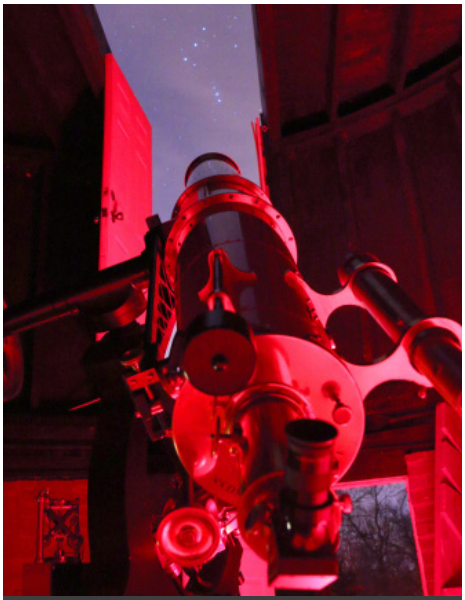
SKYSCRAPERS INC.

the Skyscraper

vol. 51 no. 9
September 2024

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

In This Issue:



Seagrave Memorial Observatory Open Nights
September 7, 14, 21 @ 8pm
September 28 @ 7pm

Constructing the 32-Inch Relay Telescope by Mario Motta

Saturday, September 7 @ 7:00pm EDT at Seagrave Memorial Observatory
In-person and on Zoom (Contact Linda Bergemann (lbergemann@aol.com) for the Zoom link.

In 2004 my wife and I resolved to move from Lynnfield to Gloucester MA. We obtained a plot of land overlooking Wingaersheek beach, which satisfied my wife's desire to live next to a beach, and my desire for a dark sky site, and still be able commute to work. After having made 2 prior observatories, and a previous 32 inch Newtonian, I resolved that the next telescope and observatory would be part of the home itself for ease of observing.

Scott Milligan convinced me to make a "relay' telescope with a spherical primary, and 5 correctors, rather than a difficult to make parabolic mirror. (Similar to the Hubble fix). Following his prescription closely, and with his help 6 optical elements were made, as well as 680 mechanical parts on my lathe and milling machine. I had considerable help from the combined expertise of many members of the ATMOB in designing and building this telescope and observatory, but entirely homemade.

I will describe the design, construction process, and improvements made over the years, as well as research projects undertaken, and show some deep sky images taken through this superb instrument.

Mario E. Motta, MD, FACC

Dr. Motta had been in practice at North Shore Medical Center in Salem, Massachusetts, since 1983, recently retiring in 2022. He is a graduate of Boston College, with a BS in physics and biology, and of Tufts Medical School. He is board certified in Internal medicine and Cardiology, and is a fellow of the American College of Cardiology, and of the American Society of Nuclear Cardiology. He is an associate professor of medicine at Tufts University School of Medicine. Dr. Motta has long been active in organized medicine, both in the American Medical Association (AMA) and in the Massachusetts Medical Society (MMS), holding a number of posts through the years. He is a past President of the MMS. He was elected and served 8 years on the AMA council of Science and Public Health, and then was elected to the Board of Trustees of the AMA in 2018, recently completing his term. In May of 2023 at its annual meeting, the MMS awarded Dr Motta its highest honor, the "Award for Distinguished Service."

Dr Motta also has a lifelong interest in astronomy, and has hand built a number of telescopes and observatories through the years to do astronomical research, including his entirely homemade 32 inch F6 relay telescope located in Gloucester, MA. He has been awarded several national awards in astronomy, including the Las Cumbras award from the Astronomical Society of the Pacific in 2003, and also the Walter Scott Houston award from the northeast section of the Astronomical League, and in 2017 the Henry Olcott Award from the American Association of Variable star Observers (AAVSO). He has served as a president of the ATM's of Boston, and has served as a council member of the AAVSO, and is a past president as well. He has also served on the Board of the IDA. He has worked on light pollution issues, and published several white papers on LP as a member of the AMA council of science and public health. He served on a UN committee (COPUOS) representing the AMA on light pollution for a worldwide effort to control LP and satellite proliferation. Finally, several years ago the International Astronomical Union awarded Dr Motta an asteroid in part for his work on light pollution as well as amateur research, asteroid 133537 MarioMotta.

President's Message

by Linda Bergemann

I am pleased to announce that Skyscrapers has won the 2024 Library Telescope drawing for the New England Region of the Astronomical League (NERAL). Each year the AL, through the Horkheimer Charitable Fund, awards a Library Telescope to an AL club in each region of the United States. This is the third time that Skyscrapers has received this award.

The Library Telescope consists of a table-top 4.5-inch Dobsonian Reflector fitted with an 8-24 mm zoom eyepiece, and a name plate commemorating the late Jack Horkheimer. The Library Telescope program was initiated by the New Hampshire Astronomical Society in 2008 and has grown into a nationwide presence. Clubs donate an easy-to-use portable telescope with quality optics and a sturdy mount to their local library. Patrons can then check it out as they do books.

Skyscrapers' involvement with the Library Telescope Program began in 2017, with the donation of Orion StarBlast telescopes to three Rhode Island libraries. This was followed by assisting other libraries with the purchase of telescopes with their own funds. In 2021, and again in 2022, Skyscrapers won the Library Telescope from the Astronomical League. These telescopes were donated to North Scituate Public Library and the Woonsocket Harris Public Library. This year, the AL Library Telescope will be donated to the Hope Public Library in Scituate, RI. We anxiously await its arrival sometime this Fall.

Telescopes, continued... We are cleaning house (or observatory)! We have gone through our inventory of telescopes and have decided to surplus many that are not being used and just gathering dust. A variety of telescopes and mounts will be available for purchase during AstroAssembly. They are priced to move! Pay us a visit on October 5th, and go home with a "new" telescope.

Warm wishes and clear skies,
Linda

New Members
Welcome to Skyscrapers

Jacinda Gides & daughter of Warwick

Library Telescopes In Rhode Island

Town	Library
Barrington	Barrington Public Library
Charlestown *	Cross' Mills Public Library
Coventry **	Coventry Public Library
Cumberland	Cumberland Public Library
East Greenwich *	East Greenwich Free Library
Greenville	Greenville Public Library
Little Compton	Brownell Library
Newport **	Newport Public Library
North Kingstown *	North Kingstown Free Library
Portsmouth	Portsmouth Free Public Library
Scituate ***	North Scituate Public Library
Tiverton **	Tiverton Public Library
Warwick **	Warwick Public Library
Westerly **	Westerly Library and Wilcox Park
Woonsocket ***	Woonsocket Harris Public Library

* Donated by the members of Skyscrapers, Inc.

** Purchased by the library with assistance from Skyscrapers, Inc.

*** Donated by the Astronomical League Horkheimer Charitable Fund

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 **September 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.

AstroAssembly 2024

Friday & Saturday, October 4 & 5

Seagrave Memorial Observatory 47 Peeptoad Road North Scituate, Rhode Island

AstroAssembly is the annual convention and fund-raising event for Skyscrapers, Inc., owners and operators of Seagrave Memorial Observatory, located in North Scituate, RI. The first "Amateur Astronomical Convention of the Skyscrapers" was held on August 2 & 3, 1952. Through the years, we have welcomed many notable speakers, including well-known astronomers, astrophysicists, scientists, and, even astronauts. This annual event brings together amateurs from all over the New England area to reconnect with old friends, learn something new and just have an enjoyable day.

The festivities will begin with **AstroAssembly Eve on Friday night** for those in the area; registration for AstroAssembly is not necessary to attend.

There will not be a Saturday evening banquet and speaker as in years past. We will instead, break at 5 PM for a snack and socializing, as well as distribution of awards and prizes. The program will conclude with our evening speaker at 6:30 PM.

All day Saturday at Seagrave Observatory

Swap Table (please bring your own table), Solar Viewing, Astro-Imaging Contest, Homemade Telescopes (bring yours!).

9:00 AM Registration Open

Morning coffee and pastries provided. Registration includes evening pizza and snacks.
Members: $25 Non-members: $30

10:30 AM – Allen Hall, Skyscrapers, Inc.

Restoring the 16" Group 128 Cassegrain for the University of Connecticut

12:00 PM – Deli Lunch

Choice of Grinder (Italian Deluxe, Turkey or Roast Beef), Spinach Pie or Salad (Garden, Garden w/ Grilled Chicken).
$15 per person. Pre-order and payment with registration required.

Astro-Imaging Contest: Noon to 4:00 PM

See our website for more information.

1:15 PM – Jeff Norwood, Camera Concepts and Telescope Solutions

Recent Developments in Optical and Astronomical Equipment

2:30 PM – Dr. Edward Guimont, Bristol Community College

When the Stars are Right, HP Lovecraft and Astronomy

3:45 PM Doug Gobeille, University of Rhode Island

Extraterrestrials, Black Holes, and Death by Space: Why Astrophysics Matters

5:00 PM Socializing & Lite Dinner

Pizza, snacks, soda, water and coffee included with basic registration.

6:00 PM – Raffle and Astro-Imaging Awards

6:30 PM – Dr. Peter Schultz, Emeritus Brown University

Bad Day Over Chile: Impact of a Cometary Body?

8:00 PM – Observing at Seagrave Memorial Observatory

The observatory's telescopes will be available for observing (weather permitting), or set up your own telescope on the grounds.

Information & Registration

theSkyscrapers.org/astroassembly2024

Skylights: September 2024

by Jim Hendrickson

Nights get noticeably longer through September. We will experience our last sunset in the 7:00pm hour on the 11th; it will not be above the horizon this late again until March 22.

The **Sun** crosses the celestial equator into a southerly declination, marking the equinox, at 8:43am on the 22nd. A few days later, on the 25th, the amount of darkness becomes greater than the daylight hours.

After traversing Leo for the past 37 days, the Sun crosses into Virgo on the 16th.

September begins with the waning crescent Moon joining Mercury in the eastern sky at dawn. The 27.3-day, 2.5% illuminated crescent is 4.2° to the north of the planet. Take note of the angle of the Moon, as the cusps of the crescent will be oriented nearly horizontally, due to the Moon's position well north of the ecliptic, and the steep angle of the ecliptic on the eastern horizon in early September.

The Moon is new at 9:56pm on the 2nd, marking the beginning of Lunation 1258.

As it progresses through its waxing crescent phase, it can be found near Venus, 4.5° west of the planet on the 4th, and 6.3° southeast of it on the 5th. On the 6th, the Moon is 2.6° southeast of Spica, in Virgo.

On the 9th, at 8:08pm EDT, the waxing crescent Moon occults magnitude 2.8 Fang (pi Scorpii). Egress from the bright limb of the Moon occurs 42 minutes later.

First quarter Moon occurs at 2:06am EDT on the 11th, in Ophiuchus.

The Moon is full, in Aquarius, at 10:34pm EDT on the 17th, As this is the closest full Moon to equinox, this is the Harvest Moon. This is no ordinary full Moon, however, as there are two events to watch for. The first is a **partial lunar eclipse**.

The second show put on by this month's Harvest Moon will be an **occultation of Neptune**, which begins at 4:13am and ends at 4:33am on the 18th. Neptune shines at a relatively bright magnitude 7.7; and seeing it beyond the bright limb of the full Moon will require higher magnification with a medium-sized telescope to not miss it.

The Moon passes Saturn, 1.3° west-southwest of the planet, on the morning of the 17th. On the evening of the 21st, it is 3.3° north-northwest of Uranus.

The waning gibbous Moon is 0.2° south of the Pleiades cluster in Taurus on the 22nd, and occults Electra (17 Tauri), the southwesternmost of the bright members of the cluster during civil twilight. Ingress occurs at 6:24am, during civil twilight, and egress is at 7:19am, during daylight.

The waning gibbous Moon is 5.7° northeast of Jupiter before midnight on the 23rd.

The Moon is last quarter, in Gemini, at 2:50pm EDT on the 24th

During the Moon's waning crescent phase, it passes 4.5° north of Mars on the 25th, 1.6° south of Pollux, in Gemini, on the 26th, and 3.1° north-northwest of the open cluster M44, the Beehive, in Cancer, on the 27th.

Of note is the orientation of the crescent Moon as it wanes late in the month. Due to its position north of the ecliptic, and the high angle of the ecliptic from the eastern horizon, the cusps of the crescent are nearly horizontal, with the Earthshined globe sitting neatly atop. This view is particularly stunning when the Moon is just 2.2° north-northeast of Regulus on the morning of the 29th, and on the 30th, when the 0.00% illuminated crescent rises from the darkened horizon at 4:30am.

Mercury undergoes its best morning apparition of 2024 during September, rising as early as 4:43am EDT, over 90 minutes before sunrise, on the 4th, when it reaches its greatest elongation,18.0° west of the Sun.

The 27.3-day, 2.5% illuminated crescent Moon is 4.2° north of Mercury on the 1st.

Mercury passes 0.5° north of Regulus, in Leo, on the 9th.

Mercury remains above the eastern horizon for at least an hour before sunrise through the 17th, then rapidly sinks into twilight and out of view as it approaches superior conjunction on the 30th.

Through a telescope, Mercury shows a crescent phase until the 5th, when it shines at 50% illumination, then progresses through its waxing gibbous phases.

Venus is visible low in the west, setting about an hour past sunset throughout September.

The waxing crescent Moon joins Venus on the 4th and 5th, when it will be 4.5° west and 6.3° southeast of the planet, respectively.

Venus joins Spica on the 17th, when the brilliant planet is 2.5° north of the magnitude 1.0 star in Virgo.

Mars becomes an evening planet on September 15, when it rises before midnight for the first time. The Red Planet continues to move eastward at a faster pace than Jupiter, extending its separation from the giant planet from 8.8° in early September to 23.4° at the end of the month.

With both Mars and Jupiter traversing the Winter Hexagon, it will be interesting to watch how the two bright planets redraw the pattern of the familiar asterism over the next several months.

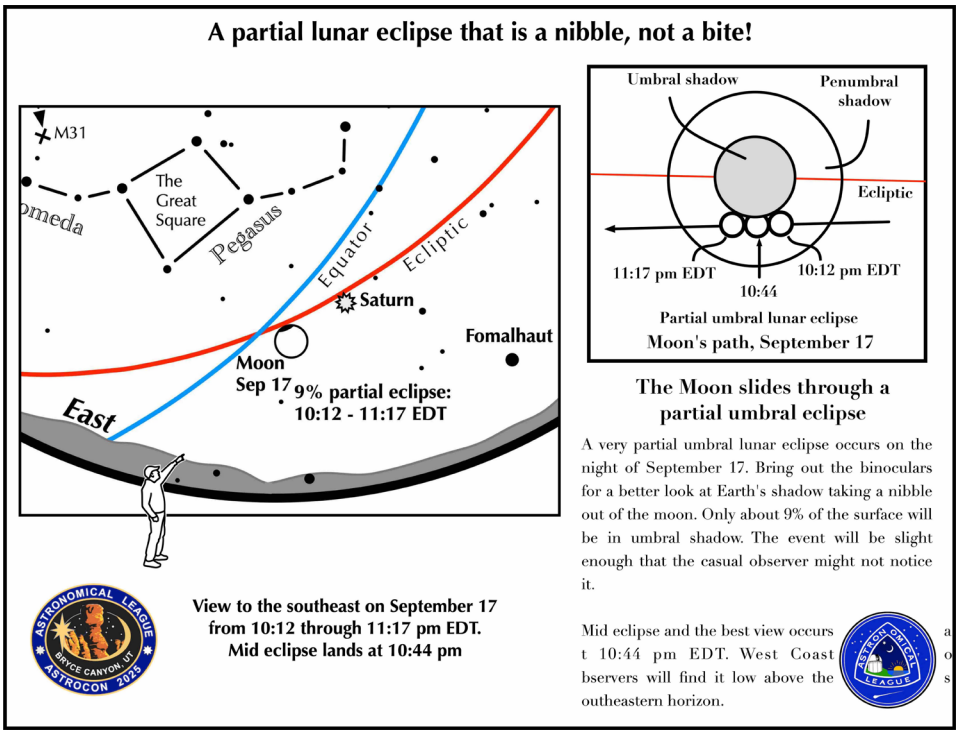
On the 9th, Mars lies 0.8° south of the open cluster M35 in Gemini.

Jupiter is the most prominent object in September's evening sky, after the Moon. Rising before midnight, it continues to move eastward through Taurus, and reaches its point of quadrature, 90° west of the

Events in September

1		Equation of Time = 0
1	05:00	Moon 4.2° N of Mercury
1	11:44	Uranus Stationary
2	21:56	**New Moon** (Lunation 1258)
4	22:00	Mercury Greatest Elongation (18.0°W)
4	04:43	Earliest Mercuryrise
4	19:45	Moon 4.5° W of Venus
5	20:00	Moon 6.3° SE of Venus
5	23:00	Sun at 11h RA
6	20:00	Moon 2.6° SE of Spica
8	00:35	**Saturn Opposition**
9	02:00	Mars 0.8° S of M35
9	05:00	Mercury 0.5° N of Regulus
9	20:08	Moon occults Fang (pi Sco; m2.8; in 20:08, out 20:50)
10	20:00	Moon 5.3° ESE of Antares
11	02:06	**First Quarter Moon**
11	19:01	Last 7:00pm sunset (until March 22)
12	06:53	Jupiter Quadrature (90°W)
16	11:00	Sun in Virgo
17	05:00	Moon 1.3° WSW of Saturn
17	19:30	Venus 2.5° N of Spica
17	22:34	**Full Harvest Moon** Partial Eclipse
18	04:13	Moon Occults Neptune (in 04:13, out 04:33)
20	20:17	Neptune Opposition
21	23:00	Moon 3.3° NNW of Uranus
22	05:00	Moon 0.2° W of M45
22	08:43	**Equinox**
22	17:00	Sun at 12h RA
23	23:00	Moon 5.7° NE of Jupiter
24	14:50	**Last Quarter Moon**
25	05:00	Moon 4.5° N of Mars
26	05:00	Moon 1.6° S of Pollux
27	04:00	Moon 3.1° NNW of M44
29	05:00	Moon 2.2° NNE of Regulus
30	17:09	Mercury Superior Conjunction

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



Sun, on the 12th.

At the end of the month, Jupiter rises by 10:00pm.

A peculiar arrangement of Jupiter's Galilean satellites occurs on the morning of the 4th, when all four moons form a flattened diamond to the east of the planet. Clockwise from Jupiter, they are arranged Io, Europa, Ganymede, and Callisto. When the moons are in a tight arrangement such as this, it is easy to perceive their motion in a short amount of time, perhaps as brief as five to ten minutes.

A similar tight diamond appears on the 11th, with the moons arranged in order: Io, Callisto, Europa, Ganymede.

Saturn is in Aquarius, and reaches opposition on the 8th. At 8.658 au from Earth, Saturn appears larger and brighter than it will all year. The ring tilt is now at 4.5° and will appear to gradually increase until mid-november, when the rings appear to be tilted 6.4°, due to the geometry of Earth's orbit with respect to Saturn as we circle the Sun at a faster rate than the outer planet.

Keep watching Saturn's moons through a telescope. Its largest moon, Titan, is visible in small telescopes at magnitude 8.4. Early on the 9th, Titan appears just over Saturn's north pole.

The Moon joins Saturn on the 16th-17th, getting as close as 1.3° west-southwest of the planet just before Moonset.

Uranus is stationary in Taurus on the 1st, and begins its apparent retrograde motion, which will continue through January 2025. Although the seventh planet is still two months from opposition, it is still in prime position for viewing. Its position near the northernmost section of the ecliptic puts it in optimal position for observers in the northern hemisphere, as it attains a high elevation in our sky, although in September we have to wait until well after midnight for this to occur.

At magnitude 5.7, Uranus is well within reach of binoculars, even in a bright moonlit sky, and from a dark sky, may even be visible without optical aid.

Located just 5° southeast of the Pleiades cluster, Uranus is quite easy to locate. From the westernmost bright stars of the Pleiades, move directly south 4.5° to find a pair of 6th magnitude stars, 14 and 13 Tauri, which are separated by 1/3° and lie on an east-west line. The nearest object of similar brightness to this pair of stars, just over 1° to the west-southwest, will be the blue-green glow of Uranus.

Our outermost planet, **Neptune**, reaches opposition, in Pisces, on the 20th, and shines at magnitude 7.7. Throughout September it is located about 13° east-northeast of Saturn, and 5.0° southeast of lambda Piscium, the southeasternmost star of the Circlet asterism.

Another way to find Neptune is to look for a quadrilateral of 4th and 5th magnitude stars located between the Circlet and magnitude 3.60 iota Ceti, to the southeast. The quadrilateral consists of two parallel lines just under 1.0° apart, 2.5° tall, and aligned in a roughly south-southeast to north-northwest orientation, with the easternmost pair extending slightly longer to the north. Drawing a line through the westernmost pair and extending north by 1.8° will lead to directly Neptune on the 12th. The planet wanders westward of the line as the month progresses, but will remain well within the same binocular field of view as the quadrilateral.

This month, there is a third way to locate Neptune, as the just-past-full Moon occults it between 4:13am and ends at 4:33am on the 18th.

Neptune's opposition brings the planet and its system of 16 moons to within 28.893 au of Earth. All but one of these moons is practically invisible to backyard telescopes, Triton. When Neptune is closest to Earth, Triton, which is 77% the size of our Moon, shines at a dim yet accessible 13.4 magnitude, and appears as far as 16 arcseconds from Neptune. This should, under ideal conditions, be achievable with a 12-inch telescope. Triton has a retrograde orbit and completes one revolution around Neptune every 5.8 days.

1 Ceres ends its retrograde motion and begins moving eastward through Sagittarius in September. It remains located within the center of the Teapot asterism, and dims slightly from magnitude 8.5 to 8.8. It begins the month about 1.5° north-northeast of globular cluster M69, and continues moving almost due east in the direction of globular cluster M54, coming within 1.5° of the latter by month's end.

Distant **Pluto** is well-positioned during early evening throughout December. At magnitude 14.4, it can be found 1.7° south-southwest of the globular cluster M75 on the border of Sagittarius and Capricornus.

Beyond our solar system, the **stars** of September begin to indicate the changing of seasons. Arcturus, the prominent star marking the southern tip of Bootes, takes up position over the western horizon in evening twilight. The star will have departed our evening sky by midnight early in the month, and at 9:30pm at the end of the month.

The Big Dipper tips "upright" as it rotates into its horizontal position low over the north-northeastern horizon.

We're still waiting for recurrent nova **T Coronae Borealis** to flare. Its position within the Northern Crown remains high enough above the horizon such that we won't miss it if it does flare this month, as it is not yet visible in the morning sky.

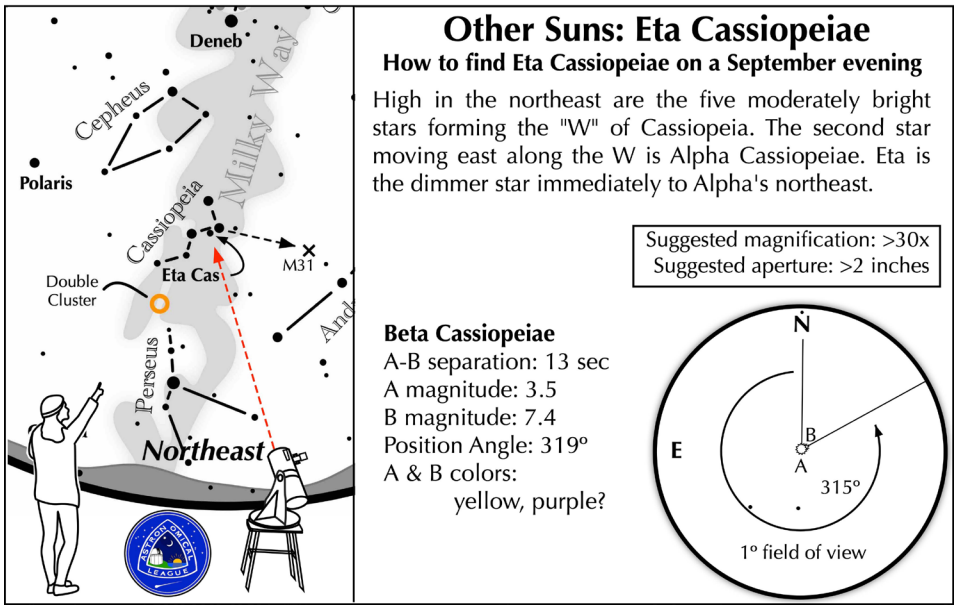
The Milky Way arcs high overhead

during September evenings. The Summer Triangle, still well-placed for exploration, gives way to the stars of autumn as the hours pass. By midnight, we're looking up at the Great Square of Pegasus and the Andromeda Galaxy.

In mid-September, the Big Dipper's pointer stars attain their 6 o'clock position directly below Polaris at midnight, and **Fomalhaut** (alpha Piscis Austrini) rides the meridian low in the south.

Finally, a preview of winter comes in the early morning during September, as just after 3:00am mid-month, the entire **Winter Hexagon** is visible above the eastern horizon.

ASTRONOMICAL LEAGUE Double Star Activity



Rhode Island Joins the DarkSky Community

by Katrina Shepard

Rhode Island has founded its own chapter of DarkSky International, joining the list of New England neighbors who are reaping the benefits of managing light pollution, and preserving the night sky. DarkSky's mission is to preserve and protect the nighttime environment and our heritage of dark skies through environmentally responsible outdoor lighting. This mission holds importance to wildlife and pollinators, and preserves the spectacular night skies for generations to come. Founded by Katrina Shepard, a former member of Massachusetts DarkSky and resident of Cumberland, RI, the founding leadership team includes Francine Jackson, Laura Landen, Sara Poirier, and Jim Hendrickson.

Darker skies and decreased light pollution have been proven to improve sleep, decrease stress, and help maintain essential wildlife in our state. Among the many personal and environmental benefits, it also preserves the beauty of coastal stargazing for photographers and astronomers alike. If you are interested in joining DarkSky or learning more, please reach out to rhodeisland@darksky.org

Does Venus Have a Moon?

by Francine Jackson

We all know that the outer planets have lots of satellites, but our two inner ones have none. Or do they?

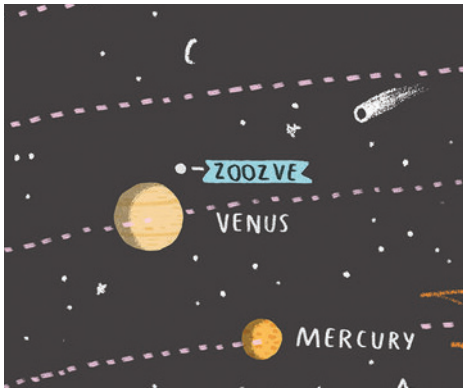
In 1672, astronomer Giovanni Cassini believed he saw one around Venus, which he called Neith. Certain astronomers believed they also viewed it, but not William Herschel, and it was never observed during the Venus transits of 1761 and 1769.

It is believed what they all saw was a star that seemed to be in the planet's field of view.

But now, there seems to be talk of a "moon" again. In 2002, Brian Skiff, an astronomer at the Lowell Observatory, discovered what he called a quasi-moon around Venus. What it appears to be is an asteroid that seems to orbit Venus, but isn't bound to it gravitationally; instead, it has a complex orbit that goes around Venus and our Sun. This makes its motion unstable, so it will eventually be ejected from this orbit.

This asteroid does cross our own orbit, so there is a possibility that, as it is close to 750 feet across, it could be considered a potential hazard to us, although not exactly one to slam into us.

This object originally was listed as 2002VE68, but was shortened to 2002VE; however, artist Alex Foster, when creating



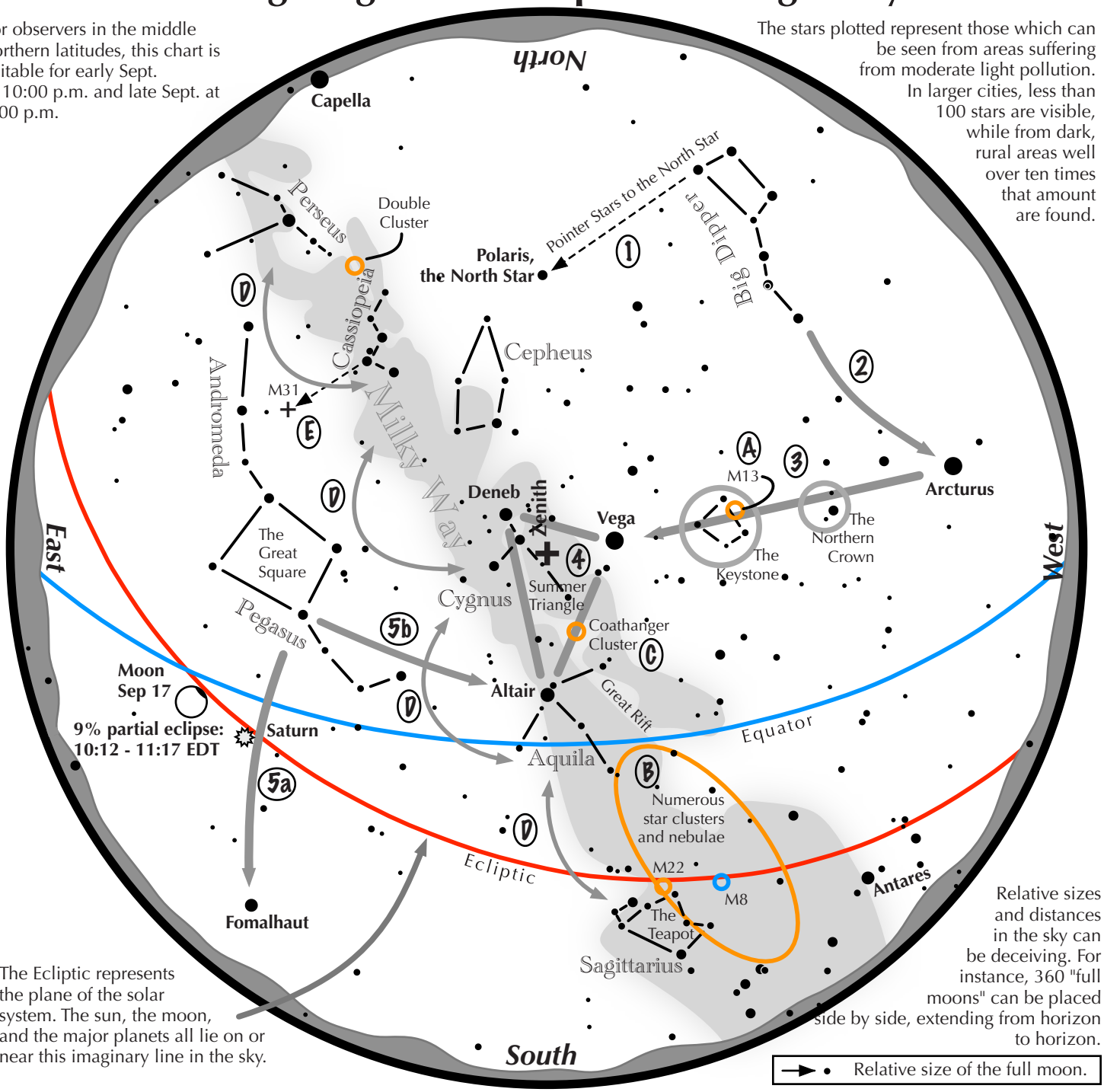
a map of it, misread it as ZOOZVE, which, on February 5, 2024, the IAU, the official astronomical naming organization, designated this is how our new solar system member would be called.

So, yes, Venus, like its neighbor Mercury, is still moonless. At least for now. . .

Navigating the mid September Night Sky

For observers in the middle northern latitudes, this chart is suitable for early Sept. at 10:00 p.m. and late Sept. at 9:00 p.m.

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 mid September night sky: Simply start with what you know or with what you can easily find.

1. Extend a line north from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
2. Follow the arc of the Dipper's handle. It intersects Arcturus, the brightest star in the September evening sky.
3. Nearly overhead shines a star of similar brightness as Arcturus, Vega. Draw a line from Arcturus to Vega. It first meets "The Northern Crown," then the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.
4. The stars of the summer triangle, Vega, Altair, and Deneb, shine overhead.
5. The westernmost two stars of the Great Square, which lies high in the east, point south to Fomalhaut. The southernmost two stars point west to Altair.

Binocular Highlights

A: On the western side of the Keystone glows the Great Hercules Cluster.
B: Between the bright stars Antares and Altair, hides an area containing many star clusters and nebulae.
C: 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger.
D: Sweep along the Milky Way for an astounding number of faint glows and dark bays, including the Great Rift.
E: The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.

Observer's Challenge:

NGC 6703:
Galaxy in Lyra

by Glenn Chaple

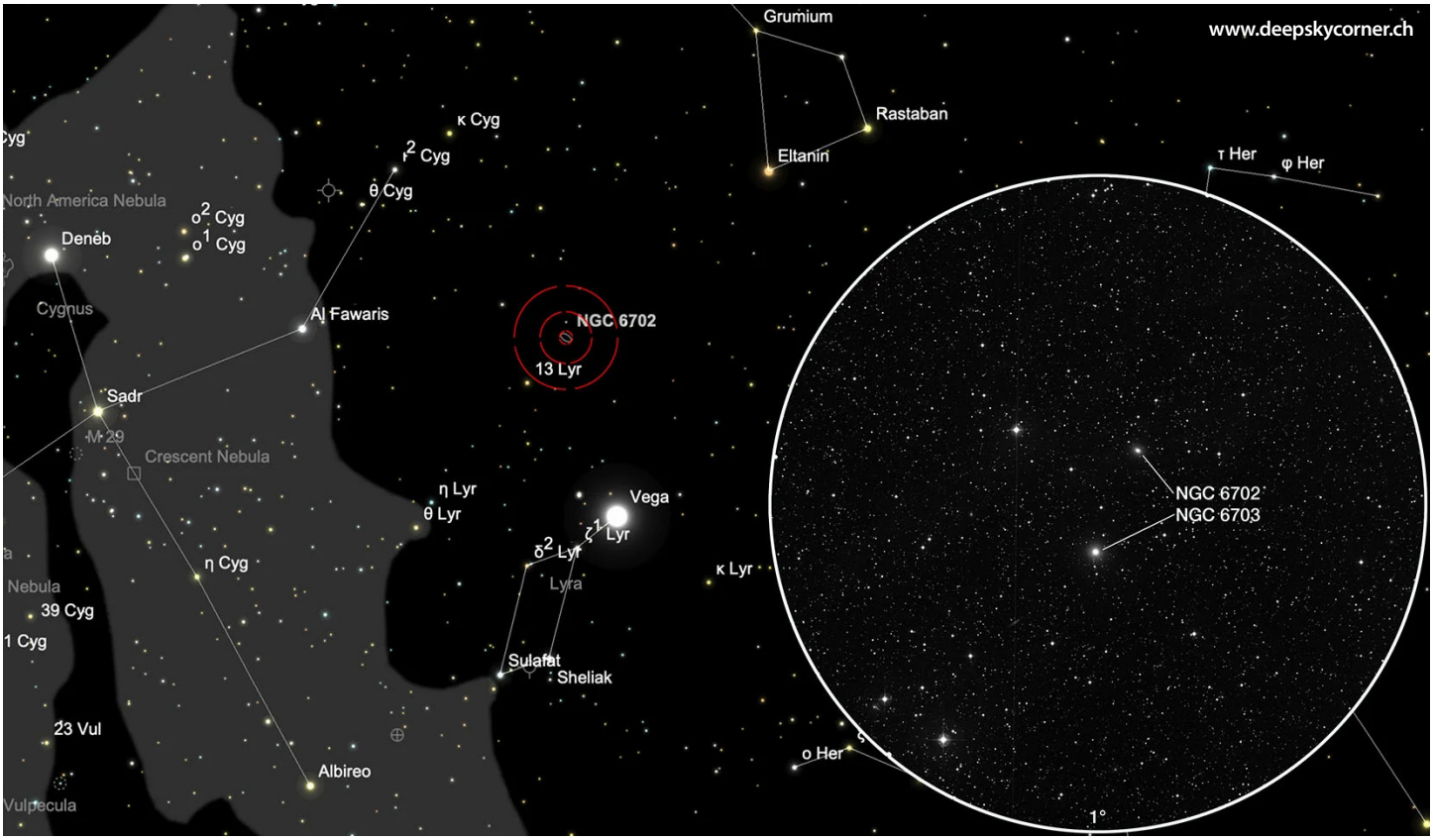
(Magnitude 11.3; Size 2.4" X 2.4')

When you learn that a deep-sky object was missed by William Herschel during his sky surveys of the late 18th and early 19th centuries, you know it must be a visual challenge. Such is the case with this month's Observer's Challenge, the lenticular (elliptical/spiral) galaxy NGC 6703 in Lyra. While its magnitude (11.3) isn't a problem for a typical 6-inch scope, its rather small size (just 2.4 arc-minutes) will make it easy to overlook. Discovery of NGC 6703 is credited to the German astronomer Heinrich Louis d"Arrest, who came across it and a fainter nearby galaxy NGC 6702 in 1863.

NGC 6703 is located at the 2000.0 coordinates RA 18h47m18.9s and Dec +45o33'02.3", a little over 2 degrees northwest of 13 Lyrae. Variable star observers recognize this star as the semiregular variable R Lyrae, a class M (M5) red giant whose magnitude has wavered between 4.0 and 4.6 during the last few decades. 13/R Lyrae, shown in Finder Chart A, is a good starting point for those who like to star-hop to their celestial targets. The tactic here is to follow a 2-degree path from there to an 11th magnitude "star" (refer to Finder Chart B).

NGC6703 is a cross between a spiral and an elliptical, mag 11.3. It is 116 MLY away in Lyra, thus small at this distance, at only 2.5 arc minutes. NGC6702 up above is not associated with 6703, being 170 MLY away, and Mag 13.2. This frame was taken with my 32 inch telescope with RGB and Lum filters, about 2.5 hours imaging total, then processed in PixInsight. Mario Motta

If you're able to see NGC 6703, try your luck with NGC 6702, just 10 arc-minutes to its north-northwest. This elliptical galaxy is fainter (magnitude 12.2) and smaller (1.6 X 1.4 arc-minutes) than NGC 6703. It can be glimpsed with an 8 or 10-inch scope under dark sky conditions. Though the two galaxies appear close together in the eyepiece field, NGC 6703 around 88 million light years away, while NGC 6702 is twice as distant.



Night Sky Notes:

Marvelous Moons

by Kat Troche

September brings the gas giants Jupiter and Saturn back into view, along with their satellites. And while we organize celebrations to observe our own Moon this month, be sure to grab a telescope or binoculars to see other moons within our Solar System! We recommend observing these moons (and planets!) when they are at their highest in the night sky, to get the best possible unobstructed views.

The More the Merrier

As of September 2024, the ringed planet Saturn has 146 identified moons in its orbit. These celestial bodies range in size; the smallest being a few hundred feet across, to Titan, the second largest moon in our solar system.

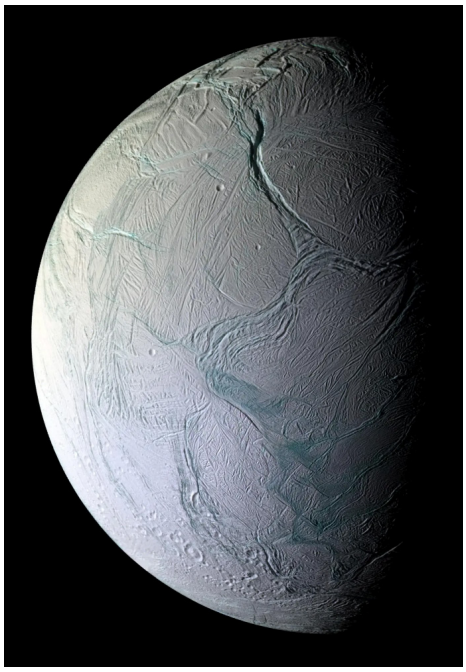
Even at nearly 900 million miles away, Titan can be easily spotted next to Saturn with a 4-inch telescope, under urban and suburban skies, due to its sheer size. With an atmosphere of mostly nitrogen with traces of hydrogen and methane, Titan was briefly explored in 2005 with the Huygens probe as part of the Cassini-Huygens mission, providing more information about the surface of Titan. NASA's mission Dragonfly is set to explore the surface of Titan in the 2030s.

Saturn's moon Enceladus was also explored by the Cassini mission, revealing plumes of ice that erupt from below the surface, adding to the brilliance of Saturn's rings. Much like our own Moon, Enceladus remains tidally locked with Saturn, presenting the same side towards its host planet at all times.

The Galilean Gang

The King of the Planets might not have the most moons, but four of Jupiter's 95 moons are definitely the easiest to see with a small pair of binoculars or a small telescope because they form a clear line. The Galilean Moons – Ganymede, Callisto, Io, and Europa – were first discovered in 1610 and they continue to amaze stargazers across the globe.

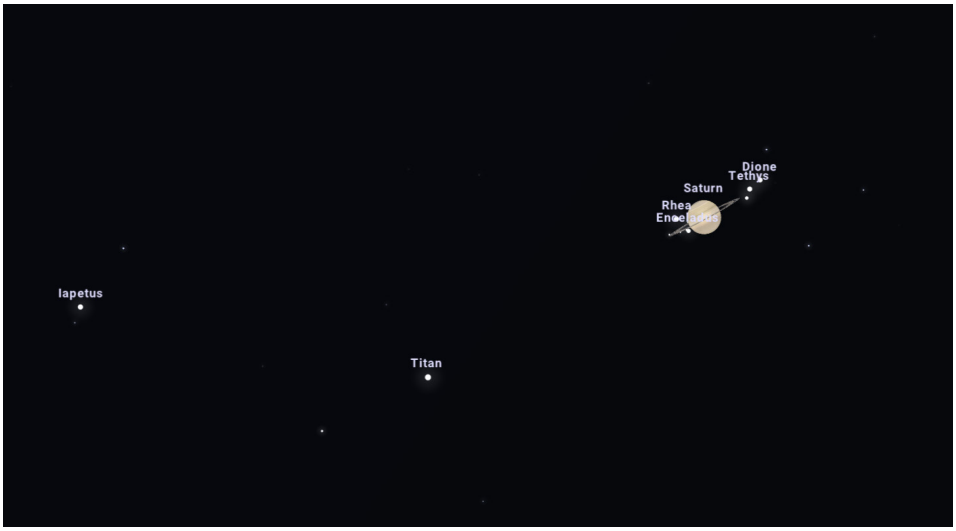
- Ganymede: largest moon in our solar system, and larger than the planet Mercury, Ganymede has its own magnetic field and a possible saltwater ocean beneath the surface.
- Callisto: this heavily cratered moon is the third largest in our solar system. Although Callisto is the furthest away of the Galilean moons, it only takes 17 days to complete an orbit around Jupiter.
- Io: the closest moon and third largest in this system, Io is an extremely active world, due to the push and pull of Jupiter's gravity. The volcanic activity of this rocky world is so intense that it can be seen from some of the largest telescopes here on Earth.
- Europa: Jupiter's smallest moon also happens to be the strongest candidate for a liquid ocean beneath the surface. NASA's Europa Clipper is set to launch October 2024 and will determine if this moon has conditions suitable to support life. Want to learn more? Rewatch the July 2023 Night Sky Network webinar about Europa Clipper here.



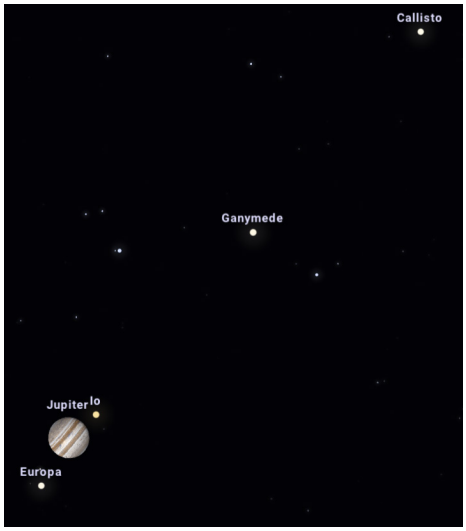
This mosaic of Saturn's moon Enceladus was created with images captured by NASA's Cassini spacecraft on Oct. 9, 2008, after the spacecraft came within about 16 miles (25 kilometers) of the surface of Enceladus. Credit: NASA/JPL/ Space Science Institute

Be sure to celebrate International Observe the Moon Night here on Earth September 14, 2024, leading up to the super full moon on September 17th! You can learn more about supermoons in our mid-month article on the Night Sky Network page!

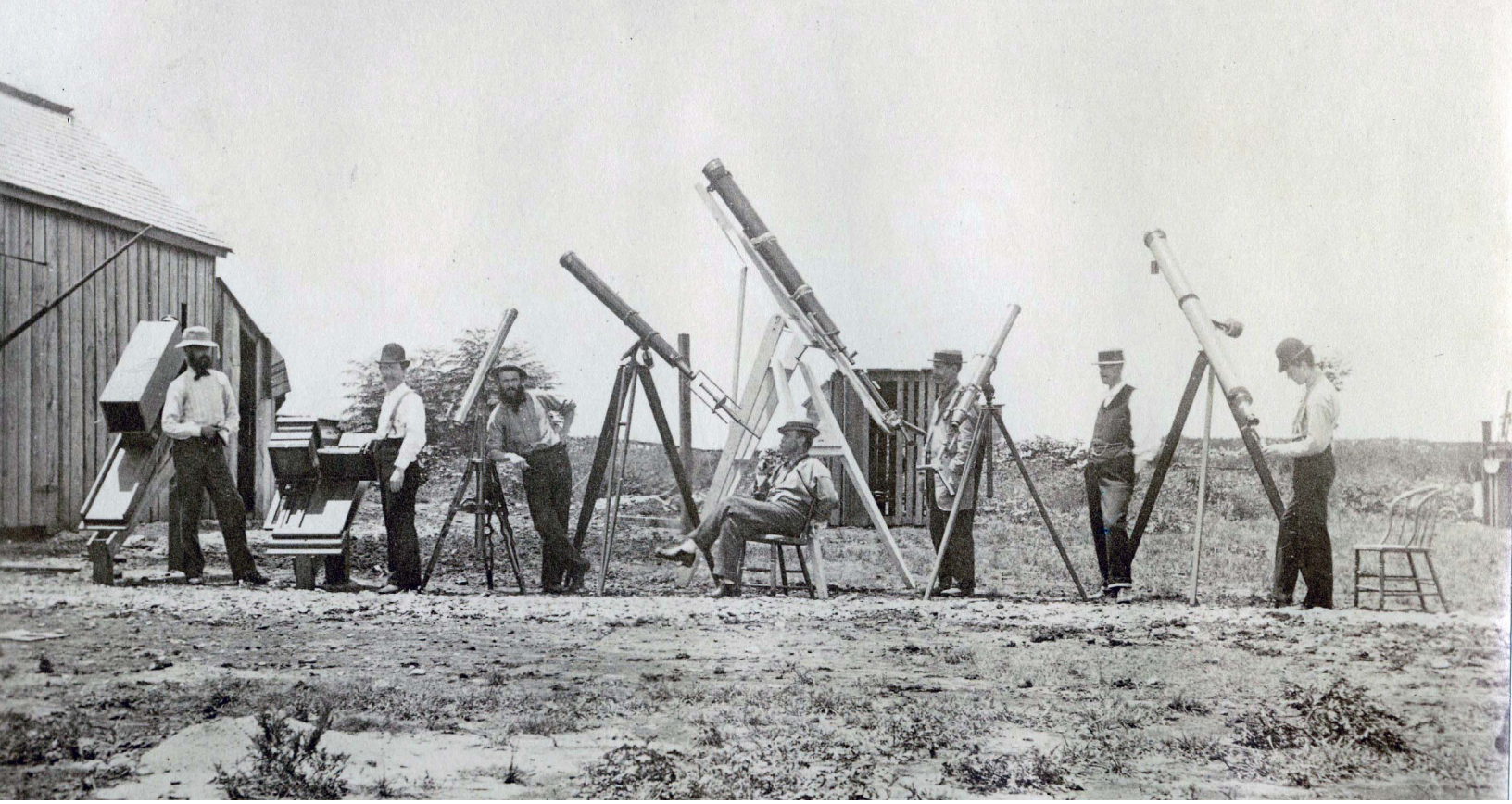
This article is distributed by NASA's Night Sky Network (NSN). The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!



The Saturnian system along with various moons around the planet Saturn: Iapetus, Titan, Enceladus, Rhea, Tethys, and Dione. Credit: Stellarium Web



The Jovian system: Europa, Io, Ganymede, and Callisto. Credit: Stellarium Web



Frank Evans Seagrave

A Timeline of His Life & Contributions in Historical Context

by David A. Huestis

~ Part I: 1860 - 1899 ~

The Early Years : 1860 - 1874

Frank Evans Seagrave was born in Providence, Rhode Island, on March 29, 1860, son of Mary Greene (Evans) and George Augustus Seagrave. George was a wealthy textile mill owner just outside of Providence, as well as a Providence bank president. During my extensive research I was surprised to learn that when Frank was born his family lived at 20 Angell Street. In 1866 George purchased the house at 119 Benefit Street.

I have been unable to uncover any details of young Seagrave's childhood. From 1869 to 1874 Frank went to a private school run by the Reverend Charles H. Wheeler of the Church of the Redeemer. Reverend Wheeler had a private school for boys and prepared students for Brown University and other New England colleges. It was at this school where Seagrave acquired a knack for mathematics.

In this treatise I have reported on some documented events simply stated with no informational detail as to how Frank's participation was realized. I will note these events in the timeline.

In addition, my years of Seagrave research uncovered many references to articles, observations, and contributions in the astronomical journals throughout his lifetime in which Seagrave authored or was a contributor. His astronomical interests covered a wide range of topics, including variable stars, double stars, solar eclipses, sunspots, aurorae, meteors and occultations of stars and planets by the Moon. Seagrave particularly excelled in orbital calculations of newly discovered asteroids and comets. I have provided an EXCEL spreadsheet posted on our Google Drive (link 1) where you can use the information supplied to access The SAO/NASA Astrophysics Data System (ADS) database in order to retrieve the material. Instructions on how to retrieve the specific volumes can be found here: ADS (Google Drive link 2).

From this point forward, when you encounter Google Drive (Google Drive link 3), click on it and you will be transferred to our Google Drive where you can view additional material.

While we currently have 14 images and one movie (Google Drive link 4) of Seagrave, I like the description of Seagrave provided by Skyscrapers founder Professor Charles Smiley in his 1934 Popular Astronomy obituary. Smiley wrote, "He was a tall, dignified gentleman with snow-white hair in his later years. His keen sense of humor and the kindly twinkle in his eyes endeared him to his many friends. His stories of the great astronomers of the last half-century, many of whom he had known personally, were always interesting, and his enthusiasm for his work was very contagious."

Let's explore Frank E. Seagrave's life and contributions to astronomy.

In the timeline, Seagrave specific material is presented in **bold blue text**.

1860 Historical Highlights

Frank is born on March 29

- The Pony Express begins operation in April to deliver mail by horse relay from Missouri to California in just ten days. The company only survives 18 months until October 1861 due to the creation of the transcontinental telegraph system.
- British astronomer Warren de la Rue uses a photoheliograph he designed to photograph the total solar eclipse on July 18 in Spain. His photographs prove that the "red flames" (prominences) seen along the lunar limb were features of the Sun.
- Abraham Lincoln is elected president of the United States on November 6.
- South Carolina secedes from the Union on December 20.

1861 Historical Highlights

I am including brief details of the Civil War here merely to place Frank Seagrave in historical context. I do not know what life was like in Rhode Island during this sad period in our history. I just haven't had the time to do the research.

However, Rhode Islander General Ambrose Burnside figured prominently in many campaigns. Also, thanks to Ken Burns' Civil War television series, another local citizen, Sullivan Ballou, is best remembered for his "Letter to Sara." See the letter at this website: https://www.battlefields.org/learn/primary-sources/sullivan-ballou-letter

- The Confederate States of America is formed on February 8. Jefferson Davis is elected as a provisional president on the 9th.
- The Civil War begins with Confederate troops firing on and capturing Union controlled Fort Sumter in Charlestown, South Carolina on April 12.
- From this date till the end of the war on April 9, 1865, many bloody battles ensue. I will only reference a few in their respective years.
- When the Great Comet of 1861 rounds the Sun on June 29 and becomes visible in the northern hemisphere, it is estimated to be between magnitude -2 and 0, with a 90-degree tail. It is reported to have cast shadows at night. Remember, this is before the advent of electric lighting.
- The first major battle between the North and South occurs at Bull Run in Virginia on July 21.
- Jefferson Davis is inaugurated as the president of The Confederate States of America for a six-year term on November 6.

1862 Historical Highlights

- On January 31, Alvan G. Clark, maker of our 8-inch telescope, makes the first observation of Sirius B, a white dwarf companion of the primary star, Sirius A. The 50-year elliptical orbit of Sirius B causes it to swing into view more easily from time to time. In 1975, several Skyscraper members, including myself, viewed it at about its maximum extent from Sirius A using our 8-inch Clark refractor.
- On March 9, two ironclad ships, the Merrimack/Virginia (Confederacy) and the Monitor (Union) engage each other off the Virginia coast at Hampton Roads. The Merrimack disables the Monitor.
- The first paper money, called "greenbacks," are issued by the US government on March 10.

1863 Historical Highlights

- On January 1, Abraham Lincoln declares in his Emancipation Proclamation that all slaves in any state under Union control shall be free. This declaration allows free and escaped enslaved African-American men to serve in the Union army. (One of my favorite movies is Glory, exemplifying the service of these men to the Union cause and continued freedom.)
- Three-day Battle of Gettysburg (July 1-3) is the bloodiest battle of the entire Civil War, with an estimated 50,000 + casualties. The Union prevails, heralding the end of Confederate ambitions.
- On November 19, Abraham Lincoln gives his now famous two-minute Gettysburg Address ("Fourscore and seven years ago our fathers brought forth, on this continent, a new nation, conceived in liberty, and dedicated to the proposition that all men are created equal.") honoring the men who had fought and died during the Battle of Gettysburg.

1864 Historical Highlights

- February 17: the Confederate submarine Hunley "torpedoes" and sinks the Union ship Housatonic in Charleston Harbor, South Carolina. The birth of submarine warfare.
- On May 14, some 20 meteorites fall over a wide area in Orgueil, France.

They are classified as carbonaceous chondrites, meaning they contained organic matter.

- British astronomer William Huggins takes the first spectrum of planetary nebula NGC 6543 (aka the Cat's Eye Nebula) on August 29.
- Atlanta is captured by William Tecumseh Sherman on September 1.
- Lincoln elected to a second term on November 8.

1865 Historical Highlights

- On April 9, General Robert E. Lee surrenders to General Ulysses S. Grant at the McLean House in the village of Appomattox Court House, Virginia.
- Five days later, on April 14, Lincoln is shot by John Wilkes Booth while attending a play at Ford's Theater in Washington, D.C. The president dies the next day. Vice-president and Democrat Andrew Johnson assumes the presidency.
- Alice's Adventures in Wonderland is published by Lewis Carroll in November.
- Leo Tolstoy publishes War and Peace in serialized form beginning in 1865 through 1867. The complete novel is published in 1869. The first purchaser of this work just finished reading it about a month ago!
- The Thirteenth Amendment, which abolished slavery and involuntary servitude, is ratified on December 6.
- Maria Mitchell becomes the first director of the Vassa College Observatory. She had discovered a comet in 1847, which was later called "Miss Mitchell's Comet."

1866 Historical Highlights

- The James-Younger Gang, Jesse and Frank James, et al, rob the Clay County Savings Association in Liberty, Missouri, on February 13.
- The Civil Rights Act of 1866 is passed by the US Congress on April 9, defining the rights of all citizens, but specifically guar-

anteeing the rights of formerly enslaved people.
- The Fourteenth Amendment to the United States Constitution is passed by the Senate on June 8. It addresses rights of citizens and a concept everyone knows, "equal protection under the law." The amendment is not ratified until July 9, 1868.
- Swedish chemist Alfred Nobel invents dynamite in 1866 and patents it in 1867.

1867 Historical Highlights
- Secretary of State William Seward purchases Alaska for $7.2 million on March 30. Officially becomes part of the United States on October 18.

1868 Historical Highlights
- Louisa May Alcott publishes her coming-of-age book for children, Little Women, in two volumes (1868 & 1869). It was later combined into one volume.
- Fourteenth Amendment to the Constitution finally ratified on July 9.
- French astronomer Pierre Jules Janssen detects an unknown element in the Sun's chromosphere during the total solar eclipse in India on August 18. It is later identified as helium.
- Republican and Civil War hero Ulysses S. Grant wins the US November 3 presidential election.

1869 Historical Highlights
- The Fifteenth Amendment to the US Constitution is passed by Congress on February 26. It states: "The right of citizens of the United States to vote shall not be denied or abridged by the United States or by any State on account of race, color, or previous condition of servitude." It is ratified on February 3, 1870.
- Dmitri Mendeleev develops the Periodic Table of Elements during February/March by arranging the elements and comparing them by their atomic weights. He enlists a colleague to read his discovery paper to the Russian Chemical Society in St Petersburg on March 6.
- At Promontory Summit in Utah, the transcontinental railroad is completed with the meeting of the Union Pacific and the Central Pacific rail lines on May 10, with the ceremonious driving of a "Golden Spike."
- The 120-mile-long Suez Canal, begun in 1859, linking the Mediterranean Sea to the Red Sea, is officially opened on November 17.

1870 Historical Highlights
Frank: 10 Years-Old
- The Standard Oil Company of Ohio is incorporated on January 10 by John D. Rockefeller et al.
- A bill creating the U.S. Department of Justice passes the House and Senate and is signed into law by Ulysses S. Grant on June 22.

1871 Historical Highlights
- James Whistler renders a painting of his mother and titles it Arrangement in Grey and Black No. 1. More widely known as Whistler's Mother - estimated worth: $36 million.
- The Great Chicago Fire destroys about a third of the city over a three-day period (October 8 to October 10). Multiple causes of the conflagration have been postulated, though Mrs. O'Leary's cow is generally blamed for knocking over a lantern.
- Sir Henry Stanley searches for Dr. David Livingstone, who had been missing in southern Africa for six years. Stanley finds him in a village named Ujiji near Lake Tanganyika in present day Tanzania on November 10 and greets him with four famous words, "Dr Livingstone, I presume."

1872 Historical Highlights
- March 1: The US Congress creates the first national park, Yellowstone, and president Ulysses S. Grant signs it into law.
- Montgomery Ward begins distributing dry goods through a mail-order catalog from Chicago in August.
- French writer Jules Verne publishes Around the World in 80 Days on December 22.
- Alice Through the Looking Glass, Lewis Carroll's sequel to Alice's Adventures in Wonderland is published on December 27, 1871, though dated 1872.

1873 Historical Highlights
- In San Francisco Levi Strauss produces "Copper Riveted Overalls" using blue denim, and patents Blue Jeans. These would eventually become Levi's.

1874 Historical Highlights
Frank: 14 Years-Old
- Mussorgsky composes Pictures at an Exhibition as a piece for piano in memory of an exhibition by the Russian painter Victor Hartmann. Mussorgsky's piece is considered "newer" classical. My introduction to it came through Emerson, Lake & Palmer's 1971 rock adaptation.

It is reported that young Frank Seagrave's interest in astronomy was awakened by a total lunar eclipse on October 24-25. So great was this new pursuit that his father bought him a 3-inch refractor soon after. It is reported that Frank observed every fair night.

1875 Historical Highlights
- William Crookes invents the radiometer, in which light (solar radiation) causes four vanes, each having one side black and the other side white, to rotate in a bulb containing gas at low pressure.
- Congress passes a Civil Rights Act on March 1. It provides, "That all persons within the jurisdiction of the United States shall be entitled to the full and equal enjoyment of the accommodations, advantages, facilities, and privileges of inns, public conveyances on land or water, theaters, and other places of public amusement; subject only to the conditions and limitations established by law, and applicable alike to citizens of every race and color, regardless of any previous condition of servitude."

Frank begins traveling to the Harvard College Observatory (HCO) twice a week, where, even though he isn't enrolled as a student, he is given access to the library and instruments. I have no details about how this arrangement had been facilitated. Information I have seen report this activity continued into 1877.

1876 Historical Highlights
- On March 7, Alexander Graham Bell is awarded the first US patent for the telephone, encompassing in part, "the meth-

od of, and apparatus for, transmitting vocal or other sounds telegraphically ... by causing electrical undulations, similar in form to the vibrations of the air accompanying the said vocal or other sound". On the 10th history is made when he "calls" his assistant in another room with the words, "Mr. Watson, come here. I want to see you." See Seagrave reminiscences below.

- On June 25-26, Colonel George Armstrong Custer and the 7th US cavalry are massacred by the Sioux at the Little Bighorn River, in Montana. This event became known as Custer's Last Stand.
- The bank robbing careers of the James-Younger gang ends after a failed attempt on a bank in Northfield, Minnesota on September 7.
- First illustrated edition of Mark Twain's The Adventures of Tom Sawyer is published in the United States in December.
- On December 7, astronomer Asaph Hall of the US Naval Observatory records the first observation of the Great White Spot on Saturn and uses it to determine Saturn's rotational period. He used the 26-inch Alvan Clark refractor.

Frank's father is so impressed with his son's new-found activities that he purchases an 8-inch Alvan Clark refractor as a present for Frank's 16th birthday (March 29, 1876). His dad pays $2310.80 for the telescope. It wouldn't be delivered until 1878.

Note: In 1934, shortly before his passing, Frank Seagrave sent two short stories to Popular Astronomy magazine, reminiscing about past experiences in 1876 and 1877. They are truly fascinating.

Reminiscences

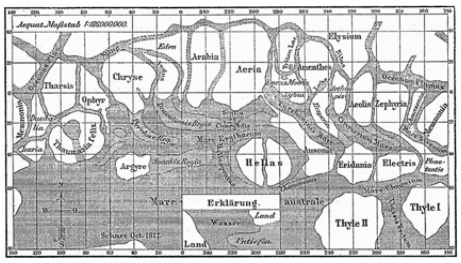
I. On the night of May 12, 1876 (*remember 1876*), Dr. Leonard Waldo, assistant at the Harvard College Observatory, was observing doublt stars with a filar micrometer attached to the 15-inch equatorial telescope. I recorded the observations for him. After making several settings, Dr. Waldo went downstairs to the library for a book. In about ten minutes he returned to the dome, greatly excited. He said, "Seagrave, I want you to come right down to the library and see what is going to be one of the greatest inventions of the nineteenth century." I went down to the library with him, and there was Professor William A. Rogers, assistant and in charge of the meridian circle, talking through what appeared to me to be a box. He would talk, then put the box to his ear to listen, then talk, and then listen again. Dr. Waldo said to me, "Do you know to whom he is talking and listening?" I said "No." Waldo said, "He is talking to a party in Boston five miles away." I became greatly interested right away. I talked and listened myself as soon as Professor Rogers had finished, and I found that I had been talking to Professor A. Graham Bell, inventor of the telephone. He was then experimenting between his Boston laboratory and several places a few miles away.

The next day I went to Providence where I then lived. I told many people what I had seen and heard on the previous night. My parents were then living. They all laughed and ridiculed the idea of talking to a party five miles away through a box. They all said I had been talking to somebody in the next room or downstairs. The afternoon that I arrived in Providence I went into Tibbetts and Randall's bookstore on Westminster Street. I was well acquainted with both gentlemen, as I had bought many books there. I told them of my experience on the previous evening. They both, and every customer who came in, ridiculed and made fun of me. To cap the climax, both Tibbetts and Randall went to my father and insisted upon it that I be sent away for observation,—the idea of talking such nonsense.

All of this happened in May, 1876. I was only 16 years old then. I am now 74. This is not wholly astronomical. Bell lectured in Providence the following September to a crowded house.

1877 Historical Highlights

- Henry McCarty, aka, William Bonney, calls himself "Billy the Kid." This cattle rustler, gunslinger, and outlaw, is killed by sheriff Pat Garret at the age of just 21 in 1881. The "Kid" was alleged to have murdered 21 people.
- Late August: Italian astronomer Giovanni Schiaparelli begins observing Mars with an 8.6-inch Mertz refractor just before its opposition on September 5 when the planet would be just over 35 million miles from the Earth. He notes some straight-line surface features he calls "canali." This means channels in Italian, but when the word is translated into English it became canals. To some minds this suggests the features were constructed by intelligent Martians. Schiaparelli does not support this interpretation. While many other Mars observers did not even see these channels, those who did perceive some details thought the markings are irregular and most likely geologic in nature. The human brain was simply playing connect-the-dots creating an optical illusion.



- Asaph Hall begins observing Mars in search of Martian moons as the planet and Earth were approaching a close (35 million miles) encounter on September 7. He discovers Deimos on August 12. On the 18th he discovers Phobos.
- On December 6, Thomas Alva Edison records and plays back the line "Mary had a little lamb" on his new phonograph.

II. On the night of August 16, 1877, I was one of a party of seven people who were up in the dome of the 15-inch equatorial telescope of the Harvard College Observatory. We were all greatly interested in observing the then newly discovered satellites of Mars, made three days earlier by Professor Asaph Hall, then of the U. S. Naval Observatory at Washington. The seven who were there included Professors E. C. Pickering, William A. Rogers, Arthur Searle, Leonard Waldo, Winslow Upton, George B. Clark of the firm of Alvan Clark & Sons, and myself. After we had all seen the satellites, a photometer was placed at the eye-end of the telescope, and Professor Pickering started a series of photometric measures of the brightness of the satellites. Just before midnight, the photometer was taken off and a filar micrometer put on. Dr. Waldo made many measures of positions and distances of the satellites, and did not finish until dawn of August 17. I recorded the observations for him.

I am writing this as I am the only one living of the seven up in that dome that night. The other six have passed on.

FRANK E. SEAGRAVE.

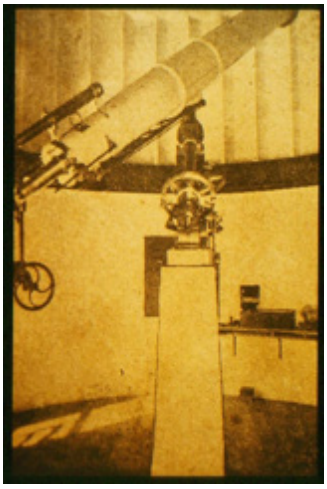
8 Durham Street, Boston, Massachusetts, June 25, 1934.

1878 Historical Highlights

- English physicist Joseph Swan demonstrates a practical electric light bulb, using an incandescent carbon filament in a vacuum
- First commercial telephone exchange opens in New Haven, CT.
- Ready Made Mixed Paints. After thousands of years where paint is mixed by hand on the spot, two Americans (Henry Sherwin and Edward Williams) begin selling premixed paints in cans.
- Thomas Edison develops the electric light

The Clark telescope ordered in 1876 is delivered and an observatory is built in the backyard of Franks's father's house at 119 Benefit St. in Providence, R.I. This great instrument is then the 3rd largest in New England, and is the largest in New England in private hands. The telescope is mounted in May. Present at the dedication ceremony is none other than Alvan G. Clark, the famous telescope maker. Also present is Leonard Waldo, Assistant Director of HCO under E.C. Pickering, who thought the "complement of accessories attending the telescope could occupy the time of two competent observers."

View the only known Seagrave notebooks (Google Drive link 5).



Left: Seagrave's Observatory in Prov. Image by Charles Smiley in 1939. Building is demolished soon thereafter. Right: 8-inch Clark Telescope in observatory.

Young Seagrave's mentorship with Leonard Waldo of HCO earns him an invitation to join Harvard's solar eclipse expedition to Fort Worth, Texas for a rendezvous with totality on July 29.

Review the complete 60-page report on the eclipse produced by Leonard Waldo (Google Drive link 6). Seagrave's report appears on pages 52 – 55.

A summary of the expedition can be found in the journal, The Observatory. Use the spreadsheet on our Google Drive (link 1) and copy the Biblio-code in row 5 and paste into the NASA/ADS (https://ui.adsabs.harvard.edu/) to view these documents.

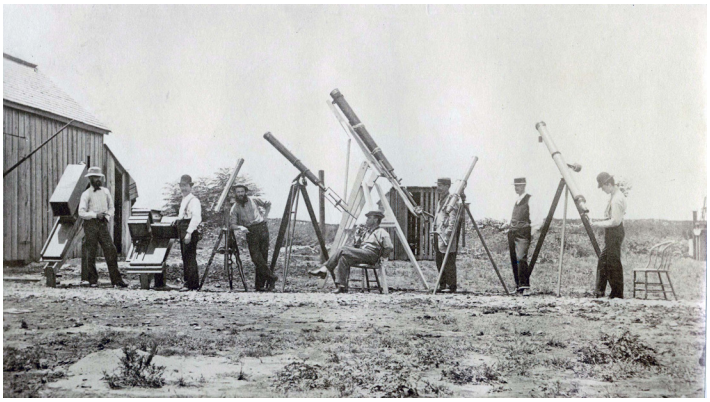
Seagrave is an integral part of this eclipse expedition. He furnishes his own 3-inch refractor, a spectroscope by Browning, having a dispersive power of ten 60-degree flint glass prisms, and a "Victor Kullberg, 1178" Sidereal Box Chronometer.

For his solar observations Seagrave "uses a 5-inch telescope of 81-inches focus, made by Alvan Clark & Sons, mounted upon a portable tripod stand, with a battery of eye-pieces, giving 61, 100, and 134 diameters respectively." This scope is on loan from Alvan Clark & Sons. Leonard Waldo assigns Seagrave with the following tasks: spectroscopic observation of the contacts; the discovery of any new prominence line, particularly beyond F; the micrometric measurement of the line "1474," and the meteorological observations.

"When the last ray of sunlight disappeared Mr. Seagrave looked very carefully for the famous 1474 line of the coronal spectrum. At first he saw nothing, but on widening the slit he saw one bright line which was quite faint and not very well defined; this was the only line in the field. He had hardly time to secure one measure of its width when the sun reappeared."

The duration of totality is 2 minutes and 28.75 seconds.

An interesting note: a local Fort Worth Agricultural professor notes Seagrave's participation saying, "…there was a young man from Rhode Island as an amateur whose father said he preferred to furnish him money for the purpose rather than for many other sports."



Harvard College Observatory Expedition participants. The original photograph does not identify the individuals. However, those who have examined the image all agree that Frank Seagrave is the young man on the right.

From August through December, Frank Seagrave, with the guidance of assistant Leonard Waldo of the Harvard College Observatory, makes micrometer observations of Saturn's satellite from Frank's new observatory in Providence. In a paper published in the April 1879 German journal Astronomische Nachrichten, Waldo noted, "The private observatory … was built by my pupil, Mr. Frank Seagrave in the spring of 1878." (So, was Frank a student at Harvard or not?) Waldo also states, " It (the 8-inch Clark refractor) is provided with the usual appliances for micrometric work and its optical qualities are of the highest order." See aforementioned spreadsheet to access Waldo's paper.

1879 Historical Highlights

- On February 22, Woolworth's Great Five Cent Store opens in Utica, New York. The store's pledge is to not sell anything that cost more the five cents. The Utica store soon fails, but the business is moved to Lancaster, Pennsylvania and opens on June 21, 1879. And the rest, as they say, is history. The chain is a staple in many down-city locations when at its peak. Woolworth's went out of business in July 1997.
- I think many folks believe that Thomas Alva Edison invented the light bulb. He did not. Many other inventors had pioneered the way. The filaments in prior incandescent bulbs burned out very quickly. After thousands of material combinations, Edison discovers that a carbonized cotton thread filament worked very well. He files his first patent application for "Improvement in Electric Lights" on October 14, 1878. The first successful test is on October 22, 1879 with the filament lasting 13.5 hours. Therefore, Edison is credited with "inventing" the first practical incandescent light bulb.
- James and John Ritty of Ohio patent the design of the first cash register on November 4, which became known as "Ritty's Incorruptible Cashier". It is later sold to a company which became known as The National Cash Register Company (NCR).

1880 Historical Highlights

Frank: 20 Years-Old

- On September 30, doctor Henry Draper takes the first photograph of the Orion Nebula using an 11-inch Alvan Clark photographic refractor. The exposure time is 50 minutes!
- December: Thomas A. Edison uses electric Christmas lights

for the first time, hanging them outside his Menlo Park lab in New Jersey.

1881 Historical Highlights

- Clara Barton, an American Civil Was hospital nurse establishes the American Red Cross in Washington, D.C. on May 21st, 1881.
- On May 22, Australian amateur astronomer John Tebbutt discovers what would become The Great Comet of 1881. (Note: There certainly seemed to be a lot of "Great Comets" in the 19th century!) When it becomes visible in the northern hemisphere around June 22, it is easily visible to the naked-eye. On June 25 it sports a 25-degree tail and the comet's nucleus is around 1st magnitude.
- Billy the Kid is shot and killed by Sheriff Pat Garrett on July 14.
- On October 26, perhaps one of the most renowned gunfights of the American West occurs in Tombstone, Arizona. The Earps, Doc Holiday, the Clintons, et al have a shootout in the Gunfight at the OK Corral.

1882 Historical Highlights

- On September 4, Thomas Alva Edison (Edison Illuminating Company) opens the first power station on Manhattan Island in New York. It provides 110 volts (DC) direct current to 59 customers in lower Manhattan.

Frank successfully observes and photographs the transit of Venus on December 6 from his observatory in Providence. See a detailed report on page 355 in the December 16 issue of Scientific American which can be found on our Google Drive (link 7). I do not know what happened to the 23 images mentioned in the report.

You can also view a brief letter Seagrave sent to Professor Asaph Hall of the US Naval Observatory in Washington DC, on February 27, 1893. The letter appears to indicate that he may have sent images to Hall, but I have no information about that. I have no idea what became of Seagrave's original plates.

- Jesse James is shot and killed on April 3 by one of his own gang members, Robert Ford, who hoped to collect the reward offered for taking out Jesse.
- September: Another comet is discovered in southern hemisphere skies, rapidly approaching the Sun. Just before perihelion passage (closest to the Sun), the comet can be seen during the day near the Sun. The comet's brightness is estimated at -17!!! This comet falls into the category known as "sungrazers." During its close encounter with the Sun the comet fragments into at least 5 pieces.

1883 Historical Highlights

- Once the largest suspension bridge in the world, the Brooklyn Bridge opens on May 24, crossing the East River. It took 14 years to complete construction.
- The Orient-Express makes its first run between Paris and Constantinople on June 5. This method of travel is luxurious.
- On August 26-27, one of the most eruptive volcanic explosions occurs when Krakatoa explodes with an estimated 200 megatons of energy in Indonesia. An estimated 35,000 people are killed.

1884 Historical Highlights

Frank Seagrave's father passes away on November 15 at age 61.

- The Adventures of Huckleberry Finn is published in the United States by Mark Twain on February 18, 1885, after first being published in the UK in December 1884.

1885 Historical Highlights

- The Statue of Liberty, made in France and funded by the French people, is shipped to New York Harbor and erected on Liberty Island. It isn't dedicated until October 26, 1886 by President Grover Cleveland.
- The 555-foot-tall Washington Monument is dedicated in 1885 with President Chester A. Arthur in attendance. Construction had begun in 1848, but funding shortfalls kept delaying the monumental project.
- While our organization has a rich history, having been founded in May, 1932, the world's first skyscraper, site of the Home Life Insurance Building, is completed in Chicago. It stands only 10 stories tall.
- George Eastman, founder of Kodak, develops dry film technology for taking pictures.
- On August 20, German astronomer Ernst Hartwig discovers S Andromedae, a supernova, in the Andromeda Galaxy. It is the first such object discovered outside of the Milky Way.

1886 Historical Highlights

- Apache medicine man and leader Geronimo surrenders on September 4.
- A drink named Coca Cola is first introduced by pharmacist John Pemberton in Atlanta, Georgia. His concoction is a combination of ingredients including caffeine and cocaine that he markets as a patent medicine (a cure-all of sorts). For a variety of reasons, the company stopped using cocaine in its formula in 1903.
- Josephine Cochrane, a housewife from Shelbyville, Illinois, is credited with inventing and building the first dishwasher. Hers differed from prior machines in that "A motor turned the wheel while hot soapy water squirted up from the bottom of the boiler and rained down on the dishes." The company she founded is later bought by KitchenAid, a brand of Whirlpool. This story was featured on the television series, "The Machines that Built America" on the History Channel.

1887 Historical Highlights

- Sir Arthur Conan Doyle publishes his first Sherlock Holmes story, 'A Study in Scarlet' in Beeton's Christmas Annual. In 1888 the work is published in book form. This is the first appearance of Sherlock Holmes and Dr. Watson.
- A young boy of 15 years-old in Farmington, Maine "invents" (actually improves) earmuffs in 1873. Word has it that he thought of the idea while he was ice skating. He supposedly asks his grandmother to sew tufts of fur between loops of wire. He is awarded a patent for "ear-mufflers" on March 13, 1877.

A government sponsored solar eclipse expedition in 1887 takes young Seagrave to Potsdam, Germany, where he observes and photographs the reversing layer, as well as obtaining prominence and corona spectra. I have been unable to locate any detailed information about this expedition. See

Seagrave's Passport application for this trip (Google Drive link 8).

1888 Historical Highlights

- Taking photography one step further, George Eastman markets his Kodak No 1 Box Camera to use the film he developed in 1885. The camera is pre-loaded with enough film to take 100 images.
- John Boyd Dunlop, a Scottish inventor, patents the first inflatable tire on December 7.

1889 Historical Highlights

- On March 31, the Eiffel Tower is inaugurated in Paris, France. Construction started on January 28, 1887 and was completed on March 15, 1889. The Tower is opened on March 31. It stands 1,083 feet tall.
- Thousands of Johnstown, Pennsylvania residents perish on May 31 after several days of heavy rain cause an earthen dam eight miles upstream of the city to give way, sending a 20-foot tidal wave down the South Fork River. Houses, factories, bridges, and trains pile up in the city.
- Mark Twain publishes an early foray into science fiction with his A Connecticut Yankee in King Arthur's Court, a 6th century time travel comedy.

Beginning in 1889 and continuing until 1899, Frank Seagrave contributes variable star observations for a program started by Harvard College Observatory (HCO) director E. C. Pickering. 17 circumpolar variable stars are observed. Following the success of this program, from 1890 through 1901 observations began on 58 long period variables. According to Michael Saladyga in the Journal of the AAVSO, Volume 27, 1999, "Between 1906 and 1910, Pickering reported, about 6000 observations of long period variable stars were "kindly communicated by other astronomers." Among them are: Professor Anne S. Young of Mt. Holyoke College; Frank E. Seagrave of Providence, RI. …" See Seagrave Variable Star contributions for Pickering in Michael's complete article (Google Drive link 9). Seagrave's contributions are reported on pages 165-166.

1890 Historical Highlights

Frank: 30 Years-Old

- On August 6, the first person to be electrocuted using the electric chair occurs in New York's Auburn Prison.
- On December 29, the 7th Cavalry massacres 250-300 Lakota Sioux in South Dakota near Wounded Knee Creek. This slaughter became known as the Wounded Knee Massacre. Twenty-five cavalry troops are also killed. After this bloodbath the United States Army ceases its campaign against the Plains Indians.

1891 Historical Highlights

- During the winter of 1891 basketball is invented in Springfield, Massachusetts by Dr. James Naismith. He uses a soccer ball and two peach baskets as goals.

1892 Historical Highlights

- Fingerprinting is officially adopted to help solve crimes.
- There is a notorious brutal axe murder in Fall River, Mass. on October 14. I'm sure you have all heard the little rhyme that describes what Lizzie Borden is alleged to have perpetrated. She is accused of murdering her father and stepmother.

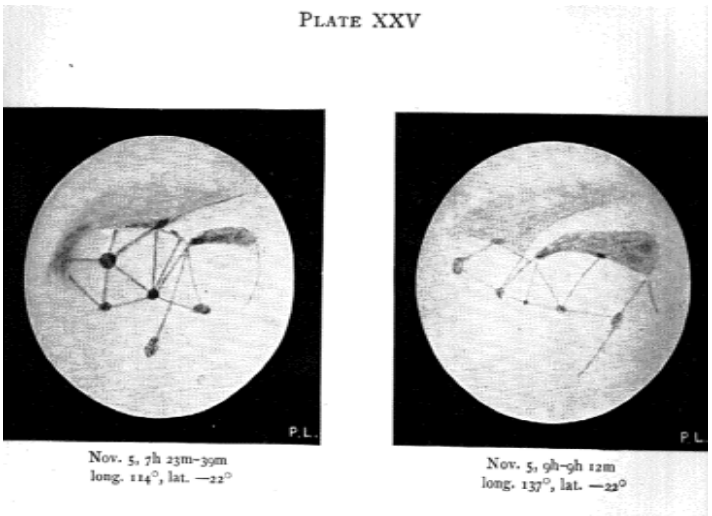
Lizzie Borden took an axe
and gave her mother forty whacks.
When she saw what she had done,
she gave her father forty-one.

Conspiracy theories still abound, and this event has found its way into pop
culture, long before pop culture was "popular." See 1893.

- On September 9, E.E. Barnard visually discovers Amalthea, the 5th moon of Jupiter to be discovered, with Lick Observatory's 36-inch refractor. The lens was made by Alvan Clark & Sons and the mounting built by Warner & Swasey.
- The Adventures of Sherlock Holmes by Arthur Conan Doyle, first published in serial form from 1891-1892, is published in book form on October 14.

1893 Historical Highlights

- Edison's Black Maria studio produces Kinetoscope movies intended for the public. See 1894.
- Lizzie Borden is acquitted of the ax murders of her father and stepmother on June 20.
- 1893-1894: Bostonian businessman Percival Lowell decides to build an observatory using his own wealth to study Mars. A 7,200-foot mountain top peak in Flagstaff, Arizona is chosen. Lowell names it Mars Hill. His initial Mars observations are made between May 29, 1894 and April 3, 1895 using an 18-inch Brashear refractor. He believes the "canali" he observes were indeed real canals constructed by Martians to transport water across the planet. His drawings are remarkable, but fanciful and wishful thinking. The seeing was so outstanding on Mars Hill that he orders a 24-inch Alvan Clark refractor to continue his observations. Sadly, astronomers with larger telescopes did not confirm Lowell's observations.



1894 Historical Highlights

- On March 12, in Vicksburg, Mississippi, Coca-Cola is sold in bottles for the first time.
- The first commercially exhibited motion pictures in the United States occurs at a Kinetoscope parlor New York City on April 14. where Edison shows ten Kinetoscopes
- Rudyard Kipling publishes The Jungle Book, a collection of fa-

bles with anthropomorphic animals to portray the characters to teach moral lessons.

1895 Historical Highlights

- The winter of 1894-1895 was very snowy in Flagstaff and the atmospheric conditions suffered. Lowell continues using the 18-inch until April 3, 1895. He decides to set up an observatory in Mexico. The 24-inch is delivered to Mars Hill and installed in early July, 1896. "First-light" is on July 23, 1896. On November 7, observations in Flagstaff end and the lens is removed and the rest of the scope is dismantled and shipped to Mexico. (Lowell wanted the new observatory to be ready for the December 10. 1896 opposition of Mars.) Lowell begins his observations of Mars from the Mexican location on December 28. Conditions are not the best and accessibility to the observatory was difficult. The last observations made at the Mexico observatory were done on March 26, 1897, and the telescope is transported back to Mars Hill. On May 8, 1897, the 24-inch is back in service above Flagstaff. Lowell's first book, "Mars," is published in 1895. It is available to read online. https://archive.org/details/marsbypercivallo00lowe/page/n7/mode/2up
- Inventor Guglielmo Marconi experiments with radio, or "Telegraphy without Wires". In early summer 1895 he initially transmits a signal a distance of about a mile. Later in 1901 he successfully receives a signal from across the Atlantic from Cornwall, England to St John's Newfoundland in Canada.
- In December, German physicist Wilhelm Roentgen discovers X-rays. They were so named because their nature was unknown.

1896 Historical Highlights

- The First Olympic Games of the modern era are held in Athens, Greece, from April 6-15.

1897 Historical Highlights

- Bram Stoker publishes Dracula on May 26, 1897
- The first Boston Marathon is held on April 19. It is the world's oldest annual marathon.

Seagrave contributes 167 observations of variable star SS Cygni (a dwarf nova).

1898 Historical Highlights

- Pierre and Marie Curie discover radium and polonium. 1mg of radium is extracted from ten metric tons of the uranium ore pitch blend.
- The USS Maine explodes and sinks in Havana harbor Cuba on February 15. US Navy inquiry suggests that a submerged mine planted by the Spanish was responsible.
- On July 1, Britain obtains a 99-year lease of Hong Kong from China. Hong Kong reverts to Chinese control on July 1, 1997.
- Harrod's of London installs the first elevator, aka "The Moving Staircase," on November 16 to take shoppers from the first level to the second level at nearly 2 miles per hour.
- H.G. Wells writes The War of the Worlds between 1895 and 1897 and was serialized in UK and US magazines in 1897. First published in hardcover in 1898.

Seagrave contributes 71 observations of variable star SS Cygni (a dwarf nova).

1899 Historical Highlights

- A German chemist, Felix Hoffman and colleagues working for Bayer, creates Aspirin (then a brand name) for pain relief. Until recently low doses were still being used today to help prevent heart attacks and strokes (this recommendation has recently come under some medical scrutiny). Acetaminophen (1956) and ibuprofen (1962) led to Aspirin's decline in popularity.

~ End of Part I ~

Part II, which will cover Seagrave's life from 1900 to his death in 1934, will take several months to complete. (I hope to finish this project before the end of this year.) Seagrave's observations and computations expanded during those years, and his contributions were cited in hundreds of astronomical journals. Plus, there are some interesting stories to tell.

Google Drive Links

1. Catalog of Seagrave Astronomical Journal references thru 1899
https://docs.google.com/spreadsheets/d/1XsKH-EsQM0PHgShEYoCsVktjsqKZ8vwl/edit?gid=998212642#gid=998212642

2. ADS Access Instructions
https://drive.google.com/drive/folders/1JST81Svc6u3gJEEV-hCBJHH7uV3mNKh-

3. Archived Frank E Seagrave Material
https://drive.google.com/drive/folders/1Y6Yaree8rp3nTRQuq5MX1NnbEaAVlVmQ

4. 14 Frank Seagrave Images and 1 video
https://drive.google.com/drive/folders/1VKaE0umER8f2Ej-G3W3-2NFZ_UxdRKvj

5. Seagrave Notebooks
https://drive.google.com/drive/folders/1VJ-6uQfdMjQ5YaoDWQYKCYmRHkrdLbW0

6. 1878 Total Solar Eclipse Reports
https://drive.google.com/drive/folders/1FOtmOWSDyYnB03a9p3vhnfaKWUDlWdeu

7. Scientific American 1882 Transit of Venus
https://drive.google.com/drive/folders/1lhcnrmkMmi73rLhzzDwC--wMP8AyPpEw

8. Seagrave's Passport Application for 1887 Total Solar Eclipse
https://drive.google.com/drive/folders/1UkVgkAaX-Dk8COR1rC8qZkJZN3OC5EST

9. Saladyga Article including Seagrave Variable Star Contributions
https://drive.google.com/drive/folders/1tVomissKc9bL84jA-aPCA0RUuLGcuCBv

The Sun, Moon & Planets in September

This table contains the ephemeris of the objects in the Solar System for each Saturday night in September 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	**7**	11 04.3	5 57.4	Leo	-26.8	1904.4	-	-	-	1.008	06:18	12:44	19:08
	14	11 29.4	3 18.0	Leo	-26.8	1908.0	-	-	-	1.006	06:25	12:41	18:56
	21	11 54.5	0 35.6	Vir	-26.8	1911.6	-	-	-	1.004	06:32	12:39	18:44
	28	12 19.7	-2 07.9	Vir	-26.8	1915.3	-	-	-	1.002	06:40	12:36	18:32
Moon	**7**	13 36.4	-12 55.2	Vir	-10.3	1773.4	43° E	13	-	-	10:40	15:52	20:55
	14	19 54.5	-26 51.6	Sgr	-12.4	1928.4	124° E	78	-	-	17:23	22:06	02:57
	21	2 26.6	16 34.8	Ari	-12.6	1978.1	139° W	88	-	-	20:04	03:24	11:00
	28	9 06.0	20 12.8	Cnc	-10.8	1789.5	52° W	20	-	-	02:20	09:49	17:06
Mercury	**7**	9 57.6	12 57.1	Leo	-0.5	6.9	18° W	54	0.310	0.982	04:47	11:38	18:28
	14	10 38.9	10 13.8	Leo	-1.0	5.8	14° W	80	0.313	1.166	05:12	11:53	18:32
	21	11 26.6	5 35.7	Leo	-1.3	5.2	9° W	95	0.343	1.301	05:50	12:13	18:34
	28	12 13.5	0 11.8	Vir	-1.6	4.9	3° W	100	0.383	1.381	06:29	12:32	18:34
Venus	**7**	12 39.3	-3 20.3	Vir	-3.8	11.4	25° E	90	0.724	1.489	08:29	14:19	20:09
	14	13 10.5	-6 54.0	Vir	-3.8	11.6	27° E	89	0.725	1.454	08:46	14:23	19:58
	21	13 42.2	-10 20.9	Vir	-3.8	11.9	29° E	87	0.726	1.418	09:02	14:27	19:51
	28	14 14.4	-13 36.9	Vir	-3.8	12.3	31° E	86	0.726	1.380	09:20	14:32	19:43
Mars	**7**	6 05.7	23 26.9	Gem	0.7	6.7	74° W	88	1.472	1.395	00:10	07:45	15:19
	14	6 23.7	23 28.8	Gem	0.6	6.9	76° W	88	1.481	1.352	00:00	07:35	15:10
	21	6 41.1	23 24.2	Gem	0.6	7.2	79° W	87	1.490	1.307	23:50	07:25	14:59
	28	6 57.8	23 14.0	Gem	0.5	7.4	82° W	87	1.499	1.261	23:40	07:14	14:47
1 Ceres	**7**	18 35.3	-30 49.4	Sgr	8.6	0.5	113° E	97	2.930	2.392	16:17	20:11	00:06
	14	18 38.1	-30 44.2	Sgr	8.7	0.5	106° E	97	2.933	2.486	15:52	19:47	23:42
	21	18 42.1	-30 37.2	Sgr	8.8	0.5	101° E	97	2.937	2.582	15:28	19:23	23:19
	28	18 47.1	-30 28.5	Sgr	8.9	0.5	95° E	97	2.940	2.681	15:04	19:01	22:57
Jupiter	**7**	5 15.3	22 20.1	Tau	-2.2	39.1	85° W	99	5.046	5.030	23:24	06:53	14:22
	14	5 18.0	22 22.7	Tau	-2.2	40.0	91° W	99	5.048	4.923	22:59	06:28	13:57
	21	5 20.1	22 24.6	Tau	-2.3	40.8	98° W	99	5.051	4.817	22:34	06:03	13:32
	28	5 21.6	22 25.8	Tau	-2.3	41.8	104° W	99	5.053	4.712	22:08	05:37	13:06
Saturn	**7**	23 12.3	-7 29.6	Aqr	0.6	19.1	177° W	100	9.665	8.658	19:12	00:47	06:22
	14	23 10.3	-7 42.4	Aqr	0.6	19.1	174° E	100	9.663	8.663	18:43	00:17	05:51
	21	23 08.4	-7 54.7	Aqr	0.6	19.1	166° E	100	9.661	8.682	18:15	23:48	05:21
	28	23 06.5	-8 06.1	Aqr	0.6	19.0	159° E	100	9.659	8.716	17:46	23:19	04:51
Uranus	**7**	3 40.1	19 17.1	Tau	5.7	3.7	108° W	100	19.573	19.244	22:03	05:18	12:33
	14	3 39.9	19 16.4	Tau	5.7	3.7	114° W	100	19.572	19.133	21:35	04:50	12:06
	21	3 39.5	19 15.1	Tau	5.7	3.7	121° W	100	19.570	19.028	21:07	04:23	11:38
	28	3 39.0	19 13.3	Tau	5.7	3.7	128° W	100	19.569	18.931	20:40	03:54	11:09
Neptune	**7**	23 58.1	-1 39.1	Psc	7.8	2.4	166° W	100	29.897	28.919	19:37	01:33	07:29
	14	23 57.4	-1 43.7	Psc	7.8	2.4	173° W	100	29.897	28.899	19:09	01:04	07:00
	21	23 56.7	-1 48.4	Psc	7.8	2.4	179° W	100	29.897	28.893	18:41	00:36	06:32
	28	23 56.0	-1 53.1	Psc	7.8	2.4	173° E	100	29.897	28.902	18:13	00:08	06:03
Pluto	**7**	20 11.4	-23 21.3	Cap	14.4	0.2	135° E	100	35.093	34.374	17:15	21:47	02:18
	14	20 11.0	-23 22.6	Cap	14.5	0.2	128° E	100	35.098	34.469	16:47	21:19	01:50
	21	20 10.6	-23 23.7	Cap	14.5	0.2	121° E	100	35.102	34.572	16:19	20:51	01:23
	28	20 10.4	-23 24.4	Cap	14.5	0.2	114° E	100	35.107	34.683	15:52	20:23	00:55

Skyscrapers Members Present at Stellafane

Francine Jackson was invited to give a presentation at the Hartness House Workshop, Eclectic Astronomy III about Ladd Observatory and H.P. Lovecraft.

Mark Munkacsy gave a Saturday afternoon presentation at during Stellafane Convention titled "The Wacky World of Exoplanets and How We Discover Them."

Cosmo: Astronomy Eduction Chatbot

by Claire Zhao, Seattle Astronomical Society

I hope this message finds you well! My name is Claire, and I am a high school junior, an active member of the Seattle Astronomical Society, and a presenter at the University of Washington's Planetarium.

Guided by faculty and graduate students in the UW Department of Astronomy, I have spent the past year designing Cosmo, an astronomy chatbot that aims to make learning about our universe accessible for various age groups. Cosmo allows users to explore the wonders of our galaxy and learn about complex astronomical concepts through a conversational interface that is available in multiple languages! You can find more about the project on the University of Washington Planetarium's Facebook page and demo video.

In line with our shared mission of making our universe universally accessible, I am reaching out to see if you'd be interested in introducing Cosmo to your club. I'd be happy to meet with you over Zoom to walk you through the program's functions. If you are interested in sharing news about Cosmo through your club's social media channels or newsletter, I would also be happy to provide the material you can use for these posts.

Finally, if you have any feedback on Cosmo or would like to suggest updates that would suit your club's needs, please don't hesitate to reach out to me. Thank you for your time!

Best wishes, Claire

Observing Events:

Open Nights at Seagrave*

Sept. 7, 8-10 PM
Sept. 14, 8-10 PM
Sept. 21, 8-10 PM
Sept. 28, 7-9 PM

* Members are encouraged to attend

Off-site Public Observing

Michael S. Van Leesten Memorial Pedestrian Bridge , Providence
Thursday, September 12, 6:30 - 9:00 PM

River Bend Farm, Uxbridge, MA
Friday, September 20, 7:30 - 8:30 PM

M16 Eagle Nebula in Serpens by Conrad Cardano

I managed to take this last night. It's only 30 minutes of data. This is the stacked JPG image from Seestar. I tried to stack the individual images from Seestar, but I can't get the colors right.

IC 4665 in Ophiuchus by Jim Hendrickson

Trying out the Seestar S50 for the first time during Seagrave Observatory Open Night, July 27, 2024. 10 minutes of 30 second exposures, auto-stacked.

Blue Supermoon by Greg Shanos

The Lunar X & V were visible on August 11, 2024 at 10:46pm local time or August 12, 2024 02h 46m Universal Time. The moon was at a 45% phase and only 18°above the horizon. The seeing was rather good however, the transparency was only average through thinning clouds and haze. The skies were completely overcast at sunset with the clouds rapidly thinning out as the evening progressed. This was the orientation of the moon as it was setting. A Meade 60mm 260mm f/4 refractor was tracking the moon on an inexpensive Orion EQ equatorially mounted tripod. A ZWO ASI 715MC one-shot color camera with Firecapture v2.7.14 was used to acquire the video with an MSI GF 65 gaming computer. The AVI video was processed using Autostakkert 4.0.11 beta and Registax 6.1.08. Further sharpening and processing in Photoshop CS4. Image by Gregory T. Shanos Longboat Key, Sarasota, Florida. The Lunar X (also known as the Werner X) is a claire-obscure effect in which light and shadow creates the appearance of a letter 'X' and 'V'. The Lunar X forms from the rim of the craters Blanchinus, La Caille and Purbach. The X is visible beside the terminator about one-third of the way up from the southern pole of the moon. The Lunar V forms along the northern part of the terminator near the crater Ukert.

Blue Supermoon by Greg Shanos

The Blue Supermoon occurred at 2:26 p.m. EDT (18h 26m UT) on Monday, August 19, 2024, when the moon was 100% fully illuminated. However, it was daytime from my location and the moon had not yet risen. This image was taken on August 19, 2024 at 11:48pm local time or August 20, 2024 at 3h 48m UT when the moon was full at 99.7% phase and only 37°above the horizon. The seeing was rather good however, the transparency was only average through thinning clouds and haze. This was the orientation of the moon as it was rising. A Meade 60mm 260mm f/4 refractor was tracking the moon on an inexpensive Orion EQ equatorially mounted tripod. A ZWO ASI 178MM monochrome camera using Firecapture v2.7.14 to acquire the video using an MSI GF 65 gaming computer. The SER video file was processed using Autostakkert 4.0.11 beta and Registax 6.1.08. Further sharpening and processing in Photoshop CS4. Image by Gregory T. Shanos Longboat Key, Sarasota, Florida.

September 2024

Volume 54

STARRY SCOOP

Editor: Kaitlynn Goulette

WHAT'S UP

The galactic center, located in the Sagittarius region and overrun with countless deep sky objects, is preparing to dip below the western horizon and make room for the fall constellations. Although Scorpius and Sagittarius are on borrowed time, the Summer Triangle asterism, comprised of Vega, Deneb, and Altair remains high overhead. It spans over 30 degrees and is visible until winter.

This month, the planets continue to dazzle both our evening and morning skies. Saturn reaches opposition on the 8th, which means that it rises at sunset and is positioned due south at midnight on that date. As the month reaches its end, the Ringed Planet rises earlier and is a great telescopic target. Jupiter, followed by Mars an hour later, joins the sky at about 11pm. This duo remains a great morning observation, positioned high overhead in the eastern heavens a few hours before the sun overtakes the sky.

The 22nd marks the September Equinox and the beginning of fall for those located in the Northern Hemisphere. The sun shines directly above the equator, which causes day and night to be of equal lengths. This is also the start of shorter days, bringing nightfall earlier and earlier in the evenings as the weeks continue.

Forty-five years ago on September 1st, Pioneer 11 became the first spacecraft to visit Saturn. It came within 13,000 miles of the Ringed Planet's gaseous atmosphere and recorded data on Saturn, its rings, and its moons. After this flyby, Pioneer 11 began its course into interstellar space. Although NASA lost contact with the probe in 1995, it continues to travel into the outer reaches of the universe and will eventually fly past a star in Aquila about four million years from now.

SEPTEMBER'S SKY

3: New Moon

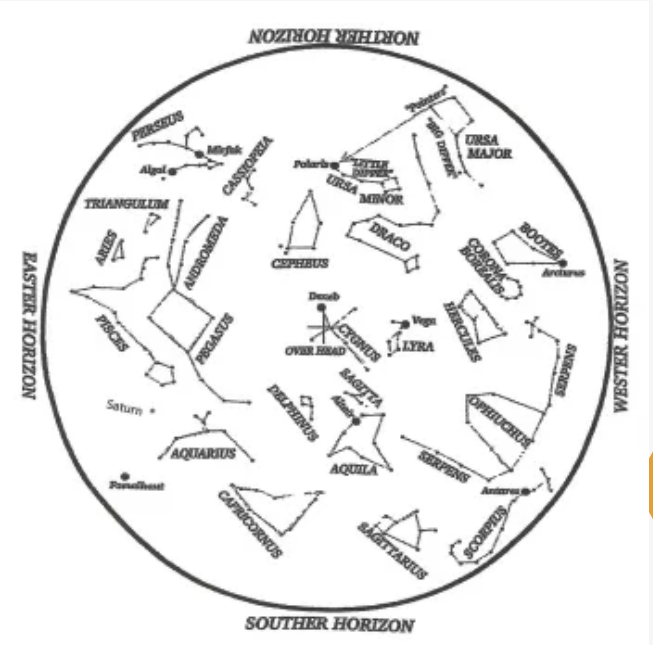
5: Mercury at Greatest Western Elongation

8: Saturn at Opposition

18: Full Moon, Supermoon

20: Neptune at Opposition

22: September Equinox



Credit: Roger B. Culver

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

OBSERVATIONS

Annually, The Springfield Telescope Makers of Springfield, Vermont put on the historic Stellafane convention. Telescope makers and astronomers from all over the world attend, and I've had the pleasure of being a part of this community alongside my family and friends since 2015. Each year after the sun passes below the horizon, I enjoy completing the Binocular Observing Olympics (BOO), a challenge compiled by astronomer and author Phil Harrington. This year, I completed it alongside my father and younger sister, Krystyna, after narrowly avoiding clouds. Just after we located the last target of the challenge, clouds blanketed the sky and would obscure the heavens for the rest of the convention.

With a thin haze covering the sky throughout the majority of the night, I found myself needing to put down my 7x35 binoculars in favor of my tripod-mounted 15x75 binoculars. This year, the program was a mix of fun asterisms and fainter, more difficult objects, and I'm already looking forward to next year's convention.

The clouds and smoke haven't made observing easy, but I recently had the opportunity to stargaze from my backyard with a few family friends. They recently received a new telescope and had fun exploring different areas of the sky throughout the night. A popular target was Albireo, a double star with a brilliant color contrast of blue and golden yellow.

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 September is the Alpha Persei Moving Cluster, designated Collinder 39. This loose grouping of stars spans over six degrees in the sky, making it one of the largest open clusters visible from the earth. It sits at roughly 570 light-years away and its stars are believed to have all formed in the same stellar nursery, as astronomers have found that they share the same stellar motion.

Collider 39 is found in northern Perseus and is easily visible to the unaided eye. The brightest star in this cluster is Mirfak, a supergiant that is over eight times the mass of the sun. While the naked eye reveals its brightest stars, binoculars disclose much more detail.

The Alpha Persei Moving Cluster

A look at the Springfield Telescope Makers' pink clubhouse, which celebrated its 100-year anniversary. Photo by Kaitlynn Goulette

Directions to Seagrave Memorial Observatory

www.theSkyscrapers.org

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.

SKYSCRAPERS INC.

47 Peeptoad Road
North Scituate, Rhode Island 02857