



# the Skyscraper

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

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## Annual Meeting Saturday, April 1 at Seagrave Memorial Observatory

In-person and on Zoom (Contact Linda Bergemann ([lbergemann@aol.com](mailto:lbergemann@aol.com)) for the Zoom link.

After four months away, we return to Seagrave for our Annual Meeting and Election of Officers, followed by two short presentations by one of our members.

Facilities will open at 6 PM for socializing before the meeting. At 7 PM, we will begin our business meeting, followed by our speaker.

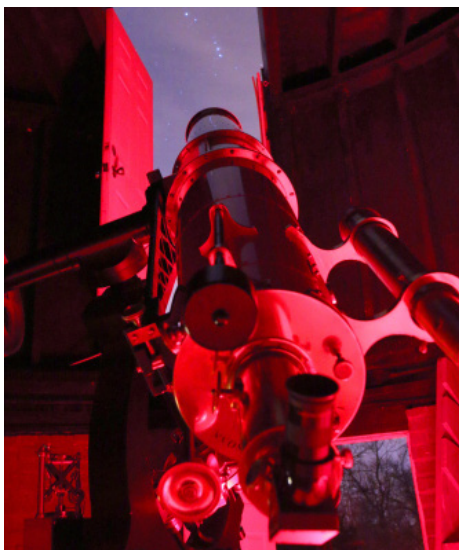
### Business

Reports  
Election of Officers  
Voting on Tommy Tse as Honorary Member  
For the Good of the Organization

**Stephen LaFlamme** held up a pair of binoculars during the summer of '78 and "discovered" the crescent shape of Venus. This spectacle led to his lifelong passion for backyard astronomy. Reaching the point in high school where a career path had to be chosen, Stephen wanted to pursue astronomy. His Dad, who was paying for college, wanted him to be a pharmacist. So, while consuming his days counting pills for Walgreens, he spent his nights under the con-

stellations with wonder. He designed and built a backyard dome some 25 years ago. Astrophotography rose to the forefront as local light pollution grew worse each year. Artificial light glow can be subtracted by software. A sampling of this work can be found under Universefromthebackyard on [Facebook](#) or [Instagram](#). Stephen has many tales to share about owning meteorites, and a piece of the moon. His day spent with John Dobson. Being 'visited' by his deceased astronomy mentor one night at his observatory. And an amusing anecdote about a failed Astronomy Club start-up. Having retired three years ago and with no alarm clock to set, Stephen now takes full advantage of every opportunity to study the stars.

Stephen will provide us with two short presentations. First, he will review a recent project where he was able to locate and take images of the James Webb Space Telescope from his backyard as it goes about its business nearly one million miles from earth. Second, he will introduce a new vocabulary word, pareidolia, and it's longtime role in visual astronomy.



**Seagrave Memorial  
Observatory  
Open Nights**  
April 8, 15, 22 & 29  
@ 8pm



# President's Message

by Linda Bergemann

It doesn't seem possible that it has been a year since Steve Siok passed the gavel (actually a hammer) over to me. While attempting to run this organization has been somewhat of a challenge and keeps me busy, I have enjoyed every minute of it. Most of all, the people, members and visitors.

Before being coerced into running for President, I was focused on Outreach, sharing astronomy with the public. My one condition for running was that I find a someone that would approach Outreach with the same or more enthusiasm as me. Michael Corvese stepped up to run our Program Committee, and I couldn't be more pleased. Together, we, the members of Skyscrapers, held an Astronomy Day event in conjunction with the Museum of Natural History and Planetarium at Roger Williams Park, we held a Solar Observing Day, we reinstated regular Open Nights in September, hosted regular monthly speakers, and to top it off, conducted a successful AstroAssembly.

The Trustees have been working dili-

gently to maintain and improve our equipment and facilities for our members and the public. We cleaned up the Meeting Hall to make more room for seating and mingling, started a Telescope Loan Program for our members, erected a dipole antenna for a venture into Radio Astronomy, and are in process of organizing all of our buildings.

Behind all of this is people. Lots of people, all volunteers. I mentioned the Program Committee, chaired by Michael, above. This committee is responsible for all of our events, except our monthly meetings. The Observatory Committee, chaired by Steve Siok, is responsible for Open Nights at Seagrave; there are 20 people on this team that show the night sky to the public every clear or partly clear Saturday night. And, our AstroAssembly Committee, headed by Bob Horton, is already up and running, planning for AstroAssembly on September 30.

If you are one of our newer members and have not partaken in our activities, please do. We are doing this for you. We

## New Member Welcome to Skyscrapers

Chris Harkins  
of Blackstone, MA

want your input and your involvement. Interacting with others is part of what makes this hobby fun.

As I finish my year as President, I would like you to know that things are in good hands. And, I want to personally thank all of you who said "yes" when I asked for a favor; all of you who raised your hand when we asked for volunteers. There are many of you out there, and it has been my pleasure to work with every one of you.

Clear skies,  
Linda

## Skyscrapers Presentations on YouTube

Many of our recent monthly presentations on Zoom have been recorded and published, with permission, on the Skyscrapers YouTube channel. Go to the URL below to view recent presentations.

<https://www.youtube.com/c/SeagraveObservatorySkyscrapersInc>



*The Skyscraper* is published monthly by Skyscrapers, Inc. Meetings are held monthly, usually on the first or second Friday or Saturday of the month. Seagrave Memorial Observatory is open every Saturday night, weather permitting.

### Directions

Directions to Seagrave Memorial Observatory are located on the back page of this newsletter.

### Submissions

Submissions to *The Skyscraper* are always welcome. Please submit items for the newsletter no later than **April 15** to Jim Hendrickson at [hendrickson.jim@gmail.com](mailto:hendrickson.jim@gmail.com).

### E-mail subscriptions

To receive *The Skyscraper* by e-mail, send e-mail with your name and address to [jim@distantgalaxy.com](mailto:jim@distantgalaxy.com). Note that you will no longer receive the newsletter by postal mail.

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# April 29 is International Astronomy Day

by Michael Corvese

International Astronomy Day is coming up quickly! It was begun by a local club in 1973 in California and advertised as “Bringing Astronomy to the People”. This has been the major theme of the event ever since. Skyscrapers is planning a day and evening of activities to celebrate this day and I hope you will join us.

Partnering again with the Museum of Natural History at Roger Williams Park, Providence, we will host 2 planetarium shows and have astronomy themed activity tables within the museum from 12:30pm – 3:30pm. Outside the museum, volunteer members will set up telescopes for safe

viewing of our closest star, the Sun (weather permitting). We may even have telescopes set up for solar viewing in other parts of the Providence metropolitan area as well.

During the evening, we turn our attention to Seagrave Memorial Observatory. There, we will be open to the public from 8:00pm-10:00pm and have activities in the meeting hall and telescopes opened for public observing throughout the evening, weather permitting.

Please join us at any of these locations to celebrate International Astronomy Day and help “Bring Astronomy to the People”! We can always use volunteers, especially those

with solar telescopes and a passion for sharing this great hobby with the public. If you are interested in volunteering for the event, please contact me at [corvesemichael@gmail.com](mailto:corvesemichael@gmail.com). Thanks, and Happy International Astronomy Day!



## Book Review

# Apollo Remastered: The Ultimate Photographic Record

by Andy Saunders, New York: Black Dog & Leventhal Publishers, 2022, ISBN [978-0762480241](https://www.isbn-international.org/details/9780762480241), hardbound, \$75.00 US

Reviewed by Francine Jackson

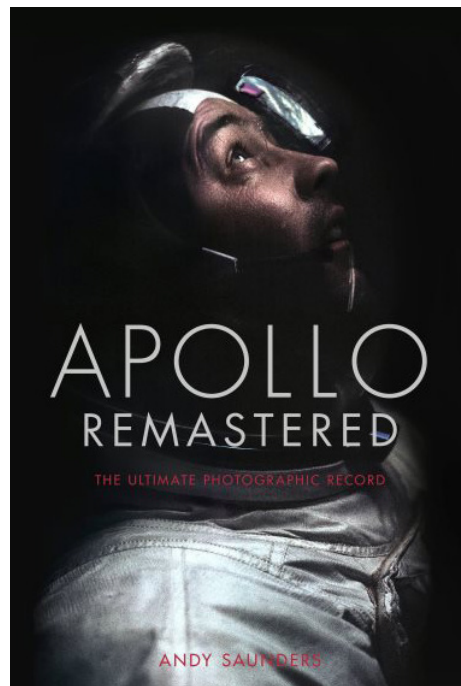
If there is any book that a person should have who has any interest in art, photography, and spaceflight history, this is it. *Apollo Remastered* not only takes the reader back to the original John Glenn orbit, where he had to “smuggle” a \$40.00 Ansco camera he bought himself on board to show the necessity of having photographic evidence of the beauty of the missions, but the evolution of the cameras and subsequent attachments.

Of course, the focus of this book is the photography, and the author’s painstaking work to remaster many of the tens of thousands of pictures taken during the flights to create what he believed to be the best, the ones that most depict NASA’s journey toward the ultimate goal: the astronauts’ memories of being on the Moon.

To reach this goal, there were many pre-Apollo practice missions, beginning with Alan Shepard’s Mercury Redstone in 1961, Glenn’s Mercury-Atlas, then on to Gemini. Each crewed mission is described in meticulous detail: The astronauts, the objectives, including the psychological effects of people crammed into a tiny craft for long periods of time. And, a critical part of each flight, the evolution of the camera,

based on successes and failures of them to work properly in this type of environment.

And, then it was on to Apollo, the ultimate journey. Each one is introduced, including the astronauts, the relevant patch, the mission, and, of course, the cameras.



Each trip into space, from Mercury-Atlas on to Apollo 17, is beautifully imaged. The author, understanding the importance and fragility of the photos, found himself perusing tens of thousands of memories, and chose what he believed would depict each mission as beautifully and historically relevant as possible. Each picture in this volume states the date, photographer, camera and settings, and, when possible, dialogue between the astronauts describing the picture setup.

Also, there is trivia mentioned in the various missions possibly not known previously, such as why one leg of the lunar module doesn’t have a contact probe, how far Shepard’s golf balls actually traveled, and the agony of Apollo 13’s disastrous flight and historic rescue.

To further show how much effort this book was, the author gives examples of certain pictures, before reprocessing, and the beautiful results. What is in your hands is years of work, showing the space missions as never before seen in such detail. *Apollo Remastered* is both a true work of art and an indispensable history of America’s space program.

# Solar Eclipses Are Coming!

by David Prosper

Have you ever witnessed a total solar eclipse? What about an annular solar eclipse? If not, then you are in luck if you live in North America: the next twelve months will see two solar eclipses darken the skies for observers in the continental United States, Mexico, and Canada!

**Solar eclipse** fans get a chance to witness an annular eclipse this fall. On **Saturday, October 14, 2023**, the Moon will move exactly in front of the Sun from the point of view of observers along a narrow strip of land stretching across the United States from Oregon to Texas and continuing on to Central and South America. Since the Moon will be at its furthest point in its orbit from Earth at that time (known as apogee), it won't completely block the Sun; instead, a dramatic "ring" effect will be seen as the bright edge of the Sun will be visible around the black silhouette of the Moon. The distinct appearance of this style of eclipse is why it's called an annular eclipse, as annular means ring-like. If you are standing under a tree or behind a screen you will see thousands of ring-like shadows projected everywhere during maximum eclipse,

and the light may take on a wan note, but it won't actually get dark outside; it will be similar to the brightness of a cloudy day. This eclipse must only be observed with properly certified eclipse glasses, or other safe observation methods like pinhole projection or shielded solar telescopes. Even during the peak of the eclipse, the tiny bit of the Sun seen via the "ring" can damage your retinas and even blind you.

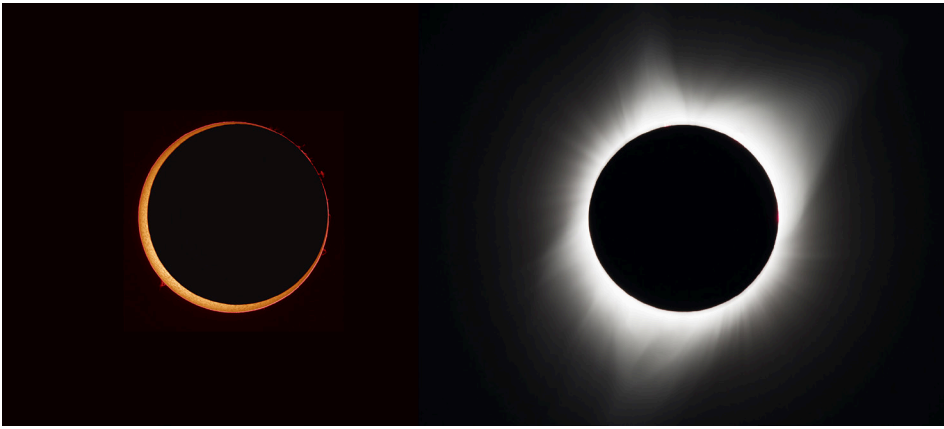
Just six months later, a dramatic **total solar eclipse** will darken the skies from Mexico to northeast Canada, casting its shadow across the USA in a strip approximately 124 miles (200 km) wide, on **Monday, April 8, 2024**. While protection must be worn to safely observe most of this eclipse, it's not needed to witness totality itself, the brief amount of time when the Moon blocks the entire surface of the Sun from view. And if you try to view totality through your eclipse viewer, you won't actually be able to see anything! The Moon's shadow will dramatically darken the skies into something resembling early evening, confusing animals and delighting human observers. You will even be able to see bright stars and planets

- provided you are able to take your eyes off the majesty of the total eclipse! While the darkness and accompanying chilly breeze will be a thrill, the most spectacular observation of all will be the Sun's magnificent corona! Totality is the only time you can observe the corona, which is actually the beautiful outer fringes of the Sun's atmosphere. For observers in the middle of the path, they will get to experience the deepest portion of the eclipse, which will last over four minutes - twice as long as 2017's total solar eclipse over North America.

While some folks may be lucky enough to witness both eclipses in full - especially the residents of San Antonio, Texas, whose city lies at the crossroads of both paths - everyone off the paths of maximum eclipse can still catch sight of beautiful partial eclipses if the skies are clear. The Eclipse Ambassadors program is recruiting volunteers across the USA to prepare communities off the central paths in advance of this amazing cosmic ballet. Find more information and apply to share the excitement at [eclipseambassadors.org](https://eclipseambassadors.org). NASA has published a fantastic Solar Eclipse Safety Guide



This detailed solar eclipse map shows the paths of where and when the Moon's shadow will cross the USA for the upcoming 2023 annular solar eclipse and 2024 total solar eclipse, made using data compiled from multiple NASA missions. Where will you be? This map is very detailed, so if you would like to download a larger copy of the image, you can do so and find out more about its features at: <https://svs.gsfc.nasa.gov/5073> Credits: NASA/Scientific Visualization Studio/Michala Garrison; eclipse calculations by Ernie Wright, NASA Goddard Space Flight Center.



Photos of an annular total solar eclipse (left) and a total solar eclipse (right). Note that the annular eclipse is shown with a dark background, as it is only safe to view with protection – you can see how a small portion of the Sun is still visible as the ring around the Moon. On the right, you can see the Sun’s wispy corona, visible only during totality itself, when the Moon completely – or totally – hides the Sun from view. A total solar eclipse is only safe to view without protection during totality itself; it is absolutely necessary to protect your eyes throughout the rest of the eclipse! Credits: Left, Annular Eclipse: Stefan Seip (Oct 3, 2005). Right, Total Eclipse, NASA/Aubrey Gemignani (August 21, 2017)

which can help you plan your viewing at [bit.ly/nasaclipsesafety](https://bit.ly/nasaclipsesafety). And you can find a large collection of solar eclipse resources, activities, visualizations, photos, and more from NASA at [solarsystem.nasa.gov/eclipses](https://solarsystem.nasa.gov/eclipses)



*This article is distributed by NASA Night Sky Network. The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit [nightsky.jpl.nasa.gov](https://nightsky.jpl.nasa.gov) to find local clubs, events, and more!*

# Skylights: April 2023

by Jim Hendrickson

We’re now well into spring, and the daylight hours outnumber hours of dark, with each successive day being over two and a half minutes longer than the previous. This becomes quite noticeable by how late evening twilight lasts, and how quickly the stars of the winter sky are dropping out of view in the west.

The Sun begins rising earlier than 6:00am beginning on the 19th, and will not rise after 6:00am until August 22. And while we won’t see 8:00pm sunsets until mid-May, the last extension of astronomical twilight finally fades away after 9:30pm at the end of April.

The Sun crosses into Aries on the 19th, where it will remain until May 14th.

The 11-day gibbous Moon is 4° north of Regulus at moonset on the 2nd. The Full Pink Moon, in Virgo, rises at 6:54pm on the 5th, and sets at 6:37am on the 6th.

At about 2:00am on the 10th, the 19-day waning gibbous Moon makes a spectacularly close 0.5° pass to the north of Antares (alpha Scorpii). The Moon is last quarter in Sagittarius on the 13th, and on the 16th, the 25-day waning crescent is 4.4° southeast of Saturn.

New Moon occurs a few minutes after midnight on the 20th, and on the opposite side of Earth from the Eastern US, a hybrid solar eclipse is occurring. While we don’t

get to see any part of this eclipse, a year from now, on April 8, 2024, we do get to experience a partial solar eclipse, which is total just to the north and west of us, Seagrave Observatory will experience a deep, 91% partial eclipse.

Just 20 hours after April’s new Moon, a very young Moon sighting opportunity presents itself, with the 0.7% illuminated, 20-hour-old Moon setting at 8:20pm on the 20th.

The waxing crescent Moon is a few degrees west of Venus on the 22nd, and east of it on the 23rd. On the 24th, it is 2.7° north of open cluster M35 in Gemini, and then passes 2.3° north of Mars on the 25th.

The First Quarter Moon is 3.2° northeast of open cluster M44, in Cancer, on the 27th, and on the 29th, the 9-day waxing gibbous is 4.4° northeast of Regulus, in Leo. Finally, on the 26th, the 10-day Moon is 3.8° south-east of Pollux, in Gemini.

The best evening apparition of Mercury occurs in April, with the planet reaching greatest eastern elongation of 19° on the 11th.

With Mercury’s position a few degrees north of the ecliptic, the steep angle of the ecliptic relative to the horizon during April evenings keeps Mercury in our sky for well over an hour after sunset for most of the month. This makes it inviting to view its rapidly changing phase in a telescope. During the first week of April, Mercury presents a small gibbous phase. On the 8th, its globe is 50% illuminated and 7 arcseconds across, and by the 13th, it narrows to a 33% illuminated crescent over 8 arcseconds

## Events in April

- 2 Moon 4.0° N of Regulus
- 6 Full Pink Moon
- 10 Moon 0.5° N of Antares
- 10 Venus 2.5° S o M45
- 11 Jupiter Conjunction
- 11 Mercury Greatest Elongation E19
- 13 Last Quarter Moon
- 15 Equation of Time = 0
- 16 Moon 4.4° SE of Saturn
- 20 New Moon (1241), Hybrid Solar Eclipse
- 20 Haumea Opposition (17.3)
- 21 Mercury Stationary
- 21 Mercury 3.8° NW of Uranus
- 25 Moon 2.3° N of Mars
- 26 Moon 3.8° SE of Pollux
- 27 First Quarter Moon
- 27 Moon 3.2° NE of M44
- 29 Moon 4.4° NE of Regulus

Ephemeris times are in EDT (UTC-4) for Seagrave Observatory (41.845N, 71.590W)

across. On the 21st, when it is just 0.66 AU from Earth, it grows to over 10 arcseconds and is 10% illuminated. And while you’re observing Mercury on the 21st, look 3.8° to its southeast, to find Uranus.

Venus’s prominent position over the western horizon for more than three hours after sunset during April gives clear illustration to its moniker as “Evening Star.” And while its brilliant magnitude -4.0 appearance high in our spring sky may seem to be the brightest a planet can appear, it is only half as bright as it will be in September, when it peaks at magnitude -4.8.

Venus closes to within 1 AU of Earth on

the 27th, when its 67% illuminated gibbous disk spans 16.7 arcseconds, slightly larger than the globe of Saturn.

As Venus tracks across the sky rather quickly, compared to other planets, notice its changing position with respect to the Pleiades in Taurus. Venus spends the second week of April within the same binocular field of view of the sky's most prominent open cluster, passing just 2.4° south of it on the 10th. It then "enters" the Winter Hexagon by crossing the line connecting Aldebaran and Capella on the 22nd, and on the 25th it passes within 1° north of open cluster NGC 1746.

There are few things that produce a more stunning sight in the deepening twilight of the evening sky than an "Earthshone" crescent Moon with sparkling Venus nearby. One of these opportunities presents itself on the 22nd, with the 9% illuminated 1.9-day Moon lying directly between Venus and the Pleiades.

You may notice that throughout April, Venus is moving across Taurus, territory that Mars was passing through not too long ago. Since we're now on the opposite side of the Sun as Mars, it appears to be moving fairly quickly as well, in the next constellation to the east, Gemini.

As April begins, the Red Planet is just 1.5° from open cluster M35. On the 14th, it forms a twin with 3.0 magnitude star Mebsuta (epsilon Geminorum) just 0.2° to its northwest. On the 25th, the 5.6-day crescent Moon lies 2.3° to its north.

While Mars still shines at a respectable first magnitude, it is now over 1.5 AU away, and its diminutive 6 arcsecond disk will show detail only through large aperture telescopes under ideal seeing conditions.

April 2023 is not a good time to observe Jupiter, as the giant planet is in conjunction on the 11th, and is only above the horizon for a few minutes after sunset at the beginning of the month, and a few minutes before sunrise at the end of the month.

While it has been hovering low in the southeast before sunrise for the past several weeks, Saturn begins to rise early enough in April to be easily observed.

On the 16th, the 25.5-day crescent Moon lies 4.4° southeast of Saturn. While we weren't looking (when it was behind the Sun two months back), Saturn moved into Aquarius and now rises at about the same time as Algenib (gamma Pegasi), 36° to its left, so when you see the Great Square asterism rising, you'll know Saturn is coming up soon.

Uranus, in Aries, is visible early in the month a few degrees east-northeast of Venus, but quickly falls into the twilight as the month progresses. Find it 4.0° southeast of Mercury on the 20th, then expect it to be hidden from view for the next several weeks.

Neptune, now in Pisces, is just far enough from the Sun to be seen low in the east before twilight at the end of the month. At magnitude 8.2, it will require a telescope to see its distant dim glow 4.6° south-southeast of lambda Piscium.

Dwarf planet Ceres, which reached opposition on March 20th, remains easily visible in Coma Berenices throughout April. As its distance from Earth steadily increases from 1.6 to 1.8 AU, it dims slightly, from magnitude 7.0 to 7.6, well within range of small telescopes, even when the bright Moon is nearby early in the month. At the beginning of April, Ceres is located in the vicinity of Messier galaxies M98, M99 and M100. By the end of April, it is just 2.5° northeast of Denebola (beta Leonis).

While Ceres is our closest, and easiest to observe dwarf planet, April presents observers with the best opportunity of the year to observe two much more distant, and challenging, objects. These are Haumea and Makemake. Discovered in 2004 and 2005, respectively, each of these objects is about ⅓ the size of Pluto, and both also have moons.

Haumea, at a distance of 49.28 AU, reaches opposition on April 30. Located about ⅔ of the way from Arcturus to zeta Bootis, the distant world shines at magnitude 17.5. While this may be within visual reach of very large telescopes (think 30 inches or more), it is relatively accessible to observers with telescopes of significantly smaller aperture that are equipped with a tracking mount and camera.

Makemake is slightly more distant, at 51.8 AU, and although it is approximately the same size as Haumea (though not the same shape, Haumea is an elongated spheroid), it has a somewhat higher albedo, and shines about a half magnitude brighter than Haumea. Makemake reaches opposition on April 12, and is located 1° east of the midway point on a line connecting Diadem (alpha Coma Berenices) and beta CrB.

It is notable that Pluto, perhaps the most well-known dwarf planet, has crossed into another constellation. Now a resident of Capricornus, the last time that Pluto crossed a constellation boundary was in 2006, when it crossed from Serpens into

Sagittarius. Pluto is still rather low in the southeast before dawn.

Asteroid 2 Pallas dims from 8th to 9th magnitude through April, as its distance from Earth increases to beyond 2 AU by the 23rd. Still, it should be easy to track with a small telescope as it makes its way northeastward from Monoceros into Canis Minor. At the beginning of April, it is a magnitude 8.3 speck about halfway between Sirius, in Canis Major, and Procyon, in Canis Minor. As the month progresses, it moves closer to Procyon, becoming only 2.8° south-southeast of the magnitude 0.4 star on the 25th.

Looking beyond the solar system, this is the time of year when we can explore our extragalactic surroundings. In early April, when our side of Earth points directly away from the Sun at midnight, we are facing straight out of the Milky Way galaxy. The North Galactic Pole lies nearly overhead in the middle of the night. If we could see the galactic pole, it would lie about midway between beta and gamma Comae Berenices. If we had a truly dark sky, horizons devoid of any obstructions, and air significantly more transparent than average, say, if we were at the peak of a high mountain, we would see the Milky Way nearly encircling our horizon. It would be a distinct band of light extending from below Procyon in the west, through the Winter Hexagon, past Capella, northward through Perseus, Cassiopeia, Lacerta, and Cetus, then through the Summer Triangle down the long axis of Cygnus in the east, southward through Aquila and Scutum, and finally dropping out of view below Antares, in the southeast. In reality, from our latitude of about 42°, there is about one quarter of the Milky Way that we never see.

Since we're looking at the Milky Way from within, and it is a relatively flat disk, gazing out along its axis affords us the ability to see deep into space, well beyond the occluding stars, dust and gas of our own galaxy. This is the reason that this region of sky was chosen for the original Hubble Deep Field, a sample survey of previously uncataloged distant galaxies conducted with the Hubble Space Telescope, using over 100 hours of exposure time in 1995. The Hubble Deep Field is in a 2.7 arcminute wide patch of sky located just north of the Big Dipper, at approximately the intersection of a line drawn north from Phecda through Megrez (gamma and delta UMa), and from Alkaid through Mizar (eta and zeta UMa).

While we cannot see any of the 3,000 galaxies revealed by the Hubble Deep Field image, some of which are 12 billion light years distant, we can find many of the show-piece galaxies from Messier's catalog in this region of sky. The one closest to the Milky Way's north galactic pole is M64, in Coma Berenices. M64 is a relatively bright spiral galaxy that is fairly easy to find. Coma Berenices contains a large open cluster, known as Melotte 111 (also Coma Star Cluster), that is visible to the unaided eye from a dark site, and is otherwise a delight to explore

with binoculars. On a dark night with no moonlight, sweep one binocular field east from the southeastern extent of the cluster to locate M64's 8.5 magnitude glow. Another way to locate it is to move  $\frac{1}{3}$  of the way along a line connecting Diadem (alpha) and gamma Comae Berenices, at the northern point of Melotte 111. Turning a telescope towards M64 and applying medium power reveals the interesting structure that gives it its nickname—the Black Eye Galaxy. Its bright nucleus is surrounded by a thick ring of dust that occludes much of the light

from the galaxy's core, but is surrounded by relatively bright spiral arms just outside of its dust ring.

As you gaze out at M64, high overhead during the late hours of these spring evenings, think back to the galaxies in the Hubble Deep Field, which are 700 times more distant. And the Coma Star Cluster? Many of its members are about 275 light years away, making it one of the closest star clusters to our solar system. "Nearby" M64 is 61,000 times more distant.

## Lunatic's Corner

# Crater Cleomedes

by Michael Corvese

Cleomedes is a floor-fractured, complex impact crater just north of Mare Crisium in the northeast quadrant of the moon. It is one of the largest craters north of Mare Crisium with a diameter of about 80 miles and a depth of 1.7 miles. Cleomedes is an interesting observing object in that it has many features visible in amateur telescopes. Terraced walls, central peaks, network of rilles, and craterlets are just some of the features greeting the discerning eye of the observer. Cleomedes is visible at the terminator around Lunar Days 4 (waxing crescent) and 17 (waning gibbous).

The central peaks of Cleomedes are somewhat off center of the crater which might indicate an oblique angle of impact, or the remnants of peaks buried in subsequent lava flows. The relatively low peak height (<5000 ft.) gives a further indication of possible hidden structure. A prominent Y-shaped rille, called Rima Cleomedes runs from north to south along the eastern side of the crater and was most likely formed by igneous intrusion given its proximity to Mare Crisium. The smooth floor of Cleomedes can be attributed to lava flows infiltrated from Mare Crisium through the worn and broken southern rim. Crater Tralles interrupts the northwest wall of Cleomedes, spilling debris onto the crater floor

The crater also contains several prominent craterlets. Cleomedes E, close to the northern rim is an interesting object. In high resolu-

tion photos, rilles can be seen on the crater floor. Given what we know about the formation of floor fractured and concentric-ringed craters, (see previous article on Hesiodus A, October 2023) Cleomedes E seems to be a hybrid of both types of craters.

The Greek astronomer Cleomedes is the namesake of our subject crater. Aside from his simplified textbook 'On The Circular Motions of Celestial Bodies', not much is known about Cleomedes. Even the dating of his work is uncertain, with some historians give dates between 50 B.C. and 400 A.D. However, most scholars agree on a publishing date within the 1st century A.D.

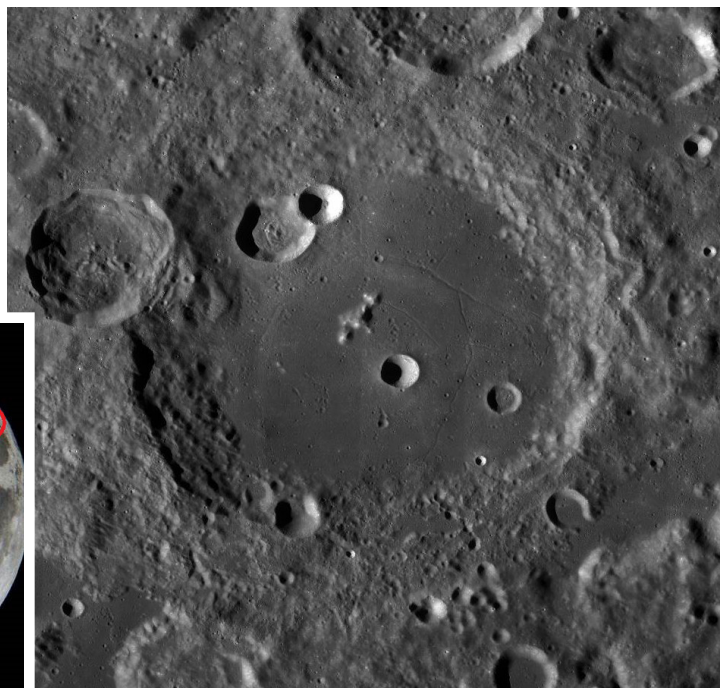
A disciple of Posidonius, Cleomedes wrote a disclaimer in the book that it contained a summary of the work primarily of Posidonius, but also of some other astronomers, and is not an original work of Cleomedes. The greatest value of this book is that it apparently quotes Posidonius almost verbatim. Posidonius was an ancient astronomer whose work did not survive to modern times.

Cleomedes' book also gave a detailed account of the method utilized by Eratosthenes to mea-

sure the circumference of the earth and is the primary way in which we know this method today. Cleomedes also wrote accurately about the Sun and Moon Illusion (both look larger at the horizon than at the zenith) and how it is caused by atmospheric diffraction and apparent distance hypothesis which he credits to Posidonius. He also remarked that the absolute size of many stars may be much larger than the sun and how the earth might look like a small star from the surface of the sun.

Cleomedes was a remarkable fellow and has left us important information about ancient astronomy. His namesake crater is also remarkable in the variety of interesting features it contains. Both are worthy of our attention and deserve a place on our list of objects to observe.

Michael Corvese is a confirmed lunatic of many years regardless of his recent interest in lunar observing.



## Observer's Challenge:

# NGC 2841: Galaxy in Ursa Major

by Glenn Chaple

**Magnitude 9.2, Size 8.1' X 3.5'**

As a result of his systematic sky sweeps made during the latter part of the 18th century, William Herschel discovered some 270 galaxies in Ursa Major. One of the brightest - at magnitude 9.2 and a definite "Messier miss" - is the spiral galaxy NGC 2841. Herschel discovered it on the night of March 9, 1788. Unaware of its true nature, he identified it as a very large nebula (Class I in his Catalogue of Nebulae and Clusters of Stars) and wrote, "Very bright, large, very much extended 151 degrees, very suddenly much brighter in the middle, equals a star of 10th magnitude."

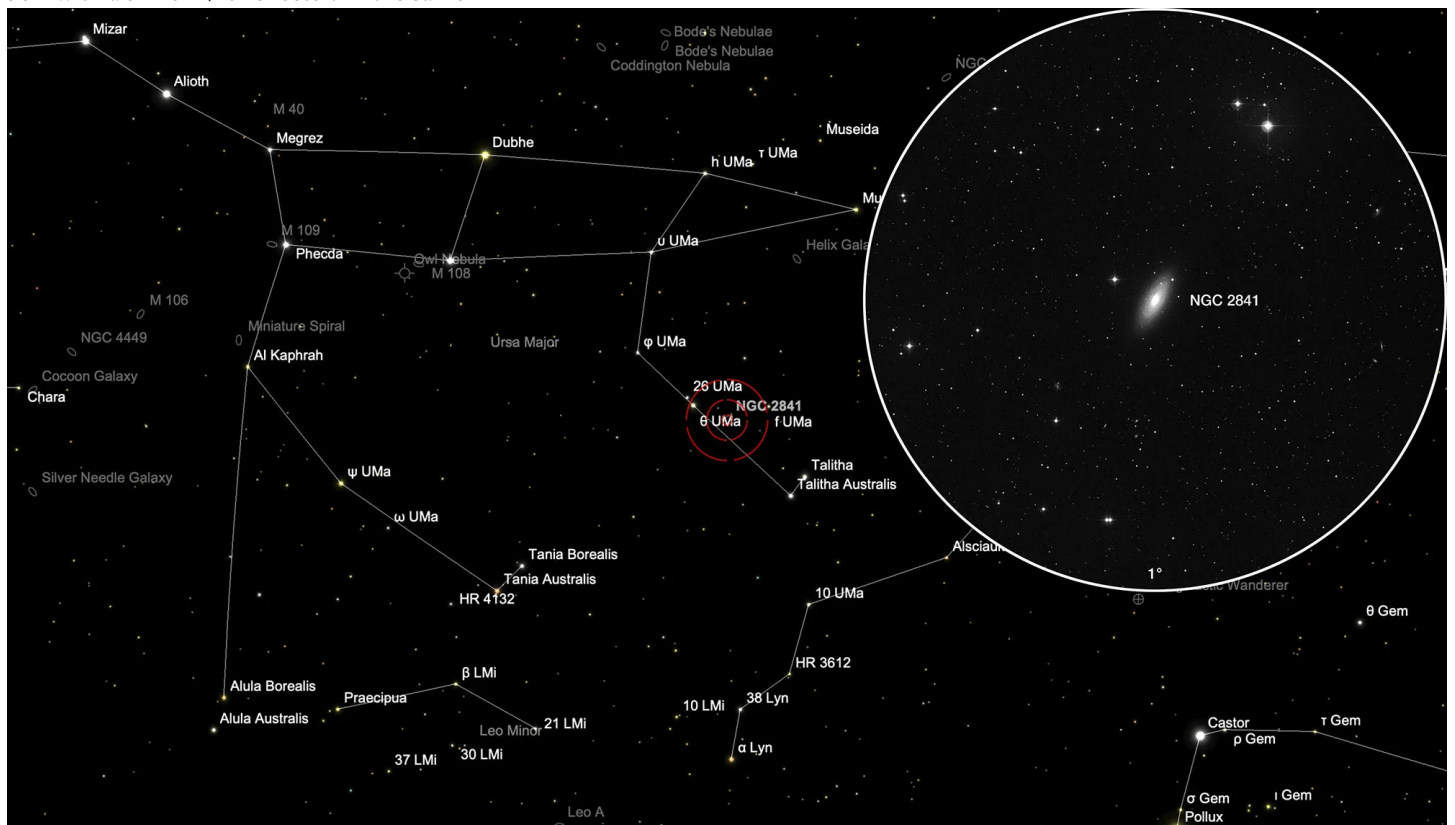
NGC 2841 is located about 2 degrees west-southwest of the 3rd magnitude star theta ( $\theta$ ) Ursae Majoris at the 2000.0 coordinates, RA 9h22m02.7s and Dec +50o58'35.3". Star-hoppers can work their way from theta to NGC 2841 by referring to the accompanying finder charts.

Bright enough to be glimpsed in 7X50 binoculars as a 9th magnitude "star" under dark-sky conditions, NGC 2841 is an easy target in small scopes. On the evening of May 3, 1976, I saw it as a hazy oval patch at 30X with a 3-inch f/10 reflector. In the same



Mario Motta, MD. (ATMoB) "Taken from Gloucester with my 32 inch F6.5 scope, with ZWO ASI6200 camera. 1 hours of Lum, then 45 min each of R/G/B filters."

Chart from [deepskycorner.ch](http://deepskycorner.ch)

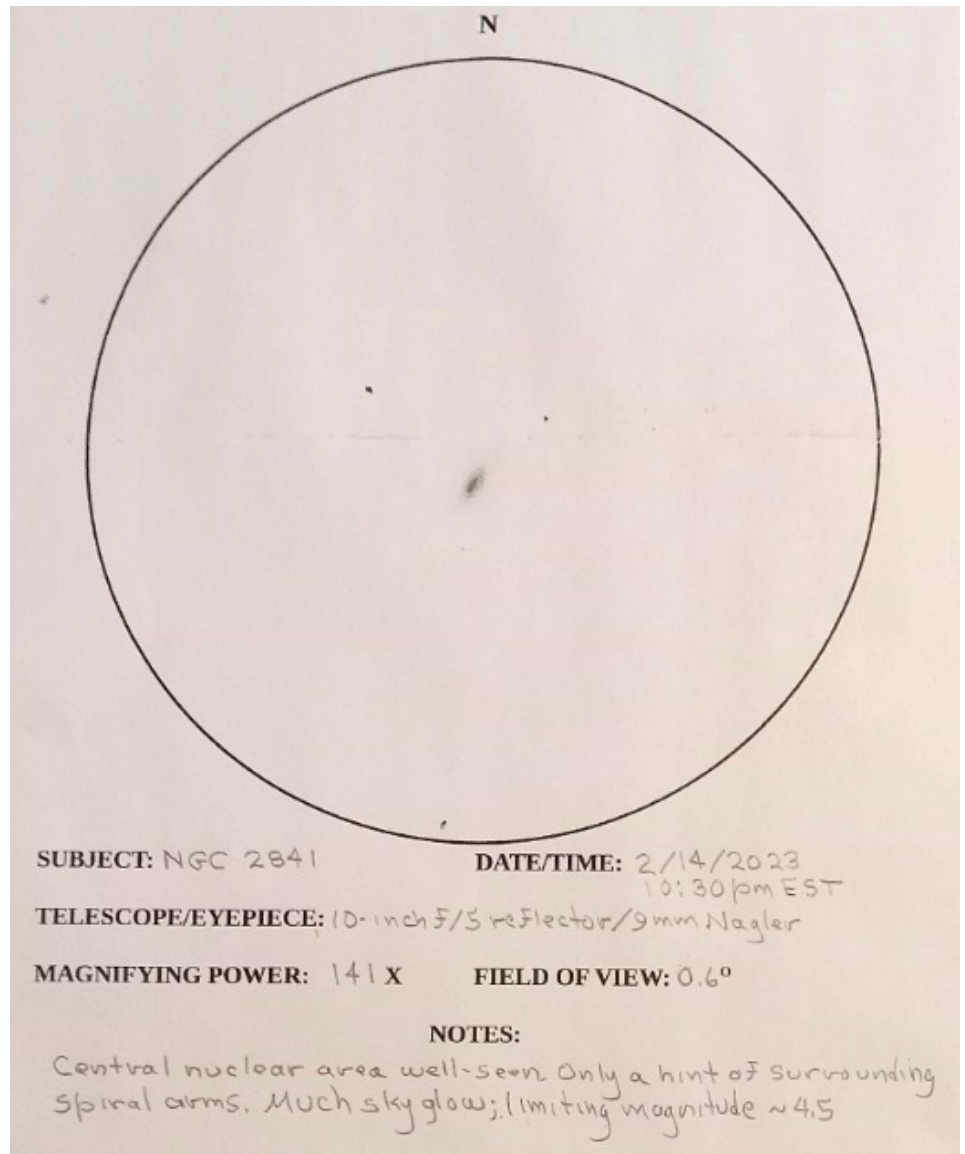




field less than a half degree north-northwest was a wide double star that I later identified as ARN 71 (magnitudes 6.2 +7.9, separation 231 arcseconds). Recently, I returned to NGC 2841 with a 10-inch, f/5 reflector. I saw the same oval patch that I had glimpsed with the 3-inch – this time much brighter and punctuated by a bright center. There was no hint of the surrounding spiral structure that appears in images of NGC 2841.

Red shift studies place NGC 2841 at a distance of some 46 million light years. Its true diameter is around 150,000 light years.

The purpose of the Observer's Challenge is to encourage the pursuit of visual observing. It is open to anyone who is interested. If you'd like to contribute notes, drawings, or photographs, we'd be happy to include them in our monthly summary. Submit your observing notes, sketches, and/or images to Roger Ivester (rogerivester@me.com). To find out more about the Observer's Challenge, log on to [rogerivester.com/category/observers-challenge-reports-complete](http://rogerivester.com/category/observers-challenge-reports-complete).



# Observatory Reports

by Observatory Committee

## Seagrave Observatory Night Saturday, January 21, 2023

From Bob Janus: Contrary to the astro weather forecasts, the cloud cover persisted and not a single star was to be seen. However, the overcast sky did not prevent us from having a successful Public Night. The observatory crew consisted of Jim Hendrickson, Dan Fountain and Bob Janus. Whenever the observatory is open visitors usually arrive; and last night was no exception. We had a relatively small group (8 people total). Dan will send you the greater information. All were visiting Seagrave for the first time. Tours were given of the anteroom museum and the Alvan Clark. We uncovered the

telescope but kept the dome closed. Even though there was nothing to see through the scope, people enjoyed watching and learning about its clock drive gearing. The internet on-screen presentations in the meeting hall greatly enhanced the evening program. It was also a nice place for folks to warm up. Conditions were very mild for January (33 degs. F, no wind, no ice or snow on the grounds, parking area not too soggy). I think this was a good demonstration that whenever possible it is well worthwhile opening for Public Night when we are clouded out. From Jim Hendrickson: It was certainly worth opening on a less than ideal night since we did have visitors that enjoyed coming out and learning about telescopes. It is also nice to be there in late January, a rare thing for us. With the cloud cover I noticed that there is a new bright spot in the sky to our southwest. I don't remember seeing this on cloudy nights last year. I wonder

if the western regions of the state got more snow than we did and it was still covering the ground in places, reflecting extra light, or if there are new lights, which apparently are not being directed or used correctly.

## Seagrave Observatory Night Saturday, January 28, 2023

Forecast was for mostly cloudy skies, but we decided to open anyway. Visitors were able to get views of Jupiter, Mars and the first quarter moon through breaks in the clouds. The comet was not visible. NSN's What's Up video was shown as well as videos on the solar system, moon, Jupiter and Mars.

## Seagrave Observatory Night Saturday, February 11, 2023

Visitors were provided a view of Comet ZTF C/2022 E3 close to Mars. The comet has faded significantly and structure is dif-

difficult to see.

### **Seagrave Observatory Night Saturday, February 18, 2023**

Another successful Public Night was held on February 18th. I believe there have been four Public Nights held so far in 2023. When we are open, visitors do come out to enjoy the observatory. Last night was no exception. I estimate there were 15 adults, 9 children less than 10 years old, and 2 young teens for a total of 26 people. Many of these were first time visitors. The sky conditions remained very clear throughout the evening with no appreciable wind and the temperature staying about 32 degrees F. Jim Meletzer was the greeter, Dan Fountain handled parking, Richard Doherty ran the Meeting Hall presentation, Jim Hendrickson operated the 12 inch Meade, Francine Jackson gave constellation tours, Bob Janus operated the Alvan Clark. With no moon, M42 was the item showcased on the Alvan Clark. A variety of deep space objects and the comet were viewed on the 12. The evening began with a nice appearance of Venus and Jupiter in the west, unfortunately too low to point the telescopes at. With the Winter Hexagon high in the sky, we looked at M42, M78 (a guest request), Mars, M41, M1, M35, M46. We took turns seeing if we could find the planetary nebula (NGC 2348) located within it, before finally spotting it, just barely visible in the 12". Comet C/2022 E3 ZTF was observed, for a 2nd week in a row. It was easy to locate coordinates of 4h40m RA and +10° dec and was still readily visible in the 12 as well as the 80mm finder. The visitor favorites seemed to be M35 and M41, which filled the field of the scope. A bit of wispy clouds came in at the very end of the session, just like last week, but didn't really deter much from viewing. Closed out by welcoming in the spring galaxies with a view of NGC 2903 in Leo. We opened at 7:00 and closed at 9:00 pm.

Another successful observatory night during the off-season.

It's fun sharing this part of the sky to visitors, as we almost never get to see it.

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Maybe 20 people came in the back to observe, including some younger ones (guessing ages 6-12). One of the young girls had a request to see M83, which I don't even know if I had ever seen. Apparently, she had seen it in a drawing somewhere. Unfortunately, it hadn't risen yet, and I think this is the southernmost Messier object. Perhaps in the spring we'll be able to find it.

### **Seagrave Observatory Night Saturday, March 18, 2023**

Surprisingly the sky stayed cloud free for the entire evening. The temperature was relatively mild gradually dropping to about 33 F by closing at 10 pm. There was no moon and little or no breeze.

I believe this was the fifth time the observatory has been open for Public Night in 2023.

We had a small but enthusiastic turn out of 5 children, 3 teens and 7 adults.

Bob Horton operated the Alvan Clark with assistance from Richard Doherty and Dan Fountain.

Francine Jackson greeted the visitors and informed them about the night sky. Jim Hendrickson helped educate the public and provided photography. Bob Janus operated the Meade 12.

Dan handled the parking. Richard ran the meeting hall pro-

gram.

People who arrived early saw the International Space Station pass over around 7:50 pm.

Mars and M42 were some of the objects viewed through the Alvan Clark. M81, M44 and NGC 2392 (Eskimo planetary nebula) were examples of deep sky objects observed with the Meade 12. (Is there a good globular cluster visible this time of year?)

The Alvan Clark at times seems not to be tracking as well as it should. Objects in the eyepiece have drifted out of the field of view. Perhaps it is time for a check-up/tune-up.

It was another enjoyable night at Seagrave.

Everything Bob said plus, the peep-toads and wood frogs were out last night.

There was also a pass of Tiangong space station 3 minutes before the scheduled ISS pass. It came up from the west, cut below Orion's belt, and faded out in the east, about magnitude -2. <https://www.flickr.com/photos/30623046@N08/albums/72177720306842808>



# The Sun, Moon & Planets in April

This table contains the ephemeris of the objects in the Solar System for each Saturday night in March 2023. Times in Eastern Daylight Time (UTC-4). Ephemeris times are for Seagrave Observatory (41.845N, 71.590W).

Object	Date	RA	Dec	Const	Mag	Size	Elong	Phase(%)	Dist(S)	Dist(E)	Rise	Transit	Set
<b>Sun</b>	<b>1</b>	0 40.5	4 21.2	Psc	-26.8	1921.2	-	-	-	0.999	06:29	12:50	19:11
	<b>8</b>	1 06.0	7 01.3	Psc	-26.8	1917.4	-	-	-	1.001	06:17	12:48	19:19
	<b>15</b>	1 31.8	9 35.5	Psc	-26.8	1913.5	-	-	-	1.003	06:06	12:46	19:27
	<b>22</b>	1 57.8	12 02.1	Ari	-26.8	1909.8	-	-	-	1.005	05:55	12:44	19:35
	<b>29</b>	2 24.2	14 18.9	Ari	-26.8	1906.3	-	-	-	1.007	05:45	12:43	19:42
<b>Moon</b>	<b>1</b>	9 07.5	21 39.6	Cnc	-12.2	1799.0	121° E	76	-	-	14:39	22:03	05:16
	<b>8</b>	14 30.8	-15 44.5	Lib	-12.6	1859.1	158° W	96	-	-	21:10	02:22	07:26
	<b>15</b>	21 21.0	-21 13.3	Cap	-11.5	1917.5	69° W	32	-	-	04:07	09:05	14:11
	<b>22</b>	3 23.3	20 05.3	Ari	-9.1	1877.8	23° E	4	-	-	07:09	14:52	22:46
	<b>29</b>	9 38.6	19 04.9	Leo	-12.0	1803.2	102° E	61	-	-	13:29	20:41	03:42
<b>Mercury</b>	<b>1</b>	1 32.4	10 39.8	Psc	-1.1	5.9	14° E	80	0.308	1.151	07:00	13:44	20:30
	<b>8</b>	2 13.8	15 47.1	Ari	-0.4	6.9	19° E	54	0.323	0.976	06:53	13:56	21:01
	<b>15</b>	2 40.7	18 43.0	Ari	0.7	8.4	19° E	29	0.359	0.800	06:40	13:54	21:08
	<b>22</b>	2 49.1	19 08.7	Ari	2.2	10.2	14° E	11	0.399	0.661	06:18	13:33	20:47
	<b>29</b>	2 41.0	17 12.6	Ari	4.2	11.6	5° E	1	0.433	0.579	05:51	12:56	20:00
<b>Venus</b>	<b>1</b>	3 01.1	18 07.0	Ari	-3.9	14.2	37° E	77	0.719	1.192	07:59	15:11	22:25
	<b>8</b>	3 34.4	20 37.5	Tau	-3.9	14.8	38° E	75	0.719	1.145	07:54	15:17	22:41
	<b>15</b>	4 08.4	22 42.7	Tau	-4.0	15.4	40° E	73	0.718	1.098	07:51	15:23	22:57
	<b>22</b>	4 42.9	24 19.7	Tau	-4.0	16.1	41° E	70	0.718	1.048	07:50	15:30	23:11
	<b>29</b>	5 17.6	25 25.9	Tau	-4.0	17.0	42° E	67	0.719	0.996	07:52	15:38	23:23
<b>Mars</b>	<b>1</b>	6 14.2	25 28.0	Gem	1.0	6.4	82° E	90	1.648	1.454	10:38	18:22	02:06
	<b>8</b>	6 29.8	25 15.5	Gem	1.1	6.1	79° E	90	1.652	1.522	10:27	18:10	01:53
	<b>15</b>	6 45.8	24 56.9	Gem	1.1	5.9	76° E	90	1.656	1.590	10:17	17:59	01:40
	<b>22</b>	7 02.1	24 32.0	Gem	1.2	5.7	72° E	91	1.658	1.656	10:08	17:47	01:27
	<b>29</b>	7 18.6	24 00.5	Gem	1.3	5.4	69° E	91	1.661	1.720	09:59	17:36	01:13
<b>1 Ceres</b>	<b>1</b>	12 20.6	15 53.6	Com	7.0	0.8	159° E	100	2.582	1.624	17:23	00:24	07:26
	<b>8</b>	12 14.8	16 07.1	Com	7.2	0.8	154° E	99	2.585	1.649	16:49	23:51	06:53
	<b>15</b>	12 09.7	16 08.9	Com	7.3	0.7	147° E	99	2.588	1.687	16:17	23:19	06:21
	<b>22</b>	12 05.5	15 59.0	Com	7.4	0.7	141° E	98	2.591	1.735	15:46	22:47	05:48
	<b>29</b>	12 02.4	15 38.1	Com	7.6	0.7	134° E	98	2.594	1.792	15:17	22:17	05:16
<b>Jupiter</b>	<b>1</b>	1 12.2	6 29.8	Psc	-1.9	33.1	8° E	100	4.952	5.939	06:54	13:19	19:45
	<b>8</b>	1 18.5	7 08.1	Psc	-1.9	33.1	3° E	100	4.953	5.952	06:30	12:58	19:27
	<b>15</b>	1 24.8	7 46.0	Psc	-1.9	33.0	3° W	100	4.953	5.955	06:07	12:37	19:08
	<b>22</b>	1 31.1	8 23.4	Psc	-1.9	33.1	8° W	100	4.953	5.948	05:43	12:16	18:49
	<b>29</b>	1 37.5	9 00.0	Psc	-1.9	33.2	13° W	100	4.954	5.931	05:19	11:55	18:30
<b>Saturn</b>	<b>1</b>	22 20.7	-11 44.7	Aqr	1.0	15.7	38° W	100	9.813	10.577	05:09	10:28	15:48
	<b>8</b>	22 23.4	-11 30.3	Aqr	1.0	15.8	44° W	100	9.811	10.500	04:43	10:03	15:24
	<b>15</b>	22 25.9	-11 16.9	Aqr	1.0	15.9	51° W	100	9.809	10.414	04:17	09:38	14:59
	<b>22</b>	22 28.3	-11 04.6	Aqr	1.0	16.0	57° W	100	9.807	10.319	03:51	09:13	14:35
	<b>29</b>	22 30.4	-10 53.5	Aqr	1.0	16.2	63° W	100	9.805	10.218	03:25	08:48	14:10
<b>Uranus</b>	<b>1</b>	2 57.7	16 32.8	Ari	5.8	3.4	36° E	100	19.656	20.458	08:00	15:04	22:08
	<b>8</b>	2 59.1	16 39.0	Ari	5.8	3.4	29° E	100	19.655	20.522	07:34	14:38	21:42
	<b>15</b>	3 00.6	16 45.4	Ari	5.8	3.4	23° E	100	19.654	20.575	07:07	14:12	21:17
	<b>22</b>	3 02.2	16 51.9	Ari	5.8	3.4	16° E	100	19.653	20.616	06:41	13:46	20:51
	<b>29</b>	3 03.8	16 58.6	Ari	5.8	3.4	10° E	100	19.652	20.643	06:14	13:20	20:26
<b>Neptune</b>	<b>1</b>	23 46.1	-2 46.7	Psc	8.0	2.2	15° W	100	29.910	30.873	06:01	11:53	17:45
	<b>8</b>	23 47.1	-2 40.7	Psc	8.0	2.2	22° W	100	29.910	30.836	05:34	11:27	17:19
	<b>15</b>	23 48.0	-2 35.0	Psc	8.0	2.2	29° W	100	29.910	30.787	05:07	11:00	16:53
	<b>22</b>	23 48.9	-2 29.6	Psc	8.0	2.2	35° W	100	29.910	30.726	04:40	10:33	16:26
	<b>29</b>	23 49.7	-2 24.6	Psc	7.9	2.2	42° W	100	29.910	30.653	04:13	10:06	16:00
<b>Pluto</b>	<b>1</b>	20 11.5	-22 29.1	Cap	14.5	0.2	71° W	100	34.738	35.053	03:43	08:19	12:55
	<b>8</b>	20 11.9	-22 29.0	Cap	14.5	0.2	78° W	100	34.743	34.943	03:16	07:52	12:28
	<b>15</b>	20 12.2	-22 29.2	Cap	14.5	0.2	84° W	100	34.748	34.830	02:49	07:25	12:00
	<b>22</b>	20 12.4	-22 29.7	Cap	14.5	0.2	91° W	100	34.753	34.716	02:22	06:57	11:33
	<b>29</b>	20 12.5	-22 30.5	Cap	14.5	0.2	98° W	100	34.757	34.602	01:54	06:30	11:05

# 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