



the Skyscraper

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March 2015

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

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Friday, March 6, 6:00pm at Cormack Planetarium

Planetarium Presentation by Renee Gamba

When did you last visit the Maribelle Cormack Planetarium? If it's been a while, you may be in for a terrific surprise. Renee Gamba, Planetarium Director, has invited Skyscrapers, Inc., to come and enjoy an evening there Friday, March 6th, at 6:00 P.M. In addition to the Zeiss projector's incredible star images, the magic of Warped Media's all-sky projection system will take you away from the Earth, to the depths of space. Come to view one of the state's great astronomical teaching facilities.

The Cormack Planetarium is located in the Museum of Natural History, Roger Williams Park.

Upcoming Meetings

April 3	Jay Dickson, Brown Geology Dept.	Research in Antarctica to study water/ice characteristics on Mars
May 1	Alan Sliski	A progress report on the refurbishment of an 8" Alvan Clark and Warner Swasey mount
June 5	Steven Carey, URI Graduate School of Oceanography	A study of volcanic and tectonic processes on Earth and the planets of the solar system
July 11	Alex Bergemann	The design and fabrication of the Seagrave Gazebo as a project to fulfil Eagle Scout
August 1	Richard Parker, ASGH and Skyscrapers	Comparison of fashioning an optical mirror and a doublet lens

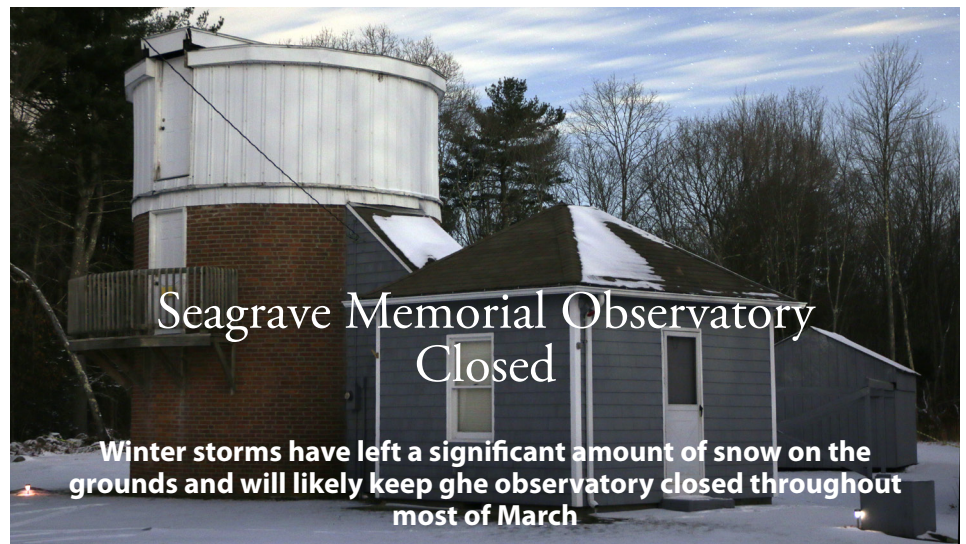
Phases of the Moon

Full Worm Moon
March 5 18:05

Last Quarter Moon
March 13 17:48

New Moon
March 20 09:36

First Quarter Moon
March 27 07:43



Seagrave Memorial Observatory Closed

Winter storms have left a significant amount of snow on the grounds and will likely keep the observatory closed throughout most of March



President's Message

Bob Horton

This has been the snowiest winter I can recall since experiencing the blizzard of 1978. Cold temperatures, and snowstorm after snowstorm have really piled up the snow to record depths. Unfortunately, this has meant that Seagrave Observatory has remained closed throughout the winter, and we will have to wait some time yet for all of this snow to melt before we can meet up again at the observatory.

The good news is that spring will be here soon, arriving on March 20th. While it may seem doubtful that all of the snow will be gone by then, we will be definitely getting closer to that time when we can get together at Seagrave Observatory, welcomed by the chorus of Peepfrogs singing in the pond nearby. For many of us, when we hear that sound, then we truly know that spring has arrived.

At recent meetings of the Board of Directors, we have been discussing what activities we should plan for this spring. A number of members expressed that we should help beginners more, providing guidance in exploring the hobby of stargazing with more basic programs to suit that need. I have to agree that this is something that is often overlooked.

Although our membership has grown over the last several years, there has been a trend in seeing people join for the first

time, only to not renew their membership the following year. I think Skyscrapers has a lot to offer, both in the astronomical expertise of many of our members, and the facilities and equipment available to our membership. But it is likely that the focus of our activities and the programs we have been offering has been more beneficial to our more experienced members, and not the beginners.

The discussion concerning these matters led to some great ideas from a number of you, and it was wonderful to hear that so many of you willing to offer running workshops geared towards those looking for help getting started in this wonderful hobby.

Francine Jackson has agreed to lead the effort to coordinate a series of weekly workshops that will begin on May 2nd. The topics will include identifying constellations, how to use a telescope, eyepiece selection, basic astrophotography using smart phones and digital cameras, observing deep sky objects, planetary observing, and much more. We also plan to offer some more advanced workshops, too, such as CCD imaging and image processing, and spectroscopy.

These workshops will be offered on Saturdays, about an hour or two before we open to the public. Many of these workshops will be offered whether the sky is clear or not.

We will have a schedule ready for the next newsletter. If you can think of a topic you would like covered, please let me know. I hope that many of you will enjoy attending these workshops, both to learn something new, but also for the fun of spending time with your fellow stargazers.



Trustee Tom Thibault, has been working to recruit new members into the organization. As you can see his granddaughter Olyvia appears to have an interest in our solar system neighbors.



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 **March 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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Friday, March 13

Double Feature at the University of Rhode Island Planetarium

University of Rhode Island Planetarium
Upper College Road
Kingston, RI

Friday, March 13th, 2015
6:00 and 7:00 P.M.

Contact: Francine Jackson: 401-527-5558

The old and the new will be shown Friday, March 13th, 2015, when the 1960s Professor Philip Morrison's award winning "Powers of 10" will be presented. Originally just a short black-and-white skit on how quickly distances change at each exponen-

tial increase, the planetarium's showing features extras by Physics Lab Manager Steve Pellegrino, resulting in an all-sky version of this science classic.

Also that night, the URI Planetarium will debut another short program, on the latest information about galaxies. From the micro universe to the macro universe, this presentation will be a unique planetarium experience.

This program, for the general audience, will be preceded by a short program, Losing the Dark on light trespass, and then will be followed by a live presentation on the Sky above the URI Campus. Admission is



just \$5.00, to benefit the URI Planetarium Fund.

The University of Rhode Island Planetarium is available for programs of many varied topics of astronomical interest. For more information, please call 401-527-5558.

The Sun, Moon & Planets in March

The month of March sees the sun moving northerly along the ecliptic at its greatest rate, reaching equinox on the 20th at 18:45 EDT, where it will be at declination 0° when all points on Earth will experience roughly equal periods of day and night. And speaking of time, we move to Daylight time on Sunday, the 8th, when the annual tradition of "spring ahead" brings us to 4 hours behind Coordinated Universal Time (UTC).

The Moon begins March as a waxing gibbous, passing Jupiter on the 2nd, and reaching its Full Work Moon phase on the 5th. Watch for the waning gibbous Moon to pass within 1.25° of Saturn on the 12th. Last quarter occurs on the 13th and the slender waning crescent can be seen well above and to the right of Mercury on the morning of the 18th.

New Moon occurs on the 20th, which presents the most ideal opportunity for conducting a Messier Marathon this year, and since the angle of the ecliptic intersecting the western horizon at sunset is still rather steep, this is still prime viewing time for the very young Moon. After the Sun sets on the 20th, there is an opportunity to spot a 14 hour old Moon. A low western horizon and very clear sky are required, however the following night the still thin crescent Moon will present a significant display of Earthshine against the deepening twilight, while Mars shines just 1° away. The follow-

ing evening, on the 22nd, the Moon joins brilliant Venus about 3° away. The widening crescent Moon enters the Hyades cluster in Taurus on the 24th, and finally the first quarter phase occurs on the 27th.

Mercury spends the entirety of March passing through a fairly low and unfavorable elongation west of the Sun, visible just before sunrise.

Venus dominates the early evening sky, climbing higher in the west as the month progresses, with some notable alignments and conjunctions along the way. Starting on March 1st, Venus lies in a line between Uranus and Mars, nearly equidistant (just over 3°) between the two. A few nights later, on the 4th, Venus is very close to Uranus, passing about 1/4° above the distant ice giant. Keen-eyed observers will probably note the changing position of Venus with respect to Uranus over the course of an hour or so. The moon joins up with Venus on the 22nd, which at a distance of about 3° is not as close as last month, but should be worth watching regardless.

Mars remains visible throughout the entire month as it slowly sinks lower into the evening twilight. It joins Uranus (1/3°) on the evening of the 12th, and the waxing crescent Moon (1°) on the 21st.

Jupiter retains its prominent position between Cancer and Leo and is the planet to watch throughout the night. The Moon passes Jupiter on the 2nd and again on the

29th.

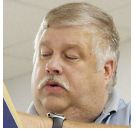
Saturn is now in a very favorable position high in the southwest in the predawn sky, residing above the claws of Scorpius. By the end of the month, Saturn will transit before the onset of morning twilight. Watch for the waning gibbous Moon to pass just over 1° above Saturn on the 12th.

Uranus is being rapidly consumed by evening twilight throughout March but has noteworthy pairings with Venus and Mars.

Neptune is very low in the eastern sky before sunrise.

Dwarf planet Ceres is located in eastern Sagittarius and can be seen low in the southeast in the predawn sky.





Reason for the Season(s)

Dave Huestis

Folklore tells us that March comes in like a lion and goes out like a lamb. While March is meteorologically a spring month, here in New England and other mid-latitude locations throughout America, it is still cold and snowy when it commences and much milder and rainy at month's end. Hence the comparison to the ferocity of a lion and the tranquility of a lamb. However, this explanation, attributed to the early American Colonists, is not globally applicable. We must turn to astronomy for a more inclusive answer.

It's really quite simple. When March begins, the constellation Leo the lion is rising above the eastern horizon just after sunset, and at month's end Aries the ram can be found setting below the western horizon at sunset. This sky clockwork has not appreciably changed for thousands of years. Our ancestors observed the appearance of these star patterns and ascribed significance to their seasonal arrival and departure in the sky.

Most everyone links the weather with seasonal changes. However, through my decades of public outreach and teaching astronomy, I know many folks are misinformed as to the reason for the season(s). Some individuals believe the northern hemisphere summer is hot because the Earth is closest (perihelion) to the Sun at that point in its orbit. Quite the opposite is true. Earth is at perihelion (approximately 91,000,000 miles) in early January, while farthest (aphelion) from the Sun at the beginning of July (approximately 94,000,000 miles). Even this three million mile difference has little effect on the Earth and its environment. The seasonal changes are the result of the Earth's axial tilt as it orbits the Sun.

Have you ever noticed how high the Sun arcs across the sky during the summer, or how low it arcs during the winter? It's an astronomical cycle that only requires one's eyes to observe, plus a one year commitment of time. I'm sure you've noticed the Sun rising or setting at various locations along your horizon during the year. One month it may be rising or setting directly in front of you as you drive down a particular road, while at other times it may be either north or south of that same position. Astronomy provides the answers.

Here are some important facts to remember: The Sun does not physically move across the sky. For this discussion, the Sun essentially rotates in space at a fixed position. The Earth (and all the other bodies of the solar system) orbit about it. Because the Earth rotates from west to east on its axis, the Sun appears to rise in the east and set in the west. If you could sit high above the Earth's north pole, our planet would rotate counterclockwise beneath you. Also, the Earth's poles are tilted $23 \frac{1}{3}$ degrees from the perpendicular and always point at the same fixed position in space. (During the nighttime hours we can observe the stars rotating around that point near the pole star Polaris.) In addition, there is an imaginary line in space called the celestial equator, an extension of the Earth's equator projected onto the sky.

Therefore, when the Earth orbits the Sun, the north and south poles are alternately tilted towards or away from it. The following video will help you to understand this orbital motion (<https://www.youtube.com/watch?v=NweLxtmnzv4>). The apparent effect in our sky is that the Sun appears to move north and south throughout the year. How high or low the Sun appears at local noon time depends entirely on one's geographic latitude. See the accompanying diagram, created specifically for Rhode Is-

land, illustrating the Sun's position on the dates of the four seasons.

Since we are astronomically experiencing winter, let that be our starting point to explore the annual progression of the seasons from our northern hemisphere perspective here in Rhode Island.

When the north pole is tilted away from the Sun, the northern hemisphere experiences winter while the southern hemisphere experiences summer. On December 20th or 21st, the Sun is as low in the sky as it can get. This event is called the winter solstice. Since the pole is tilted $23 \frac{1}{3}$ degrees, a person standing on the Earth at latitude $23 \frac{1}{3}$ degrees south will see the Sun pass directly overhead at local noon. This line of latitude is called the Tropic of Capricorn, and it can be found on most Earth globes.

After the moment of winter solstice, the Sun then begins its welcome migration northward as the north pole begins tilting more towards the Sun. When it crosses the celestial equator, spring begins in the northern hemisphere. Occurring on March 20th or 21st, this event is called the vernal equinox. Equinox means equal day and night, for each of Earth's hemispheres receives equal sunlight. A person standing on the Earth's equator will see the Sun pass directly overhead at local noon. On this date the Sun rises due east and sets due west—

Sun's varying seasonal altitude above the southern horizon at local noon as seen from Rhode Island.

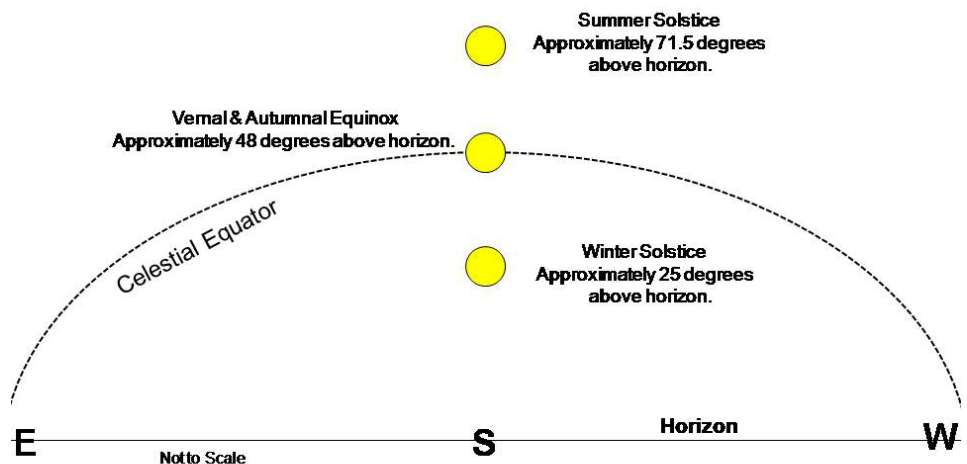


Diagram by Dave Huestis

an ideal time to determine what direction east/west is without using a compass.

As the Earth continues along in its orbit, the Sun moves northward until it reaches its highest position in the sky on June 20th or 21st, the summer solstice. The north pole is then tilted at its maximum toward the Sun. And since the pole remains at a fixed tilt of $23\frac{1}{2}$ degrees, a person standing at latitude of $23\frac{1}{2}$ degrees north on the Earth's surface will see the Sun pass directly overhead at local noon. This line of latitude can be found on any Earth globe...it's called the Tropic of Cancer.

After the summer solstice the Sun will begin moving southward in the sky, the result of the north pole beginning its tilt away from the Sun. On September 22nd or 23rd the Sun once again crosses the celestial equator, signaling the autumnal equi-

nox—the beginning of fall for the northern hemisphere. For the second time in the year, day and night are of equal length.

And finally to complete the one year cycle, the Sun will continue its southern migration in our sky until December 20th or 21st, when winter begins in the northern hemisphere once again.

So now that you have a better understanding of how the Earth's axial tilt and orbit about the Sun affects the Sun's seasonal position in the heavens, keep your "eye to the sky" and note its north and south migration during the course of a year. Become more aware of the sky events around you that most people either don't understand or simply take for granted.

Though you will not require a telescope to welcome in the spring season, there are still many astronomical delights to ob-

serve at Rhode Island's fine observatories during any season. Seagrave Memorial Observatory (<http://www.theskyscrapers.org>) in North Scituate is open to the public every clear Saturday night. Also, Ladd Observatory (<http://www.brown.edu/Departments/Physics/Ladd/>) in Providence is open every clear Tuesday night. Frosty Drew Observatory (<http://www.frostydraw.org/>) in Charlestown is open every clear Friday night year-round. And don't forget 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. Be sure to check all the websites for the public night schedules and opening times before visiting these facilities.

Keep your eyes to the skies.



Year of the Dwarf Planets Dawn Arrives at Ceres

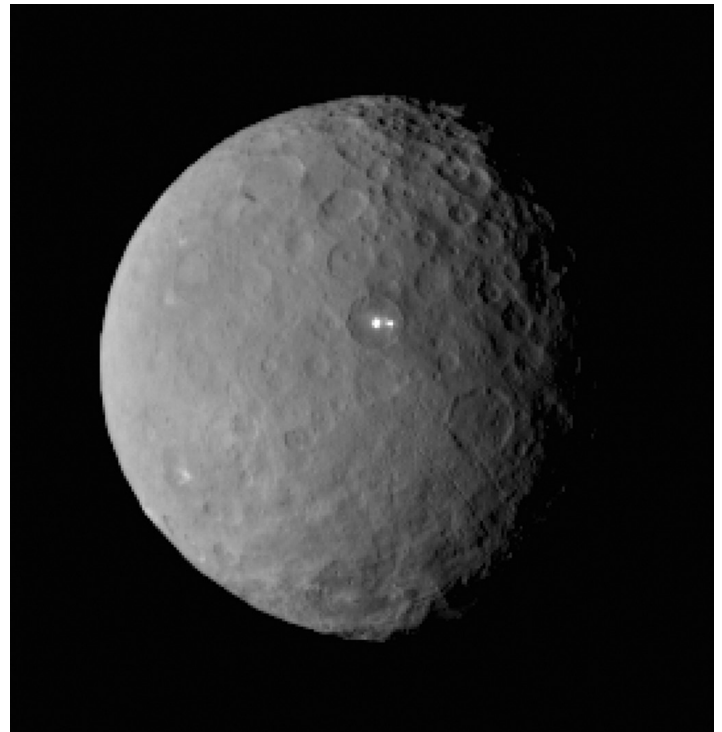
Francine Jackson

Can you believe it's been four years since we first started thinking Vesta Fiesta, when little space craft Dawn approached, then began to orbit, our fourth discovered asteroid, Vesta? After one year of discovery, we have images of this bright member of the asteroid belt such as could never have been gotten from Earthbound telescopes.

And, now, the scene has shifted. After a three-year voyage through the asteroid region, Dawn is now ready to begin another yearlong session, at what is now one of our five dwarf planets: Ceres, the first discovered in this region, and the largest within this part of our solar system.

Ceres was first observed in 1801 by Guiseppe Piazzi, who believed he had found the "missing" planet, the object that closed the mathematics chart first proposed by Titius of Wittenberg in 1766. But, then, other objects became known within that separation between Mars and Jupiter – the next three also by telescope, then the explosion of discoveries courtesy of photography. Although Ceres continued to be the largest body found there, its diameter was too small to keep the title of planet, so it became known, at about 590 miles in diameter, as the largest asteroid, at least until last decade, when it became promoted to dwarf status.

Already the images are flowing from Ceres. Dawn has arrived at the vicinity, and is working toward mapping the entire body, much as it did with Vesta. In addition to its topographic mapping, Dawn is equipped with instrumentation to measure its gravitational field, its mineralogical composition, and any gamma ray and neutron presence. It is hoped the exploration of Ceres will be another step forward in our knowledge of the beginning of our solar system.



This image was taken by NASA's Dawn spacecraft of dwarf planet Ceres on Feb. 19 from a distance of nearly 29,000 miles (46,000 kilometers). It shows that the brightest spot on Ceres has a dimmer companion, which apparently lies in the same basin. Dawn is due to be captured into orbit around Ceres on March 6. Image credit: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA

On Friday, February 20 under clear skies and record cold temperatures, the waxing crescent Moon joined Venus and Mars for a spectacular conjunction in the western sky.



Steve Hubbard



John Leonelli



Jim Hendrickson

Jupiter with a 6 inch F 10 refractor and a ZWO ASI120MC by Steve Hubbard. 2X barlow, processed with AS2! and registax. Ganymede is the spot to the right, it's shadow is the spot on the left.



Jupiter & Moons by Steve Hubbard. Friday night, February 27



Io >

Ganymede >

Europa >



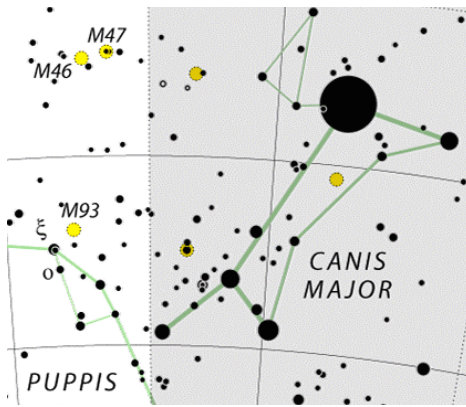
Moons by Steve Hubbard.
February 27 2015



Open Cluster in Puppis Messier 47 (NGC 2422)

Glenn Chaple

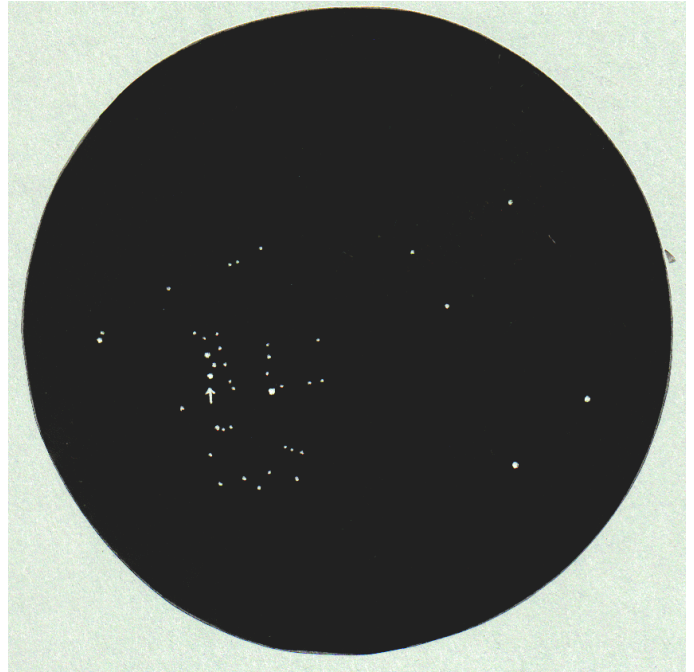
Last March, we explored the open star cluster Messier 46 in Puppis. This time around, we turn our telescopes 1 ½ degrees westward to another Puppis cluster – M47. For nearly two centuries, this was one of Messier’s “missing” objects. It was originally discovered by the Italian astronomer Giovanni Battista Hodierna – a forerunner of Messier. Hodierna reported it in a treatise on comets and “admirable objects of the sky,” published in 1654. Hodierna’s work was unknown to Messier who independently discovered the cluster on February 19, 1771. Messier made an error in plot-



ting its position, and the mistake wasn’t rectified until the mid 1900s.

At magnitude 4.4 and having the apparent width of a full moon, M47 is visible to the unaided eye under dark-sky conditions. It’s a fine sight in binoculars and rich-field scopes, which capture M46 as well. While the latter appears as a hazy patch, M47 has an almost Pleiades-like look. Even a small scope will pick up several dozen cluster members.

Like M46, which houses the planetary nebula NGC 2438, M47 is home to a deep-sky delight of its own. Near its center is the pretty double star Struve (STF) 1121 – a pair of white magnitude 7.0 and 7.3 stars separated by 7.4 arc-seconds. STF 1121 is well resolved when



M47 is viewed with magnifications of 50X and up.

M 47 is approximately 1600 light-years away and has a true diameter of 12 light-years.



The Lunar Straight Wall, also known as Rupes Recta, is a fault feature which becomes prominently visible just after the First Quarter phase of the Moon. Photo by Steve Hubbard on February 27.



The heavyweight champion of the Cosmos

By Dr. Ethan Siegel

As crazy as it once seemed, we once assumed that the Earth was the largest thing in all the universe. 2,500 years ago, the Greek philosopher Anaxagoras was ridiculed for suggesting that the Sun might be even larger than the Peloponnesus peninsula, about 16% of modern-day Greece. Today, we know that planets are dwarfed by stars, which themselves are bound together by the billions or even trillions into galaxies.

But gravitationally bound structures extend far beyond galaxies, which themselves can bind together into massive clusters across the cosmos. While dark energy may be driving most galaxy clusters apart from one another, preventing our local group from falling into the Virgo Cluster, for example, on occasion, huge galaxy clusters can merge, forming the largest gravitationally bound structures in the universe.

Take the "El Gordo" galaxy cluster, catalogued as ACT-CL J0102-4915. It's the largest known galaxy cluster in the distant universe. A galaxy like the Milky Way might contain a few hundred billion stars and up to just over a trillion (10¹²) solar masses worth of matter, the El Gordo cluster has an estimated mass of 3×10^{15} solar masses, or 3,000 times as much as our own galaxy! The way we've figured this out is fascinating. By seeing how the shapes of background galaxies are distorted into more elliptical-than-average shapes along a particular set of axes, we can reconstruct how much mass is present in the cluster: a phenomenon known as weak gravitational lensing.

That reconstruction is shown in blue,

but doesn't match up with where the X-rays are, which are shown in pink! This is because, when galaxy clusters collide, the neutral gas inside heats up to emit X-rays, but the individual galaxies (mostly) and dark matter (completely) pass through one another, resulting in a displacement of the cluster's mass from its center. This has been observed before in objects like the Bullet Cluster, but El Gordo is much younger and farther away. At 10 billion light-years distant, the light reaching us now was emitted more than 7 billion years ago, when the universe was less than half its present age.

It's a good thing, too, because about 6

billion years ago, the universe began accelerating, meaning that El Gordo just might be the largest cosmic heavyweight of all. There's still more universe left to explore, but for right now, this is the heavyweight champion of the distant universe!

Learn more about "El Gordo" here: <http://www.nasa.gov/press/2014/april/nasa-hubble-team-finds-monster-el-gordo-galaxy-cluster-bigger-than-thought/>

El Gordo is certainly huge, but what about really tiny galaxies? Kids can learn about satellite galaxies at NASA's Space Place <http://spaceplace.nasa.gov/satellite-galaxies/>.



Image credit: NASA, ESA, J. Jee (UC Davis), J. Hughes (Rutgers U.), F. Menanteau (Rutgers U. and UIUC), C. Sifon (Leiden Observatory), R. Mandelbum (Carnegie Mellon U.), L. Barrientos (Universidad Catolica de Chile), and K. Ng (UC Davis). X-rays are shown in pink from Chandra; the overall matter density is shown in blue, from lensing derived from the Hubble space telescope. 10 billion light-years distant, El Gordo is the most massive galaxy cluster ever found.



NACA at 100

Jim Hendrickson

March 3, 2015 marks the 100th anniversary of the founding of the National Advisory Committee for Aeronautics. The now defunct federal research agency was created before America's entry into the First World War in response to the superior aeronautical capabilities of its European counterparts.

Throughout its early years, facilities such as aerodromes and wind tunnels were constructed and aeronautical technology advanced

significantly. Much of this research helped America and the Allied Forces achieve victory in World War II despite the Axis powers having superior aerospace technology.

Following the Second World War NACA research extended the capabilities of supersonic flight and rocket propulsion, including many of the notable X-plane projects. NACA and its personnel were the recipients of several coveted Collier Trophies, including for the Bell X-1, the first supersonic aircraft. Heading into the 1950s the agency's research began to include spacecraft systems and spaceflight.

NACA was disbanded in 1958 and its personnel, facilities and projects were folded into



the newly formed National Aeronautics and Space Administration that we still know today. NASA continues the legacy started within NACA not only with the spaceflight programs, but with ongoing research projects advancing flight technologies including hypersonic flight, improved navigation systems, more efficient propulsion and wing designs, and unmanned aircraft.



Secretary
Tina Huestis

Skyscrapers February Meeting Meeting Minutes 2/6/15

President Robert Horton called the Skyscrapers' February meeting to order at 7:30 p.m.

President, Robert Horton: Bob welcomed everyone and explained that the business meeting will be followed by the evening program. He noted that the business meeting is expected to be short, since the organization conducts most of its business during its Board meetings. Bob encouraged all members to attend those Board sessions.

Treasurer, Linda Bergemann: Linda said that there were no new members. She also noted that Chris Martel and Jim & Pamela Wallace were not present, so they will be voted on at the next meeting in which they are in attendance.

Trustee, Tom Thibault: Tom reported that the structure comprising the Observatory's slit was rotten (side plywood panels) and needs to be replaced with something more durable. He explained that, although the building may still be functional, the repair should be addressed now. He intends to make an effort to visit the grounds and see first-hand what that would entail. • Con-

rad informed all present that the Seagrave buildings/property would be closed until spring, since the long-range forecast is not likely to include any melting of the snow and ice. • Bob said that he plans to have the driveway area (immediately in front of the chain) plowed in order to allow for emergency access to the property.

Public Relations Chair, Francine Jackson: Bob introduced Francine, who has volunteered to organize a series of beginners' programs covering the basics in astronomy. The first workshops will be held in the spring and will be repeated again in the summer and fall. • Francine mentioned that she is looking for volunteers to help with these workshops and also invites members to express what topics they'd like to see offered. These workshops are expected to run on the Saturday nights, from 6:00 – 7:00 p.m., just prior to the public open night start times. • Already in the planning stages are: "The Sun," "The Night Sky," "Binocular Astronomy," and "The Telescope." • Francine noted upcoming URI planetarium shows, including one on March 13 that will be a 'new twist' on powers of ten.

President, Robert Horton: Bob reported that Ed Haskell will be the Chair of this year's Nominating Committee. Conrad Cardano and Tom Thibault will assist Ed in assembling a slate of officers for the upcoming elections. The ballot will be sent out to members prior to the April meeting. Anyone who is interested, or knows someone who might be, should get in contact with these members of the Nominating Com-



Treasurer
Linda Bergemann

Cash Flow YTD as of February 20, 2015 (4/1/14 through 02/20/15)

INFLOWS

AstroAssembly	
Banquet	\$1,475.00
Centennial Mugs	\$145.00
Grill	\$397.25
Raffle	\$539.00
Registration	\$1,755.00
TOTAL AstroAssembly	\$4,311.25
Donation	
Misc Donation	\$873.37
Refreshment Donation	\$44.00
TOTAL Donation	\$917.37
Dues	
Contributing	\$35.95
Family	\$120.00
Junior	\$15.00
Regular	\$840.55
Senior	\$347.90
TOTAL Dues	\$1,359.40
EAGLE Project In	\$970.00
Misc Income	
Book Income	\$106.00
Interest Inc	\$31.07
Sale of Items	\$660.00
TOTAL Misc Income	\$797.07
Star Party Donations	\$533.00
Subscription Income	
Astronomy	\$68.00
Sky & Telescope	\$65.90
TOTAL Subscription Income	\$133.90
TOTAL INFLOWS	\$9,021.99

OUTFLOWS

Astro Assem Exp	
Banquet	
Caterer	\$1,121.00
Reception	\$108.30
TOTAL Banquet	\$1,229.30
Centennial Postcard	\$85.60
Grill	\$180.37
Refreshments	
Friday PM	\$7.98
Saturday AM	\$2.02
TOTAL Refreshments	\$10.00
Speaker Fee	\$300.00
Tent Rental	\$720.00
TOTAL Astro Assem Exp	\$2,525.27
Contingency	
Speakers Fees	\$200.00
TOTAL Contingency	\$200.00
Corporation, State Fee	\$20.00
EAGLE Project Out	\$970.00
Postage and Delivery	\$24.15
Presidential Fund	\$40.00
Printing and Reproduction	\$10.70
Property Insurance	\$2,386.00
Refreshment Expense	\$182.64
Subscription Payments	
Astronomy	\$68.00
Sky & Telescope	\$65.90
TOTAL Subscription Payments	\$133.90
Trustee Expense	
Capital Equipment	\$222.33
Property Maintenance	\$3,298.65
TOTAL Trustee Expense	\$3,520.98
Utilities	
Electric	\$200.23
Porta-John	\$693.00
Propane	\$80.25
TOTAL Utilities	\$973.48
TOTAL OUTFLOWS	\$10,987.12
OVERALL TOTAL	(\$1965.13)

Cash and Bank Accounts - As of 02/20/15

Capital One Bank	\$12,369.54
Cash	\$0.00
Checking	\$10,253.60
PayPal	\$0.00
TOTAL Bank Accounts	\$22,623.14



Alan Hirshfeld



mittee.

Second Vice President, Steve Siok: Steve reported that March's program will be the Cormack Planetarium show at the Museum of Natural History. • He noted the following upcoming programs: April will be Dr. Jay Dickson, Brown University planetary geologist; May will be Alan Sliski, Antique Telescope Society member, who will speak about an Alvan Clark telescope circa 1910; June will be Steve Carey, URI professor of volcanology; July will be member Alex Bergemann, who will report on his Eagle Scout pavilion project; and August will be member Dick Parker, who will speak on the pros/cons of building mirrors vs. lenses. • Steve said to contact him if anyone has any thoughts for future programs.

First Vice President, Kathy Siok: Kathy gave an update on AstroAssembly 2015. She has reserved October 1st for the Community Center. • Kathy is also seeking ideas for speakers and topics. If anyone has any leads, please contact her.

For the good of the organization: Francine told the group that tickets are on sale now at PPAC for Neil deGrasse Tyson's September 24 program. She noted that several Skyscrapers members are planning to attend and suggests it might be possible to

arrange to meet before or after the show for a bite to eat. • Bob noted that on February 20 and 21, Venus and Mars will appear very close to the Moon in the sky, which should afford some beautiful views.

The meeting adjourned at 7:50. Submitted by Tina Huestis, Secretary.

Steve Siok introduced Alan Hirshfeld.

Speaker, Alan Hirshfeld presented "From Backyard to Mountaintop: Adventures of History's Best Worst Telescope." Alan Hirshfeld explained that he has spent more than a decade in conducting research devoted to understanding how astronomy became a modern science. His talk focused on Ainslie Common (1841–1903), who aspired to bring the use of cameras and photography (ubiquitous in the 1870s) to the field of astronomy. In 1877, Ainslie Common built an 18-inch equatorial reflector telescope in his backyard roll-off roof observatory in West London. But he needed a bigger telescope and installed a 37-inch, 9-ton Newtonian-style equatorial reflector in 1879. Using this scope, Ainslie took a ground-breaking, 60-minute exposure of the Orion Nebula in 1883 that astounded the community of professional astronomers. Alan Hirshfeld chronicled the ownership changes and relocation of Ainslie's mas-

sive telescope to Lick Observatory on Mt. Hamilton, California. Unfortunately, the scope did not flourish at Mt. Hamilton until Lick Director James Keeler took it on as a special project (1898). The original Ainslie mirror remains at Lick to this day, although the rest of the original instrument has long since gone.

Board of Directors Meeting Minutes 1/31/15

Attendees: Kent Cameron, Conrad Cardano, Ian Dell'Antonio, Joe Filocco, Jim Hendrickson, Bob Horton, Tina Huestis, Francine Jackson, Pat Landers, Bobby Napier, Tracy Prell, Kathy Siok, Steve Siok, and Tom Thibault.

Bob Horton, President: Bob called the meeting to order at 2:00 p.m. at the Greenville Public Library.

Bob presented the meeting agenda and raised the first topic of discussion, which was programs/workshops. • Bob explained that he wants the Board to address how to retain new members. He suggested that the Society may not be offering programming or experiences for someone new to the field of astronomy.

New Members Programming: The group began brainstorming what the ideal offering would be to attract/retain new members. • An earlier suggestion from Linda Bergemann was to run short classes before the Saturday public nights, to optimize use of the Observatory when members would already be scheduled to be present. • The Board discussed logistics for proposed Saturday programs and determined that the spring would be the best time to introduce this new series to the membership. It was also decided that the programs could repeat two or three times in the year, which would reduce the need to prepare new material and allow new members the opportunity to catch up on programs that they might have missed in the prior season. • Kathy reminded everyone about Roger Williams University's interest in having students help us by creating a series of four seasonal PowerPoint presentations. Adria Updike, assistant professor of physics at Roger Williams University, would curate the student's work. Perhaps these could be used in orientation sessions. • Tracy Prell suggested the idea of handouts. • The group brainstormed suitable topics for both new and intermedi-

ate knowledge levels (e.g., imaging workshop, binocular astronomy, constellation identification, how to use a telescope). • Joe expressed that when he bought an imaging device, he could have benefited from more experienced mentors helping him with advice and support. • Tom remarked that new members may believe that a benefit of joining an organization like Skyscrapers would be an expectation that they would receive guidance from more experienced observers. • Bobby introduced the idea of branching out with a greater Internet presence, (e.g., apps). He noted that the younger generation is much more motivated with imaging using the Internet versus visiting an Observatory. One example is “Astronomers Without Borders,” where clubs/organizations interact with counterparts in foreign countries and reciprocate using their instruments via online access. • Bob asked for a volunteer to spearhead the new members workshops. Francine agreed to coordinate this new initiative, with Steve & Kathy Siok and Jim Hendrickson offering to support her efforts. • The consensus on the topic of new members workshops is to use the wintertime to organize and recruit volunteers to develop the programs. Implementation would be April through June, with eight programs that would repeat in the summer and in the fall.

Collaboration with colleges/universities/citizen scientists: Bob moved to the next agenda topic and provided some background. Previously Brown University had sold its Jerimoth Hill dark-sky location and is exploring how to upgrade its observatory facilities. Their city location is light polluted and does not provide sufficient scale because it is relatively small for projects. • Ian elaborated on Brown’s need for spectroscopy and with broadband imaging. What is needed is a large instrument, in the 24-inch to 27-inch range, located in a dark-sky location that can be accessed remotely. Funding could be acquired via foundations/grants. Ian suggested that if Skyscrapers were interested, Brown would have week night usage of such a scope and Skyscrapers would have weekend usage. • Tom commented that there would be a number of unknowns that would have to be worked out. • The Board agreed to pursue this joint effort with Brown. Bob asked everyone to compile a list of their questions about this collaboration and send them to him. • Kathy suggested that an advantage to Skyscrapers would be in having Internet on the property again. Bobby reminded

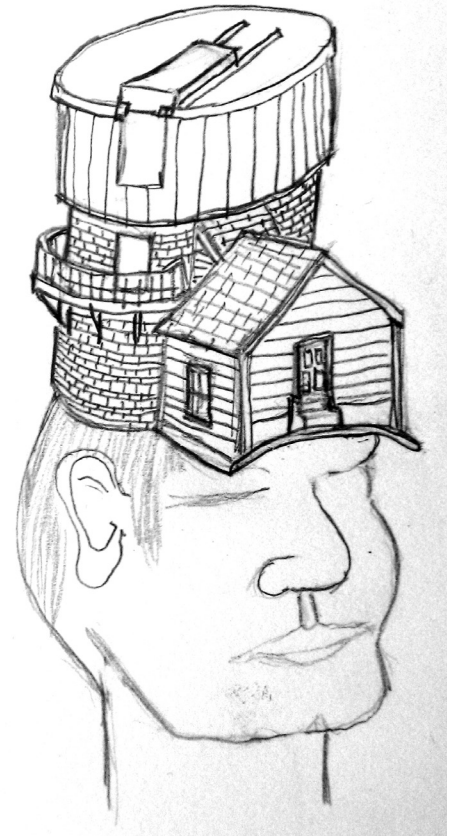
everyone that Skyscrapers had Internet previously through Brown. Ian said that he would look into whether or not that Internet connection could be re-established. • A related discussion arose about joining NASA’s Fireball Meteor Network. Skyscrapers would need to install an all sky camera with Internet access. It was noted that the ATMs clubhouse participates in this network.

Nominations due by March: Bob raised the next agenda item, which was nominations. He announced that Ed Haskell agreed to be Chair of the Nominating Committee. Bob is looking for two more people to be on that committee.

Miscellaneous: Conrad reported that due to the amount of snow at Seagrave, the Observatory will not open again until March. • Bob said that he has lined up someone to plow a space to allow for a few cars • with the understanding that this snowplowed area would only be for Board-related access (e.g., checking on security of the buildings). • Steve Siok alerted everyone that a more substantial snow load on the Observatory could affect the flashing/aluminum covering on the roof. It was noted that there is rotting plywood in the Observatory slit. • Francine updated everyone that the spacecraft Dawn will be reaching Ceres. • Francine also reported that in April there will be an exhibit at the Roger Williams Museum of Natural History on small bodies in the solar system (on the upper floor). • She also noted that 2015 is the “Year of Light” and that a traveling exhibit about this event will be in Framingham in October. The exhibit has an open availability for the November/December time slot. Francine posed the question whether or not Skyscrapers could collaborate, or perhaps the Museum, Brown University, or even the Children’s Museum as a possible host site. • Francine reminded the group that the Hubble Telescope grant deadline is in April, if Skyscrapers is interested in submitting paperwork for a mission using the Hubble Telescope. • Francine informed the Board that on September 24, Neil DeGrasse Tyson will be at PPAC. Some members have bought individual tickets. It might be nice if those attending could meet for dinner beforehand. • Kathy noted that the April meeting will be held on the second Friday night, since Good Friday falls on the first Friday of that month. And she reminded everyone that the March monthly meeting will be held at the Planetarium at the Roger Williams Museum at 6:00

p.m. • Kathy reminded the group that she is seeking someone to take over the refreshments. Bob offered to handle the coffee set up and Kathy agreed to continue providing the cookies.

Submitted by Tina Huestis • Secretary



During our 2014 AstroAssembly convention, Skyscrapers celebrated the Centennial Anniversary of Seagrave Memorial Observatory. To commemorate this achievement Dave Huestis and Jim Hendrickson produced a 2014 calendar, a postcard, and a mug showing the observatory throughout its 100 year old history. Other ideas for centennial merchandise were pondered, but they never came to fruition.

During the next few months we would like to share those unrealized products with you.

#1 Inspired by the recovery of Frank Seagraves' iconic hat in 2010, Tom Thibault designed the Seagrave Memorial Observatory baseball cap.



M3: 5 X 300 Images, capture and calibrated with Maxim DL
Post processing with Pixinsight. Photo by Lloyd Merrill

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