the Skyscraper

vol. 44 no. 05
May 2017

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

In This Issue:

Skyscrapers Board Meetings
Third Monday of the Month
All Members Welcome

Phases of the Moon

First Quarter Moon
May 3 02:47

Full Flower Moon
May 10 21:42

Last Quarter Moon
May 19 00:33

New Moon
May 25 19:44

Friday, May 5, 7:00pm
at Seagrave Observatory

A New Window on the Universe from an Old Wave-Band

The first radio telescopes used for astronomy operated at meter wavelengths or longer, but with the advent of better computers and new science cases, observations shifted to the centimeter regime. Centimeter observations are simpler than meter wave for several reasons, but over the last decade, several new meter wave radio telescopes have been constructed with the hope of observing a unique signature from the first stars and galaxies in the universe. I will present the science behind these observations and describe the latest efforts to detect long-wavelength cosmological emission from the early universe.

Jonathan Pober is an assistant professor of physics at Brown University and a member of the Murchison Widefield Array (MWA) and Hydrogen Epoch of Reionization Array (HERA) telescope projects.

Black Holes at the URI Planetarium!

University of Rhode Island Planetarium
Kingston Campus
Upper College Road
Friday, May 12th, 2017, 6:00 P.M.
Contact: Francine Jackson 401-527-5558

Black Holes are one 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 12th, at 6:00 P.M. In addition, a short program on Light Pollution will be shown, followed by 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 University of Rhode Island Planetarium is available for programming for schools and other organizations. For more information, please contact Francine Jackson at 401-527-5558.

Spring 2017 Astronomy Workshop Series

Anyone interested in learning the fascinating hobby of amateur astronomy is invited to come to Seagrave Memorial Observatory, 47 Peep Toad Road, Scituate, RI. Skyscrapers, Inc., the Amateur Astronomical Society of Rhode Island, is offering workshops on topics in astronomy to introduce anyone interested in the fascinating world of amateur astronomy. Also, sky permitting, each program will be followed by observing with the historic 8-inch refracting telescope. All programs are free and open to the public.

May 6, 6:00 P.M.: Spring Constellations

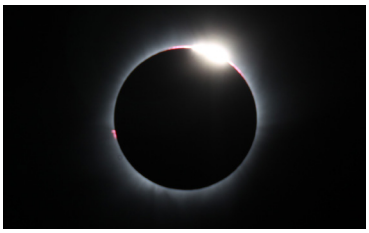
For many, the beauty of the nighttime sky, and learning the constellations, looks almost hopeless; however, with a free computer program, Stellarium, and some of the seasonal star myths, you can easily learn the stars present at this time of year.

Francine Jackson has been associated with planetariums throughout the years, and loves introducing the sky.

May 13, 6:00 P.M.: The Moon

Although the Moon is always with us, and the seasons occur every year, understanding the reasons for the seasons and the changing phases of our Moon is not always obvious. This session will be both a lively presentation and discussion of these two natural phenomena.

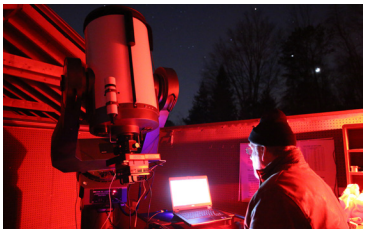
Kathy Siok is 2nd Vice President of Skyscrapers, Inc., and has been an amateur astronomer for many years.



May 20, 6:00 P.M.: The Sun & Solar Eclipses

Today will be all about our nearest star, the Sun. You will learn what we know about Sun, be advised how to observe it very safely, and prepare for one of the most beautiful of our natural events, the total solar eclipse of August 21, 2017.

Ian Dell'Antonio is an Astrophysics Professor at Brown University.



June 17, 9:00 – 11:00 P.M.: Astrophotography

RESCHEDULED DUE TO CLOUDY WEATHER

This evening will introduce you to taking images with a CCD camera, but you can bring with you any photographic equipment you might own. Note: Space is limited, and this workshop is weather dependent. If cloudy it will be rescheduled. If interested, please contact Bob Horton at shootingsta98@gmail.com. Bob Horton and Jim Hendrickson have been photographing the sky for decades, and are always willing to impart their knowledge to others.

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 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.

Observe the Messier Globulars

At the Saturday workshop on April 22, Steve Siok presented an overview of globular clusters and how they indicate the structure of the Milky Way. He presented this list of Messier objects (all globular clusters) that are visible in the sky from early Spring into Summer. All of them may be observed (except M79, which is now below the horizon) and Steve issued a challenge for all to observe them and report their observations before AstroAssembly in order to receive a special recognition.

Messier #	RA			DEC		Constellation	Magnitude	Size
	hr	min	sec	deg	min			min
79	5	24	11	-24	31	Lep	8	8
68	12	39	28	-26	45	Hya	9	9
53	13	12	55	18	10	Com	8	14
3	13	42	12	28	23	CVn	7	19
5	15	18	33	2	05	Ser	6	20
80	16	17	03	-22	59	Sco	8	5
4	16	23	35	-26	32	Sco	6	23
107	16	32	32	-13	03	Oph	9	8
13	16	41	41	36	28	Her	6	23
12	16	47	14	-1	57	Oph	7	12
10	16	57	09	-4	06	Oph	7	12
62	17	01	13	-30	07	Oph	7	6
19	17	02	38	-26	16	Oph	8	5
92	17	17	08	43	09	Her	7	12
9	17	19	11	-18	31	Oph	8	6
14	17	37	36	-3	15	Oph	9	7
28	18	24	33	-24	52	Sgr	8	15
22	18	36	24	-23	54	Sgr	6	17
70	18	43	13	-32	18	Sgr	8	4
54	18	55	03	-30	29	Sgr	8	6
56	19	16	36	30	11	Lyr	9	5
55	19	40	00	-30	58	Sgr	6	15
71	19	53	47	18	47	Sge	8	6
75	20	06	05	-21	55	Sgr	9	5
72	20	53	28	-12	32	Aqr	9	5
15	21	29	58	12	10	Peg	7	12
2	21	33	27	0	-49	Aqr	7	12
30	21	40	22	-23	11	Cap	8	9

The Sun, Moon, Stars, and Dung Beetles

by Francine Jackson

Apparently, we are finally looking to celebrating the season of spring. We don't seem to have any more predicted snow, and our only major concern now will be what kinds of insects we will have to interact with this year. So far, I've already been introduced to the tick, hopefully for the last time, but there are many others out there, ready to mainly make our lives uncomfortable.

Fortunately, one insect we don't really have to worry about here, although it can be considered one of the reasons our Earth is swept relatively clean, is the dung beetle, that amazing insect that rolls whatever dung it can find, preferably that of herbivores, and uses it in various ways. If it weren't for these little creatures, our world would be a much dirtier place.

We have learned within the past decades that birds migrate by the sky, that they have an embedded program that allows them to travel by night by the stars. This has been determined several times by planetarium researchers; however, it is now learned that many form of insects also travel by the stars – in fact, there is an incredible planetarium show concerning the migration of monarch butterflies.

In shorter travels, it appears our dung beetle also is programmed to move by the sky. In 2003, scientists determined that one form of dung beetle navigates by using the polarization patterns in moonlight; however, more amazing is that the average beetle is actually taking a "mental snapshot" of the night sky. They perform a little dance on top of their dung balls, and, in doing so, are recording the positions of the Sun, Moon and the stars. With that information within their incredible little brains, they are then ready for a full day of work, then a direct line home.

I've always believed that insects are amazing, and, with this unbelievable piece of information, hopefully you do, also.

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

Some Astronomical Events in May

by Dave Huestis

Every year at this time I'm talking more about weather than astronomy. "It's déjà vu all over again." Just when we say the weather can't get any worse—it does. Last winter into spring was absolutely horrible. So far 2017 has been downright depressing. Ladd Observatory is open every clear Tuesday night. Since mid-December until now (April 8) the facility has been open just once! Many Saturday nights at Seagrave Observatory have also been canceled. My public outreach responsibilities there are on the first Saturday of each month. I haven't operated the Clark refractor since November! We can only hope we will be able to observe more clear skies than cloudy ones as we progress further into spring.

Here's a brief sampling of astronomical events we can expect to observe during May.

Jupiter will continue to be well-placed in the sky. Drag your telescopes out of the garage or basement and focus in on this giant planet. There is much detail to be seen here. For more details reference my April column. You can find it on the Skyscrapers web site. If the skies are clear for the open nights at the local observatories, Jupiter will be one of the featured objects for a few more months. On May 1 it can be found about 35 degrees above the southeast horizon in the constellation of Virgo, above the bright star Spica. Jupiter will be the brightest object in this area of the sky. You can't miss it.

It's been a while since we've experienced a decent meteor shower. That bad weather is once again to blame. On the night of May 5-6 we can observe a shower of particles shed by Halley's Comet long ago. They enter the Earth's upper atmosphere head-on at 41 miles per second. Unfortunately we can expect no more than 10-15 swift and yellow shooting stars from this shooting star display per hour. Why? This meteor shower, called the Eta Aquarids, is best seen from the southern hemisphere. And this year a bright waxing gibbous Moon will be in the sky until about 3:45 a.m., reducing the peak number of meteors even more. Because the Eta Aquarids come in so fast, you can still expect a few bright ones to be seen despite the Moon's presence.

Steve Hubbard captured this image of Jupiter on April 14.

This shower is best observed after midnight. Aquarius, the constellation from where the meteors appear to emanate, is not very prominent. For many casual stargazers it can be a little difficult to recognize even without bright moonlight. Aquarius will be about 12 degrees above the east-southeast horizon at the 4:00 a.m. hour. The shower's radiant point is in the Water Urn asterism (looks like a Y-shaped group of stars). While the meteors appear to radiate from this region of the sky they can be seen anywhere. Once the Moon sets dawn's early light will not be far behind, so you will not have a dark sky for a long duration to see the most meteors.

Also at the beginning of May practically everybody's favorite planet will be rising after midnight. Soon it will be visible at a more convenient time for the casual stargazer. I'm talking about magnificent Saturn. Saturn's rings are opened almost to their maximum extent soon, so the view will be stunning. The planet currently resides on the Sagittarius/Ophiuchus border, just to the right of the teapot shape that forms Sagittarius and to the right of the Milky Way that seems to pour from the spout of the teacup. Saturn will be at its closest to the Earth for 2017 on June 15 at approximately 840,571,000 miles. I'll provide more details about Saturn in next month's column.

Perhaps you are aware that there are many names given to a Full Moon. Many of these we have adapted from Native American cultures. Others have come from the early American settlers who brought them over from Europe. There does not seem to be any rhyme or reason for favoring the use of one over the other.

The Full Moon of May is on the 10th. Because spring flowers were heralding a new season, Native Americans called that moon the Full Flower Moon. Other names used were Full Corn Planting Moon and the Milk Moon. Perhaps I should write a column about Full Moon names and their origin for a future column.

And finally, for you early morning risers, on May 17 you can catch a glimpse of Mercury, our solar system's innermost planet. Just before sunrise look towards the east and about ten degrees (a fist held out at arm's length provides this measurement)

above the horizon. You may also try a few days before and after, but on this day it will be at its highest. Good luck.

Southern New Englanders, and especially Rhode Islanders, are very fortunate to have so many observatories that provide wonderful views of the heavens. As long as the skies are clear these facilities are happy to offer free public observing of the universe. Seagrave Memorial Observatory (http:/www.theskyscrapers.org) in North Scituate is open to the public 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 Wednesday night. Frosty Drew Observatory (http://www.frostydrew.org/) in Charlestown is open every clear Friday night yearround. Be sure to check all the websites for the public night schedules and opening times before visiting these facilities.

Cross your fingers, your legs or your eyes for good luck. Just remember to uncross your eyes when you get to the telescope eyepiece!

Great American Total Solar Eclipse on August 21, 2017. Countdown: 113 days as of May 1, 2017.

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

Galaxy in Coma Berenices

M98 (NGC 4192)

by Glenn Chaple for LVAS

Mag. 10.1; Size 9.8′ X 2.8′

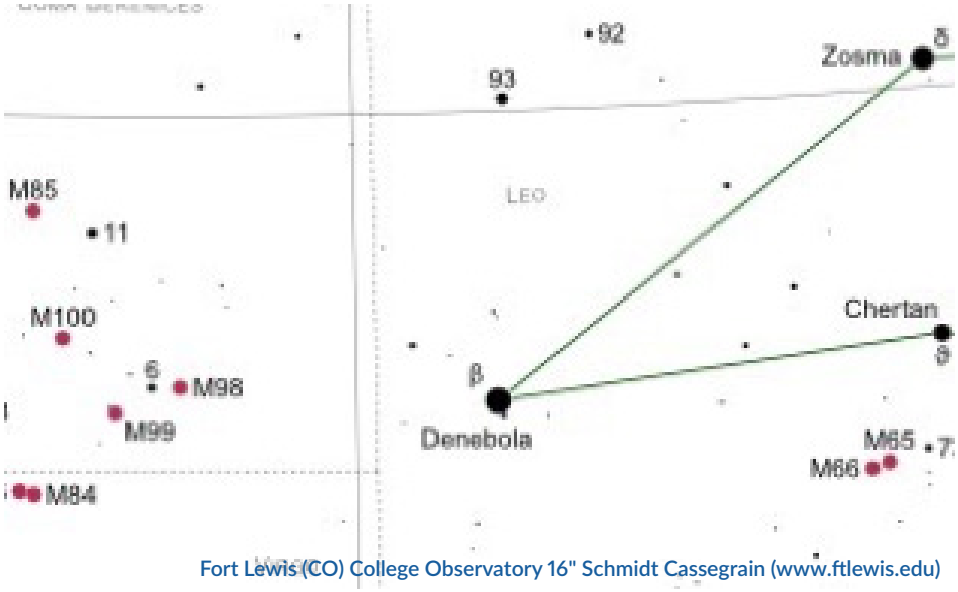
Spring is galaxy season, with the Virgo Galaxy Cluster well-placed in the evening sky after sunset. The cluster is home to over a dozen Messier objects, including this month's LVAS Challenge, the nearly edge-on spiral M98 (NGC 41920). At magnitude 10.1, M 98 is one of the faintest Messier objects, but it's relatively easy to locate as it lies just a little over 6o east of Regulus and 1/2o west of 5th magnitude 6 Comae.

As faint as it is, M98 can be seen with a small-aperture scope. I first saw M98 on April 2, 1978, using a 3-inch f/10 reflector and a magnifying power of 30X. The galaxy required averted vision and a chart (an Astro Card) that pinpointed its precise location. I reobserved M98 on the evening of April 12, 2015, this time with a 4.5-inch f/8 reflector and16mm Nagler eyepiece that yielded 57X and a 1.4o field. M98 was extremely faint, once again visible only because I knew exactly where to look. Despite the dimness, its elongated form was unmistakable.

Along with nearby M99 and M100, M98 was discovered by Messier's comet-hunting contemporary Pierre Méchain on the evening of March 15, 1781. It lies approximately 60 million light years away and, unlike the vast majority of galaxies, is actually approaching the earth at a speed of about 80 miles/second. This "blue shift" behavior is due to its motion within the Virgo Galaxy Cluster.

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.

Mario Motta M.D.



Fort Lewis (CO) College Observatory 16" Schmidt Cassegrain (www.ftlewis.edu)

March/April Reports

Skyscrapers Board of Directors Meeting: March 20, 2017 at 7:00 PM at Ladd Observatory

Present: Kathy & Steve Siok, Bob Horton, Francine Jackson, Jim Hendrickson, Tracy Prell, Linda Bergemann, Jim Crawford, Tom Thibault, Kent Cameron, Ian Dell'Antonio, Lloyd Merrill

1. The next monthly meeting is scheduled for Friday, April 7 at Seagrave. The speaker is Brian Kilpatrick from Brown . This is our Annual meeting and the election will be held. The budget for the next year will be voted on. Dava Sobel will be featured at a special meeting at 7 PM on Wednesday, April 12.

2. Our treasurer , Lloyd, presented the 2016-17 budget and actual expenditures and a proposed budget for 2017-8. Specific items were discussed and modified. The final will be presented to the membership at the April meeting.

3. Ian reported that the NASA proposal for the 27 inch telescope has been submitted. A second proposal to the Champlain Foundation for the observatory building will be submitted by the end of April.

4 - Trustees. Jim Crawford reported that he had an estimate for electrical upgrades. This will be submitted as part of the Champlin proposal.

5 - Election Committee will be sending out ballots within the week. They may be mailed or returned in person at the April meeting.

6 - Library Telescopes. Linda Bergemann has agreed to spearhead this project. She reported that 3 libraries have agreed to get involved: North Kingstown, East Greenwich and Charlestown. This will be a pilot program before embarking on other libraries. Linda will purchase the telescopes and modification hardware. She is also preparing documentation needed for the libraries.

7 - Spring Workshop Schedule is being finalized by Francine and will be published shortly.

8 - Power Plant in Burrillville issue was discussed. An open letter prepared by Jim Hendrickson was reviewed and will be modified by Jim and Bob Horton and discussed again at the April e-board meeting.

9 - April Director's Meeting will be held on Monday, April 17th at Seagrave Observatory at 7 PM.

Kathy Siok- Secretary pro-tem


Brian Kilpatrick

Report of the Annual Skyscraper meeting April 7 2017

At 7:35pm, president Steve Siok commenced the meeting and asked anyone at a meeting for the first time to rise and be recognized.

Tracy Prell immediately commenced to take numerous pictures followed closely by Jim Hendrickson.

New members in attendance were recognized and welcomed into membership. Max Ledoux (Jr. member), Ron Fratus, Robert Janus and Larry Spencer.

Application by John Roe for a senior membership was presented. John was not in attendance and will be voted upon at the next meeting.

Treasurer's report: Treasurer Lloyd Merrill provided and explained the budget for the next year. Total projected income = $10,600. Total projected expenses = $10,600.

Budget was accepted by the membership unanimously.

Library telescope project: President Siok outlined where we are with the project thus far. We will be starting with 3 libraries. North Kingstown, Greenville and one other that your humble secretary neglected to write down. Linda Bergemann is heading this up, purchasing the telescopes and needed equipment to do modifications. If all goes well, this program will be expanded.

Trustees: Matt Ouellette reported that the porta potty is now on site. The trustees will be meeting soon for planning.

Public outreach: Francine Jackson reported an upcoming planetarium show at U.R.I. "Star Signs." Cost to be $5.00.

Cash Flow YTD 2016 - 2017
4/1/2016 through 3/31/2017

Category	4/1/2016-3/31/2017
INFLOWS	
AstroAssembly	
Banquet	1,225.00
Cash Bank	460.00
Doantions	1,000.00
Grill	288.00
Raffle	529.00
Registration	1,215.00
TOTAL AstroAssembly	4,717.00
Donation	
Donations Earmarked - In	1,378.00
Donations Earmarked - Out	-1,378.00
Misc Donation	1,238.90
TOTAL Donation	1,238.90
Dues	
Family	540.00
Junior	15.00
Regular	1,100.00
Senior	645.00
TOTAL Dues	2,300.00
Misc Income	
Interest Inc	3.05
TOTAL Misc Income	3.05
Star Party Donations	140.00
TOTAL INFLOWS	**8,398.95**
OUTFLOWS	
Astro Assem Exp	
Banquet	
Caterer	641.25
Reception	38.45
TOTAL Banquet	679.70
Cash Bank	460.00
Grill	167.05
Misc	20.27
Refreshments	
Friday PM	17.28
TOTAL Refreshments	17.28
Speaker Fee	533.40
TOTAL Astro Assem Exp	1,877.70
Corporation, State Fee	125.00
Misc Expenses	96.68
PayPal Fee	54.27
Postage and Delivery	132.15
Property Insurance	2,457.00
Refreshment Expense	86.90
Trustee Expense	614.18
Capital Equipment	1,533.04
Donations Earmarked	-1,378.00
Property Maintenance	1,121.61
TOTAL Trustee Expense	1,890.83
Utilities	
Electric	183.73
Internet	839.88
Porta-John	792.00
Propane	80.25
TOTAL Utilities	1,895.86
TOTAL OUTFLOWS	**8,616.39**
OVERALL TOTAL	**-217.44**

Photographic interlude: For reasons known only to her, Tracy Prell rose up and started taking multiple jpegs of Francine. Twice!

There are 3 upcoming star party requests. The Greenville Tiger Cub Scouts, One in Harrisville at the Jesse Smith Library on August 4 with the potential for 100 people and a school in Cumberland.

The series of 5 spring workshops will be starting on Saturday, April 22 at 6pm.

Additional photographic interlude: More snapping and flashing by Tracy Prell.

Elections: 38 ballots were returned. Following in the footsteps of the former Soviet

NOAA's Joint Polar Satellite System (JPSS) to monitor Earth as never before

By Ethan Siegel

Later this year, an ambitious new Earth-monitoring satellite will launch into a polar orbit around our planet. The new satellite—called JPSS-1—is a collaboration between NASA and NOAA. It is part of a mission called the Joint Polar Satellite System, or JPSS.

At a destination altitude of only 824 km, it will complete an orbit around Earth in just 101 minutes, collecting extraordinarily high-resolution imagery of our surface, oceans and atmosphere. It will obtain full-planet coverage every 12 hours using five separate, independent instruments. This approach enables near-continuous monitoring of a huge variety of weather and climate phenomena.

JPSS-1 will improve the prediction of severe weather events and will help advance early warning systems. It will also be indispensable for long-term climate monitoring, as it will track global rainfall, drought conditions and ocean properties.

The five independent instruments on board are the main assets of this mission:

• The Cross-track Infrared Sounder (CrIS) will detail the atmosphere's 3D structure, measuring water vapor and temperature in over 1,000 infrared spectral channels. It will enable accurate weather forecasting up to seven days in advance of any major weather events.

• The Advanced Technology Microwave Sounder (ATMS) adds 22 microwave channels to CrIS's measurements, improving temperature and moisture readings.

Ball and Raytheon technicians integrate the VIIRS Optical and Electrical Modules onto the JPSS-1 spacecraft in 2015. The spacecraft will be ready for launch later this year. Image Credit: Ball Aerospace & Technologies Corp.

• Taking visible and infrared images of Earth's surface at 750 meter resolution, the Visible Infrared Imaging Radiometer Suite (VIIRS) instrument will enable monitoring of weather patterns, fires, sea temperatures, light pollution, and ocean color observations at unprecedented resolutions.

• The Ozone Mapping and Profiler Suite (OMPS) will measure how ozone concentration varies with altitude and in time over every location on Earth's surface. This can help us understand how UV light penetrates the various layers of Earth's atmosphere.

• The Clouds and the Earth's Radiant System (CERES) instrument will quantify the effect of clouds on Earth's energy balance, measuring solar reflectance and Earth's radiance. It will greatly reduce one of the largest sources of uncertainty in climate modeling.

The information from this satellite will be important for emergency responders, airline pilots, cargo ships, farmers and coastal residents, and many others. Long and short term weather monitoring will be greatly enhanced by JPSS-1 and the rest of the upcoming satellites in the JPSS system.

Want to teach kids about polar and geostationary orbits? Go to the NASA Space Place: https://spaceplace.nasa.gov/geo-orbits/

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!

Union, there were no competitive races and all officers running were elected. The following individuals were elected:

Steve Siok / president, Ian Dell'Antonio / 1st VP / Kathy Siok / 2cnd VP and other half of our Diarchy, Secretary / Steve Hubbard, Treasurer / Lloyd Merrill, Member at large / Linda Bergemann, Trustee / Tom Thibault

Center for Astrophysics public nights: On the 3rd Thursday of every month there is a public lecture streamed live over the internet. In person tickets are almost impossible to get. Will be hosting the next one at the Seagrave Observatory meeting hall on Thursday April 20 at 7pm.

Following this, Ian Dell'Antonio introduced our speaker for the evening, Brian Kilpatrick from Brown University.

Respectfully submitted, by your humble society secretary

The Sun, Moon & Planets in May

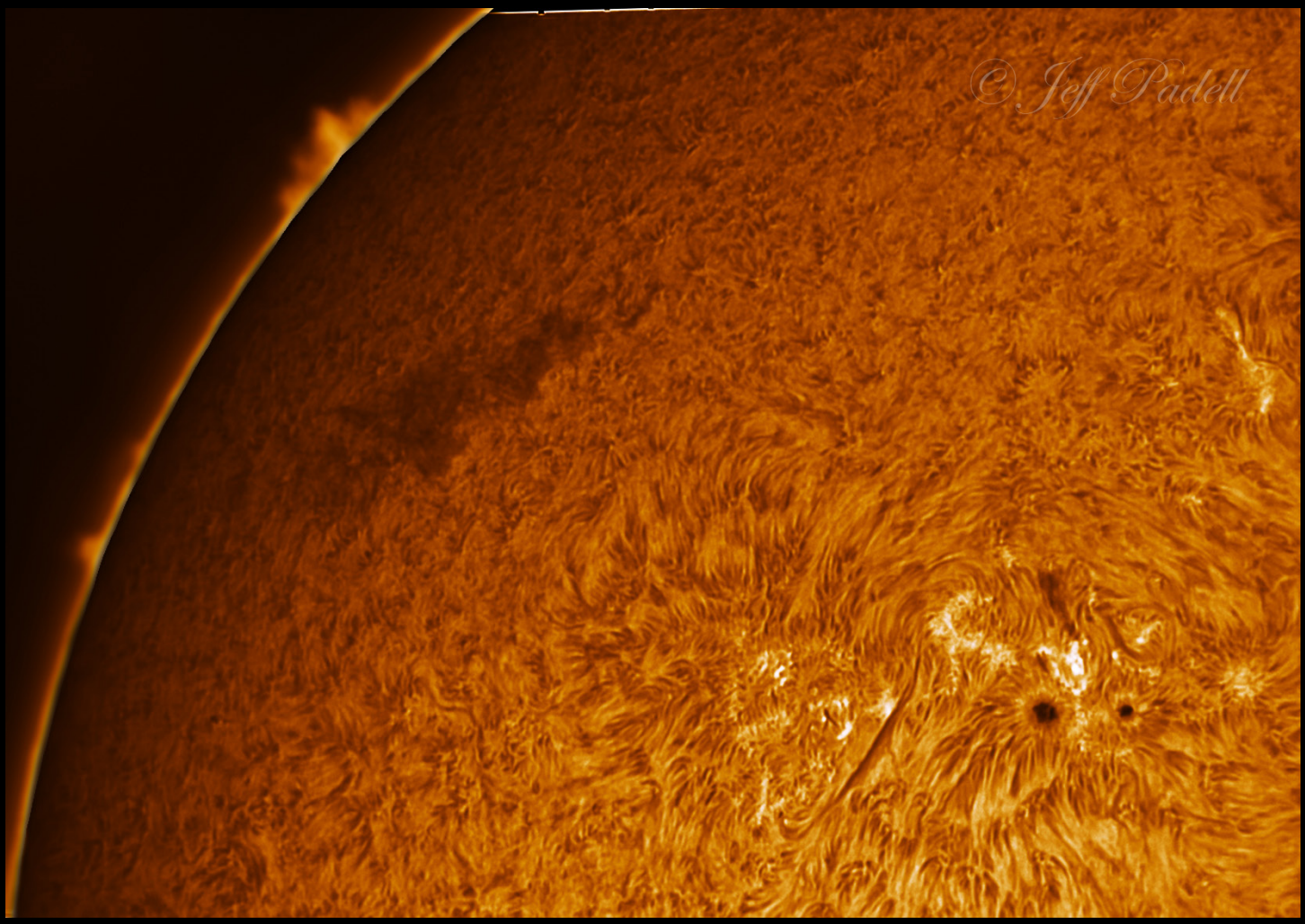
This table contains the ephemeris of the objects in the Solar System for each Saturday night in May 2017. All times are in Eastern Daylight (UTC-4). Ephemeris times are for Seagrave Observatory (41.845N, 71.590W).

Object	Date	RA	Dec	Const	Mag	Size	Elong	Phase(%)	Dist(S)	Dist(E)	Rise	Transit	Set
Sun	**6**	2 52.8	16 31.5	Ari	-26.8	1902.6	-	-	-	1.01	05:35	12:42	19:50
	13	3 20.1	18 22.4	Ari	-26.8	1899.6	-	-	-	1.01	05:27	12:42	19:58
	20	3 47.8	19 58.1	Tau	-26.8	1896.7	-	-	-	1.01	05:21	12:42	20:05
	27	4 16.1	21 17.2	Tau	-26.8	1894.2	-	-	-	1.01	05:16	12:43	20:11
Moon	**6**	11 28.5	4 49.1	Leo	-12.3	1855.7	125° E	79	-	-	15:46	22:05	04:15
	13	17 01.4	-18 23.9	Oph	-12.5	1759.5	157° W	96	-	-	21:31	02:33	07:33
	20	22 51.1	-8 59.3	Aqr	-11.7	1846.5	78° W	40	-	-	02:25	08:09	14:01
	27	5 26.4	18 02.7	Tau	-8.7	2011.6	17° E	2	-	-	07:13	14:43	22:15
Mercury	**6**	1 34.1	7 19.2	Psc	1.5	10.4	21° W	19	0.47	0.65	04:53	11:22	17:50
	13	1 46.9	7 38.2	Psc	0.8	9.1	25° W	31	0.46	0.74	04:38	11:08	17:39
	20	2 10.5	9 36.4	Cet	0.4	7.9	26° W	44	0.44	0.86	04:27	11:05	17:44
	27	2 43.2	12 44.0	Ari	0.0	6.9	24° W	56	0.41	0.98	04:20	11:11	18:03
Venus	**6**	0 13.8	2 00.2	Psc	-4.4	35.5	42° W	31	0.73	0.48	03:53	10:03	16:13
	13	0 32.7	3 00.6	Psc	-4.4	31.9	44° W	36	0.73	0.53	03:40	09:54	16:08
	20	0 54.2	4 27.8	Psc	-4.3	28.9	45° W	41	0.73	0.58	03:29	09:48	16:08
	27	1 17.7	6 14.5	Psc	-4.3	26.4	46° W	45	0.73	0.64	03:19	09:44	16:11
Mars	**6**	4 33.1	22 38.1	Tau	1.6	3.9	24° E	98	1.56	2.42	06:51	14:22	21:53
	13	4 53.5	23 18.5	Tau	1.6	3.8	22° E	98	1.57	2.45	06:41	14:15	21:49
	20	5 14.1	23 48.8	Tau	1.6	3.8	20° E	99	1.57	2.48	06:31	14:08	21:44
	27	5 34.6	24 08.8	Tau	1.6	3.7	18° E	99	1.58	2.51	06:23	14:01	21:39
1 Ceres	**6**	4 03.7	19 06.3	Tau	8.8	0.3	17° E	100	2.73	3.68	06:37	13:52	21:07
	13	4 15.6	19 50.9	Tau	8.8	0.3	13° E	100	2.73	3.70	06:18	13:36	20:55
	20	4 27.6	20 32.4	Tau	8.7	0.3	9° E	100	2.72	3.71	05:59	13:21	20:42
	27	4 39.9	21 10.5	Tau	8.6	0.3	6° E	100	2.72	3.72	05:41	13:05	20:30
Jupiter	**6**	12 57.5	-4 28.5	Vir	-2.2	43.1	149° E	100	5.46	4.56	16:56	22:42	04:28
	13	12 55.2	-4 15.5	Vir	-2.2	42.5	142° E	100	5.45	4.62	16:26	22:13	03:59
	20	12 53.3	-4 05.5	Vir	-2.2	41.9	135° E	100	5.45	4.70	15:56	21:43	03:31
	27	12 51.9	-3 58.8	Vir	-2.1	41.2	128° E	99	5.45	4.78	15:27	21:15	03:02
Saturn	**6**	17 47.5	-22 02.1	Sgr	0.2	17.8	139° W	100	10.06	9.28	22:58	03:36	08:14
	13	17 46.0	-22 01.5	Sgr	0.2	18.0	146° W	100	10.06	9.21	22:29	03:07	07:45
	20	17 44.2	-22 00.9	Sgr	0.1	18.1	153° W	100	10.06	9.15	22:00	02:38	07:15
	27	17 42.3	-22 00.2	Oph	0.1	18.2	160° W	100	10.06	9.10	21:30	02:08	06:46
Uranus	**6**	1 36.1	9 24.4	Psc	5.9	3.4	20° W	100	19.93	20.87	04:47	11:23	18:00
	13	1 37.5	9 32.5	Psc	5.9	3.4	26° W	100	19.93	20.83	04:21	10:57	17:34
	20	1 38.9	9 40.3	Psc	5.9	3.4	33° W	100	19.93	20.77	03:54	10:31	17:08
	27	1 40.2	9 47.6	Psc	5.9	3.4	39° W	100	19.93	20.70	03:27	10:05	16:43
Neptune	**6**	23 01.7	-7 10.5	Aqr	7.9	2.2	62° W	100	29.95	30.41	03:13	08:49	14:26
	13	23 02.2	-7 07.6	Aqr	7.9	2.3	68° W	100	29.95	30.30	02:46	08:22	13:59
	20	23 02.6	-7 05.1	Aqr	7.9	2.3	75° W	100	29.95	30.19	02:19	07:55	13:32
	27	23 03.0	-7 03.3	Aqr	7.9	2.3	82° W	100	29.95	30.08	01:51	07:28	13:05
Pluto	**6**	19 23.2	-21 11.5	Sgr	14.2	0.2	116° W	100	33.32	32.86	00:30	05:11	09:53
	13	19 22.9	-21 12.5	Sgr	14.2	0.3	123° W	100	33.33	32.76	00:02	04:44	09:25
	20	19 22.6	-21 13.8	Sgr	14.2	0.3	130° W	100	33.33	32.67	23:35	04:16	08:57
	27	19 22.1	-21 15.2	Sgr	14.2	0.3	137° W	100	33.34	32.59	23:07	03:48	08:29

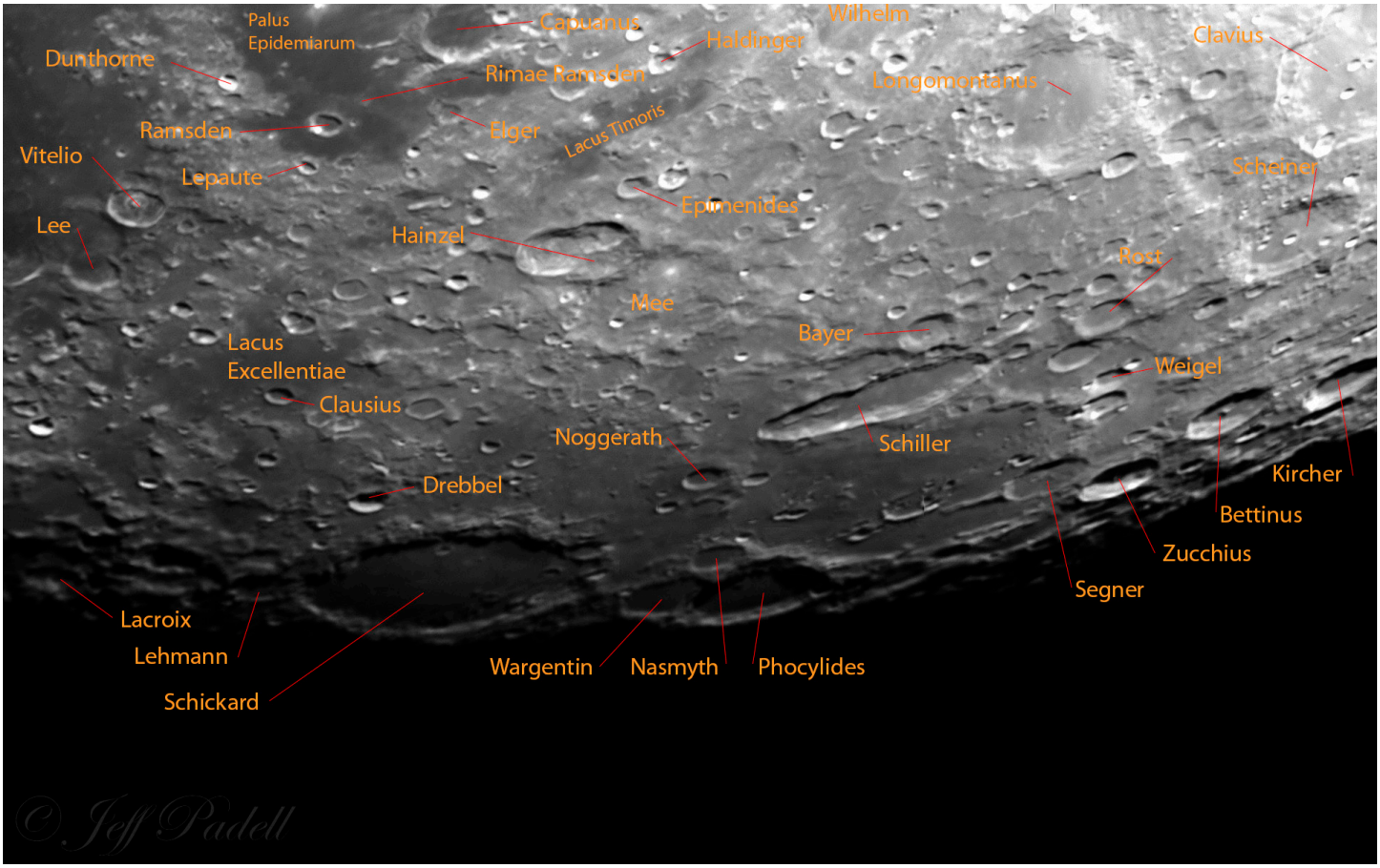
Author Dava Sobel visited Ladd and Seagrave Observatories on Wednesday, April 12. Top: touring the Transit Room at Ladd Observatory with Dave Targan, Bob Horton and Ian Dell'Antonio. Above: Dava Sobel autographs a copy of The Glass Universe for Kathy Babcock at Seagrave Observatory. Right: clear skies permitted Dava Sobel and attending guests views of Jupiter through the Alvan Clark telescope,.

Astro Image Gallery

Steve Hubbard took these images of M51 and M64 with a Malincam on a 14-inch SCT.



Sunspot AR12651 moves across the Sun as seen on April 24; taken with Lunt LS80 and ZWO ASI174mm camera by Jeff Padell.



Southwestern terminator of the Moon from Saturday April 8th by Jeff Padell.

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• 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:
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