim Crawford, Jim Hendrickson and Francine Jackson, traveled to Newport under exceptionally clear skies for our second

“Art After Dark” event at Newport Art Museum. The event was held to bid farewell to the 180-year-old Fernleaf Beech tree on the lawn of the museum.

About 100 guests were treated to views of a waxing crescent Moon and brilliant Jupiter and its 4 Galilean moons throughout

the evening, and a few even had the chance to get a naked-eye view of Mercury, which was visible just between trees to the left of the Newport Tower.

Additionally, the Orion Nebula was still well placed as well as Mizar and Alcor in the Big Dipper.

Joint Meeting of RI Section of the American Chemical Society and Skyscrapers Inc.

Date: Friday, June 3, 2016

Location: Seagrave Observatory, 47 Peeptoad Road, North Scituate, RI 02857

There is no charge for this meeting. Families are welcome.

RSVP to Kathy Siok, kathys5@cox.net

Time: 7:00 PM Light Refreshments

7:30 PM Featured Speaker

Adam Sarafian, Graduate student, MIT/Woods Hole Oceanographic Institute

How Did the Earth Get its Ocean?

This is a very old question. Two theories exist. Either our water came from inside the Earth, stored during its early formation or the water came from comets or other wet bodies hitting the Earth much later in its history.

Oddly enough, the answers lay in solid rocks and not our liquid water. The team at the Institute have obtained and extracted evidence from rare samples of ancient meteorites that have fallen to Earth. Adam and his colleagues have analyzed the isotopic ratios of Hydrogen in these rocks, as this ratio varies in different parts of the solar system. We will find out how this difficult analysis was conducted and what answers it has uncovered.

9:00 PM Observing the skies through the 138 year old 8" Alvan Clark Refractor at Seagrave.

In June, the planet Saturn will be well-placed for observing (weather permitting)

For more information about Skyscrapers, please visit : www.theskyscrapers.org

Skyscrapers March Meeting Minutes — 4/9/2016

President Bob Horton called the Skyscrapers' April meeting to order at 7:37 p.m.

President, Bob Horton: Bob welcomed everyone to the Annual Meeting of Skyscrapers. • He remarked that there will be a short business meeting followed by the evening talk, and that the Observatory is open every clear Saturday night.

Budget: The President noted that the proposed budget was published in the newsletter. After a brief review of the income and expense line items (which were patterned after prior year), there was a motion to accept the budget, which was seconded. The membership voted unanimously to approve the 2016-17 budget.

Membership Report: It was noted that Glenn Huestis is to be voted into membership at the next meeting.

27-inch Telescope Grant Update: Ian Dell-Antonio reported that the goal is to submit the grant by April 30 for the Champlin Foundation deadline. • Ian indicated



Amanda Preston



Cecelia Sanders

that the project's timescale is long, with an installation sometime in 2018.

Trustees, Tom Thibault: Tom said the Trustees are looking at starting summer preparations and some minor repairs.

Public Relations Chair, Francine Jackson: Francine noted that there are three upcoming star parties. One will be held at Seagrave next Friday with approximately 20-30 attending from the Pawtucket School. And this Thursday is the star party held at the Newport Art Museum from 7:30 to 9:00 p.m. Lastly, there is the Portsmouth star party that is tentatively planned for the 22nd (or a date close to the first quarter moon). If you are interested in volunteering for any of these outreach efforts, please see Jim Hendrickson, Bob Horton, or Francine.

First Vice-President, Steve Siok: Steve reported that next month's speaker will be Dr. Michael Person, Planetary Scientist at MIT, who will speak about his work on atmospheric occultations and data from New Horizons.

Elections Report: All votes were counted and the results were announced to the membership. With motions to accept and to second, the following 2016-17 slate was approved: President, Steve Siok; First Vice President, Ian Dell-Antonio; Second Vice President, Kathy Siok; Secretary, Steve Hubbard; Treasurer, Lloyd Merrill; Trustee, Kent Cameron; Member at Large #1, Tracy Prell; and Member at Large #2, Linda Bergemann.

For the Good of the Organization: Jim Brenek brought a framed copy of Professor Smiley's star map (copyright 1943) that his wife discovered when going through family memorabilia. He suggested that it could be added to the archives in the main Observatory's anteroom/museum. • Bob and Francine said that plans to observe the transit of Mercury at Ladd Observatory in Providence have not been finalized. • It was noted that Aldebaran will soon be occulted by the crescent moon. • Francine announced that the 5-week members' workshop series is starting on May 7 at 6:00 p.m. with a talk by Ian on the Sun. He will include a how-to session on observing the Mercury transit. On May 14, Steve Siok will offer an introduction to celestial coordinates. On May 21, Francine will cover the spring constellations and light pollution. The series will skip Memorial Day weekend and resume in June with workshops on globular clusters and how-to-build a

Cash Flow YTD 2016 - Apr 2016 4/1/2016 through 4/30/2016

Category	4/1/2016- 4/30/2016
INFLOWS	
Donation	
Misc Donation	132.70
TOTAL Donation	132.70
Dues	
Family	60.00
Regular	447.20
Senior	75.00
TOTAL Dues	582.20
Misc Income	
Interest Inc	3.05
TOTAL Misc Income	3.05
Subscription Income	
Astronomy	34.00
TOTAL Subscription Income	34.00
TOTAL INFLOWS	751.95
OUTFLOWS	
Misc Expenses	96.68
Postage and Delivery	48.72
Utilities	
Internet	69.99
Porta-John	99.00
TOTAL Utilities	168.99
TOTAL OUTFLOWS	314.39
OVERALL TOTAL	437.56

Cash and Bank Accounts - As of 4/30/2016

Account	4/30/2016 Balance
Bank Accounts	
Capital One Bank	12,415.85
PayPal Account	197.64
PCU Checking	13,486.50
TOTAL Bank Accounts	26,099.99
Cash Accounts	
Cash Account	0.00
TOTAL Cash Accounts	0.00
OVERALL TOTAL	26,099.99

backyard observatory. See the newsletter for more information. • Bob Horton expressed that it has been a pleasure to serve as President over the last two years and to work side-by-side with friends. He spoke a few words to the membership on what Seagrave Observatory has meant to him, from his first visit as a young boy scout and throughout his many years with Skyscrapers. He ended with heartfelt thanks for all who volunteer in our outreach efforts and encouraged everyone to get involved in our mission to education the public on astronomy and share the experience of looking through a telescope with others. • Incoming President Steve Siok thanked everyone present for their support and said that he is looking forward to the tremendous activities and accomplishments that are in store for the organization.

The meeting adjourned at 8:00. Submitted by Tina Huestis, Secretary.

Amanda Preston, Executive Director of the Harvard Origins of Life Initiative, presented an overview of the program, which was founded in 2006. She explained that approximately 160 individuals comprise a dynamic membership that engages all science departments at Harvard in an interdisciplinary collaboration. More information can be found at www.origins.harvard.edu; on Facebook at /harvardoriginsoflife; and on Twitter @Harvard_Origins.

Cecelia Sanders, Senior, Harvard University's Earth & Planetary Sciences, presented her talk, "Impact Gardening as a Driver of Serpentinization on Early Mars: Implications for Climate and the Origins of Life." Cecelia's research focused on Noachian Mars. The Noachian is a geologic system and early time period on the planet Mars characterized by high rates of mete-

orite and asteroid impacts and the possible presence of abundant surface water. Her work examined serpentinization (a mechanism for crustal evolution and climate change) as a theoretical explanation for transient warming events that might have sustained conditions for life on the planet.

Orion on March 26
by Jim Hendrickson



Remembering Comet Halley: 30 Years Later

by Francine Jackson

Can you believe that Halley's Comet was in our sky 30 years ago? A note in a recent magazine reminds us that in the mid '80s we were looking at the most famous of our periodic comets, the only major one not named for its discoverer, but instead for the person who determined that it indeed did return to us. Later research noted that it had been documented since 240 B.C.

Edmund Halley was not the first to question whether comets came to us more than once, but he was fortunate to observe a comet in 1682 that coincidentally formed a path around the Sun similar to one in 1607; another had been seen in 1531 that also moved similar to those two. His conclusion was that they were the same traveler, and would return again in 1758. Halley tried his best to live long enough to see it again, but unfortunately died in 1742 at 85.

There are stories that could fill this newsletter about the history of this comet, but perhaps we could take a few minutes and look back on our own observations. Personally, its first introduction to the Earth in 1985 was as a very tiny blob in the early evening sky; however, its return in the morning in February, 1986 showed itself at its best. Unfortunately, it was beautiful in

February. In the middle of the night. Low to the horizon. Best views were at places of really good horizons. For us, it was Scarborough Beach. In February. In the middle of the night. The only thing missing was snow. But, what a sight! Halley's seemed to hug the horizon, so low it made a slight reflection in the water. And, because it was on its way back outward, it was moving tail-first.

A family that we met came from Connecticut. They had a beach house in Narragansett, and had come in the middle of winter just to get their best views of Halley's Comet. The beach was actually crowded with people eager to get their best look of the comet that was so historic, that had come near the Earth so many times. And, how different the Earth was each time.

Perhaps those who saw Halley's Comet could take a few minutes and write a few words for the next newsletter. What did you think as you watched this periodic visitor pass across the sky? How old were you at the time? Did it change your attitude toward the sky – perhaps this was what gave you your love of astronomy? Hopefully, some of you will send a note to Jim for the June edition of the Skyscraper. All of us



Photo of Comet Halley taken on March 12, 1986
by Rick Lynch. From *75 Years of Skyscrapers*.

would love to hear your memories of such a historic part of our celestial neighborhood.

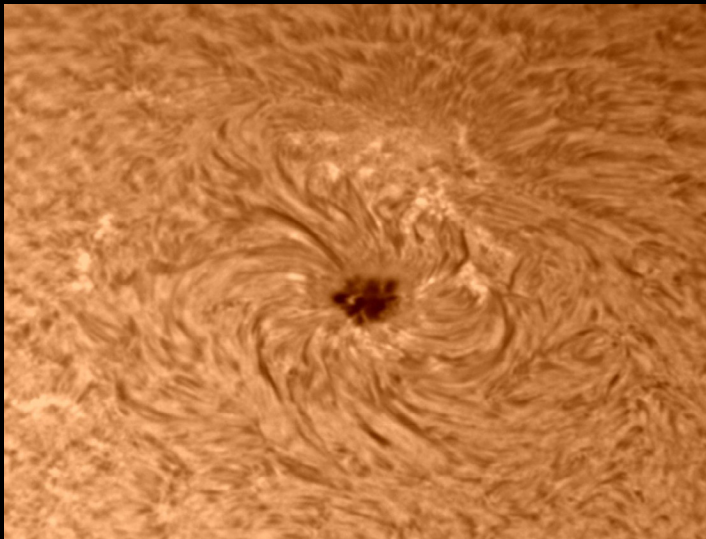


Francine Jackson is Skyscrapers Public Relations Spokesperson, writes the weekly newsletter for Ladd Observatory and serves as planetarian at the University of Rhode Island. See more at <http://theskyscrapers.org/francine-jackson>



Steve & Sue Hubbard traveled to Indonesia to witness the March 9 Total Solar Eclipse. These photos of the eclipse taken with a 500mm lens from the deck of a ship.

April 10 Sunspot: It's a big one and rotating towards the center of the Sun. I used my 100mm Lunt an Orion B+W SSAG and post processing with ASI2 and registax. 3X barlow used for this closeup. Photo by Steve Hubbard



This image of Jupiter was recorded as a 30 sec video in HD connected to our 12 inch Schmidt-Cassegrain telescope at Seaagrove Observatory on Apr 23rd. I then used command line ffmpeg to convert my Canon EOS 70D mov file format to a raw avi file format and removing the audio track. I used RegiStax to convert the frames of the movie to 957 individual images. I selected the best image and selected the number of alignment points, the software searched and aligned the best images. I used other options in RegiStax such as contrast, brightness, wavelet, RGB alignment and calibration. I then realigned the processed image a second time and then stacked and saved the image file. I used Photoshop for additional image processing and this is the end result. This processing enhances the colors and details and removes any noise from the image — Tracy Prell



International Space Station passes over Seagrave Observatory during open night, Saturday, April 14. First quarter Moon & Jupiter also visible.



M51



M5



M82 & M81



NGC 4565

Deep Sky images by Jim Hendrickson, using an Atik Infinity CCD camera on an 80mm refractor at f/4.8. Images are stacks of 30 second frames, processed in Photoshop.



Planetary images by Steve Hubbard, 14-inch SCT. Shadow of Jupiter's moon Europa. Europa is just to the right of the planet's edge on April 15. Mars and Saturn early April 17 2016. 14" SCT, air was very turbulent.



Hubble Shatters The Cosmic Record For Most Distant Galaxy

by Ethan Siegel

The farther away you look in the distant universe, the harder it is to see what's out there. This isn't simply because more distant objects appear fainter, although that's true. It isn't because the universe is expanding, and so the light has farther to go before it reaches you, although that's true, too. The reality is that if you built the largest optical telescope you could imagine -- even one that was the size of an entire planet -- you still wouldn't see the new cosmic record-holder that Hubble just discovered: galaxy GN-z11, whose light traveled for 13.4 billion years, or 97% of the age of the universe, before finally reaching our eyes.

There were two special coincidences that had to line up for Hubble to find this: one was a remarkable technical achievement, while the other was pure luck. By extending Hubble's vision away from the ultraviolet and optical and into the infrared, past 800 nanometers all the way out to 1.6 microns, Hubble became sensitive to light that was severely stretched and redshifted by the expansion of the universe. The most energetic light that hot, young, newly forming stars produce is the Lyman- α line, which is produced at an ultraviolet wavelength of just 121.567 nanometers. But at high redshifts, that line passed not just into the visible but all the way through to the infrared, and for the newly discovered galaxy, GN-z11, its whopping redshift of 11.1 pushed that line all the way out to 1471 nanometers, more than double the limit of visible light!

Hubble itself did the follow-up spectroscopic observations to confirm the existence of this galaxy, but it also got lucky: the only reason this light was visible is because the region of space between this

galaxy and our eyes is mostly ionized, which isn't true of most locations in the universe at this early time! A redshift of 11.1 corresponds to just 400 million years after the Big Bang, and the hot radiation from young stars doesn't ionize the majority of the universe until 550 million years have passed. In most directions, this galaxy would be invisible, as the neutral gas would block this light, the same way the light from the center of our galaxy is blocked by the dust lanes in the galactic plane. To see farther back, to the universe's first true galaxies, it will take the James Webb Space Telescope. Webb's

infrared eyes are much less sensitive to the light-extinction caused by neutral gas than instruments like Hubble. Webb may reach back to a redshift of 15 or even 20 or more, and discover the true answer to one of the universe's greatest mysteries: when the first galaxies came into existence!

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!



(top); NASA, ESA, P. Oesch (Yale University), G. Brammer (STScI), P. van Dokkum (Yale University), and G. Illingworth (University of California, Santa Cruz) (bottom), of the galaxy GN-z11, the most distant and highest-redshifted galaxy ever discovered and spectroscopically confirmed thus far.

Amazon Smile Program

by Tracy Prell

I would like to tell you about the "Amazon Smile" program and how it can benefit our Society financially at not cost or obligation to us. This program is offered by Amazon, the online retailer and is available to all 501(c)(3) organizations.

Amazon will donate .5% of your total purchase price to Skyscrapers, Inc. via direct deposit to our checking account. Please note: your purchase price is not inflated because you use the "Smile" program and if you decide to send a gift card to a friend or family member, that amount is not reduced in anyway.

Some of our members already know about this program and have already registered their existing Amazon accounts with the "Smile" program which immediately provides donations to Skyscrapers, Inc.

After discussing this program at one of our board meetings, initially mentioned

by Jim Hendrickson, I received a unanimous approval from the board to register Skyscrapers, Inc. with the Amazon "Smile" Program.

To participate in the Amazon Smile program, click on the following link which will take you to the Amazon Smile program website and sign in if you're an existing Amazon customer or register if you are a new customer to Amazon: <https://smile.amazon.com/ch/05-0382371>

Once you sign in to your existing Amazon account or you registered a new Amazon account, you are now participating in the Amazon Smile Program. This is a one-time registration! If you are an existing Amazon customer, all of your account information to include recent purchases and order history are available just like it was before. You do not need to re-enter any of your account or credit card information again.

If you are new to Amazon, then of course you would have to register your name, address, credit card information that you would like to use and other information. I've personally been an Amazon customer

since 1998 and never encountered any issues with Amazon.

Any future purchases that you make will be financially helping our society.

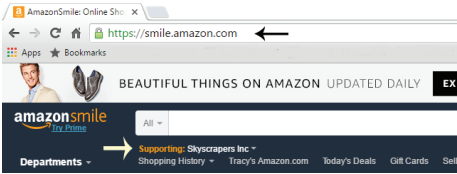
Feel free to shop and purchase whatever you need and this will help our organization tremendously if all of us participate.

We would really like everyone to register with this program to help offset the costs of maintaining our facilities, internet access, utilities, and insurance.

For all future purchases when shopping at Amazon, please ensure in your browser address bar at the top shows www.smile.amazon.com You will also see Skyscrapers, Inc. right below so you know that .5% of your purchases will be helping our organization.

I've added a photo of what you should see so you will know if you are on the Amazon Smile Program website. If not, just type in www.smile.amazon.com

If you need any assistance or questions, please feel free to contact me.



Tracy Karen Prell is Skyscrapers Member-at-Large. See more at <http://www.theskyscrapers.org/tracy-karin-prell>

Skyscrapers, Inc. Membership Renewal

NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

PHONE _____

EMAIL _____

Membership Dues

	Annual Dues (choose one category)
JUNIOR (13-17)	<input type="checkbox"/> \$15
REGULAR	<input type="checkbox"/> \$50
FAMILY	<input type="checkbox"/> \$60
SENIOR (65+)	<input type="checkbox"/> \$25
CONTRIBUTING	<input type="checkbox"/>

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

Magazine Subscriptions*

Members may optionally subscribe to the following publications at a significant discount from their regular subscription rates.
*Magazine subscription rates subject to change at any time.

ASTRONOMY \$34.00*

SKY & TELESCOPE \$32.95*
(\$10 savings)

TOTAL \$ _____
(Make check payable to Skyscrapers, Inc.)
Mail to:
Membership Secretary
Skyscrapers, Inc.
47 Peepload Road
North Scituate, RI 02857

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