



the Skyscraper

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April 2024

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 13 @ 7:00pm EDT at Seagrave Memorial Observatory

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

6 PM: Socializing

7 PM: Business Meeting & Presentation

After four months away, we return to Seagrave for our Annual Meeting and Election of Officers, followed by a presentation by member David Huestis.

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, For the Good of the Organization

TOPIC: Seagrave Memorial Observatory: A Highlight of 164 Years Of History (in, hopefully, under an hour!)

SPEAKER: David Huestis, Historian, Skyscrapers, Inc.

Frank Evans Seagrave (1860 - 1934) was a well-known Rhode Island astronomer who received an 8-inch Alvan Clark refractor telescope in 1878 for his 16th birthday present (1876). An observatory was built at his family residence at 119 Benefit St in Providence to house that instrument. Eventually light pollution from gas lamps hindered his observations, so he searched for a new location to move his telescope.

He found a piece of property on Peep Toad Road in North Scituate, RI, where in 1914 he built a new observatory and moved the Clark telescope there.

Skyscrapers was founded in 1932 by Professor Charles Smiley of Brown University.

Frank Seagrave passed away in 1934, and his estate was bequeathed to his cousin, Walter Angell. The observatory sat idle for a time. When Angell passed soon thereafter, it was offered for sale.

In 1936 Skyscrapers incorporated and purchased the property. The organization

has maintained and operated it ever since.

Dave will explore some of Frank Seagrave's achievements and highlight some of Skyscrapers' rich history.

Dave Huestis' interest in astronomy was kindled during his elementary school days when he participated in school plays about the solar system in two different grades (perhaps 4th - 1962-1963 and 5th - 1963-1964). In one of them he portrayed the Sun, and in the other he played the role of the astronomy professor. In the 6th grade (1964-65) he purchased his first science fiction book - HG Wells' War of the Worlds. Wells sparked that interest about the possibility of extraterrestrial life.

Combine that influence with an early interest in UFOs (now UAP), the many science fiction series during the 1960's, the US space program, a March 23, 1969 display of the northern lights, and a 97% partial solar eclipse seen from Providence, Rhode Island on Saturday, March 7, 1970, Dave was always looking towards the heavens.

Dave's introduction to a micro-computer (Digital PDP8) during his junior year in high school (1969 - 1970), launched his eventual career in the IT world. Upon graduation he attended a business school and obtained a certificate in programming and accounting.

Soon after Dave started a part-time computer operator position, he purchased a 6-inch Edmund Scientific reflector (the Super Space Conqueror) in August 1973. At the end of 1974 he finally paid a visit to Seagrave Observatory during one of the society's public open nights. Dave was so impressed with the amateur astronomers that evening that he applied for membership at the December 1974 monthly meeting, and



**Seagrave Memorial
Observatory
Open Nights**
April 6, 13, 20 & 27
@ 8pm

was voted into membership of Skyscrapers at the January 1975 meeting.

Dave comments, "I soon learned of the rich history of the organization and that of the original owner of the observatory itself, Frank Evans Seagrave (1860 – 1934). At the monthly meetings, then Skyscrapers historian, William "Bill" Guca would often provide some tidbits of information about Mr. Seagrave. At some point Bill had little free time to fulfill the position. He knew of my

interest, so he encouraged me to assume the role of historian."

With only a few faded copies of early newspaper articles about Frank Seagrave to guide him, Dave began to research this fascinating "amateur" astronomer. One of his proudest moments as a Skyscrapers member was back in 1986, when his article entitled "Stardust Memories: Frank Evans Seagrave and Halley's Comet - 1910," was published in the May 1986 issue of The

Rhode Island History Journal. This article told the story of Seagrave's Halley Comet calculations, predictions, observations, and advice to a concerned public.

And in 2007, Dave and Skyscrapers newsletter editor and website guru Jim Hendrickson published a book entitled 75 Years of Skyscrapers (1932 – 2007).

As Skyscrapers historian, Dave continues to research the rich history of Frank E. Seagrave and Skyscrapers, Inc.

President's Message

by Linda Bergemann

It's April, the month everyone has been anxiously awaiting. Wishing clear skies for all those traveling to see totality and for those staying home to view a partial eclipse. Seagrave will be open with minimal staff on Monday, April 8, from 2-4:30 PM. We will have solar eclipse glasses available and, hopefully, a solar telescope or two. If you are available, please stop by.

April marks the beginning of our fiscal year. With this comes our annual meeting, elections, budgets and dues payments. Our annual meeting will be on April 13, when

election results will be announced; the budget will have to wait until May.

I would like to extend my gratitude to all who have actively engaged in our activities throughout the past year; those who planned the events, those who made them happen, and those who attended. It takes all of us to make this Society function. Thank you all! We are always looking for ideas for new events for our members and the public. Send all of your ideas my way.

I especially wish to thank Michael Corvese and Mark Munkacsy for their effort

New Member
Welcome to Skyscrapers
Denise Turco of Lincoln

creating and conducting our first "Sky Puppies" program. Begun last fall, they just completed this Astronomical League observing program for youth ages 6 to 10 at the Portsmouth Free Public Library. Our goal is to repeat this program at another library this fall. Contact me if you would like to host a "Sky Puppies" class at your local public library.

See you at Seagrave on April 13th. Did I mention that there may be cake?

Warm wishes and 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.

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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Jim Hendrickson

Astronomical League Correspondent (ALCor)

Jeff Padell

Astronomical League Update

by Jeff Padell, ALCor

With the announcement of the dues increase at the Astronomical League I am sure people are wondering what they are getting for their membership. At the very least you get the magazine *The Reflector*, that in itself is worth the cost of the membership. Also the AL website is a wealth of information! Star Charts, what in the sky, a AL store with lots of great stuff.

What else do you get, well you can interact with fellow astronomers and even better and what I enjoy are the award programs and certificates and pins you earn for completing the various challenges. They run the gamut from beginner levels all the way up to programs for Advanced Astronomers.

They also can be completed in various ways, visual, sketching, imaging both with your own scope but also with remote scopes (membership scopes). I started with a few of the beginner programs and then moved on to Solar Imaging, Globular Cluster imaging. Some of the programs can be done in a month others can stretch out over a year or more.

I am currently working on two programs that are going to take me at least another year to complete, I have been working on them for a year already. They are the “The Local Galaxy Group & Galactic Neighborhood” and “Galaxy Groups and Clusters”

The AL has books covering most pro-

grams and I can recommend getting the book for “The Local Galaxy Group & Galactic Neighborhood” it is about ½ thick 114 pages. I have been reading and you WILL learn more about our local galaxy, galaxy group and the area around the Milky Way than you would ever learn otherwise. Even if you are not working on the program reading the book is fascinating and a great learning experience.

Check out the AL programs at <https://www.astroleague.org/observing-program-division/>



April 8 Partial Solar Eclipse Over Rhode Island

by Jim Hendrickson

On Monday, April 8, 2024, a total solar eclipse will transect North America. This is the second solar eclipse in six months (the first being the annular eclipse of October 14, 2023), and the first total eclipse in the US since August 21, 2017.

A solar eclipse occurs whenever the Moon, in its 29.5-day (synodic) orbit, passes between Earth and the Sun. Even though solar eclipses only occur during New Moon, not every New Moon results in a solar eclipse. This is due to the Moon’s orbit being inclined by about 5° relative to the ecliptic, the plane of Earth’s orbit around the Sun. While this angle may seem small, the distance to the Moon, between 28 and 32 times the radius of Earth, causes the Moon to “miss” the Sun by invisibly passing too far north or south of our star to block any part of it as seen from Earth, most of the time. But, on average, slightly more frequent than once per year, the alignment is just right for a solar eclipse to occur somewhere on Earth. Slightly less frequent, however, this results in a total eclipse, when, over a small slice of Earth’s surface, the entire Sun is blocked by the Moon.

Another factor in determining whether a total eclipse can be seen is the distance to the Moon. As the orbit of the Moon, like every other celestial object, is not perfectly

circular, but elliptical, the distance varies over the course of its orbit. In the case of the Moon, that distance varies by approximately 11%, from about 28 to 32 times Earth’s radius. The varying distance changes the apparent diameter of the Moon in the sky. If the Moon passes directly between Earth and the Sun when it is at its farthest distance, known as apogee, it will not be large enough to cover the entire disk of the Sun. Anyone along the centerline of this eclipse would witness an annular eclipse, where a narrow ring of sunlight surrounds the Moon at maximum eclipse. This is what occurred on October 14, 2023.

To a lesser extent, the Sun’s varying apparent diameter resulting from Earth’s changing distance can determine whether we see an annular or total eclipse.

During the April 8 eclipse, observers in Rhode Island do not experience totality, when 100% of the Sun is obscured by the Moon. No portion of Connecticut or Massachusetts lies under the full shadow of the Moon, either. The nearest place you can go to see totality is Montpelier, Vermont. Northern New York, New Hampshire north of the White Mountains, and a large section of interior Maine also experience totality.

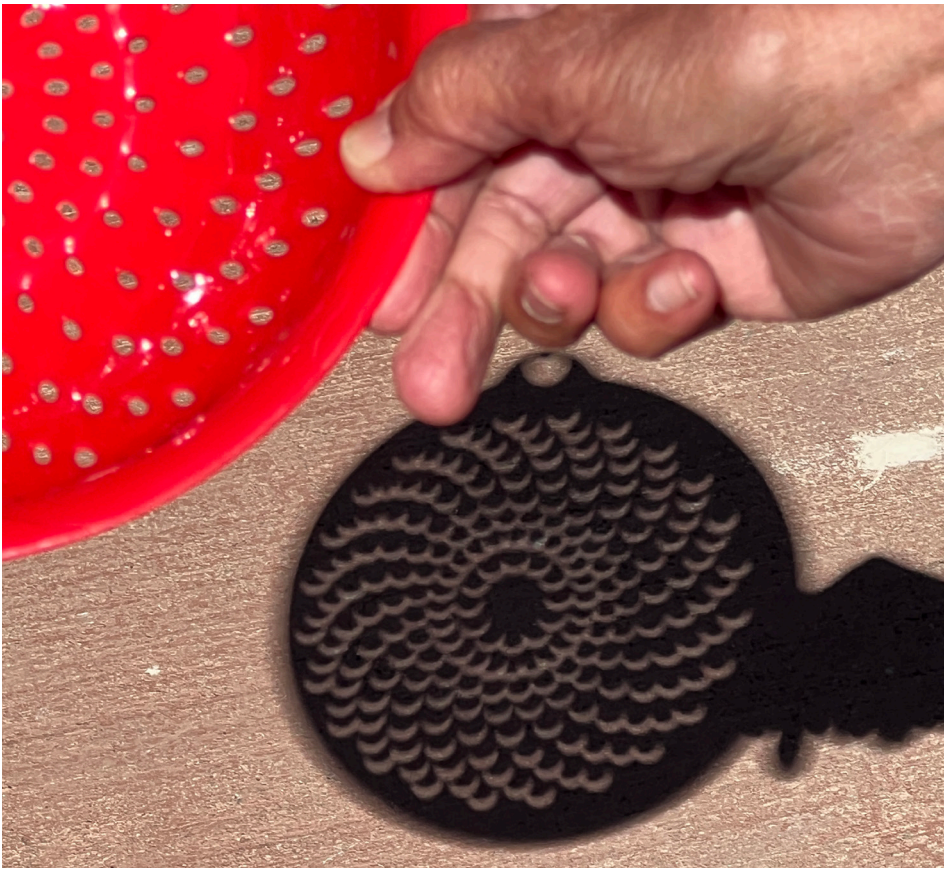
For observers in Rhode Island, the eclipse will only be partial, but a rather



Rhode Island experiences about 91% partial solar eclipse on Monday, April 8, similar to this image of the 2017 eclipse taken from Wyoming during the partial phase.

deep one. Most of the state will be under approximately 91% of the Moon’s shadow. This is more than enough to experience some of the more interesting aspects of a solar eclipse.

If the day is mostly cloudless, the first thing you’ll notice is the changing color of the clear blue. As the eclipse deepens, the sky transforms from its typical midday blue hues, to a very pale blue, into a dull silvery gray, as if the color is being almost com-



Using a colander to project the October 14, 2023 eclipse in Albuquerque, New Mexico.

pletely drawn out of the daytime sky. Also notice the quality of sunlight changes as we approach maximum eclipse. The light will take on a distinct golden-yellow cast, quite unlike any other daylight scenario, including the sunset “golden hour.” And while a 91% eclipsed Sun won’t be diminished

enough to reveal shadow bands, a phenomenon caused by narrow rays of sunlight exposing the dynamics of moving layers of air, ordinary shadows will take on a sharpness that looks eerily unnatural.

If we’re unfortunate to be under an over-cast sky, you will still notice quite a bit of

diminished daylight, not unlike the onset of twilight.

Either way, there are other changes to notice under a deep partial eclipse. First, you’ll probably notice the temperature drop by a few degrees. Depending on other conditions, like wind direction and the amount of cloud cover, this change may seem rapid and dramatic. Under full cloud cover, the change in temperature may be very subtle or even unnoticeable.

One of the more underreported phenomena to observe during an eclipse is the behavior of local wildlife. Listen for any birds, and how their calls change as the sky darkens and the temperature cools. Insects, too, are known to exhibit behavioral changes during eclipses, although early April may not provide many active insects in our area. One group of animals we are likely to hear from are the wood frogs and spring peepers, which are typically very active after sundown during this time of year.

Rhode Island’s partial eclipse begins at 2:15pm, when the Moon begins to bite into the lower right limb of the Sun. Maximum eclipse occurs at 3:29pm EDT, and the last contact, when the Moon departs the upper limb of the Sun, at 4:38pm EDT.

It cannot be emphasized enough that you cannot look at the Sun at any time without special solar filters. Doing so risks irreversible eye damage. Safe solar eclipse viewing glasses are widely available, and you may even still have a set from the last eclipse. Check your local library, as many of



them are hosting special programs to help you prepare for the eclipse, and some of them may have eclipse glasses to hand out at these events.

The simplest way to observe a partial eclipse is by using a pinhole projector. A small hole punched in a card which is held parallel to a smooth, uniform surface will reveal the phase of the eclipse, projected in reverse, just like a lens.

Of course, you could go even simpler, by laying your fingers of one hand perpendicular over the fingers of your other hand, with a slight gap between them, forming your very own eclipse projector, without any equipment whatsoever. Even if you have solar filters or a specialized solar telescope, this is always a simple and fun activity to do.

Finally, there are some nearby locations that are planning to host eclipse observing events:

Roger Williams National Memorial & River Bend Farm Visitor Center
[https://www.nps.gov/planyourvisit/event-details.htm?id=FA317F53-F20D-](https://www.nps.gov/planyourvisit/event-details.htm?id=FA317F53-F20D-BE34-9B23A858DFC987B6)

[BE34-9B23A858DFC987B6](https://www.nps.gov/planyourvisit/event-details.htm?id=FA317F53-F20D-BE34-9B23A858DFC987B6)

The eclipse will begin just after 2 PM and last about 2.5 hours. Park staff will have eclipse glasses on hand, so you can enjoy the (partial eclipse) event safely.

Visitors can also become official Eclipse Explorers. You can complete activities in an eclipse booklet and earn a special badge.

• **River Bend Farm Visitor Center**

287 Oak St, Uxbridge, MA

Visitor Center will be open 10 AM - 4 PM

• **Roger Williams National Memorial**

282 N Main St, Providence, RI

Visitor Center will be open 1 PM - 4 PM

Eclipse Watch Party at the Museum of Natural History in Roger Williams Park

<https://www.providenceri.gov/rwpmuseum-eclipse-april-2024/>

On Monday, April 8, 2024, the Museum is hosting a FREE watch party for the partial solar eclipse. The eclipse starts at 2:25pm and peaks at 3:30pm. Visit the Museum of Natural History for a family-friendly fun and viewing party. Enjoy hands-on activities and more as we gear up for the

main event. Each family visiting on April 8 will receive a FREE pair of eclipse viewing glasses, provided by the NASA Rhode Island Space Grant Consortium. This free community event includes FREE admission to the Museum on Monday, April 8.

Solar Eclipse at Brown

The NASA Rhode Island Space Grant Consortium will be hosting a viewing event on the Main Green for Brown University and the local community, weather permitting, from 2 PM - 4 PM.

<https://events.brown.edu/event/282989-solar-eclipse-at-brown>

Seagrave Memorial Observatory

While no formal program is planned, several members will be available with solar telescopes and live internet feeds from NASA.

For more information about eclipses, see <https://science.nasa.gov/eclipses>

For video live feeds, see <https://www.youtube.com/watch?v=2MJYptQW1o> and <https://www.youtube.com/watch?v=J5j95RUSLd8>

Skylights: April 2024

by Jim Hendrickson

April is the month during which we get our last look at the winter constellations. The later sunsets, warmer nights, and the chorus of peepers and wood frogs are clear indicators that spring is finally here. As the Sun climbs higher in declination, the impinging twilight consumes the previous season's stars at a more rapid rate than any other time of the year.

As we turn away from the winter sky, Ursa Major lies directly overhead, and the constellations of spring now occupy the eastern sky. As winter's bright stars, clusters and nebulae depart, we turn towards the part of the sky that appears more sparsely populated, but is more transparent to the more distant universe. Just after midnight, the galactic north pole is directly over our heads, which means that the Milky Way is nearly parallel to our horizon, and we're looking straight out of our galaxy.

Under dark sky conditions, binoculars will reveal a couple dozen galaxies in the spring sky, throughout the constellations Ursa Major, Coma Berenices, Virgo, and Leo. A modest telescope may reveal hun-

dreds.

One of the more challenging deep-sky observing opportunities presents itself every April, when observers at our latitude (~42° north) are able to observe an object that is considered to be a southern hemisphere gem, the globular cluster Omega Centauri. From our latitude, the cluster clears the horizon by just 1°.

The most important requirement, besides a moonless night of excellent transparency, is to find an observing site with a completely unobstructed southern horizon. A hilltop with southern exposure is good, but any light pollution or skyglow near the horizon will greatly increase the difficulty of seeing the object, so a southern shore may be the best option.

The next thing is to wait for Spica, alpha Virginis, to transit the meridian, because this star lies at the same right ascension as Omega Centauri. It is notable, also, that Mizar (zeta Ursae Majoris) also transits at the same time. When you reach 13 hours 28 minutes local sidereal time (the right ascension of Omega Centauri), aim your telescope directly at the southern horizon. A medium-to-high magnification works best, as it will darken the sky background and increase contrast. While keeping the horizon in view, slowly sweep back and forth to detect a diffuse "smudge" lying just over the

horizon. You will likely not resolve individual stars, but just gazing upon this massive cluster from as far north as we are is what makes this challenge worthwhile.

From the deep sky, back to our own solar system, there are plenty of interesting things to watch for in April.

After moving through Pisces for the past 38 days, the Sun enters Aries on the 18th. On that morning, the Sun begins rising before 6:00am, and will not rise later than 6:00am again until August 21.

The Moon reaches its last quarter phase, in Sagittarius, at 11:15pm EDT on the 1st.

The waning crescent Moon is 1.8° south-southeast of Saturn, and 3.8° east of Mars on the 6th. On the 7th, the very old 28-day Moon is 4.7° southwest of Venus before sunrise. A daytime occultation occurs between 12:45pm and 1:55pm EDT. As this is only 15° from the Sun, a well-shielded telescope or camera is necessary to observe it. Do not attempt if you are unable to prevent any sunlight from entering the optics.

New Moon comes on the 8th, marking the start of Lunation 1253. We don't often get a chance to "see" a new Moon, but this one is an exception, as it partially eclipses the Sun from 2:15PM to 4:38pm EDT, with maximum eclipse at 3:29pm, with 91% of the diameter of the Sun obscured by the Moon.

Following the eclipse, the waxing cres-

cent Moon joins both Jupiter and Uranus on the 10th, as the two planets are just 1.8° apart. With comet P/12 Pons-Brooks lying just 6.3° below the slender Moon, this should be a fine sight in binoculars.

The following evening, on the 11th, the Moon makes its monthly pass by the Pleiades cluster, M45, in Taurus. This month's pass, at 5.1° to the east, is not as close as some of the ones coming later this year, including an occultation in November.

On the 12th, the Moon is 1.8° southwest of Elnath (beta Tauri), and on the 13th it is 3.6° north-northeast of M35, the largest open cluster in Gemini. On this same night, look 3.0°, south of the Moon to find 4 Vesta, at magnitude 8.2.

The Moon is first quarter in Gemini at 3:13pm EDT on the 15th. Later that evening, it is 5.5° east-southeast of Pollux (beta Geminorum).

The waxing gibbous Moon is 4.8° west-northwest of Regulus, in Leo, early on the 18th – best seen before Moonset.

Sigma Leonis, a 4th magnitude class B main sequence star that is 210 light years away, is occulted by the Moon on the 20th, with disappearance behind the dark limb of the gibbous Moon 12:41am, and reappearance at 1:55am.

On the 22nd, the nearly full Moon is 0.4° north of Spica, in Virgo.

The **Full Pink Moon** occurs at 7:49pm on the 23rd. It rises at 7:35pm, which is less than a minute before sunset. On the morning of the 24th, the Moon sets five minutes after sunrise. Full Moons that are just above the horizon while the Sun also is make for the most dramatic views and photos. With the foreground landscape still in sunlight while the Moon hangs low in the sky beyond, it is rather simple to get the right ex-

posure for a spectacular photo. Use a tool such as The Photographer's Ephemeris to find the best alignments for moonrise and moonset scenes.

The first week of April marks the last of **Mercury's** best evening apparition of the year. The fleeting inner planet still sets over an hour after sunset, and is positioned nearly perpendicular to the horizon from the point the Sun dips below, making this an excellent time to turn a telescope on it and view its stunning crescent phase. Each night Mercury grows larger, and its crescent gets slimmer.

The last time you see Mercury during this apparition may be during the total solar eclipse, when the planet will be 6° from the Sun. After the 8th, Mercury quickly falls out of sight until after its inferior conjunction on the 11th, when it returns to the morning sky.

Although it remains low and difficult to observe, try to find it 1.7° north of Venus on the 19th.

Venus rises less than a half hour before the Sun throughout April, as it gets closer to its superior conjunction in June. It is joined by the waning crescent Moon on the 7th, and Mercury on the 19th.

Mars meets Saturn on the 10th, when the ringed planet is just 0.5° east-southeast of the red planet. It is notable that both Mars and Saturn are about equal in brightness, at magnitude 1.1, but Saturn is over five times more distant than Mars.

Mars joins Neptune on the 29th, when the two planets will be separated by just 0.1°. Neptune will be over 15 times more distant than Mars, and about 450 times fainter. If your telescope is able to resolve the globe of Neptune, you will find it is just about half the width that of Mars.

After ruling the sky for the past several months, **Jupiter** begins to sink into the evening twilight.

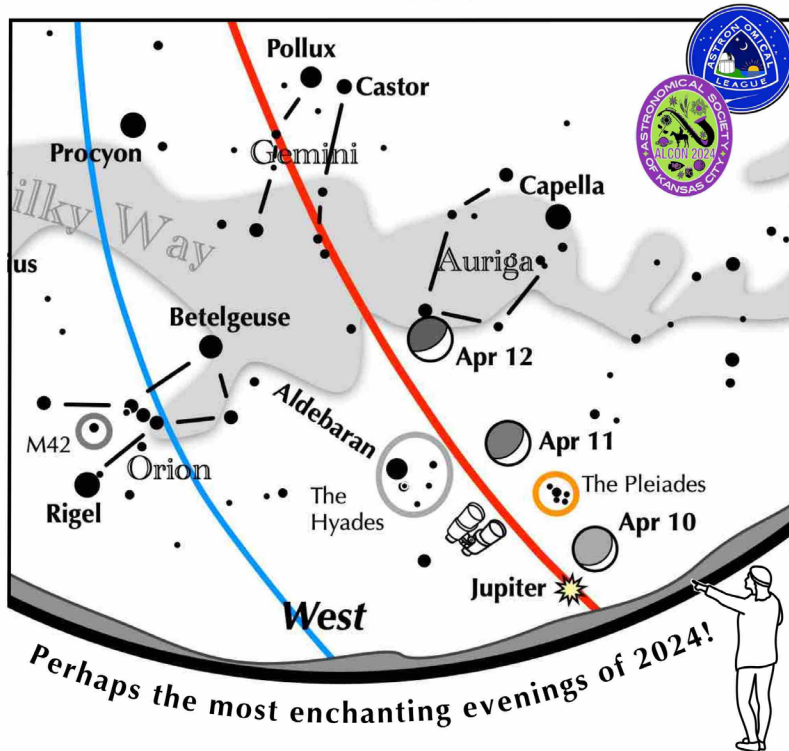
Before it departs our evening sky, it joins Uranus, 0.5° to its north, on the 20th, and moves into Taurus on the 28th.

Some notable arrangements of the Galilean moons that occur in April: On the 4th, the moons are paired on either side of the planet in a shallow parallelogram, with Io and Callisto to Jupiter's east, and Europa and Ganymede to the west.

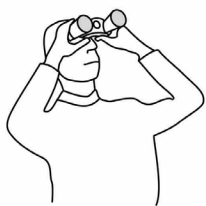
On the 6th, the moons appear in order of orbital radius, extending to the east of Jupiter.

As with Mars, **Saturn** reemerges from the glare of the Sun in April. The two planets meet up through the first half of April,

If you can see only one celestial event this April, see this one.



Perhaps the most enchanting evenings of 2024!



Enhance the scene – use binoculars!

www.astroleague.org

On April 10, 11, and 12, look low in the west-northwest 60 minutes after sunset.

- The crescent moon, glowing full with earthshine, floats just above the horizon in the bright twilight on April 10. Next to it shines Jupiter, and above it lies the pretty Pleiades star cluster.
- On April 11, the slightly thicker, but more pronounced crescent moon moves between the Pleiades and the Hyades star clusters.
- On the third night, the crescent moon stands commandingly above the scene.

Events in April

1	16:07	Mercury Stationary
1	23:15	Last Quarter Moon
3	06:15	Venus 0.3° S of Neptune
6	06:00	Moon 1.8° SSE of Saturn
6	06:00	Moon 3.8° E of Mars
7	06:00	Moon 4.7° SW of Venus
7	12:45	Moon occults Venus (in 12:45*, out 13:55*)
7	21:00	Vesta 0.2° N of M35
8	14:21	New Moon (Lunation 1253) Total Solar Eclipse
10	05:30	Mars 0.5° WNW of Saturn
10	20:00	Moon 4.0° N of Jupiter
10	20:00	Moon 2.8° NE of Uranus
11	04:00	Makemake Opposition (mag. 17.1, 52.68184 AU Sun, 51.815089 AU Earth)
11	19:03	Mercury Inferior Conjunction
11	21:00	Moon 5.1° E of M45
12	23:00	Moon 1.8° SW of Elnath
13	21:00	Moon 3.6° NNE of M35
13	23:00	Moon 3.0° N of Vesta (mag. 8.2)
15		Equation of Time = 0
15	15:13	First Quarter Moon
15	21:00	Moon 5.5° ESE of Pollux
18	03:00	Moon 4.6° NNW of Regulus
18	10:00	Sun in Aries
20	00:41	Moon occults Sigma Leonis (mag. 4.0, in 00:41, out 01:55)
20	21:00	Jupiter 0.5° S of Uranus
20	23:00	12P/Pons-Brooks Perihelion (0.7808 AU Sun, 1.6053 AU Earth)
22	03:00	Lyrind Meteor Shower
22	23:00	Moon 0.4° N of Spica
23	02:00	Sun Declination ½ to Solstice (+12° 43' 09")
23	19:49	Full Pink Moon
24	04:25	Mercury Stationary
28	09:00	Jupiter in Taurus
29	04:30	Mars 0.1° E of Neptune
30	22:00	Haumea Opposition (mag. 17.5, 49.98174 AU Sun, 49.11006 AU Earth)

Ephemeris times are in EST (UTC-5) through March 9 and EDT (UTC-4) after March 9 for Seagrave Observatory (41.845N, 71.590W)



and the waning crescent Moon joins the pair on the 6th.

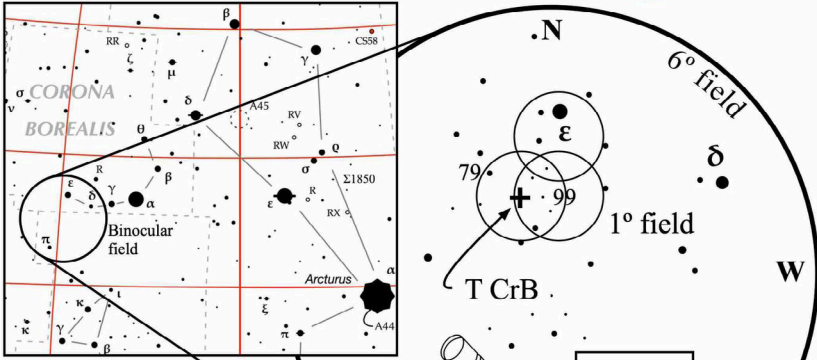
Since you probably haven't aimed your telescope at the ringed planet in a while, take note of the angle of the ring plane. It has narrowed considerably since before conjunction, and is now just around 4°. The ring plane angle will continue to lessen until late June, when it will be just 2.4°, then widen slightly through the remainder of the year, owing to Earth's faster orbit around the Sun, moving us further from the ring plane. The actual ring plane crossing occurs next March, when, unfortunately, Saturn will still be hidden in the glare of the Sun.

For much of the past year, we've used Jupiter as a guide, the starting point, on a

T Coronae Borealis

A nova waiting to happen – soon!
also known as HIP 78322 and the "Blaze Star"



How to find T Coronae Borealis


- Locate bright Arcturus and the kite shaped constellation Boötes.
- Corona Borealis lies directly east of Boötes.
- Trace the semi-circle of the stars of the crown.
- Epsilon and Delta are fourth magnitude stars shining east of Alpha (Gemma), the brightest member of the crown.
- Place Epsilon in the northern half of the binocular (or finder) field. Fifth magnitude Pi Serpentis lies near the bottom of the field.
- T Coronae Borealis is about 1/4 the distance between Epsilon and Pi.
- Move two low power eyepiece fields south of Epsilon.
- Then move 1/2 low power eyepiece field east.
- This is the vicinity of 10th magnitude T CrB.

- The star normally is magnitude 10.3.
- Ten years before its outburst, it rises to magnitude 9.8. It did this 10 years ago.
- It then dims to about magnitude 12 one year before outburst. It did this in April 2023.

Stellar Magnitude	Symbol
3	●
4	●
5	●
6	●
7	●
8	●
<8.5	•

Between now and September, T CrB is predicted to nova, quickly reaching 2nd magnitude and rivaling the brightness of Alpha CrB (Gemma).

- Its brightness rise will take 1 day or less.
- It will likely remain near maximum brightness (2nd mag.) for less than 10 days.



© 2024 Astronomical League
T CrB: Blaze Star
2403

journey to locate our seventh planet, **Uranus**. The two planets are within the same binocular field of view throughout April, and on the 20th, they are just 0.5° apart, with Jupiter and its four Galilean moons passing to the south of the tiny blue-green globe of Uranus. The two planets will be rather low on the horizon, and magnitude 5.9 Uranus will be difficult to spot without a sizable telescope.

After this month, Uranus remains out of view until later in June.

Neptune slowly rises out of its post-conjunction proximity to the Sun during April, and remains largely out of view until the end of the month. The first good opportunity to look at our outermost planet is on the 26th, when it lies just 0.1° west of Mars.

4 Vesta is still easy to observe in the evening sky. It crosses into Gemini from Taurus on the 3rd, and on the 7th, it will move

just 0.2° north of the open cluster M35. This close conjunction provides an excellent opportunity to witness celestial motion, as the magnitude 8.2 asteroid is moving about 0.3° east each night, and passes relatively close to the similarly bright stars of the cluster. Train a telescope on M35, leaving the cluster towards the southern edge of the field of view in a medium to high magnification eyepiece. A polar-aligned, tracking mount helps. Then keep an eye on the pair of 9th magnitude stars oriented north-south just north of the cluster. These stars can be used as a distance and angle reference as Vesta approaches from the northwest.

On the 30th, Vesta will still shine at magnitude 8.3, and lie just 0.4° southwest of Mebsuta (epsilon Geminorum).

3 Juno fades as it moves northward into Leo, and its high elevation in the early evening sky makes it an easy object to observe.

On the 7th, the magnitude 9.4 asteroid is just 0.5° east of rho Leonis, and it remains within the same field of view of the star for several days before and after.

Late in the evening of the 18th, the waxing gibbous Moon is 1.5° to the north of Juno.

2 Pallas brightens this month as it moves northward through Hercules. On the 22nd, the magnitude 9.0 asteroid is 3.2° east of Kornephoros (beta Herculis).

At the end of the month, Pallas is 1.3° southwest of NGC 6210, a 9th magnitude planetary nebula that is 6,500 light years away.

When observing Pallas, take note of how far north of the ecliptic it is. Besides comets and near-Earth objects (NEOs), bodies in our solar system are seldom seen traversing the sky this far from the ecliptic plane. Through most of April, Pallas is well north of 40° ecliptic latitude, and peaks at 47° later next month, before the asteroid moves into Corona Borealis.

1 Ceres is moving through Sagittarius in the morning sky. At the beginning of April, it lies 2.5° south of Albaldah (eta Sagittarii), the brightest star of the teaspoon asterism. Towards the end of the month, it is

7.0° north-northwest of the globular cluster M55. Through April, the dwarf planet brightens from magnitude 8.8 to 8.5 as Earth's distance to it decreases from 2.73 au to 2.36 au.

Pluto is in Capricornus, and now rises prior to the onset of astronomical twilight, bringing it once again into observability, although its southerly declination means it never attains a very high elevation in our sky. A large telescope or sensitive camera can pick up its magnitude 14.5 glow about 3.0° east of the globular cluster M75.

Two distant dwarf planets reach opposition in April. **Makemake**, at a distance of 51.82 au from Earth, is at opposition on the 11th, in Coma Berenices, its dim 17.1 magnitude light taking over seven hours to reach us.

Haumea, at a distance of 49.11 au, reaches opposition on the 30th. Its 6.8 hour old light appears as a magnitude 17.5 speck in Boötes.

Comet **12P/Pons-Brooks** reaches perihelion, at a distance of 0.78 au from the Sun, on the 20th. Barring an unexpected brightening, the comet will fall out of view during the last week of April, after which it begins to dive down towards the southern

hemisphere, and will not make an appearance in our sky again until 2094.

High in the southwest during the evenings, comet **144P/Kushida** has peaked at magnitude 10, and can be observed with a telescope moving eastward through Gemini. On the 3rd, it is just 0.3° north of lambda Geminorum.

It moves into Cancer on the 18th, and on the 22th it lies 2.5° south of the double star zeta Cancri.

Comet **C/2022 S3 (PanSTARRS)** is expected to remain between magnitude 9-10, and is moving northward through Vulpecula, and along the neck of Cygnus, through the rich starfields of the Milky Way. On the 1st, it is within the same binocular field of view as Collinder 399, also known as the Coathanger asterism. On the 26th and 27th, it is within 2° of Sadr (gamma Cygni).

Finally, the **April Lyrids** are active during the last two weeks of the month, with peak activity expected on the night of the 21st-22nd. This is a relatively low-rate shower, whose meteors appear to originate from a point southwest of Vega that actually lies within Hercules. Given the peak night occurs just before full Moon, prospects for observing this shower are not very favorable this year.

A Visit to the Museum of Science

by Francine Jackson

Although the weather was chilly and rainy here, it was beautiful in Boston's Museum of Science Sunday, March 17th. Rick Lynch, Bob Horton, Ron Zincone, Laura Landen, Denise Turco, Jim Hendrickson and Francine Jackson were met by Planetarium Specialist Darryl Davis, who, with the exception of the Omni program, gave us free rein to enjoy the Museum and Planetarium.

With time before the Omni presentation of *Deep Sky*, we moved around the Museum, finding several exhibits of interest, until we had to rush to the Omni. The program was

one of the best introductions to the JWST we had ever seen. Then, after grabbing a snack, it was on to the planetarium, for *God, Science, and Our Search for Meaning*, written and narrated by Dan Brown, of *Angels and Demons* fame. Although the title had a couple members a bit unsure of watching it, the end result had everyone totally amazed. The images were spectacular, and the consensus was it was one of the best ever seen.

We were also allowed to stay for the live program, *Explore the Universe: Eclipse Edition*, which was totally filled. Caity Sul-

livan was out with the audience, and Darryl manned the projection system. What all of us were amazed with was that every question Caity asked those present, almost everyone in the theater called out the correct answer, making us wonder if Massachusetts schools concentrated more on space science than other states.

After the program ended, it was decided to wend our way home, but all of us were happy to have gone, and we do hope to return in the near future, and hope others will want to go, also.



Participate in Eclipse Science

by Kat Troche



April is NASA's Citizen Science Month, and there is no shortage of projects available. Here are some citizen science projects that you can participate in on April 8th, on and off the path of totality right from your smartphone!

Eclipse Soundscapes

Eclipse Soundscapes will compare data from a 1932 study on how eclipses affect wildlife – in this case, crickets. There are a number of ways you can participate, both on and off the path. NOTE: you must be 13 and older to submit data. Participants 18+ can apply to receive the free Data Collector kit. Learn more at: eclipsesoundscapes.org/

GLOBE Eclipse

Folks that participated in the GLOBE Eclipse 2017 will be glad to see that their eclipse data portal is now open! With the

GLOBE Observer smartphone app, you can measure air temperature and clouds during the eclipse, contributing data to the GLOBE program from anywhere you are. Learn more at: observer.globe.gov/

HamSCI

HamSCI stands for Ham Radio Science Citizen Investigation. HamSCI has been actively engaged in scientific data collection for both the October 14, 2023, annular solar eclipse and the upcoming April 8, 2024, total eclipse. Two major activities that HamSCI will be involved in around the solar events will be the Solar Eclipse QSO Party (SEQP) and the Gladstone Signal Spotting Challenge (GSSC) which are part of the HamSCI Festivals of Eclipse Ionospheric Science. Learn more about these experiments and others at: hamsci.org/eclipse



SunSketcher™

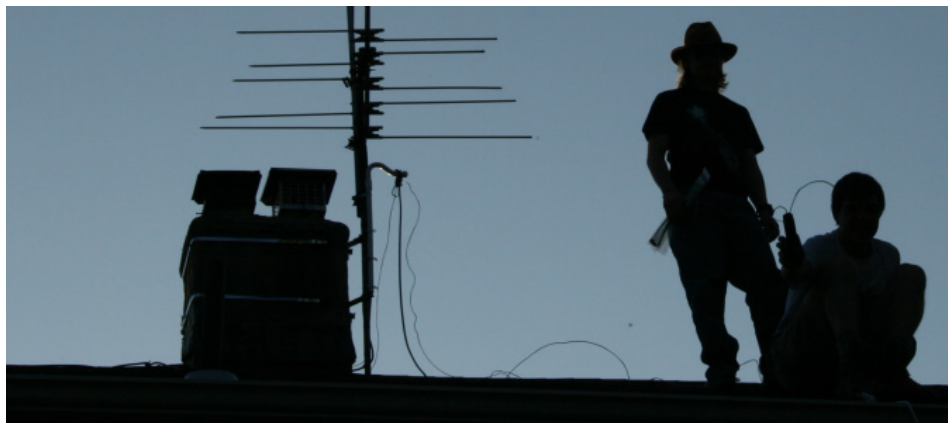
SunSketcher

If you're traveling to totality, help the SunSketcher team measure the oblateness, or shape, of the Sun during the eclipse by timing the flashes of Baily's Beads. You will need a smartphone with a working camera for this, along with something to hold the phone in place - don't forget a spare battery! NOTE: The app will need to run from five minutes before the eclipse starts until the end of the eclipse. Any additional phone use will result in Sun Sketcher data loss. Learn more at: sunskecher.org/

Don't stop at the eclipse - NASA has citizen science projects you can do all year long – from cloud spotting on Mars to hunting for distant planets! By contributing to these research efforts, you can help NASA make new discoveries and scientific breakthroughs, resulting in a better understanding of the world around us, from the critters on the ground, to the stars in our sky.

We'll be highlighting other citizen science projects with our mid-month article on the Night Sky Network page, but we want to wish all you eclipse chasers out there a very happy, and safe solar eclipse! For last minute activities, check out Night Sky Network's Solar Eclipse Resources section!

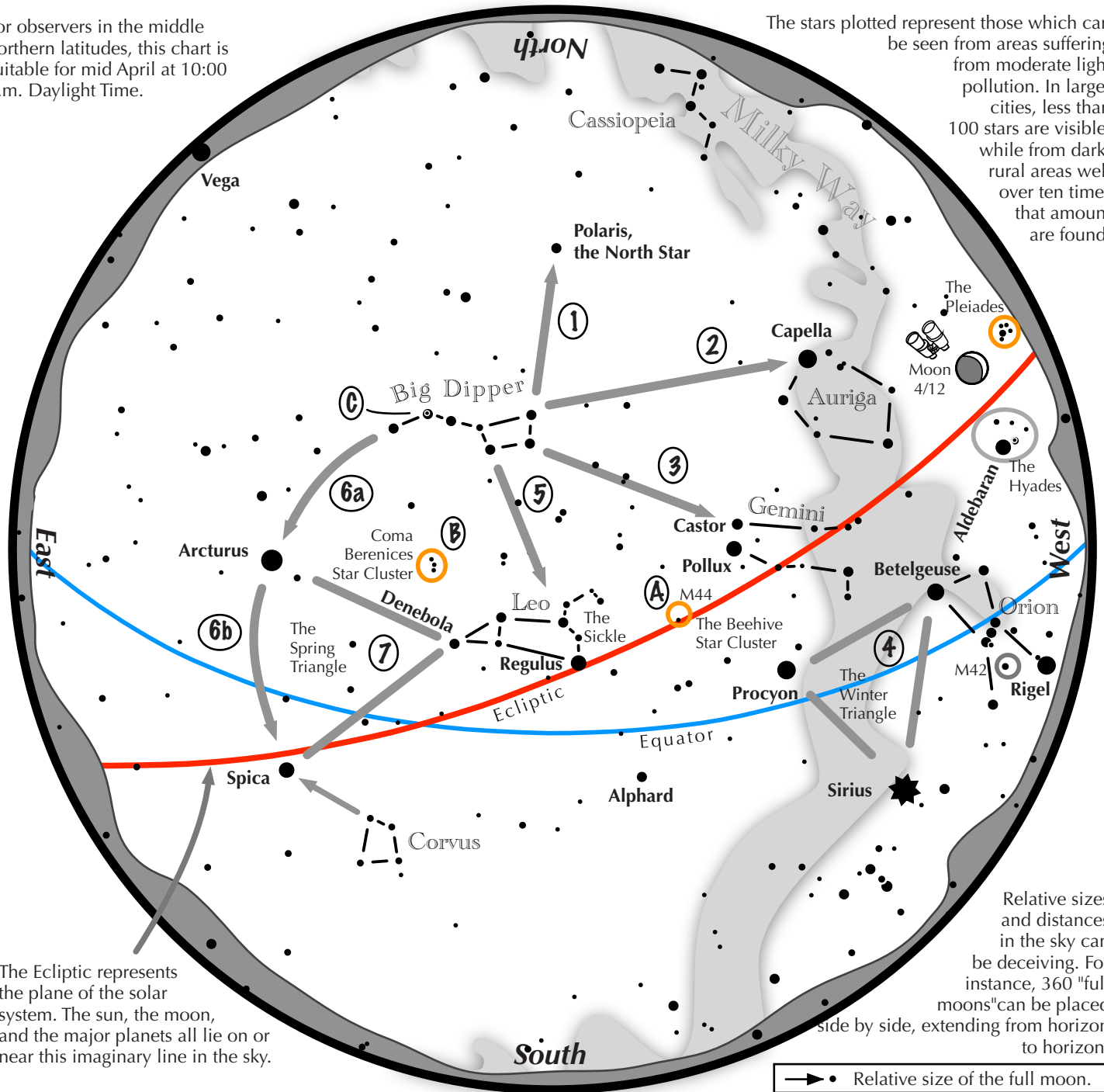
This article is distributed by NASA's Night Sky Network (NSN). The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!



Navigating the April Night Sky, Northern Hemisphere

For observers in the middle northern latitudes, this chart is suitable for mid April at 10:00 p.m. Daylight Time.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.



The Ecliptic represents the plane of the solar system. The sun, the moon, and the major planets all lie on or near this imaginary line in the sky.

Relative sizes and distances in the sky can be deceiving. For instance, 360 "full moons" can be placed side by side, extending from horizon to horizon.

→ • Relative size of the full moon.

Navigating the April night sky: Simply start with what you know or with what you can easily find.

- 1 Extend an imaginary line north from the two stars at the tip of the Big Dipper's bowl. It passes Polaris, the North Star.
- 2 Draw another imaginary line west across the top two stars of the Dipper's bowl. It strikes Capella low in the northwest.
- 3 Through the two diagonal stars of the Dipper's bowl, draw a line pointing to the twin stars of Castor and Pollux in Gemini.
- 4 Look in the west-southwest for the bright Winter Triangle stars of Sirius, Procyon, and Betelgeuse.
- 5 Directly below the Dipper's bowl reclines the constellation Leo with its primary star, Regulus.
- 6 Follow the arc of the Dipper's handle. It first intersects Arcturus, then continues to Spica.
- 7 Arcturus, Spica, and Denebola form the Spring Triangle, a large equilateral triangle.

Binocular Highlights

- A: M44, a star cluster barely visible to the naked eye, lies to the southeast of Pollux.
- B: Look nearly overhead for the loose star cluster of Coma Berenices.
- C: In the Big Dipper's handle shines Mizar next to a dimmer star, Alcor.



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The Sun, Moon & Planets in April

This table contains the ephemeris of the objects in the Solar System for each Saturday night in April 2024. Times in Eastern Daylight Time (UTC-4) for Seagrave Observatory (41.845N, 71.590W).

Object	Date	RA	Dec	Const	Mag	Size	Elong	Phase(%)	Dist(S)	Dist(E)	Rise	Transit	Set
Sun	6	1 01.5	6 33.3	Psc	-26.8	1917.9	-	-	-	1.001	06:19	12:48	19:18
	13	1 27.2	9 08.8	Psc	-26.8	1914.1	-	-	-	1.003	06:08	12:46	19:25
	20	1 53.2	11 36.8	Ari	-26.8	1910.4	-	-	-	1.005	05:57	12:45	19:33
	27	2 19.5	13 55.3	Ari	-26.8	1906.9	-	-	-	1.006	05:47	12:43	19:41
Moon	6	22 41.3	-12 09.1	Aqr	-10.4	1960.9	39° W	11	-	-	05:23	11:01	16:52
	13	5 13.0	27 28.6	Tau	-11.1	1913.4	57° E	23	-	-	09:10	17:25	01:40
	20	11 16.3	7 06.5	Leo	-12.4	1789.7	136° E	86	-	-	16:29	22:49	04:58
	27	16 41.7	-26 60.0	Sco	-12.5	1823.7	145° W	91	-	-	22:57	03:19	07:36
Mercury	6	1 32.8	13 05.6	Psc	3.2	10.5	10° E	5	0.388	0.639	06:26	13:16	20:04
	13	1 17.4	10 18.6	Psc	4.9	11.6	3° W	0	0.425	0.580	05:54	12:32	19:09
	20	1 03.5	6 50.8	Psc	2.9	11.4	13° W	7	0.451	0.590	05:26	11:52	18:17
	27	1 01.7	4 48.7	Psc	1.6	10.4	21° W	19	0.465	0.650	05:04	11:24	17:43
Venus	6	0 06.2	-0 57.7	Psc	-3.8	10.3	16° W	96	0.728	1.639	05:53	11:53	17:55
	13	0 37.9	2 28.0	Cet	-3.8	10.2	14° W	97	0.727	1.659	05:45	11:57	18:11
	20	1 09.7	5 51.8	Psc	-3.8	10.1	12° W	98	0.726	1.677	05:37	12:02	18:28
	27	1 41.9	9 09.5	Psc	-3.8	10.0	10° W	98	0.726	1.693	05:29	12:06	18:44
Mars	6	22 51.4	-8 37.4	Aqr	1.2	4.5	36° W	95	1.389	2.071	05:06	10:38	16:10
	13	23 11.7	-6 32.7	Aqr	1.2	4.6	37° W	95	1.386	2.045	04:51	10:30	16:10
	20	23 31.8	-4 25.5	Aqr	1.1	4.6	39° W	95	1.384	2.018	04:35	10:23	16:10
	27	23 51.7	-2 16.9	Psc	1.1	4.7	40° W	94	1.382	1.992	04:20	10:15	16:10
1 Ceres	6	19 14.5	-23 29.1	Sgr	8.8	0.5	90° W	97	2.837	2.661	02:29	07:00	11:31
	13	19 20.4	-23 38.2	Sgr	8.7	0.5	95° W	97	2.842	2.570	02:08	06:38	11:09
	20	19 25.3	-23 49.9	Sgr	8.6	0.5	101° W	97	2.847	2.479	01:46	06:16	10:45
	27	19 29.3	-24 04.6	Sgr	8.5	0.5	107° W	97	2.852	2.391	01:23	05:52	10:20
Jupiter	6	3 04.8	16 32.3	Ari	-1.9	33.8	32° E	100	5.005	5.828	07:45	14:49	21:54
	13	3 11.1	16 58.5	Ari	-1.9	33.4	26° E	100	5.007	5.885	07:22	14:28	21:34
	20	3 17.5	17 24.4	Ari	-1.9	33.2	21° E	100	5.009	5.932	06:59	14:07	21:15
	27	3 24.0	17 49.8	Ari	-1.9	33.0	16° E	100	5.010	5.970	06:36	13:46	20:55
Saturn	6	23 04.2	-7 47.0	Aqr	1.1	15.7	33° W	100	9.710	10.539	05:15	10:49	16:23
	13	23 07.0	-7 30.5	Aqr	1.1	15.8	39° W	100	9.708	10.471	04:49	10:24	15:59
	20	23 09.7	-7 15.0	Aqr	1.2	15.9	45° W	100	9.706	10.393	04:23	09:59	15:35
	27	23 12.2	-7 00.7	Aqr	1.2	16.1	51° W	100	9.704	10.307	03:57	09:34	15:11
Uranus	6	3 14.7	17 45.2	Ari	5.8	3.5	34° E	100	19.598	20.416	07:50	14:59	22:07
	13	3 16.2	17 50.9	Ari	5.8	3.4	28° E	100	19.597	20.478	07:23	14:32	21:42
	20	3 17.7	17 56.9	Ari	5.8	3.4	21° E	100	19.596	20.528	06:57	14:06	21:16
	27	3 19.3	18 03.0	Ari	5.8	3.4	15° E	100	19.595	20.565	06:30	13:41	20:51
Neptune	6	23 54.9	-1 52.8	Psc	8.0	2.2	19° W	100	29.901	30.848	05:44	11:39	17:35
	13	23 55.9	-1 47.0	Psc	8.0	2.2	25° W	100	29.901	30.805	05:17	11:13	17:08
	20	23 56.7	-1 41.4	Psc	8.0	2.2	32° W	100	29.901	30.750	04:50	10:46	16:42
	27	23 57.6	-1 36.2	Psc	7.9	2.2	38° W	100	29.901	30.683	04:23	10:19	16:16
Pluto	6	20 19.6	-22 36.5	Cap	14.5	0.2	75° W	100	34.988	35.238	03:29	08:04	12:40
	13	20 20.0	-22 36.6	Cap	14.5	0.2	82° W	100	34.993	35.126	03:02	07:37	12:12
	20	20 20.2	-22 37.1	Cap	14.5	0.2	88° W	100	34.998	35.012	02:35	07:10	11:45
	27	20 20.3	-22 37.8	Cap	14.5	0.2	95° W	100	35.003	34.898	02:08	06:43	11:18

The Smart Telescope Revolution

by Jeff Padell

The world of astronomy observing and imaging has been changing at an ever increasing pace. Image stabilized binoculars, hydrogen alpha solar scopes that only a few years ago were the purview of large observatories with lots of money, and smart telescopes. The smart telescopes started out by your being able to put an object number or name into the mount and it would slew to it. You still had to have the mount/scope properly aligned for it to find the object. The next level to come out was add-ons that would image the sky and align the mount for you. You still needed a mount and scope and the entire setup could be very expensive. You could do visual observing with this, and with adding a camera, imaging.

Now, just recently, the smart telescope revolution has started. This new generation of smart telescopes run the gamut from \$500 to \$4,000. The \$4,000 scope is the new soon to be release Celestron, then there is a scope at \$1,500. Today I am going to talk about the scope I decided on, the Seestar S50 by ZWO. So far I think it is the best smart scope, is only \$500, and weighs about 4 pounds. It comes with a table top tripod that holds it quite well, but it can be used on any regular tripod. It is alt-az although some people are using it on a wedge as an EQ scope, but I am not sure what that might do to the gears in the scope over

time, ZWO doesn't recommend it. The S50 not only does night time deep space objects but will find and image both the Moon and the Sun. Note however that it is not very good on the planets, they are too small for its short focal length (250mm)

The Seestar S50 doesn't have an eyepiece it is imaging only. It has a built in 64 gigabyte SD card, and you run it via a smart phone or tablet. You can have two devices connected to it at the same time. I got it for outreach as instead of a Jeep full of gear I can just grab the provided case, about the size of a thick briefcase and bring it where ever I want to go. One thing that is nice about this is that kids and older people are used to looking at things on cell phones and tablets rather than an eyepiece. You first download the Seestar app to control the scope and imaging. Setting up and using the S50 couldn't be easier, you put it on the tripod, I use the level built into the tripod to get it as level as possible, then attach the S50. Next step is to align the compass, that is accomplished by lifting and rotating the scope and tripod while in the compass part of the app. To make it even easier, I picked up a camera panoramic rotator and I leave the tripod in place and rotate the scope. Once it is aligned to the compass you then level the scope itself. Part of the app is a level with two "balls" you bring together as you adjust the tripod legs for level. Again,

to make it easier I got a special leveler with three knobs on Amazon. Once the scope is level enough, the balls turn green you are ready to go, you can get as precise as you want trying to get it perfectly level at 0.0 degrees, but really anything under 2.0 degrees when the balls turn green is good enough.

The next recommended step is horizontal alignment. It is not totally needed but recommended as it makes going to objects more accurate. You point the scope at an open area of the sky, from my home I have lots of trees but have a few breaks in them and a big one to the northwest so I will point the scope there and then say align and it does 3 different plate solving images and determines where it is.

Now the fun part: you tell it to go to an object! You can type in a Messier or Caldwell or NGC or a star, or use one of the recommended "what's up in the sky tonight" or use the built in sky chart to find an object. The S50 does 10, 20 and 30 second exposures, although I recommend 10 second exposures. The S50 will automatically stack them in a live stack and show it as it gathers the data on your device. Since it is alt-az it is susceptible to field rotation, so with any object if imaged long enough will show dark edges on the image. Less than 30 minutes it really isn't an issue. You can download just the live image or you can save the



individual files and stack them yourself on the S50, or download them to your PC and used Siril or Pixinsight to stack and process them. Depending on the brightness of the object will determine on how long you must image. For example after even 10 second you will be able to see M42!

I am posting images I have taken with the

S50 on Flickr <https://www.flickr.com/photos/jmpadell/albums/72177720314620443>

It being cold outside and not wanting to go out to set up if there is snow, I created an observing shelf from an air conditioner bracket to hang on my window sill with a piece of plywood on it. Rather than leave it out all the time it is easy to put out and take

in, takes about 20 seconds each way. Then I simply put the S50 on it. I also cut up a box to make a windscreen and privacy block for the neighbors house.

It takes less than two minutes to be ready to image and I am inside in the warmth! You could set up in a field or parking lot and image from the warmth of your car!

Lunar Imaging with the ZWO Seestar S50 Smart Scope

by Greg Shanos

A novel way to image the moon is with the use of a smart scope. A Smart Telescope utilizes sophisticated sensors, camera systems, and software to capture stunning images of the universe. I always wanted to purchase a smart scope; however, the price was prohibitive starting at \$3,999 to \$4,999. Recently the ZWO Seestar S50 has entered the market at an astonishingly low price of \$499. This smart scope is one of the most cost-effective, fastest and easiest ways to take impressive images of the Moon, Sun, deep-sky as well as Terrestrial objects. In this short review, I shall focus only on how to take impressive images of the Moon with the Seestar S50. There is also another smart scope on the market at this price range, namely the Dwarf II. I do not own a Dwarf II therefore I cannot say anything regarding this smart scope. I refer everyone to check out YouTube videos that do side by side comparisons of the Dwarf II, Seestar and other smart scopes before you decide which one to purchase.

The Seestar is easy to use and set up. It only takes approximately 5 to 10 minutes to set up the telescope and you are ready to go. After turning on the device, you sync it using built-in Wi-Fi to your iPhone/Android cell phone or Apple iPad. I highly recommend using an iPad since the image appears rather small on a cell phone. Next you need to calibrate the compass by turning the alt-azimuth mounted telescope and tripod 360 degrees several times until the telescope states the calibration is complete. Next you need to level the Seestar. There is an auto-level feature that successfully levels the telescope. You are now ready to begin imaging. There are four separate modes, namely Stargazing, Lunar, Solar and Scenery. Just click on Lunar mode and the Seestar automatically finds the Moon! The moon is centered in the field of view and is tracked accordingly.

Next click on autofocus and you're ready to image. You can take a single photographic snapshot of the Moon which is at lower resolution. The photograph appears and is saved as a jpg on your cell phone or iPad.

The Seestar features two video modes namely AVI (raw) and MP4 (compressed) for the Sun, Moon, and Planets. I recommend using only AVI (RAW) since this is uncompressed and compatible with Autostakkert. However, the file sizes will be very large. For a five-minute exposure, the file size of the video was a whopping 8 GB. This large video file is stored in the Seestars SSD internal memory which is 64 GB in size. A recent software/firmware update now allows for 2X and 4X digital zoom so you can focus on various craters and maria. You can then connect the Seestar and download the

video file to your computer. Once the AVI is downloaded you can import it into Autostakkert for aligning and stacking.

Unfortunately, planets in the Seestar appear very small due to the short focal length of only 250mm. The Seestar is optimized for a larger field of view that would encompass the Sun, Moon and deep-sky Objects.

The ZWO Seestar S50 software/firmware is updated at least twice a month with new features added at every upgrade. I have contacted ZWO support on several occasions and always receive a response within 24 hours!

The introduction of smart scopes will soon revolutionize the field of amateur astronomy. The Seestar and other smart scopes are light weight, easy to use and can take scientific quality images. In conclusion, a smart scope in the price range of \$499 is affordable and a necessary addition to everyone's arsenal of astronomical equipment. These powerful new instruments make astrophotography easy and fun with an added scientific value.





Frank Evans Seagrave

A Timeline of His Life & Contributions in Historical Context

by David A. Huestis

~ Preface ~

Over the years I have realized that while many folks may know about historical events in general, they are clueless as to where they fit in a historical timeline. When I taught astronomy labs at Bryant University for ten years, I encountered students who incorrectly “guessed” that Galileo Galilei made his observations in the 1800’s.

But even before these realizations I wanted to write Frank E. Seagrave’s biography to enlighten current and future Skyscrapers members. Frank was the original owner of our observatory and the eight-inch Alvan Clark refractor. He received this exquisite telescope for his 16th birthday in 1876. Two years later, in 1878, the telescope was delivered and an observatory was built

in the backyard of the family residence at 119 Benefit Street in Providence. The telescope was relocated to North Scituate in a new facility on Peepoad Road in 1914 due to deteriorating observing conditions in Providence. Skyscrapers acquired the observatory in 1936.

At this point in my life, I don’t expect that I will accomplish my dream of writing that biography. What I have decided to do though, is to create a timeline of Seagrave’s Life and Accomplishments and report it in historical context of what was happening in the world during his remarkable lifespan of just over 74 years. It will include both astronomical, scientific, and general history elements.

In the coming months I will present that timeline in a series of articles. Currently I do not know how many articles there will be. I have only recently begun to review all the research I had previously uncovered over the decades. The plan is to highlight as much of Seagrave’s work as possible and provide you with contemporary historical events and discoveries. Perhaps this project may help everyone to better appreciate the legacy of Frank Evans Seagrave.

First, let me enlighten you on how I became involved in the Skyscrapers organization and its rich history.

My interest in astronomy was kindled during my elementary school days when I participated in a school play about the solar

system in two different grades (perhaps 4th – 1962-1963 and 5th – 1963-1964). In one of them I portrayed the Sun, and in the other I played the role of the astronomy professor. Then in the 6th grade (1964-65) I completed an assignment comparing the sizes of all nine planets (Pluto was not demoted to dwarf-planet status until August 24, 2006). I still have that paper somewhere in my archives.

Also, while in the 6th grade, I purchased my first science fiction book - HG Wells' *War of the Worlds*. I couldn't put the book down. Wells sparked that interest in me about the possibility of extraterrestrial life.

At the same I purchased another book, *Flying Saucers: Serious Business*, by Frank Edwards. This work discussed many of the "classic" flying saucer sightings to-date and offered the author's opinion on their validity. I wanted to believe that our Earth was not the only inhabited world in the cosmos, but at the time I did know that the distances to even the closest stars would take an inordinate amount of time to traverse given the known laws of physics.

Still, I would often venture outdoors and look towards the heavens and wonder if that star, or that one over there, possessed a system of planets. And possibly one or many of them were inhabited by advanced beings. (It wasn't until 1992 that an extrasolar planet was confirmed.) At first my sky gazing was random, but then I purchased a planisphere and began to learn the constellations.

In addition, there were many science fiction series on television during the 60s that I couldn't get enough of. Furthermore, the US Space Program was well underway. Though I do not remember Sputnik, I do remember going out after sunset to watch Echo I (launched August 12, 1960), a high-altitude aluminized balloon, 100 feet in diameter) and Telstar I (launched July 10, 1962; a true satellite) traverse the sky. I was also very interested in following the progress of the Mercury, Gemini, and Apollo programs.

However, my initial interest in astronomy waned due to the influence of a teacher.

James Corbett was my home room teacher in the 7th grade (1965-1966). His area of expertise was World History. As I recall he was a WWII tank commander who had been in the Battle of the Bulge. He later went on to serve in the Korean con-

flict. He retired as a Colonel and went to college on the GI Bill where he became a history teacher. Our paths crossed in the North Smithfield school system.

I often asked him questions about WWII, especially on his role in the Battle of the Bulge. He was a great teacher who fostered my deep appreciation for history. During high school I had Mr. Corbett for World History I (9th grade) and World History II (10th grade). During most of my high school years at North Smithfield High School (NSHS) my twice-yearly meetings with the guidance counselor focused on my going to college to be a history teacher. That was until our math department shared a Digital PDP8 computer via a phone dial-up with another school during my junior year (1969-1970). Remember, this was way before the internet.

The first real astronomical event I recall was probably on the night of March 23, 1969, when the television news reported a display of the northern lights in progress. I remember going outdoors and looking to the northeast sky to see these undulating waves of greenish light brighten and fade repeatedly. It was quite a beautiful sight.

A partial solar eclipse seen from my grandmother's home in Providence, Rhode Island on Saturday, March 7, 1970 rekindled my astronomy interests. At the time I did not know about safe solar observing protocols, and irresponsibly used exposed black and white film negatives to watch parts of the event. At maximum eclipse just over 97% of the solar disk was obscured by the Moon. Fortunately, I suffered no eye damage.

During my senior high school year (1970-1971) NSHS obtained their own computer which was set up in a small storage closet. I'm relating this seemingly inconsequential story because it was the turning point in what would become my career path in the IT world.

Upon graduation I attended a business school and obtained a certificate in programming and accounting.

Furthering my interest in astronomy were some great displays of the aurora during the first week of August 1972.

Soon after starting a part-time computer operator position, I purchased a 6-inch Edmund Scientific reflector (the Super Space Conqueror) in August 1973. Armed only with a copy of the Old Farmers' Almanac, I

could easily locate Venus, Mars, Jupiter, and Saturn, as well as the Moon. At the end of 1974 I finally paid a visit to Seagrave Memorial Observatory during one of the society's public open nights. I was so impressed with the amateur astronomers that evening that I applied for membership at the December 1974 monthly meeting, and was voted into membership of Skyscrapers at the January 1975 meeting.

I soon learned of the rich history of the organization and that of the original owner of the observatory itself, Frank Evans Seagrave (1860 – 1934). At the monthly meetings, then Skyscrapers historian William "Bill" Guca would often provide some tidbits of information about Mr. Seagrave.

At some point Bill had little free time to fulfill the position. He knew of my interest, so he encouraged me to assume the role of historian. Bill and I became kindred spirits, and I was best man at his wedding.

With only a few faded copies of early newspaper articles about Frank Seagrave to guide me, I began to research this fascinating "amateur" astronomer. One of my proudest moments as a Skyscrapers member was back in 1986, when my article entitled "Stardust Memories: Frank Evans Seagrave and Halley's Comet - 1910," was published in the May 1986 issue of *The Rhode Island History Journal*. This article told the story of Seagrave's Halley Comet calculations, predictions, observations, and advice to a concerned public.

And in 2007, Skyscrapers newsletter editor and website guru Jim Hendrickson and I published a book entitled *75 Years of Skyscrapers (1932 – 2007)*.

The plan is to publish the first installment of Frank Seagrave's historical timeline before the northern hemisphere's summer solstice on June 20.

Special note: When I joined Skyscrapers in January 1975, the organization had only one image of Frank Evans Seagrave. It shows Frank at the Clark refractor looking up along the tube assembly. When I became Skyscrapers historian and began to research Seagrave, I began to locate additional images. Two of them were taken by the same photographer who had produced the original one. As of the writing of this historical timeline document we now have 14 images and one movie of Seagrave. All of them will soon be posted online for everyone to see. DAH

Observer's Challenge: NGC 2440: Planetary Nebula in Puppis

by Glenn Chaple

Magnitude 9.4; Size 74" X 42"

Our March Observer's Challenge takes us to the southern constellation of Puppis and the planetary nebula NGC 2440. It was discovered by William Herschel discovered on March 4, 1790 and described by him as "a beautiful planetary nebula of a considerable degree of brightness, not very well defined, about 12" or 15" in diameter." Modern-day images reveal faint butterfly wing-like extensions that expand its true dimensions to 74" by 42", hence its nick-name the Butterfly or Bow Tie Nebula.

NGC 2440 is located at 2000.0 coordinates 7h41m54.9s right ascension and -18o12'29.7" declination. Star-hoppers will find it by starting at the bright open cluster Messier 47 and centering on a 4.9 magnitude star located one degree to its south-east. A three degree drift southward will bring you to the Butterfly.

I first saw NGC 2440 on the evening of March 21, 1979, using a 3-inch f/10 reflecting telescope and a 60X eyepiece. At that magnification, the nebula appeared like a 9th magnitude star. At 120X, it took on a fuzzy appearance when compared to an 8th magnitude star a few arc-minutes to its east. Further east and to the south was a double star whose components were oriented north-south and estimated by me to be 9th magnitude with a 30 arc-second separation. The nebula itself appeared to be a few arc-seconds in diameter – the outer regions were obviously too faint for such a small instrument.

NGC 2440 is of particular interest to professional astronomers because of its complex, chaotic structure. The central star is an extremely hot white dwarf with a surface temperature of 200,000 degrees C (360,000 degrees F). At magnitude 17.5, it's too faint to be seen with most backyard scopes. Most sources place NGC 2440 at a distance of 4000 light years.

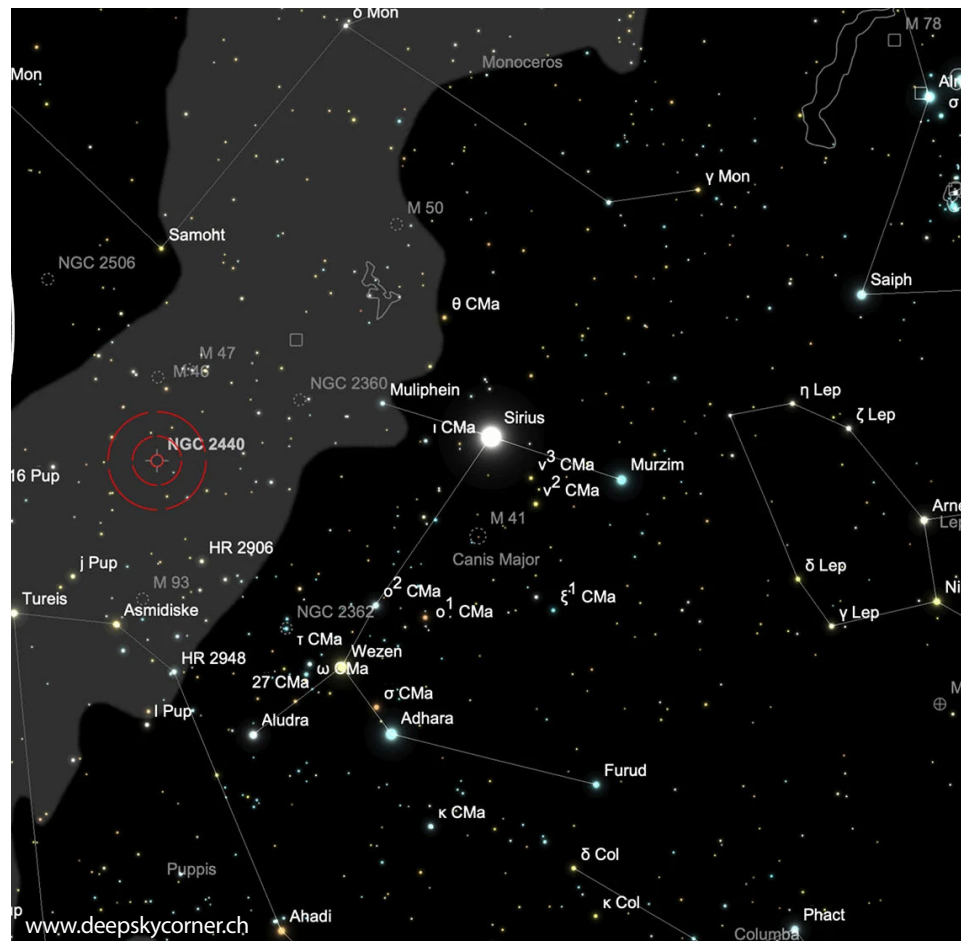
The purpose of the Observer's Challenge is to encourage the pursuit of visual observing. It is open to anyone who is interested. If you'd like to contribute notes, drawings, or photographs, we'd be happy to include them in our monthly summary. Submit your ob-



This was taken with my 32 inch scope with NB filters (Ha, O3, S2) for a total of about 2 hours imaging, with my ZWO 6200 camera. processed in PixInsight. Mario Motta, MD (ATMoB)

servicing notes, sketches, and/or images to Roger Ivester (rogerivester@me.com). To find out more about the Observer's Chal-

lenge, log on to rogerivester.com/category/observers-challenge-reports-complete.



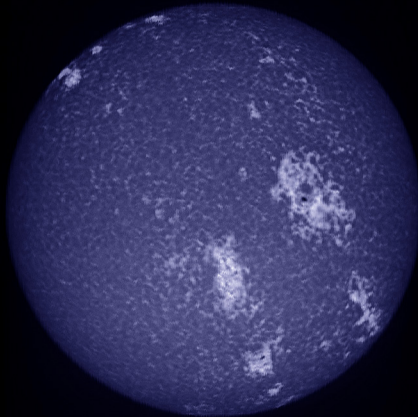


Penumbral Lunar Eclipse by Greg Shanos

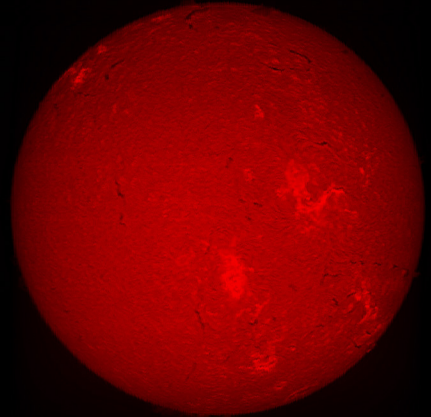
Penumbral Lunar Eclipse of March 25, 2024 at 7h 13m UT (3:13 am local time). Maximum predicted eclipse for Sarasota, Florida was 7h 12m UT (3:12 am local time). The temperature was 64°F with a relative humidity of 89%. The moon was 52.8 degrees above the horizon. The image was processed as it would have appeared naked eye through binoculars. A definite darkening was visible in the south near the crater Tyco. Seeing was average with a Jetstream. The transparency was clear skies with a slight haze. Meade 2.25 inch refractor 250mm at f/4 piggybacked on an equatorially mounted Meade LX6 8-inch Schmidt-Cassegrain. The camera was ZWO ASI 178MM monochrome camera with an Optolong UV/IR cut filter. Processed using Autostakkert 4.0.11beta, Registax 6.1 and further sharpened in Photoshop CS4. Image by Gregory T. Shanos

Sun in multiple wavelengths by Conrad Cardano

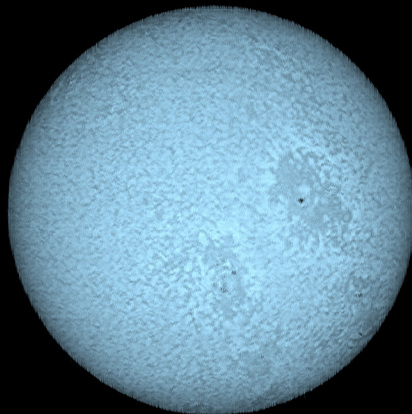
Taken March 22 using a SolEx spectroheliograph on 3" refractor. Besides the Sun, this setup can also be used to take stellar spectra images.



The Sun 03/22/2024 Calcium K Light



The Sun 03/22/2024 in Hydrogen Alpha Light



The Sun 03/22/2024 in Hydrogen Beta Light



Solar Prominences 03/22/2024

STARRY SCOOP

Editor: Kaitlynn Goulette



WHAT'S UP

On April 8th, a once-in-a-lifetime opportunity will present itself to people across North America. A total solar eclipse occurs when the sun and moon are perfectly aligned, with the moon casting a shadow on regions of the earth. The part in which the entire sun is blocked is called the path of totality, being only about 100 miles wide. Totality occurs for a mere few minutes, but the unique display is something astronomers travel the world to experience again and again.

April provides the last chance to observe Jupiter, as it will soon dip below the horizon into the sunglow. A 4th magnitude comet is visible nearby, slowly moving to the southeast as the month progresses. Catch both the planet and comet along with the thin crescent moon on the 10th, all within about 5 degrees of each other.

The large Winter Hexagon asterism has moved into our western sky and is slowly disappearing behind the tree line. The spring stars are now holding center stage, bringing with them "galaxy season." Coma Berenices, Virgo, and Leo all contain a wealth of galaxies. Just beneath Leo the lion's hindlegs lies a famous grouping of star systems known as the Leo Triplet. This is a popular target for astrophotographers and represents a small portion of the cosmic beauty found within this region.

The 14th marks the one-year anniversary of the launch of JUICE, the JUpiter ICy moons Explorer. This spacecraft, launched by the European Space Agency, will reach Jupiter in

2031 with the goal of studying the gas giant and its moons Ganymede, Callisto, and Europa. The possibility exists that these worlds are inhabited by some form of life due to the large bodies of water they host.

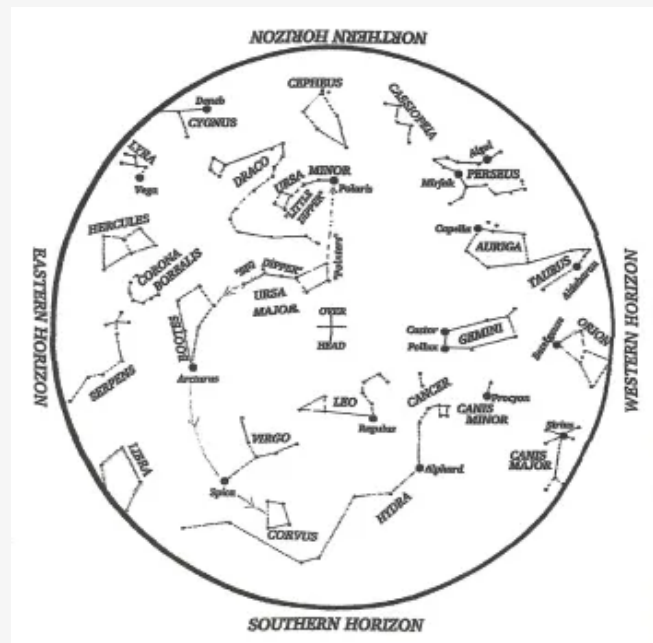
APRIL'S SKY

8: New Moon

8: *Solar Eclipse*

22-23: Lyrid Meteor Shower Peak

23: Full Moon



Credit: Roger B. Culver

Hold star map above your head and align with compass points.

OBSERVATIONS

My town is lucky enough to have an active space and astronomy club, not only in the high school, but at the middle school as well. Recently, the WMS Space and Astronomy Club hosted an observing event in which the entire student body was invited, along with members of the high school club.

Even before the skies became dark, crowds were gathering. Pointed at the moon was the beautiful telescope, hand-crafted by Robert Gravel, which was donated to the middle school club in 2019. Joining students and their families was Westfield Mayor Mike McCabe, who had the opportunity to explore the medley of craters coating the moon's surface. Throughout the night, the target changed to the planets Jupiter and Saturn, as well as other celestial objects.

Many members of the WHS Space and Astronomy Club offered assistance with using the telescopes and shared their knowledge of the night sky. Warren Carrington, a local astronomer, also shared his expertise and knowledge, and brought his Seestar Smart Telescope. This amazing piece of technology imaged the Orion Nebula and allowed attendees to view the photo on his iPad rather than through an eyepiece.



The purpose of the Starry Scoop is to communicate current astronomy and space events. If you want to share your observations or get digital copies of the Starry Scoop, contact starryscoop@gmail.com. The Starry Scoop is now on Facebook. Clear skies!

OBJECT OF THE MONTH

The featured object for the month of April is Caldwell 38. This galaxy, located 42 million light-years away, has a spiral structure that we view edge-on. This appearance has earned it the nickname "Needle Galaxy" and grew its fame in the astronomy community.

Find the Needle Galaxy in Coma Berenices, about three degrees southeast of Gamma Comae Berenices. Due to its great distance, a telescope is needed to resolve this galaxy. Good luck!



Needle Galaxy

Photo Credit: ESA/Hubble & NASA



Mayor McCabe peers into the telescope eyepiece while other visitors gaze skywards. Photo by Don Goulette.

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