



ASTROFILES

Auburn Astronomical Society Newsletter

June 2023 *Newsletter Editor — John Wingard — jwin1048@gmail.com*

Moon Phases

June 10 — Last Quarter
June 18 — New Moon
June 26 — First Quarter
July 3 — Full Moon
July 9 — Last Quarter
July 17 — New Moon
July 25 — First Quarter
August 1 — Full Moon

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<https://www.facebook.com/groups/79864233515/>

News and upcoming activities

Apologies are in order for the lateness of the June newsletter as I have had a very busy end of the month here with some other activities. I also needed more time to collect some useful content for the newsletter. I wish I had more club related news to share but a recently scheduled stargaze was unfortunately cancelled due to weather. We had planned to gather at Children's Harbor on Lake Martin on the evening of Wednesday, June 21, 2023 but Mother Nature had other ideas. That turned out to be a very wet week for most of the region so we were unfortunately not able to make it. The stargaze was to be part of a children's camp that week, so once the opportunity was missed there was no option to reschedule it. We have helped with some events there in the past so hopefully the next time we will have better success. Also, as I write this, we are in the midst of an early summer heat wave + high humidity, and with that typically comes hazy sky conditions, insects, and of course, fewer hours of darkness this time of the year. I know that it has been challenging for some of our astrophotography members to actually find suitable nights for imaging this past month.

In my search for some interesting objects to observe in July I happened to run across a comprehensive list of a variety of objects visible in July from the Astronomical League. This list, titled "What's Up Doc?" is primarily geared toward their many observing programs for their members. Of course, our club and its members are part of the Astronomical League as well. The following two pages list all sorts of objects that can be observed so go through the listings and pick out a few targets that may be of interest and give them a try. If you are not already familiar with where some of them are located in the sky you will need to consult a star atlas or digital astronomy app.

What's Up, Doc? †

July 2023 (Eastern Daylight Time)

Dr. Aaron B. Clevenson, Observatory Director, Insuperity Observatory in Humble ISD

This document tells you what objects are visible this next month for many of the Astronomical League Clubs. If you are working on one of the more advanced clubs, then I assume that you are tracking where your objects are all the time. I have concentrated on the common and starter level clubs. This information is based on 9 PM Eastern Time at about 39° North Latitude (Washington DC).

Naked-Eye Clubs

Meteors – any night, any time, anywhere, the darker the sky the better.

<u>Shower</u>	<u>Duration</u>	<u>Maximum</u>	<u>Type</u>
Southern Delta Aquarids	7/14 to 8/18	7/28 & 7/29	Moderate
Alpha Lyrids	7/9 to 7/20	7/14 & 7/15	minor
July Phoenicids	7/9 to 7/17	7//15	minor
Alpha Pisces Asutralids	7/16 to 8/13	7/30 & 7/31	minor
Sigma Capricornids	6/18 to 7/30	7/10 to 7/20	minor
Tau Capricornids	6/2? to 7/29	7/12 & 7/13	minor
Omicron Draconids	7/6 to 7/28	7/17 & 7/18	minor

Constellation Hunter, Northern Skies (and some Southern Skies) – any night, any time, anywhere, the darker the sky the better.

Last Chance this cycle: Ursa Major, Leo Minor, Leo, Crater, Corvus.

Transit: Ursa Minor, Draco, Hercules 14 & 7, Corona Borealis, Serpens, Ophiuchus, Libra, Scorpis, Lupus, Norma.

New arrivals: Cepheus, Lacerta, Cygnus, Vulpecula, Sagitta, Delphinus, Equuleus, Aquila, Scutum, Sagittarius, Corona Australis.

Earth Orbiting Satellites – Most requirements can be seen naked-eye. Information about all satellite passes required for this certification can be found on the website: www.heavens-above.com. Be sure to provide accurate latitude and longitude for your observing site.

Binocular Clubs

Binocular Messier – Monthly highlights include:

Easy – 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 16, 17, 18, 22, 23, 24, 25, 27, 29, 39, 52, 92.

Medium – 14, 19, 28, 40, 49, 53, 62, 63, 64, 80, 81, 82, 83, 94.

Hard – 9, 26, 51, 54, 56, 65, 66, 68, 71, 97, 101, 104, 106.

Big Binoculars – 58, 59, 60, 61, 69, 70, 84, 85, 86, 87, 88, 89, 90, 95, 96, 99, 100, 102, 105, 107, 108, 109.

Deep Sky Binocular – Monthly highlights include (by Astronomical League numbers):

5, 38, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59.

Other Clubs

Messier

In addition to those listed under Binocular Messier, check out: 21, 57, 91, 98.

Caldwell

1, 2, 3, 4, 6, 7, 9, 11, 12, 15, 16, 19, 20, 21, 26, 27, 29, 32, 33, 34, 35, 36, 37, 38, 40, 42, 45, 47, 52, 57, 60, 61, 66, 69, 75, 76, 77.

Double Star (by Astronomical League numbers):

1, 4, 9, 10, 11, 12, 13, 14, 15, 17, 18, 20, 22, 25, 26, 29, 31, 35, 36, 37, 38, 39, 40, 41, 43, 44, 45, 46, 48, 50, 51, 52, 54, 56, 57, 58, 59, 62, 64, 66, 67, 68, 69, 70, 71, 74, 84, 86, 87, 91, 92, 93, 94, 96, 97, 100.

Other Clubs (of the Solar System)

Solar System – These are the tasks that can be done this month:

Sun – Any clear day is a good time to get those sunspots.

Sunset is at 2033 at mid-month.

Moon:

The Maria requirement can be done any time the moon is visible. Look before 7/10 or after 7/24 for the fullest views.

The Highlands requirement can be done at the same time.

The Crater Ages requirement is best done on 7/23 or 7/24.

The Scarps requirement is best done on 7/25.

Occultations occur all the time, the bright ones can be found on the internet. Objects disappear on the East side of the moon.

Jupiter and Uranus not available in the evening sky mid-month.

Mercury is in Cancer and sets at 2128 mid-month.

Venus is in Leo and sets at 2203 mid-month.

Ceres is in Virgo and is up all night mid-month.

Mars is in Leo and sets at 2232 mid-month.

Saturn is in Aquarius and rises at 2243 mid-month.

Neptune is in Pisces and rises at 2332 mid-month.

Pluto is in Sagittarius and rises at 2100 mid-month.

Asteroids – Course Plotting and Measuring Movement requirements can be done at any time on any asteroid.

Lunar

Key timings are indicated below (times are Central Time):

New, 6/28 4 days, 7/2 7 days, 7/5 10 days, 7/8 14 days, 7/12

Old moon in new moons arms – before 1132 on 7/20. ~10 % illuminated. (72 hr > New)

New moon in old moons arms – after 1132 on 7/14, ~10 % illuminated. (72 hr < New)

Waxing Crescent – before 1132 on 7/19, ~4 % illuminated. (48 hr > New)

Waning Crescent – after 1132 on 7/15, ~4 % illuminated. (48 hr < New)

Major Astronomical Events this Month:

- 7/1 – Neptune is Stationary
- 7/4 – Lunar Perigee
- 7/6 – Earth at Aphelion
- 7/10 – July Perseids Meteor Shower
- 7/20 – Venus is Stationary and Lunar Apogee
- 7/22 – Pluto at Opposition
- 7/28 – Piscis Austrinids Meteor Shower and July Draconids Meteor Shower
- 7/29 – Delta Aquarids Meteor Shower
- 7/30 – Southern Delta Aquarids Meteor Shower and Alpha Capricornids Meteor Shower

* - Although these Observing Programs are not detailed in this “**What’s Up Doc?**” handout, you can get information on many of their objects by using the “**What’s Up Tonight, Doc?**” spreadsheet (version 4.1). To get your copy, talk to the Doc, Aaron Clevenson, by sending an email to aaron@clevenson.org. It is also available on the club website.

† - “What’s Up Doc?” is used with permission from Warner Bros. Entertainment Inc.

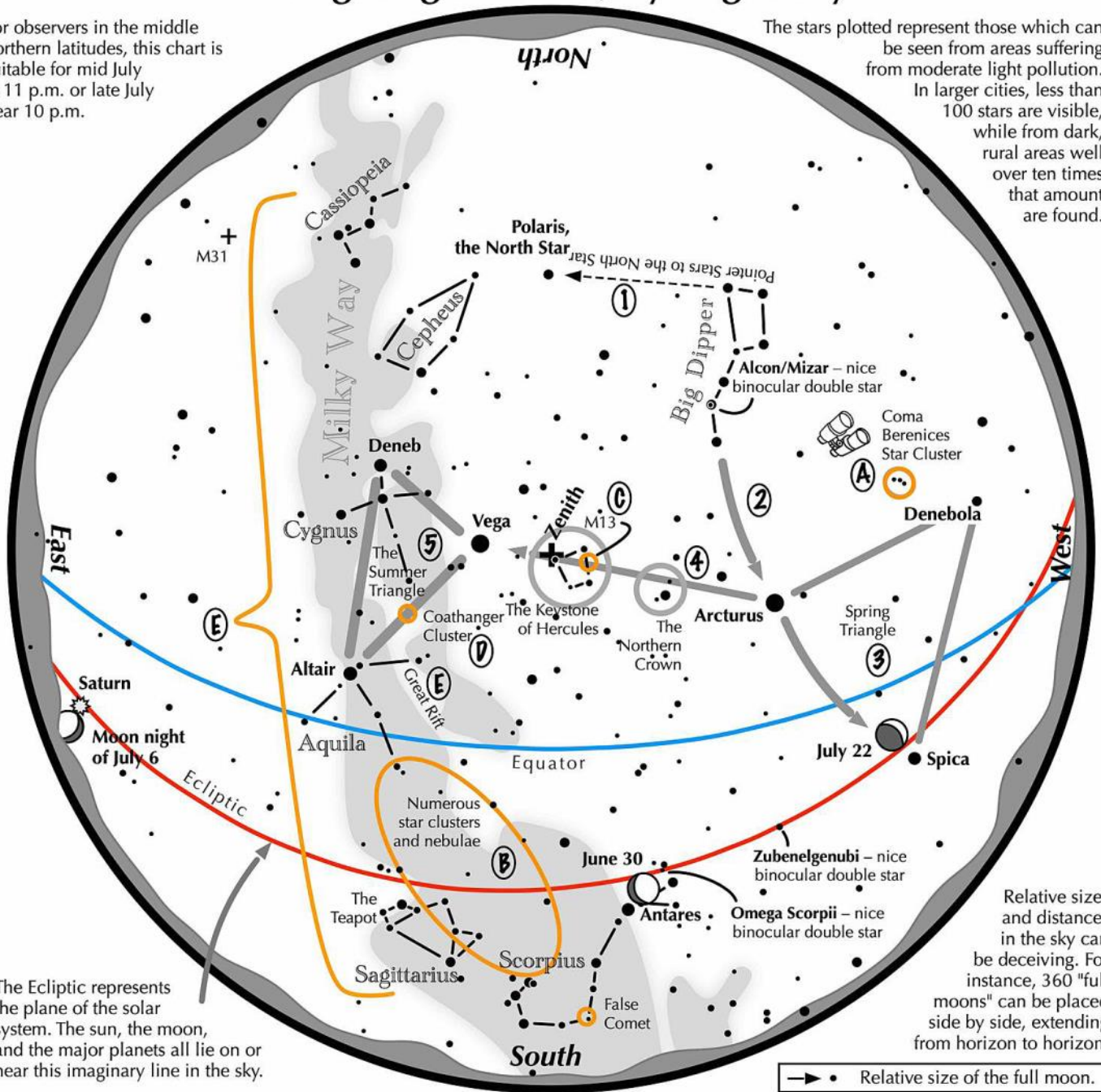
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Insperty Observatory, 2505 S. Houston Avenue, Humble, TX: www.humbleisd.net/observatory

Navigating the mid July Night Sky

For observers in the middle northern latitudes, this chart is suitable for mid July at 11 p.m. or late July near 10 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 July 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 first intersects Arcturus, the brightest star in the July evening sky, then continues to Spica. Arcturus, Spica, and Denebola form the Spring Triangle, a large equilateral triangle.
- 3 To the northeast of Arcturus shines another star of similar brightness, 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 High in the East lies the Summer Triangle stars of Vega, Altair, and Deneb.

Binocular Highlights

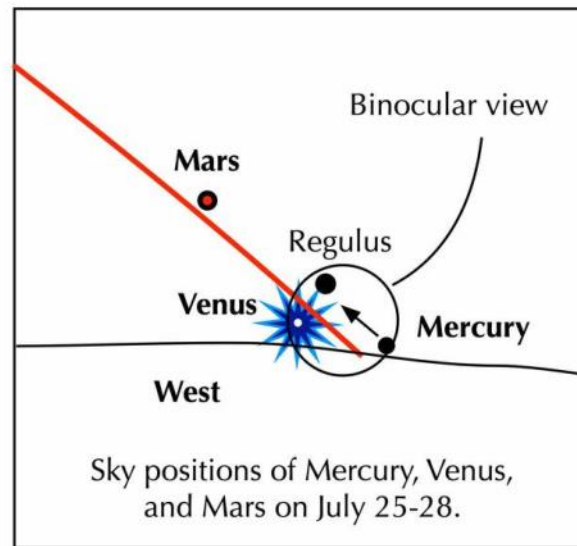
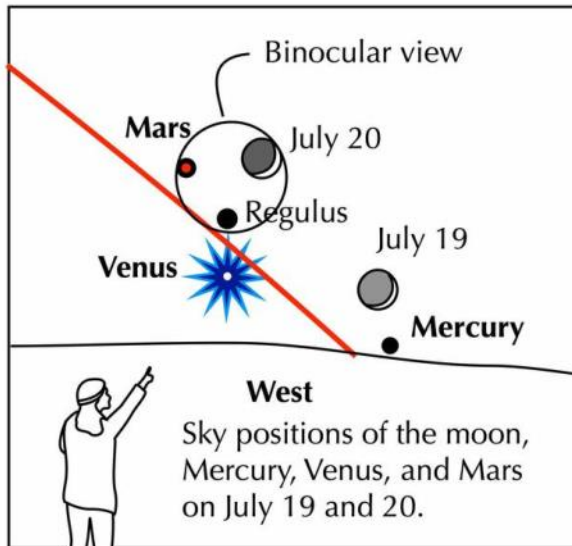
- A: Between Denebola and the tip of the Big Dipper's handle, lie the stars of the Coma Berenices Star Cluster.
- B: Between the bright stars Antares and Altair, hides an area containing many star clusters and nebulae.
- C: On the western side of the Keystone of Hercules glows the Great Hercules Cluster, containing nearly 1 million stars.
- D: 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger.
- E: Sweep along the Milky Way for an astounding number of faint glows and dark bays, including the Great Rift.



Astronomical League www.astroleague.org/outreach; duplication is allowed and encouraged for all free distribution.



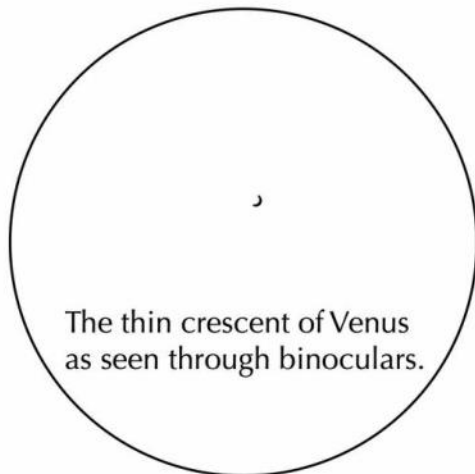
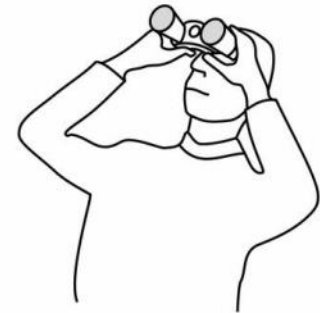
If you can see only one celestial show in the evening this July, see this one.



All the rocky planets, all at once!

On the evenings of July 19 and 20, look towards the west 30 minutes after sunset.

- Brilliant Venus will be seen as a tiny crescent in steadily held binoculars.
- On the first evening, the thin crescent moon, full with earthshine, hangs above Mercury. The little planet might be lost in the bright twilight.
- On July 20, the moon forms a triangle with Regulus and Mars. Venus sinks below them. Mars, having lost its splendor from last fall, might be difficult to spot in the bright twilight. Binoculars will help.



The thin crescent of Venus as seen through binoculars.

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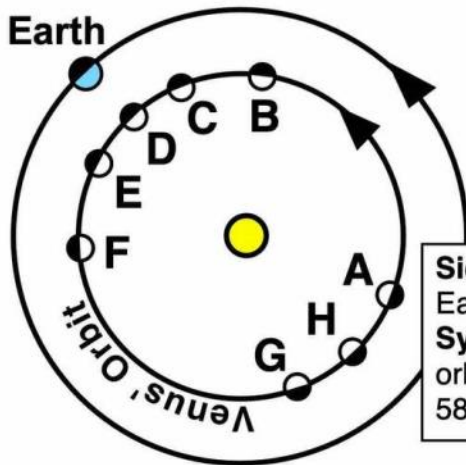
- Mercury climbs somewhat higher over the remaining evenings in July. On July 28, it lies directly next to Regulus, which has dropped much closer to the horizon. Venus may lie too close to the horizon to be spotted. Because of their low altitude, very clear skies and a low horizon are needed to see this.

ASTRONOMICAL LEAGUE

PHASES OF VENUS



Orbital positions of Venus with respect to Earth



Venus' position above the horizon ...

- A Gibbous phase low in evening sky.
- ◐ B Half phase high in evening sky, Greatest Eastern Elongation.
- ◑ C Crescent phase low in evening sky.
- D Inferior Conjunction, in front of the sun and can't be seen.
- ◑ E Crescent phase low in morning sky.
- ◐ F Half phase high in morning sky, Greatest Western Elongation.
- G Gibbous phase low in morning sky.
- H Superior Conjunction, behind the sun and can't be seen.

Sidereal orbital period: Time it takes to completely circle the sun.
Earth: 365.25 days; Venus: 224.7 days.

Synodic orbital period: Time it takes Venus to catch Earth as they orbit the Sun (the time between successive inferior conjunctions):
584 days = 19.5 months.

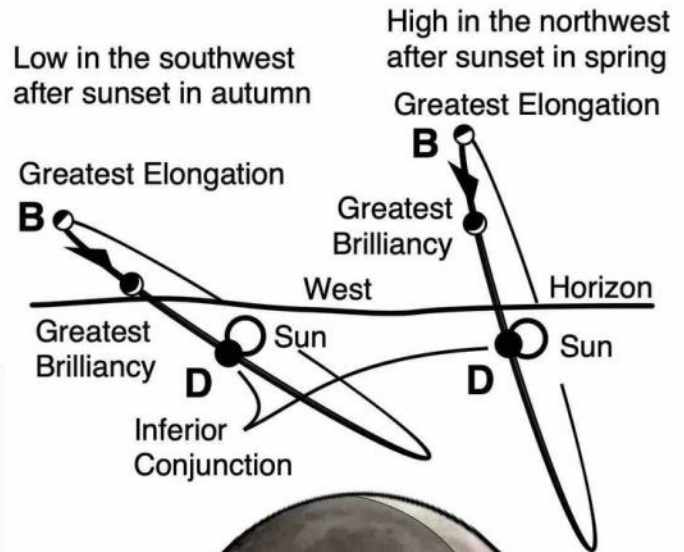
Inferior Conjunction Dates

January 9, 2022	August 13, 2023
March 23, 2025	October 24, 2026

Venus in the evening sky ...

- Points of greatest elongation (B & F) occur 10 weeks before and after inferior conjunction. This is when Venus attains its greatest angle from the Sun. In a telescope, the planet appears to be half illuminated.
- Points of greatest brilliancy (near C & E) occur 4 weeks before and after inferior conjunction. The planet appears as a thin crescent.

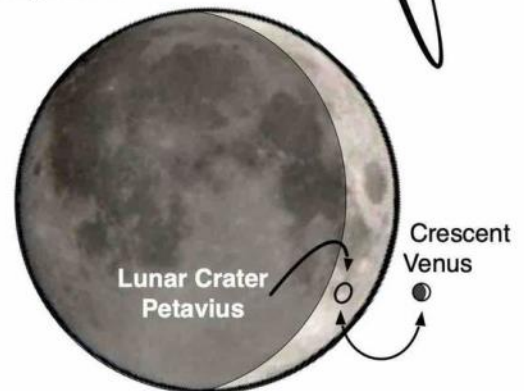
For observers in the contiguous US, Venus lies higher above the horizon at sunset when it is in the spring sky than the autumn sky because the angle of the ecliptic with respect to the horizon is greater in the spring months.



Venus is bright enough that it can cast a shadow and, at times, it can be seen in the daytime!

Venus is very bright because ...

- it presents the largest apparent angular diameter of any planet when it nears its closest point to Earth. At that time, Venus has about the same apparent angular diameter as a large lunar crater.
- Venus' permanent, thick cloud cover reflects 75% of the sunlight that strikes it (called its "albedo"). Compare that to the Moon's albedo of 12%, Mercury's 12% and Mars' 16%!



Relative apparent sizes of the Moon, a large crater (Petavius) & the crescent Venus.



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!

Find A Ball of Stars

Linda Shore, Ed.D

French astronomer Charles Messier cataloged over 100 fuzzy spots in the night sky in the 18th century while searching for comets – smudges that didn't move past the background stars so couldn't be comets. Too faint to be clearly seen using telescopes of the era, these objects were later identified as nebulae, distant galaxies, and star clusters as optics improved. Messier traveled the world to make his observations, assembling the descriptions and locations of all the objects he found in his *Catalog of Nebulae and Star Clusters*. Messier's work was critical to astronomers who came after him who relied on his catalog to study these little mysteries in the night sky, and not mistake them for comets.

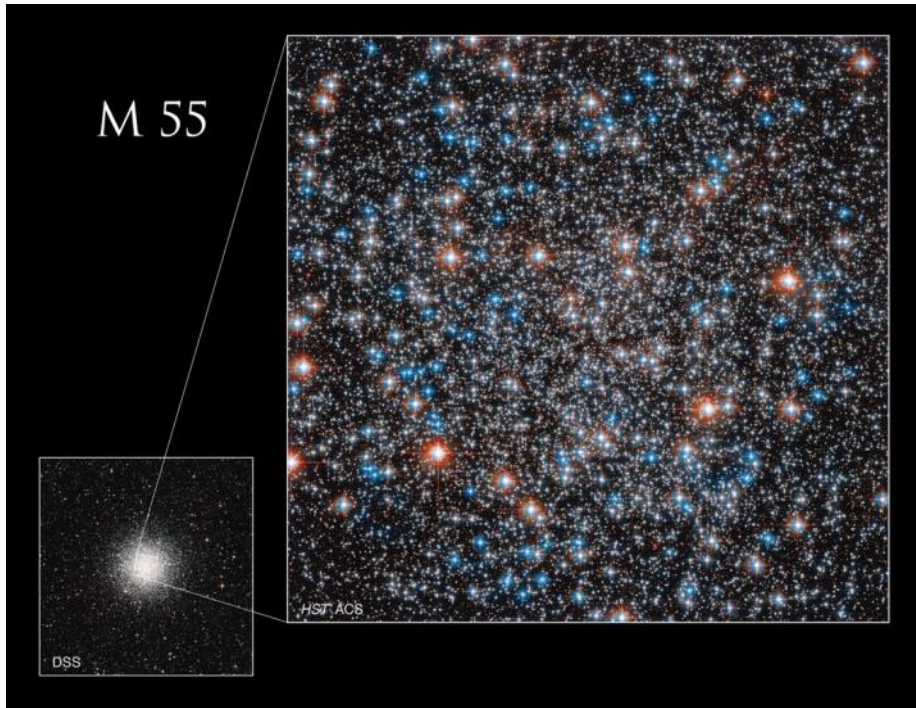
Most easily spotted from the Southern Hemisphere, this “faint fuzzy” was first cataloged by another French astronomer, Nicholas Louis de Lacaille in 1752 from Southern Africa. After searching many years in vain through the atmospheric haze and light pollution of Paris, Charles Messier finally added it to his catalog in July of 1778. Identified as **Messier 55 (M55)**, this large, diffuse object can be hard to distinguish unless it's well above the horizon and viewed far from city lights.

But July is great month for getting your own glimpse of M55 – especially if you live in the southern half of the US (or south of 39°N latitude). Also known as the “Summer Rose Star,” M55 will reach its highest point in northern hemisphere skies in mid-July. Looking towards the south with a pair of binoculars well after sunset, search for a dim (mag 6.3) cluster of stars below the handle of the “teapot” of the constellation Sagittarius. This loose collection of stars appears about 2/3 as large as the full Moon. A small telescope may resolve the individual stars, but M55 lacks the dense core of stars found in most globular clusters. With binoculars, let your eyes wander the “steam” coming from the teapot-shaped Sagittarius (actually the plane of the Milky Way Galaxy) to find many more nebulae and clusters.

As optics improved, this fuzzy patch was discovered to be a globular cluster of over 100,000 stars that formed more than 12 billion years ago, early in the history of the Universe. Located 20,000 light years from Earth, this ball of ancient stars has a diameter of 100 light years. Recently, NASA released a magnificent image of M55 from the Hubble Space Telescope, revealing just a small portion of the larger cluster. This is an image that Charles Messier could only dream of and would have marveled at! By observing high above the Earth's atmosphere, Hubble reveals stars inside the cluster impossible to resolve from ground-based telescopes. The spectacular colors in this image correspond to the surface temperatures of the stars; red stars being cooler than the white ones; white stars being cooler than the blue ones. These stars help us learn more about the early Universe. Discover even more: <https://www.nasa.gov/feature/goddard/2023/hubble-messier-55>

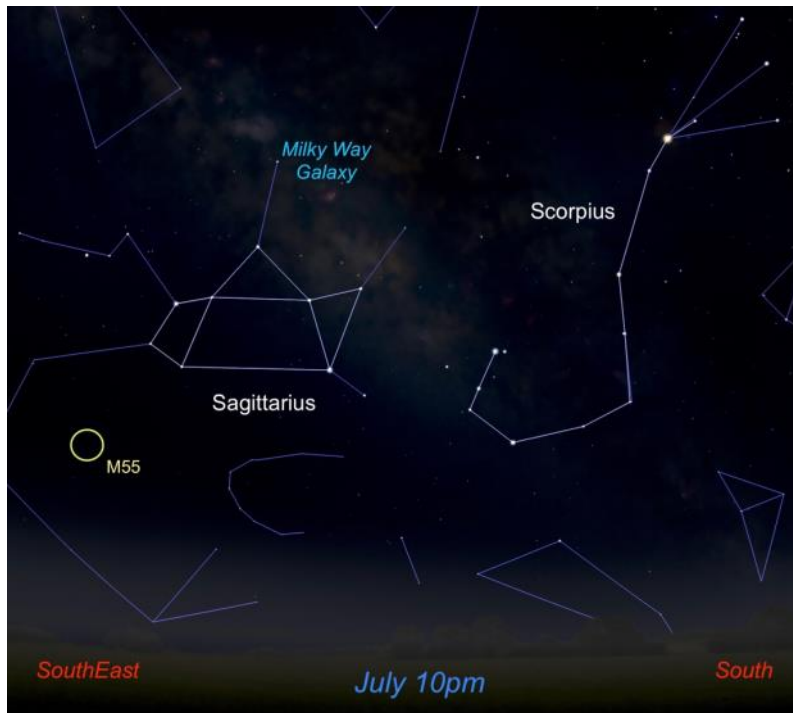
The Hubble Space Telescope has captured magnificent images of most of Messier's objects. Explore them all:

<https://www.nasa.gov/content/goddard/hubble-s-messier-catalog/>



The large image shows just the central portion of M55 taken by the Hubble Space Telescope. Above Earth's atmosphere, this magnificent view resolves many individual stars in this cluster. How many can you count through binoculars or a backyard telescope?

Original Image and Credits: NASA, ESA, A. Sarajedini (Florida Atlantic University), and M. Libralato (STScI, ESA, JWST); Smaller image: Digital Sky Survey; Image Processing: Gladys Kober



Look to the south in July and August to see the teapot asterism of Sagittarius. Below the handle you'll see a faint smudge of M55 through binoculars. More "faint fuzzies" can be found in the steam of the Milky Way, appearing to rise up from the kettle.



Auburn Astronomical Society

Application for Membership

To insure that our records are accurate, please print information clearly

Name: _____

Address: _____

City: _____ State: _____ ZIP: _____

Phone: _____ Date of Application: ____/____/____

E-Mail: _____

Telescopes owned (if any): _____

Area(s) of special interest: _____

Enclose \$20.00 for regular annual membership, payable in January. *Full-time* student membership is \$10.00.

For *NEW* members joining after January, refer to the prorated dues table below for the month you are joining:

Jan \$20.00	Feb \$18.33	Mar \$16.66	Apr \$14.99	May \$13.33	Jun \$11.66
Jul \$10.00	Aug \$8.33	Sep \$6.66	Oct \$4.99	Nov \$2.33	Dec \$1.66

New—Just Joining

Renewal

Please make checks payable to: Auburn Astronomical Society and return this application with your payment to:

Auburn Astronomical Society
c/o John Wingard, Sec/Treasurer
5 Wexton Ct.
Columbus, GA 31907

Note: At this time we do not have an option for online payment of dues.

The Auburn Astronomical Society is a member of the Astronomical League, the national organization representing astronomy clubs throughout the United States. As a club benefit, paid members of the Auburn Astronomical Society are eligible to received quarterly issues of *The Reflector*, the official publication of the Astronomical League. It will be mailed to the address that you provided above but could be delayed somewhat until their mailing lists are updated.

For additional information about our club, please go to our website www.auburnastro.org . You can also follow us on our Facebook page. Just search for "Auburn Astronomical Society."