



the Skyscraper

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July 2015

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

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Saturday, July 18, 6:00pm at Seagrave Memorial Observatory

Skyscrapers Pluto Party and Cookout (Rain or Shine)

6:00pm: Cookout & Pot Luck

Members and friends are invited to attend an informal summer party featuring hamburgers, hotdogs, and beverages. Participants are asked to contribute \$5 per person (paid on that evening) and to bring something to share. Please RSVP to Kathy Siok (kathys5@cox.net) so that the right amount of food is purchased.

7:30pm

Official Dedication of Skyscrapers Gazebo, built by Alex Bergemann.

My Eagle Scout Project at Seagrave Observatory by Alex Bergemann

Observing Globular Clusters in the Summer Sky by Steve Siok

The Quest for Pluto by Dave Huestis

The talks will be followed by viewing the latest Pluto images from NASA and live images from Seagrave Observatory (weather permitting).

Phases of the Moon

Full Buck Moon

July 2 02:20

Last Quarter Moon

July 8 20:24

New Moon

July 16 01:24

First Quarter Moon

July 24 04:04

Full Apollo Moon

July 31 10:43



Seagrave
Memorial
Observatory
Open Nights

Saturday's at 9:00 pm
weather permitting

President's Message

by Bob Horton

If you are a member of Skyscrapers you are obviously interested in astronomy. And most likely at one time or another you have traveled some distance to view the night sky from a location far from city lights.

Over the years I have traveled with some of you to such remote locations as the Mojave Desert and the Sierra Nevada Mountains in California, Mesas in New Mexico, red rock country in Arizona, and closer to home, the White Mountains of New Hampshire and Stellafane in Vermont. From such places we get to enjoy a majestic view of the night sky unhindered by light pollution where the Milky Way glows brilliantly and stretches from horizon to horizon.

I took the photo of the Milky Way from a truly dark location on White Mountain in California 13 years ago. Places like this are becoming fewer and a more remote.

When I first started stargazing over 40 years ago such views of the sky could be had locally. Back then the Milky Way was quite prominent as seen from Seagrave Observatory. From the western part of RI, where I spent my childhood, the skies were truly magnificent.

Over time more and more of our skies have become awash in light pollution. The dimming of the stars was gradual of course, and as our local skies became more light



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 **June 19** 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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polluted, many of us started to travel further away from home to enjoy our view of the universe.

Check out the satellite image of the Earth at night. The remaining dark areas unhindered by light pollution are beginning to look more and more like oases on a planet awash in artificial lighting. It does make me wonder just how few people have actually seen a truly beautiful night sky.

In an effort to explore what I can do to help preserve our dark skies, I recently joined the International Dark Sky Association (IDA), an organization that works to reduce light pollution. I encourage all of you to consider joining, too.

The IDA works to reduce artificial lighting by influencing policy makers and educating people to use proper lighting that will reduce light pollution. They have had success doing this, but IDA would definitely benefit from having more amateur as-

tronomers involved in this effort.

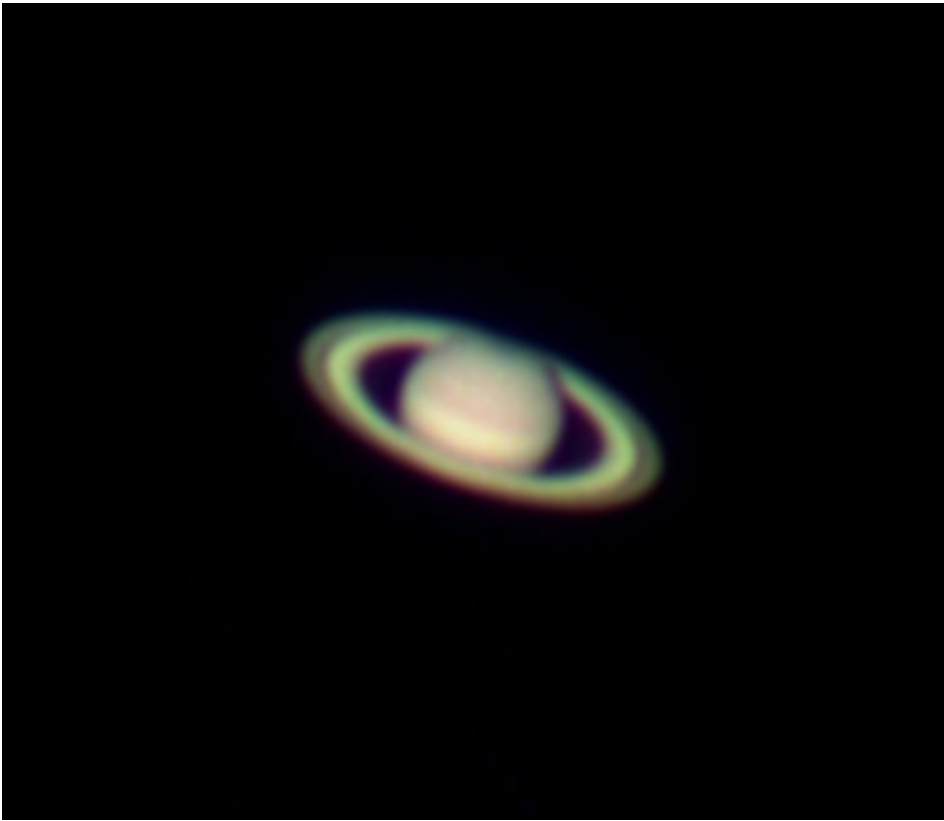
One approach often taken is to stress that better lighting fixtures require less energy, which in turn saves money. Saving money always sounds good, right? This is also better environmentally because these savings also mean burning less fossil fuel. One should also consider the impact artificial lighting has on wildlife and human health. These economic and environmental arguments for better lighting are something policy makers and voters will listen to. These are good, logical facts to present in hopes of persuading policy makers and voters alike to make beneficial changes concerning outdoor lighting.

However, in addition to presenting logical arguments, we need to consider our emotional reasons - one might even say a spiritual need we have as humans. Consider what could happen if we do nothing? Very soon magnificent views of the night sky will

be limited to only the most remote places of our world.

How would you feel if your children or grandchildren could never see the night sky as you have seen it, and as how our ancestors saw it? Our little world exists within a grand universe, and the sight of its beauty, which has inspired humanity and provoked profound thinking since civilization began, should not be denied to future generations.

That certainly motivates me to be more involved!



Steve Hubbard captured this image of Saturn under poor seeing conditions with a 6 inch f/10 Jaegers refractor and a ZWO color imager. The image is the result of a 50 second AVI processed with ASI2 and Registax, and cleaned up with GIMP.

Saturn: The Original Lord of the Rings

by Dave Huestis

If you have any rudimentary knowledge about astronomy, anytime someone mentions the planet Saturn the image that immediately pops into your head is a planet with an extensive system of rings. This sixth planet from the Sun is magnificent to observe with any size optical instruments. Why? Saturn's exquisite ring system is a marvelous spectacle to behold.

Richard Proctor (1837-1888), a famous English astronomer, wrote in his 1901 book, *Pleasures of the Telescope*, "When Saturn is in view the owner of a telescope may become a recruiting officer for astronomy by simply inviting his friends to gaze at the wonderful planet." In another one of his books, 1901's *Other Worlds*, he states, "Many telescopic views in the heavens disappoint the beginner, but that of Saturn does not. Even though the planet may not look as large as he expects to see it from what he has been told of the magnifying power employed, the untrained observer is sure to be greatly impressed by the wonder-

ful rings, suspended around it ... No previous inspection of pictures of these rings can rob them of their effect upon the eye and the mind. They are overwhelming in their inimitable singularity, and leave every spectator truly amazed."

Nothing can entice a crowd of casual stargazers to an observatory more than the announcement that Saturn will be the focus of attention. Several hundred folks have lined up to get a glimpse of this beautiful ringed world from Ladd Observatory, especially when consecutive weeks of bad weather had forced cancellation of Tuesday open nights.

However, don't wait until Saturn is too low in the southwestern sky at the end of September to visit one of the local observatories. Saturn is well placed for viewing now, so check the open night schedules and select a cloud-free night to enjoy this, and other, celestial wonders.

Even if you have one of the small "department store" refractors, these telescopes

will provide adequate views of Saturn and his rings. All you need to know is where to find Saturn in the sky. And this task is very simple in 2015.

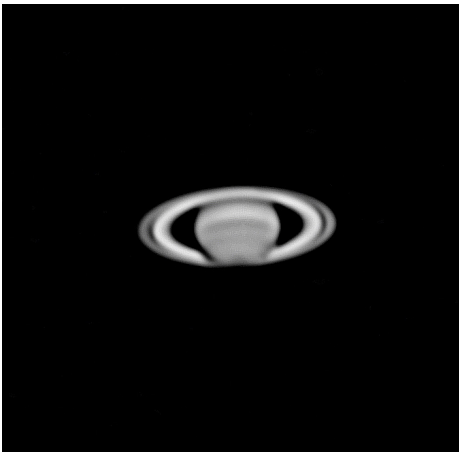
Saturn currently resides in the constellation of Libra, the scales. Libra is not very distinct, but it is above and to the right of Scorpius, the scorpion. (See the accompanying sky chart.) Saturn sits just above the head of the scorpion. From now until it disappears completely from view in October, Saturn will be the brightest object in this region of the sky, except when the Moon passes nearby once each month.

There is nothing that can compare with the experience of viewing and exploring this magnificent ringed-world. When children observe Saturn for the first time they often comment, "It looks like a sticker." With so many overcast nights marring our observing sessions, I wish I could get away with posting a sticker or hanging a planetary mobile to satisfy their scientific curiosity. To prepare you for such an evening of discovery, please read the following details on what to expect to observe once the planet is focused on your eye.

Saturn was at opposition (opposite the Sun in our sky) and closest to the Earth on May 22 at approximately 11:00 p.m. EDT local time. It was still a distant 835,500,000 miles away. When this column is published at the beginning of July, the Earth will have pulled out ahead of Saturn in our respective orbits and will be 853,750,000 plus miles away. Though this difference in distance may seem large, only careful measurements would reveal the ever widening gulf between our two worlds. Regardless, the view will remain impressive.

During the summer months you will have to wait until after 9:00 p.m. for the sky to get sufficiently dark before you begin your observing session. However, Saturn will be bright enough to pick out even before the last traces of evening twilight fade away. And each night the Sun will set earlier and earlier, allowing you to start observing sooner.

Regardless of telescope size, Saturn is indeed a pleasure to observe. The very first feature that will catch your eye is the rings.



Saturn by Tom Thibault using Celestron 11-inch SCT and NexImage 5.

During Saturn's almost 29½ year orbit of the Sun, we see the rings at varying inclinations. Currently they are tilted at an angle of just over 24 degrees from edge-on, affording a view of the northern "surface" of the ring system.

It is amazing that Saturn's rings are visible at all, considering the planet's distance from the Earth and the fact that the ring plane varies from only about 30 feet to about 300 feet (the length of a football field) thick. Although there are hundreds of ringlets, under good seeing conditions you shouldn't have any difficulty seeing the separation between the primary "A" (outer) and "B" (inner) rings, called the Cassini Division. This gap is only 2,175 miles wide. In comparison, the width of the "A" ring

is 9,321 miles and the "B" ring is around 16,032 miles across. What ring features can be observed will depend upon what size telescope is used and the steadiness of the atmosphere above your viewing location.

The rings are composed of irregularly shaped dirty snowballs, ranging in size from grains of dust to the size of pebbles. There are also some "boulders" as large as several feet across. They all orbit Saturn along the planet's equatorial plane.

While the rings will command most of your attention, don't neglect the disk of Saturn himself. The light-colored bands and zones in Saturn's cloud tops are much less prominent than those of Jupiter. (Very little cloud detail can be seen in small telescopes.) However, bright "spots" do develop from time to time.

In addition, both before and after opposition, one can observe the shadow of Saturn projected onto his rings. Also, as the observing angle of the Sun/Earth/Saturn increases, a keen-eyed observer should have no difficulty in detecting the shadow of the rings upon Saturn's cloud tops. These particular viewing circumstances provide a stunning 3-D effect of the Saturnian system.

Also, though Saturn has 62 known moons, at best we can observe the eight brightest with the largest of the telescopes available in Rhode Island. Those moons are: Titan, Rhea, Iapetus, Dione, Tethys, Enceladus, Mimas and Hyperion. The first five or six of the above can be observed

in a dark moonless sky using the 12-inch Brashear refractor at Ladd Observatory.

If you or your children have never observed Saturn through a telescope, then please take advantage of the opportunities provided at the local observatories. Anyone with an Internet connection can see spectacular images of the Saturnian system. However, that detached and passive exploration can never substitute for the actual experience of seeing this distant world for oneself. And if you decide to use your own telescope, please let your friends and neighbors know. You'll have no trouble recruiting a small crowd of people to share in the excitement. And by all means encourage the neighborhood children to put down their electronic devices for a few minutes to explore the science of astronomy firsthand.

In conclusion, don't forget to visit the local observatories (<http://www.theskyscrapers.org/free-public-observing-at-sea-grave-memorial-observatory>) throughout the summer to experience some wonderful views of Saturn and a variety of other astronomical objects.



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>



Rosetta Update

by Francine Jackson

As we are continuing to monitor Dawn at Ceres, and New Horizons at Pluto, another breakthrough mission seems to have been lost in the dwarf planet hype. Rosetta, traveling alongside Comet 67P/Churyumov-Gerasimenko, is still sending back incredible information on the comet, as craft and comet are moving together in the vicinity of the Sun.

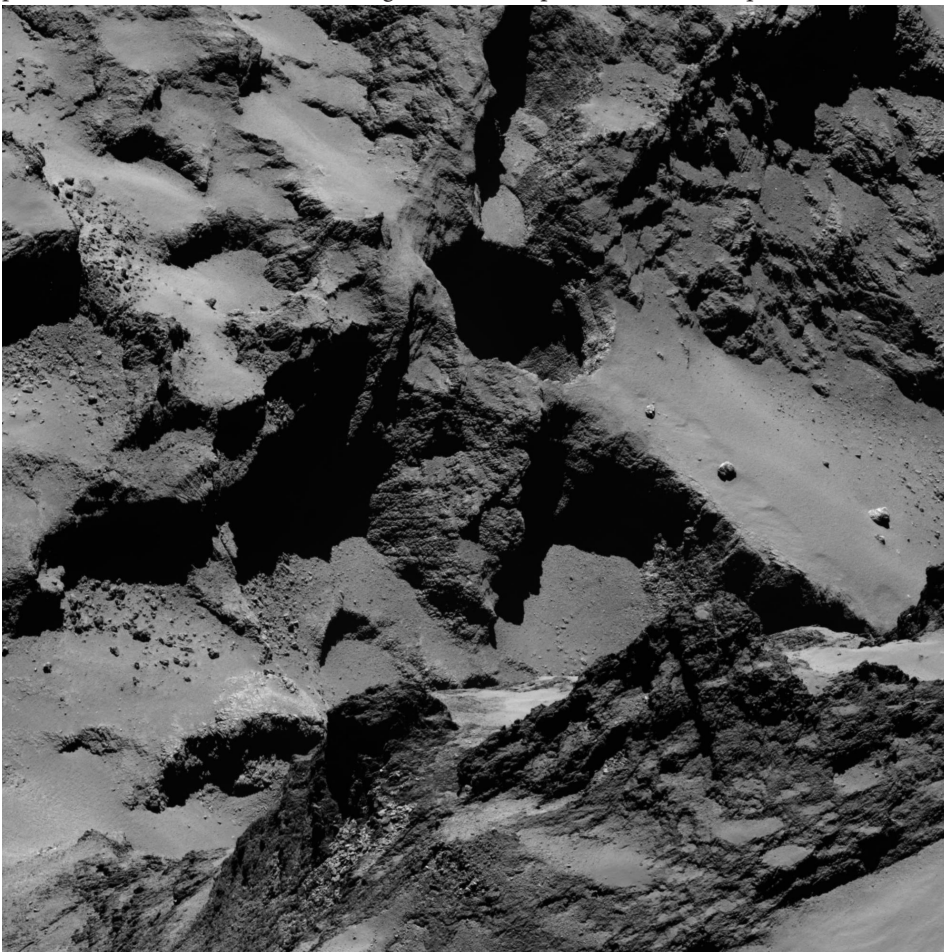
Rosetta, in observing the comet, has apparently found giant sinkholes on the comet's surface. It appears they were probably created the same way those on Earth happen: Surface material above underground

cavernous areas suddenly collapse under their own weight. They appear to be several hundred feet across and possibly the same depth. It also seems as if they were formed at different times, as shown by the differing types of surfaces of their walls.

So far, over a dozen of these very large holes have been sighted, mostly on the "northerly" regions of the surface. None have apparently been located on what is considered the "south," as this side heats up more as Comet 67/P glides around the Sun, apparently speeding up erosion, leaving that part of the surface quite flat.

You might recall the tiny lander, Philae, that, in attempting to land on the comet's surface, had some problems: It bounced off, relanded, finally setting down in what seemed a part of the comet that wasn't conducive to the lander's solar array picking up much needed sunlight; however, just a couple weeks ago, it "woke up," bidding the ESA's Space Operations Centre a long-awaited salutation. It apparently was in hibernation mode, and the prospects of receiving more transmissions from it seems highly probable.

Rosetta itself will be flying around the comet, staying with it and continuing to operate as 67/P passes around the Sun and begins to travel back outward, away from the inner solar system. The space craft, and all of us, recently received some very good news, as the mission has been extended by nine months, meaning we will be able to receive information from Rosetta, and hopefully Philae, until September, 2016.



ESA/Rosetta/MPS for OSIRIS Team MPS/UPD/LAM/IAA/SSO/INTA/UPM/DASP/IDA



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



For updates on the Rosetta mission, follow
https://twitter.com/ESA_Rosetta

The Sun, Moon & Planets in July

This table contains the ephemeris of the objects in the Solar System for each Saturday night in June. Times are in Eastern Daylight 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	4	6 51.0	22 54.9	Gem	-26.8	1,887.8	0° W	100	-	1.02	05:16	12:50	20:24
	11	7 19.7	22 10.1	Gem	-26.8	1,887.8	0° W	100	-	1.02	05:20	12:51	20:22
	18	7 48.1	21 06.6	Gem	-26.8	1,888.4	0° W	100	-	1.02	05:26	12:52	20:18
	25	8 16.1	19 45.6	Cnc	-26.8	1,889.4	0° W	100	-	1.02	05:32	12:52	20:12
Moon	4	20 36.0	-15 01.2	Cap	-12.7	1,937.5	154° W	95	1.02	-	21:29	02:47	08:12
	11	2 58.6	12 39.9	Ari	-11.2	1,890	62° W	27	1.02	-	01:51	08:58	16:12
	18	9 12.3	11 33.3	Cnc	-9.0	1,804.2	23° E	4	1.01	-	08:03	14:54	21:37
	25	14 38.0	-12 53.3	Lib	-12.0	1,823.3	99° E	58	1.02	-	14:43	20:01	01:14
Mercury	4	5 25.9	21 31.3	Tau	-0.4	6.5	20° W	60	0.35	1.03	03:59	11:27	18:55
	11	6 17.7	23 08.8	Gem	-1.1	5.7	14° W	81	0.32	1.18	04:17	11:52	19:28
	18	7 19.7	23 10.6	Gem	-1.8	5.2	7° W	96	0.31	1.29	04:52	12:27	20:02
	25	8 23.4	21 04.7	Cnc	-2.1	5	2° E	100	0.33	1.34	05:38	13:03	20:27
Venus	4	9 43.0	13 53.2	Leo	-4.4	34.3	42° E	32	0.73	0.49	08:47	15:41	22:33
	11	9 56.3	11 36.3	Leo	-4.5	38.3	39° E	26	0.73	0.44	08:42	15:26	22:09
	18	10 04.4	9 31.0	Leo	-4.5	42.8	35° E	20	0.73	0.4	08:29	15:06	21:41
	25	10 06.1	7 47.3	Leo	-4.5	47.8	29° E	13	0.73	0.35	08:09	14:39	21:08
Mars	4	6 27.8	24 03.2	Gem	1.5	3.6	5° W	100	1.58	2.59	04:49	12:26	20:04
	11	6 48.1	23 47.9	Gem	1.5	3.6	7° W	100	1.58	2.59	04:43	12:19	19:55
	18	7 08.3	23 23.1	Gem	1.6	3.6	9° W	100	1.59	2.59	04:37	12:11	19:45
	25	7 28.1	22 49.1	Gem	1.6	3.6	12° W	100	1.6	2.58	04:32	12:04	19:35
Ceres	4	20 46.1	-27 56.9	Mic	7.8	0.6	154° W	99	2.93	1.99	22:34	02:44	06:53
	11	20 41.0	-28 43.1	Mic	7.7	0.6	161° W	100	2.94	1.96	22:06	02:11	06:17
	18	20 35.2	-29 27.4	Mic	7.5	0.6	167° W	100	2.94	1.94	21:36	01:38	05:39
	25	20 28.8	-30 07.9	Mic	7.5	0.6	169° W	100	2.94	1.94	21:06	01:04	05:02
Jupiter	4	9 39.1	14 56.7	Leo	-1.6	32.2	40° E	100	5.37	6.11	08:38	15:36	22:33
	11	9 44.4	14 30.1	Leo	-1.6	31.9	35° E	100	5.38	6.18	08:18	15:13	22:09
	18	9 49.8	14 02.2	Leo	-1.6	31.5	30° E	100	5.38	6.24	07:57	14:51	21:45
	25	9 55.4	13 33.1	Leo	-1.6	31.3	25° E	100	5.38	6.29	07:37	14:29	21:21
Saturn	4	15 48.8	-17 52.8	Lib	0.3	18	137° E	100	9.99	9.22	16:48	21:44	02:39
	11	15 47.7	-17 50.7	Lib	0.3	17.8	130° E	100	9.99	9.3	16:19	21:15	02:10
	18	15 46.8	-17 49.6	Lib	0.3	17.6	123° E	100	9.99	9.39	15:51	20:47	01:42
	25	15 46.2	-17 49.5	Lib	0.4	17.4	117° E	100	9.99	9.49	15:23	20:19	01:14
Uranus	4	1 16.0	7 20.2	Psc	5.8	3.5	81° W	100	19.99	20.12	00:45	07:13	13:42
	11	1 16.4	7 22.4	Psc	5.8	3.5	88° W	100	19.99	20	00:17	06:46	13:15
	18	1 16.6	7 23.8	Psc	5.8	3.5	95° W	100	19.99	19.88	23:50	06:19	12:48
	25	1 16.7	7 24.2	Psc	5.8	3.6	101° W	100	19.99	19.77	23:23	05:51	12:20
Neptune	4	22 46.2	-8 40.0	Aqr	7.9	2.3	122° W	100	29.96	29.41	23:13	04:44	10:15
	11	22 45.9	-8 42.3	Aqr	7.8	2.3	129° W	100	29.96	29.32	22:45	04:16	09:47
	18	22 45.4	-8 45.0	Aqr	7.8	2.3	136° W	100	29.96	29.23	22:18	03:48	09:18
	25	22 45.0	-8 48.2	Aqr	7.8	2.3	142° W	100	29.96	29.15	21:50	03:20	08:50
Pluto	4	19 01.3	-20 41.2	Sgr	14.1	0.3	177° W	100	32.9	31.89	20:16	01:00	05:43
	11	19 00.6	-20 43.0	Sgr	14.1	0.3	175° E	100	32.91	31.89	19:44	00:27	05:11
	18	18 59.9	-20 44.8	Sgr	14.1	0.3	169° E	100	32.91	31.91	19:16	23:59	04:42
	25	18 59.1	-20 46.7	Sgr	14.1	0.3	162° E	100	32.92	31.95	18:48	23:31	04:14



Skyscrapers enjoyed participating in the RI Great Outdoors Pursuit, held at Lincoln Woods State Park on Saturday, June 13. Park visitors enjoyed viewing Venus, Jupiter, Saturn and several deep sky objects with our telescopes. Many of those attending had never looked through a telescope before. Thanks go out to Dave Huestis, Alex Bergemann, Francine Jackson, Jim Hendrickson, Kent Cameron, Tracy Prell, Ian Dell'Antonio and Bob Horton for volunteering their time.







Fireflies & Northern Lights

by Dave Huestis & Jim Hendrickson

Well Jim, it did make it this far south.

See this link for images taken by an old friend of Skyscrapers, Chris Cook, who lives out on the Cape. http://space-weathergallery.com/indiv_upload.php?upload_id=113913&PHPSESSID=6fpfqcv-ljmclsvgvo8ld5imfj4

Also, I went down to the lake at about 11:10 pm. Had a lot of clouds to the north. Clouds went from northern horizon up to about 25 to 30 degrees. Could see Ursa Major and Cass primary stars. As I dark adapted I noticed a general low arc within about 10 degrees of the northern horizon. Then I noticed some bright "regions" forming along the arc. Then they subsided. Then a few rays rose from the arc through Cass. Subsided again. Then a few rays rose between the Dipper and Polaris. Rose about 30-35 degrees. Color was predominantly very light greenish-white. The rays that stretched upwards near the dipper had a slight reddish glow to them before subsiding. No real detail observed due to the intervening cloud cover.

Decided to take a ride to see if I could

get a better cloud-free view. It's difficult finding a public access point with no lights that affords a good unobstructed view to the north. I ended up north of Worcester. Very dark as you climb the plateau heading up to Mt. Wachussett. Stopped by the side of the road and had a good look covering the entire northern sky. Could see a distinct glow less than 5 degrees off the horizon, but no rays were apparent. Turned around at RT 140 and came home.

Thought I'd send this report before hitting the pillow.

Dave PS. Got to get myself a good camera. Though clouds hid the detail here in Pascoag, a 15-20 sec exposure would have revealed the arc and the rays through the high cloud deck.



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>

Thanks Dave, quite a report, and glad you traveled to try to get a better view. There's no excuse for you to wait any longer to get a camera. Let me know when you go camera shopping and I can help you pick something out.

I started around sunset, getting my AVX set up so I can figure out how to align it, with the aim of taking some astrophotos and hopefully capture the Pluto field. During twilight had a nice view of Moon Jupiter and Venus from the parking lot so I had to work with them while I still had them. Venus "set" before it was really dark so I finished with that a bit early.

Getting back to the mount did a quick 2 star align before I became distracted by the intense firefly display going on in the woods behind me. I must have taken about 45 minutes worth of sequenced images of them (needed to wait for twilight to end anyway). It turns out that in some of those shots I saw hints of purple in the sky, so the aurora was already going on.

Sometime around 11 or so I saw a verti-



cal spike in the north. It was moving rather slow so I put the camera on it to check. Yup, cloud - why is there ALWAYS a vertical spike of cloud in the north when aurora are expected? I didn't see any hint of aurora in the shot so I continued with my mount calibration.

I didn't notice the aurora until about 11:30 when looking to the north seeing that "twilight" gradient long after it should have been gone, and also that it had a slight reddish color to the naked eye. A quick camera shot revealed it was the real deal. So I grabbed the tripod and set up in the front area looking north. Took a few shots to test exposure settings. I ended up going with ISO 3200, 13 sec at f/2.8 with the 16mm lens. I also make sure to turn off the auto dark compensation so I could get a continuous string of shots and stood there for probably an hour or more shooting away while watching. "High thin stuff" (the real kind, not imagined) starting taking over the sky from the northwest as it was heightening in intensity but I could see brilliant curtains of light that looked mostly white with hints of red. You could easily see them moving in real time even with interference from clouds. It would ebb and flow over this time

but I could always see the light gradient in the north, where we typically don't have much light pollution so I know there was still activity. Low to the horizon there were lots of green in the photos, with the red curtains extending well above that, even as high (if not higher) than Polaris and the pointer stars of the Big Dipper at times. Finally the sky cleared sometime after 12:00 but unfortunately my lens was starting to dew up! I quickly wiped it off between shots so I could get a continuous sequence. All the while the firefly show was continuing in the background and in the foreground. Some of the shots even show fireflies passing in front of the observatory at times. Finally a bit after 12:30 I could no longer see any dynamic changes (although still a diffuse glow) so stopped continuous shooting (needed to save "film").

I went back to the scope (which was also now soaked in dew and had tracked well past the meridian- had it on Saturn) to try for the Pluto shot. Took a couple of shots of the field but haven't checked if I got Pluto yet. Probably not as the dew was diffusing the images quite severely. So I packed up the scope and before leaving took a couple more shots to the north around 1:30, and

saw that there were still distinct colors (and visible gradient) low in the sky. If it was a weekend I likely would have stayed until dawn, or at least until I ran out of "film".

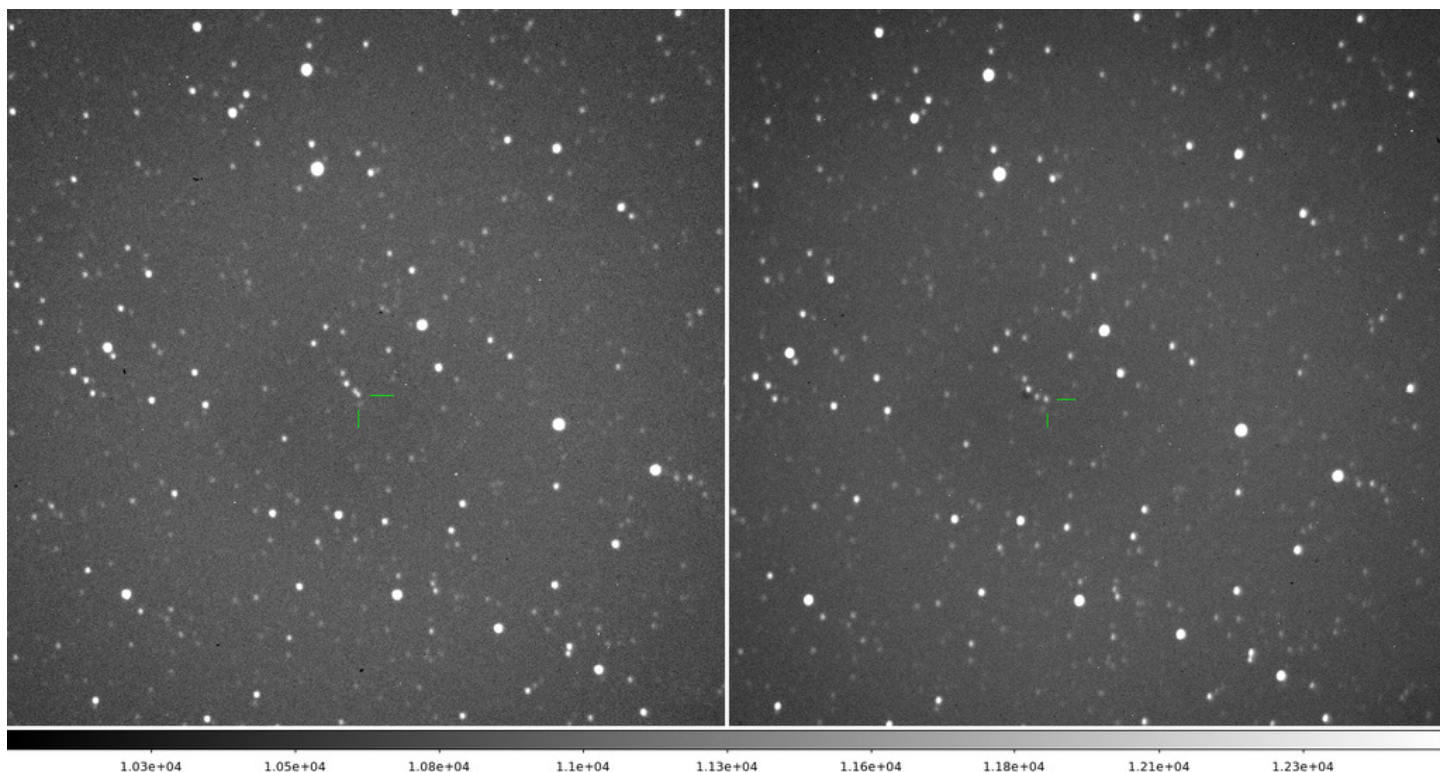
Perhaps the biggest surprise to me was that this is the first auroral display I've seen that lasted more than 3 minutes. Duration of detectable activity was at least 2 hours continuous (though varied greatly in intensity), so it was well worth the trip.

Oh and I still need to figure out how to polar align my mount properly. I didn't really get to spend much time on that.



Jim Hendrickson is newsletter and web editor and has been a member for 20 years. See more at <http://theskyscrapers.org/jim-hendrickson>

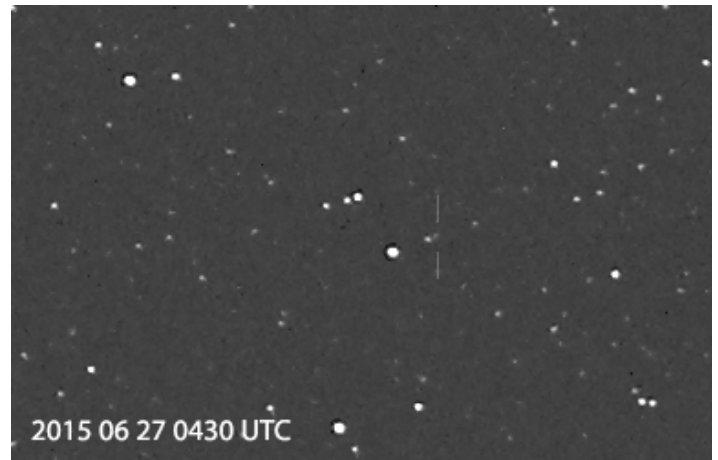
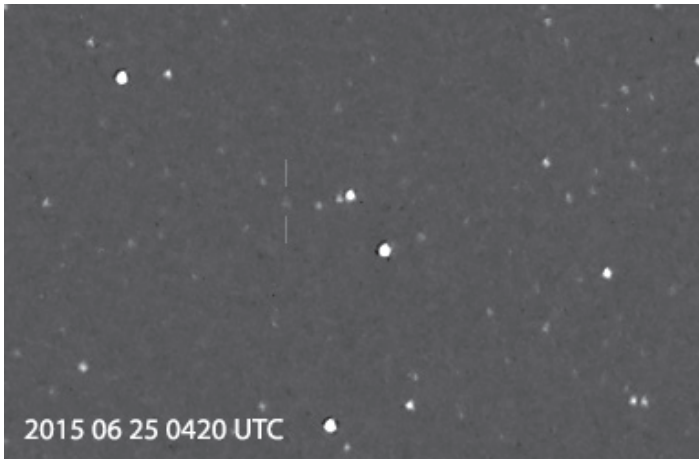
Pluto in View



July 6 11:08 pm and July 7 1:08 am
by Prof. Dell'Antonio



Bob Horton took this image of Pluto on the night of June 24 at Seagrave using the 12" Meade. The exposure was just 1 minute long. Weather permitting, we should have no difficulty getting images of Pluto on July 18th.



Jim Hendrickson used an SLR camera and a 3-inch telescope to capture Pluto from Seagrave Observatory between June 25 and 27. The frame below shows the wide field of view (with Pluto marked left of center) and above are 2 frames cropped and stretched to show the motion of Pluto over the course of 2 days.



Board of Directors Meeting Minutes — 5/30/15

Attendees: Gene Allen, Jim Crawford, Ian Dell-Antonio, Ed Haskell, Jim Hendrickson, Bob Horton, Tina Huestis, Francine Jackson, Bobby Napier, Tracy Prell, Steve Siok, and Tom Thibault.

Bob Horton, President: Bob called the meeting to order at 3:10 p.m. at Seagrave Observatory.

Large Remote-Controlled Telescope: Bob introduced guest Gene Allen, the owner of the (undeveloped) abutting property, and provided a synopsis of where the large remote telescope project stands currently. The time frame for installation would be fall 2016. Gene reiterated that his plans haven't changed on a donation to Skyscrapers; however there are remaining issues (e.g., wet lands, estate claim) that need to be re-



Dr. Steven Carey

solved before he can proceed. • Gene was agreeable to give Skyscrapers more square footage if needed. (And he had no objection to cutting back the brush/stumps on the perimeter, with the request to use hay bales to protect the area first.) • There was some discussion how best to merge any donated land so as not to disrupt the organization's tax exempt status. • Ian said that realistically, it could take nine to twelve months for the grant awarding process, and may require one to two rounds of applications. Ian has agreed to be the primary grant writer, with vetting of the proposal by the Board, and expects to ask for assistance with the details of the building/costs, etc. Ian reiterated the benefit of having the telescope installed at Seagrave for access by

students. • Tom mentioned that an architect will review any plans for the cement rods/base for no cost. • There were preliminary discussions on dome size, pier materials, and number of floors, and door size/ramp. Tom will begin putting together a plan for a building concept proposal and will bring it back for the Board to review.

Treasurer's Update: Ed Haskell asked to address some housekeeping items. The first item being moving the Skyscraper's accounts from Citizens Bank. After some discussion on the merits, the Board voted that Ed could change banks for conducting Skyscrapers' treasurer's duties. Ed will research which bank would be best for the organization's needs and also ensure not to incur any additional fees. Ed agreed that the society's address would be unchanged. • The second item was the membership list. It was agreed that Board members could have access to the membership list, upon request (including the email addresses), with the understanding that any use of the list would respect the privacy of our members. Jim Crawford said that he is maintaining the list, however it was noted that these email addresses were not being updated for the newsletter distribution.

Workshop Series: Francine reported that the series was a lot of fun. The Board agreed to continue running this programming in the fall (September into October, skipping Astro Assembly) and to keep the same subjects, while also introducing some advanced ones. Ian suggested the topic of where to observe locally in Rhode Island/favorite spots.

Programs: Steve informed the group that the Pluto event occurring in July (closest approach on July 14) would make for a unique programming opportunity for Skyscrapers. It was agreed that the date of the 18th would be the optimal time for scheduling the organization's July monthly meeting. Details on how best to incorporate a NASA direct feed and compare to images taken at Seagrave (prior to the event, for the purpose of "blinking") were discussed. • Steve gave an update on Astro Assembly. He said that Kelly Beatty would give talks on both New Horizon/Pluto and light pollution. Steve noted that Beatty's talk on light pollution would dovetail with the International Dark Sky's (IDA) efforts and a possible membership drive for that group. The membership fee is \$35 and he would like to advertise it during the event.

Ideally if Skyscrapers could pre-enroll at least eight people into the IDA, that would be a good start. • Steve said that he has lined up speakers from the Center for Astrophysics on Chandra and Kepler. Also Francine will give a talk on the "International Year of Light." • Steve spoke about the proposed changes of using the meeting hall and not renting the large tent. Refreshments will be outside in the new gazebo. There will still need to be a tent rental, although it would be much smaller. How to use the roll-off roofs as make shift tents and the need for other pop-up tents were discussed. • Steve will be creating the poster for advertising Astro Assembly at the Conjunction, Stellafane and other similar meetings.

Miscellaneous: Francine reminded the Board that 2015 is the "International Year of Light" and that the associated traveling exhibit is looking for a cosponsor and location for November. She and Bob will be investigating whether there is any site available at Brown. • Bobby raised the topic of Internet access. The group debated the merits of linking with the nearby OSHEAN network (at the North Scituate Library), which has the potential for grant funding to cover the costs, versus FIOS access directly at Seagrave. Tracy offered to explore whether there was local FIOS presence.

Meeting adjourned at 5:20. Submitted by Tina Huestis, Secretary

Skyscrapers June Meeting Minutes — 6/12/2015

President Bob Horton called the Skyscrapers' June meeting to order at 7:35 p.m.

President Bob Horton welcomed everyone and explained that the Observatory is typically open following the meeting when skies are clear. However, Seagrave will be open from 9:00 – 11:00 p.m. tomorrow night (Saturday).

Treasurer Report: Ed Haskell reported that there was one new member, Peter Bond of Warwick, to introduce. He noted that Michael Perpall was not present and will be voted on at the next meeting in which he is in attendance.

Announcements: Bob reported that Skyscrapers would be hosting a star party at Lincoln Woods on the following night. The event is organized by DEM and is expected to attract about 100 people. If anyone wishes to volunteer, see Bob following the meeting. • Also, he noted that Skyscrapers members received an invitation to a star party at the Durfee High School Observatory for next

Thursday evening. An announcement will be emailed to members with the details.

Second Vice President Report: Steve Siok reported that the July meeting will be held on Saturday the 18th. There will be a cookout and a special evening program to coincide with the New Horizon's mission to Pluto. The cookout will begin at 6:00 p.m. and members are asked to contribute \$5.00 and a potluck food item. Skyscrapers will provide hot dogs, burgers, and beverages. Kathy Siok circulated a clipboard RSVP sign-up sheet. • In July, Alex Bergemann will speak about his Eagle Scout project, and short talks will be given by Dave Huestis and Steve Siok. The main event will include a real-time display of the NASA encounter and, weather permitting, CCD images from our scope. These images will be "blinked" to identify the planet's position. An email will be sent to members with the details and RSVP contact information. It is planned to be a "rain or shine" program. • Steve also reported on Astro-Assembly programming. He noted that Kelly Beatty, Sr. Editor at Sky & Telescope magazine, agreed to present two talks: the first on New Horizons and the second on light pollution. Steve explained that Skyscrapers members are encouraged to join in the work of the International Dark Sky Association (IDA) either by becoming a member or by giving a donation. More details will be provided in the next newsletter. (The IDA's mission is to lobby for dark skies.)

Members Workshop series: Bob reported that the series of six programs have wrapped up. The turnout was good and feedback from members included the wish for advanced workshops in addition to beginners' topics. The series will be restarted in the fall (September – October). Please see Francine Jackson if you are interested in volunteering. • Bob thanked Francine for organizing the series. He also acknowledged all the members who contributed programs: Conrad Cardano, Steve Siok, Ian Dell-Antonio, and Francine Jackson.

Trustee Report: Tom Thibault reported that the Trustees met tonight and reviewed the list of items still needing attention. They will continue finishing these improvements. • He announced that a couple of work sessions are planned to remove the brush that is encroaching on the property's east side. • Also the Trustees will be strengthening/improving the Observatory deck. The decision was made to restrict public access to

the deck for purely safety concerns.

For the Good of the Organization:

Dave Huestis noted that Alex Bergemann received his Eagle Scout status this week. Alex built our gazebo and will talk about it at the upcoming meeting. • Francine said this month's Sky & Telescope magazine included a "75- years ago" quote by Charles Smiley (a founder of Skyscrapers) about the Schmidt camera. • Bobby Napier remarked that it was one of the earliest of its kind and is on display at Ladd Observatory.

The meeting adjourned at 7:56. Submitted by Tina Huestis, Secretary.

Dr. Steven Carey, presented the program "Exploring Volcanoes on Earth and Other Parts of the Solar System." Dr. Carey began with some facts about volcanoes. In order to make a volcano, there must be heat (radioactivity or tidal heating) and something to melt (silicates or ice). Dr. Carey explained that volcanism is affected by gravity (lower gravity reduces the buoyancy of magmas) and atmosphere (high atmospheric pressure can suppress explosive activity). On Earth, plate tectonics is the unifying theory for volcanoes. Put simply, the boundaries between the plates are where volcanic activity occurs. Volcanoes can exist on land and in the ocean. On Earth, 75% of the volcanic activity occurs underwater. Dr. Carey compared volcanoes elsewhere: on the Moon, now dead to volcanoes, running out billions of years ago; on Venus, which has been resurfaced by volcanic processes and has thousands (or possibly millions) of volcanoes; on Mercury, which is volcanically dead; on Mars, where the largest known volcano (Olympus Mons) exists; and on Jupiter's moon Io, which is the most volcanically active in the solar system. Dr. Carey concluded by explaining that Earth is the only body that exhibits evidence of plate tectonics. Why? Because the presence of water helps facilitate plate tectonics. On other planets and moons in the solar system, volcanism is unlike Earth's because of: different gravity, lack of tectonics, and different surface pressures. Otherwise, much of volcanism is the same.

Cash Flow YTD 2015 - YTD:2

4/1/2015 through 6/19/2015

Category Description	4/1/2015-6/19/2015
INFLOWS	
Donation	
Chet Siok	640.00
Misc Donation	1,739.35
Refreshment Donation	5.00
TOTAL Donation	2,384.35
Dues	
Family	58.38
Junior	15.00
Regular	344.40
Senior	149.15
TOTAL Dues	566.93
Misc Income	
Interest Inc	3.15
Sale of Items	35.00
TOTAL Misc Income	38.15
Star Party Donations	250.00
TOTAL INFLOWS	3,239.43
OUTFLOWS	
Refreshment Expense	42.28
Trustee Expense	
Property Maintenance	87.00
TOTAL Trustee Expense	87.00
Utilities	
Electric	15.95
Porta-John	198.00
Propane	80.25
TOTAL Utilities	294.20
TOTAL OUTFLOWS	423.48
OVERALL TOTAL	2,815.95

Cash Flow YTD 2015 - YTD

4/1/2015 through 6/19/2015

Category Description	4/1/2015-6/19/2015
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Interest Inc	3.15
Sale of Items	35.00
TOTAL Misc Income	38.15
Star Party Donations	250.00

Venus & Jupiter Conjunction



Bob Horton took these images of Venus & Jupiter over Providence from the observatory on the roof of Barus & Holley Physics Building at Brown University.

June 24



June 26



This sequence of images shows the closing of Venus and Jupiter taken by JimHendrickson a Seagrave Observatory using a Canon SLR camera and 200mm lens. The moons of Jupiter are clearly visible, and in the final image a cloud obscured Venus just enough to hide its glare and reveal its crescent phase.

June 29



June 30

Bob Horton took this image on June 30, the date of the closest conjunction, when Venus and Jupiter were a mere 20 minutes apart, from Ladd Observatory.



Double Star in Scorpius

Xi (ξ) Scorpii (Σ 1998)

by Glenn Chaple

Our cosmic wanderings take us 93 light years away to the triple star xi (ξ) Scorpii (Σ 1998), located in the Scorpion's north-west corner. A 60mm refractor magnifying 60X will reveal two stars (xi Scorpii A and C), of magnitudes 4.9 and 7.3 and separated by 7.0". If the seeing is extremely steady, check out the brighter star with a larger scope (minimum aperture of 4 inches) and magnification of 150X or more. You should capture a magnitude 5.2 companion (xi Scorpii B) just 1.1" away. Xi Scorpii A and B are a binary pair with an orbital period

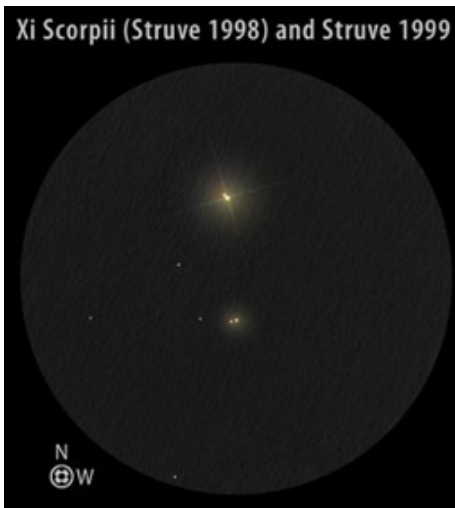
of 46 years. As the diagram shows, they are currently near greatest separation.

When I first viewed xi Scorpii with a 3-inch reflecting telescope in the summer of 1971, I was surprised to see a faint double star in the same field. I had "discovered" Σ 1999 (magnitudes 7.5 and 8.1; separation 11.8"). Although nearly 5 minutes of arc separate Σ 1999 from xi Scorpii, the two have the same common proper motion and are likely gravitationally bound. When viewing xi Scorpii and Σ 1999, pay close attention to the colors of their component stars. Xi

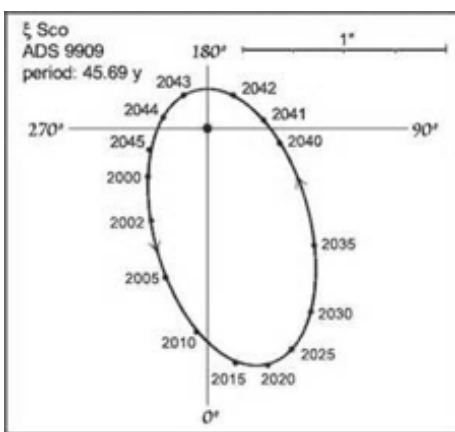
Scorpii A and B are F-type stars, while C is a cooler G8 dwarf. Both Σ 1999 stars have K spectral classes. What colors do you see?



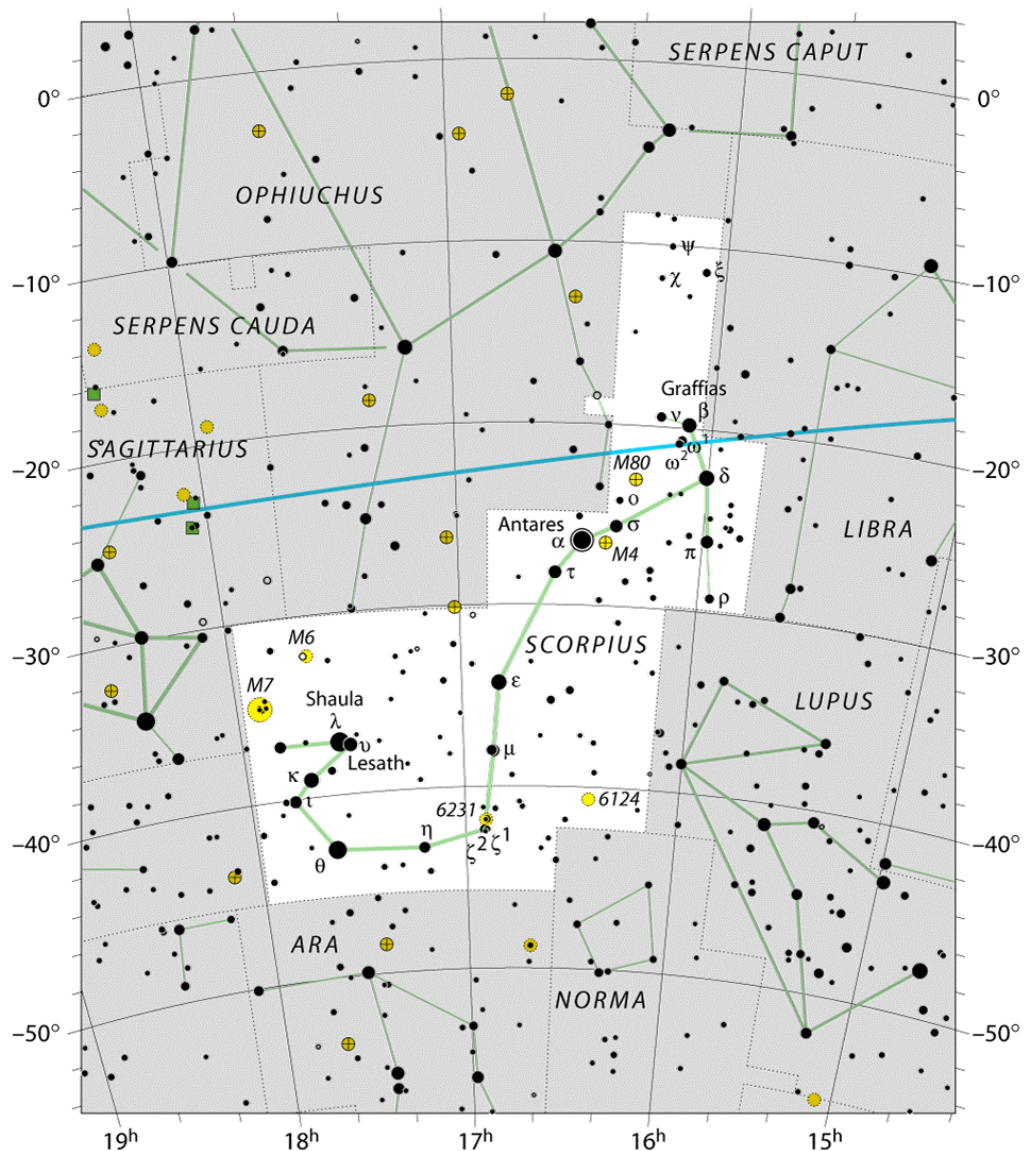
Glenn Chaple is a member of the Amateur Telescope Makers of Boston, American Association of Variable Star Observers, and contributes the monthly "Observing Basics" column for Astronomy Magazine. See more at <http://theskyscrapers.org/glenn-chaple>



Sketch by Jeremy Perez (www.perezmedia.net)



www.dibonsmith.com





No Surprise! Earth's Strongest Gravity Lies Atop The Highest Mountains

by Ethan Siegel

Put more mass beneath your feet and feel the downward acceleration due to gravity increase. Newton's law of universal gravitation may have been superseded by Einstein's, but it still describes the gravitational force and acceleration here on Earth to remarkable precision. The acceleration you experience is directly proportional to the amount of mass you "see," but inversely proportional to the distance from you to that mass squared.

The denser the mass beneath your feet, the stronger the gravitational force, and when you are closer to such a mass, the force is even greater. At higher elevations or even higher altitudes, you'd expect your gravitational force to drop as you move farther from Earth's center. You'd probably also expect that downward acceleration to be greater if you stood atop a large mountain than if you flew tens of thousands of feet above a flat ocean, with nothing but ultra-light air and liquid water beneath you for all those miles. In fact this is true, but not just due to the mountain's extra mass!

Earth is built like a layer-cake, with the less dense atmosphere, ocean, and crust floating atop the denser mantle, which in turn floats atop the outer and inner cores of our planet. An iceberg's buoyancy is enough to lift only about one tenth of it above the sea, with the other nine tenths below the surface. Similarly, each and every mountain range has a corresponding "invisible mountain" that dips deep into the mantle. Beneath the ocean floor, Earth's crust might

be only three to six miles thick, but it can exceed 40 miles in thickness around major mountain ranges like the Himalayas and the Andes. It's where one of Earth's tectonic plates subducts beneath another that we see the largest gravitational anomalies: another confirmation of the theory of continental drift.

A combination of instruments aboard NASA's Gravity Recovery and Climate Experiment (GRACE) satellites, including the SuperSTAR accelerometer, the K-band ranging system and the onboard GPS receiver, have enabled the construction of the

most accurate map of Earth's gravitational field ever: to accelerations of nanometers per second squared. While the mountain-tops may be farther from Earth's center than any other point, the extra mass of the mountains and their roots – minus the mass of the displaced mantle – accounts for the true gravitational accelerations we actually see. It's only by the grace of these satellites that we can measure this to such accuracy and confirm what was first conjectured in the 1800s: that the full layer-cake structure of Earth must be accounted for to explain the gravity we experience on our world!

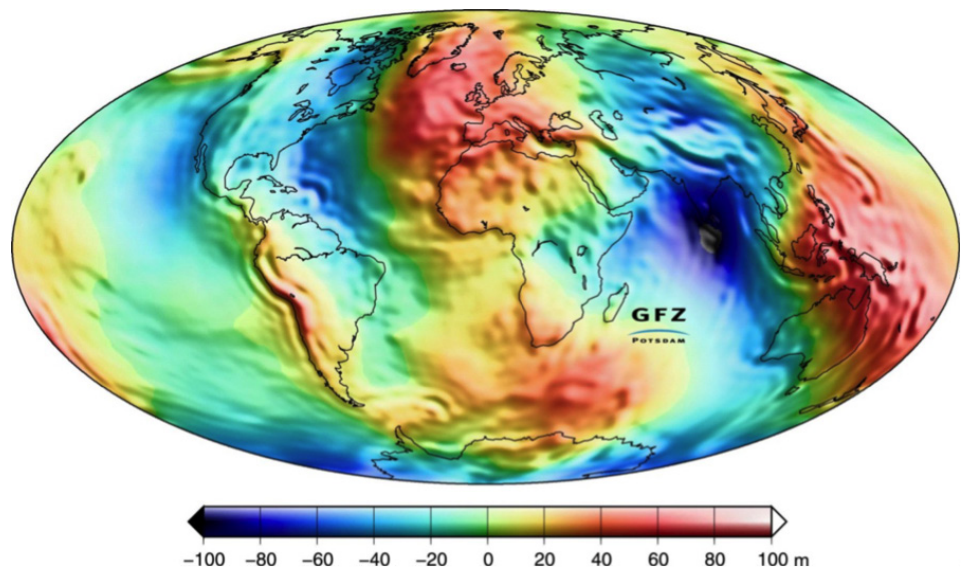


Image credit: NASA / GRACE mission / Christoph Reigber, et al. (2005): An Earth gravity field model complete to degree and order 150 from GRACE: EIGEN-GRACE02S, *Journal of Geodynamics* 39(1), 1-10. Reds indicate greater gravitational anomalies; blues are smaller ones.

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