ASTROFILES

Auburn Astronomical Society Newsletter

October 2022 *Newsletter Editor — John Wingard — jwin1048@gmail.com*

Moon Phases

October 17 — Last Quarter

October 25 — New Moon

November 1 — First Quarter

November 8 — Full Moon

November 16 — Last Quarter

November 23 — New Moon

November 30 — First Quarter

December 7 — Full Moon

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News and events

This past week I had the need to venture outside before dawn and it happened to be a rather chilly and clear morning. Much to my delight as I gazed upward at the sky, there was my old friend Orion the Hunter high overhead in all its splendor, even in my light-polluted sky. I say old friend because Orion and the great Orion Nebula (M42) were among the very first objects that I observed with my little 3-inch reflector that I got way back in 1960 or so when I was in the 6th grade. Other than the light-pollution, it still looks exactly the same as it did over 60 years ago now. As an additional treat, the star Sirius, the brightest star in the sky is found just below Orion in the constellation of Canis Major. You can also enjoy Orion by arising before dawn where it will be high in the southern sky. It will be more conveniently placed for earlier evening viewing beginning in January. The upcoming winter months are a great time to get out and enjoy the clearer skies and the winter constellations!

Here is some information for those that live in the central Alabama area, particularly in the Montgomery area and northward. There is an observatory conveniently located to you at the University of Montevallo in Montevallo, AL south of Birmingham. The James Wylie Shepherd Observatory has frequent nights that are open to the public for viewing the night sky. The best source of information about their activities is to go to the web page **https://www.montevallo.edu/campus-life/around-campus/observatory/** and contact Jessica Shumate to get put on an alert e-mail list for the public viewing nights. Currently, they have public sessions scheduled for November 2nd, 16th, and 30th (all on Wednesdays) but are subject to cancellation due to weather or sky conditions. The physical address of the observatory is 1093 Pebble Road, Montevallo, AL. Most of the sessions are from 7—9 PM CT.

More from the James Webb telescope

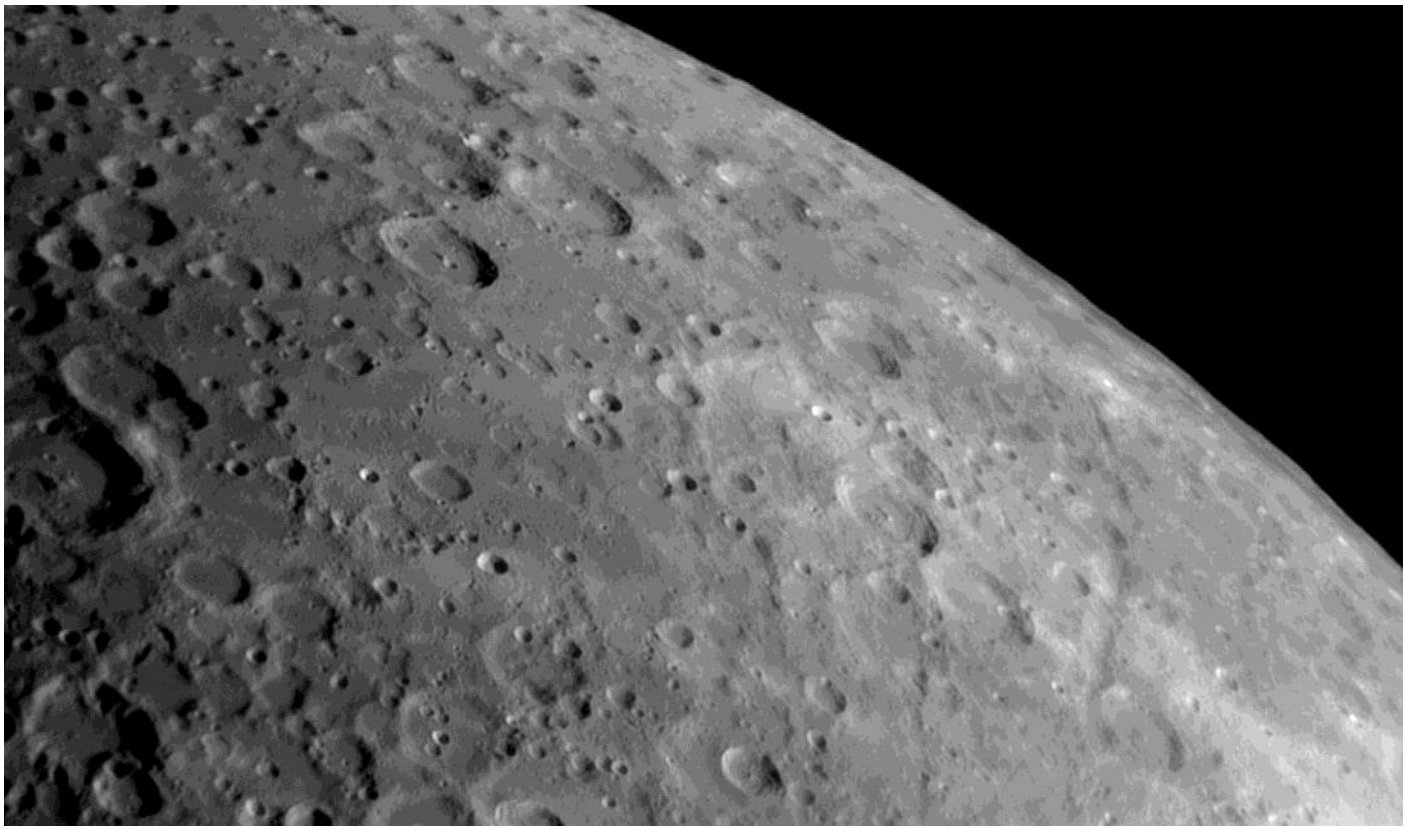
The James Webb Space Telescope (JWST) continues to astound us with incredible new images of some old familiar objects. The pair of images below show the now-famous “Pillars of Creation” contained within the Eagle Nebula. The image on the left was captured in visual light by the Hubble Space Telescope (HST) some years ago. Astronomers believe that the massive columns of dust are where young stars are born, but the dust obscures much of the detail within the dust columns. The image on the right was recently obtained by the Webb telescope . Due to the Webb’s infrared ability to see through this dust, astronomers can now see the actual stars in the process of forming. The amount of additional detail contained in the Webb image is astounding

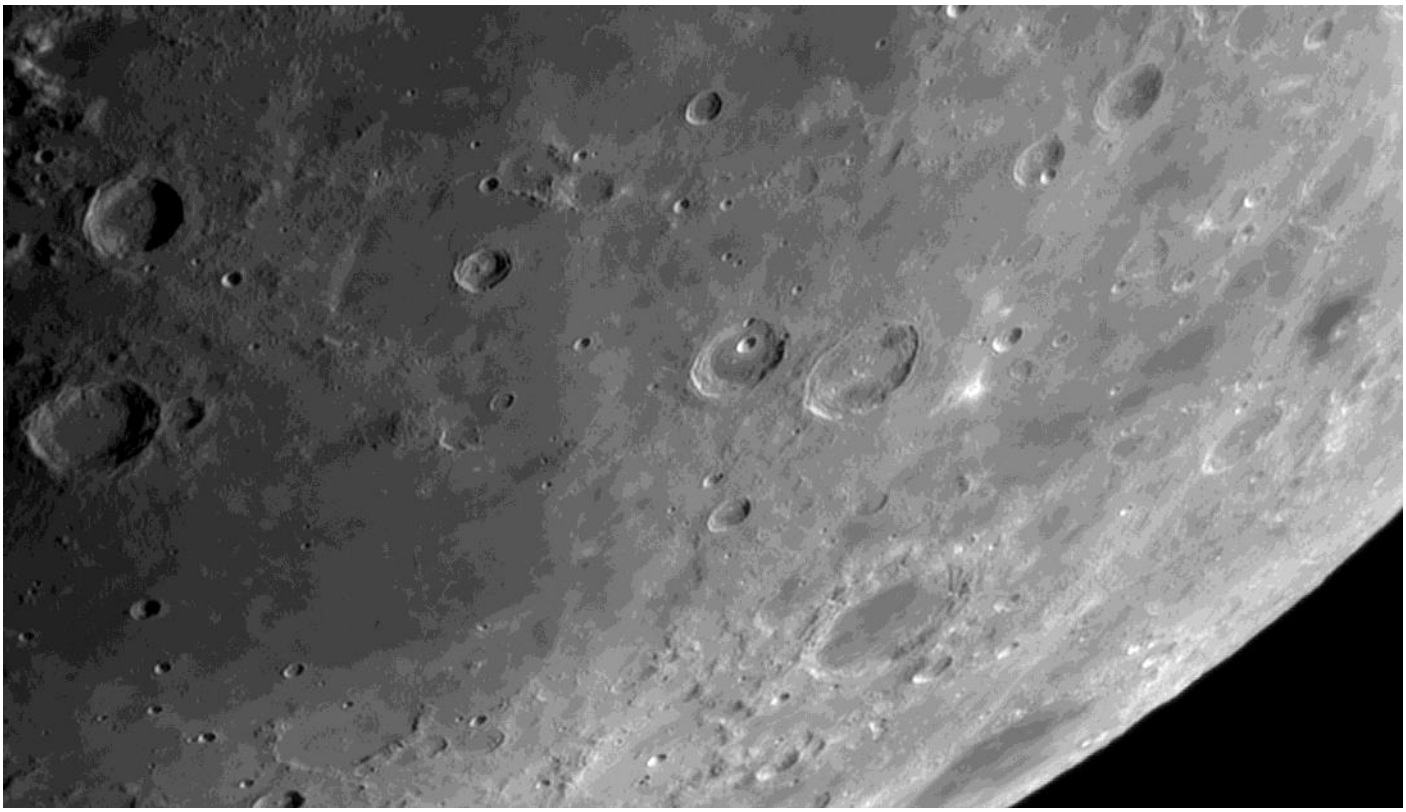
AAS Member Photos

The image at the left was recently captured by AAS member Chris Young. Image processing was done by AAS member Jay Hall. This is the Eastern Veil Nebula (NGC 6992) in the constellation of Cygnus. It is part of a larger network of nebulas called The Cygnus Loop. This particular image is the result of 16.45 hours of exposure obtained over multiple nights from 10/9/22 to 10/11/22. With today’s amazing image processing software, image data from multiple observing sessions (and even multiple telescopes) can be combined and processed into the final result that you see here. Using these tools, amateur astronomers today can easily produce results that rival those that were obtained from the world’s great professional observatories in the past.

More member photos

AAS member John Wingard recently obtained these two images of the first quarter moon on International Observe the Moon night on Saturday, October 1, 2022. These images, along with quite a few others, were captured with a Questar 3.5” Mak-Cass scope using a ZWO ASI 174MC camera. Processing was done in Autostakkert 3.0, Registax 6.0 and Photoshop.





 **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!

Cepheus: A House Fit for a King

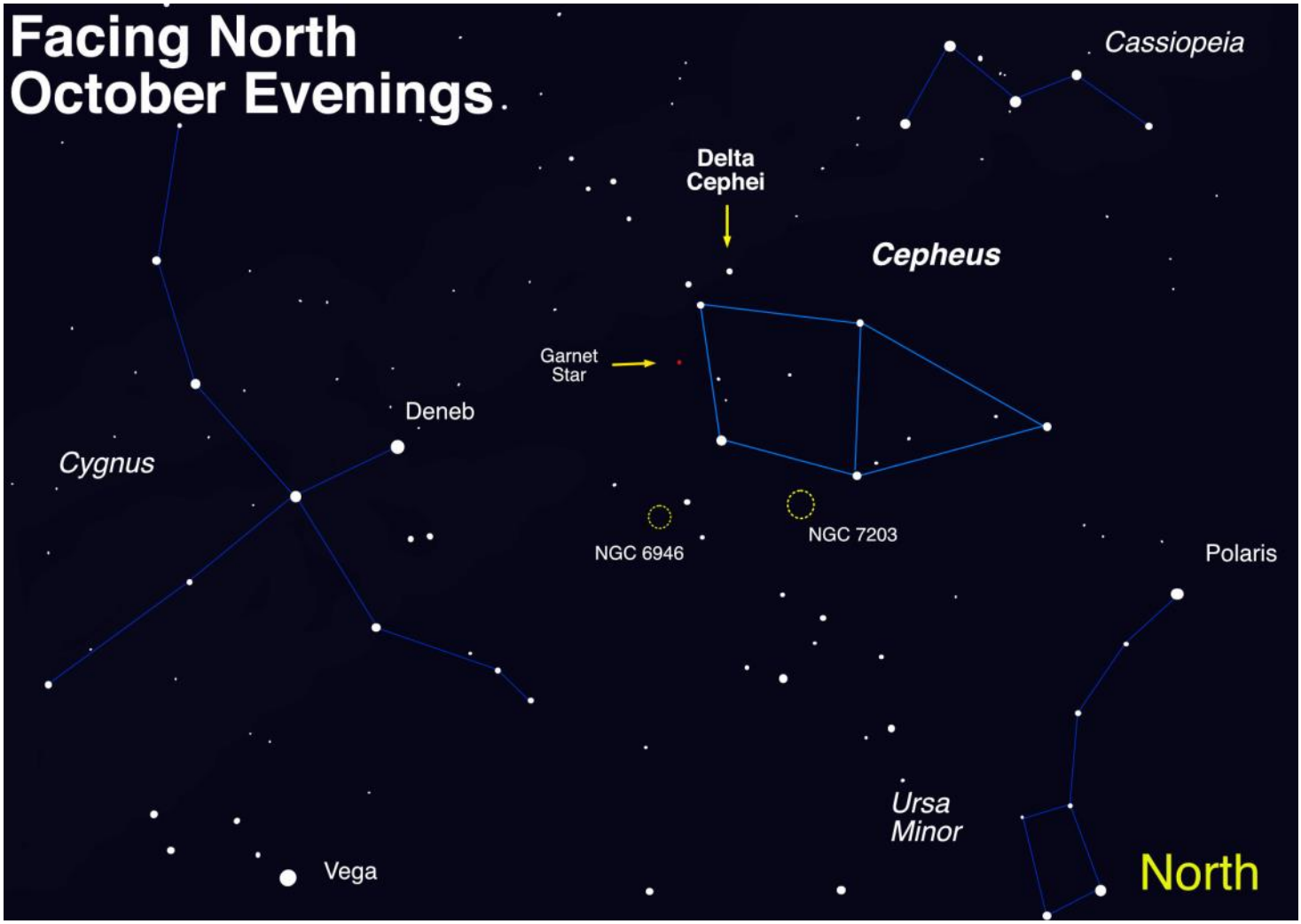
David Prosper

Sometimes constellations look like their namesake, and sometimes these starry patterns look like something else entirely. That's the case for many stargazers upon identifying the constellation of **Cepheus** for the first time. These stars represent Cepheus, the King of Ethiopia, sitting on his throne. However, many present-day observers see the outline of a simple house, complete with peaked roof, instead – quite a difference! Astronomers have another association with this northern constellation; inside its borders lies the namesake of one of the most important types of stars in modern astronomy: Delta Cephei, the original **Cepheid Variable**.

Cepheus is a circumpolar constellation for most observers located in mid-northern latitudes and above, meaning it does not set, or dip below the horizon. This means Cepheus is visible all night long and can be observed to swing around the northern celestial pole, anchored by Polaris, the current North Star. Other circumpolar constellations include Cassiopeia, Ursa Major, Ursa Minor, Draco, and Camelopardalis. Its all-night position for many stargazers brings with it some interesting objects to observe. Among them: the "Garnet Star" Mu Cephei, a supergiant star with an especially deep red hue; several binary stars; several nebulae, including the notable reflection nebula NGC 7023; and the "Fireworks Galaxy" NGC 6946, known for a surprising amount of supernovae.

Perhaps the most famous, and certainly the most notable object in Cepheus, is the star **Delta Cephei**. Its variable nature was first discovered by John Goodricke, whose observations of the star began in October 1784. Slightly more than a century later, Henrietta Leavitt studied the variable stars found in the Magellanic Clouds in 1908 and discovered that the type of variable stars represented by Delta Cephei possessed very consistent relationships between their luminosity (total amount of light emitted), and their pulsation period (generally, the length of time in which the star goes through a cycle of where it dims and then brightens). Once the period for a Cepheid Variable (or **Cepheid**) is known, its luminosity can be calculated by using the scale originally developed by Henrietta Leavitt, now called "Leavitt's Law.". So, if a star is found to be a Cepheid, its actual brightness can be calculated versus its observed brightness. From that difference, the Cepheid's distance can then be estimated with a great deal of precision. This revolutionary discovery unlocked a key to measuring vast distances across the cosmos, and in 1924 observations of Cepheids by Edwin Hubble in what was then called the Andromeda Nebula proved that this "nebula" was actually another galaxy outside of our own Milky Way! You may now know this object as the "Andromeda **Galaxy**" or M31. Further observations of Cepheids in other galaxies gave rise to another astounding discovery: that our universe is not static, but expanding!

Because of their importance as a "standard candle" in measuring cosmic distances, astronomers continue to study the nature of Cepheids. Their studies revealed that there are two distinct types of Cepheids: Classical and Type II. Delta Cephei is the second closest Cepheid to Earth after Polaris, and was even studied in detail by Edwin Hubble's namesake telescope, NASA's Hubble Space Telescope, in 2008. These studies, along with others performed by the ESA's Hipparcos mission and other observatories, help to further refine the accuracy of distance measurements derived from observations of Cepheids. What will further observations of Delta Cephei and other Cepheids reveal about our universe? Follow NASA's latest observations of stars and galaxies across our universe at nasa.gov.



The stars of Cepheus are visible all year round for many in the Northern Hemisphere, but fall months offer some of the best views of this circumpolar constellation to warmly-dressed observers. Just look northwards! Image created with assistance from Stellarium: stellarium.org.

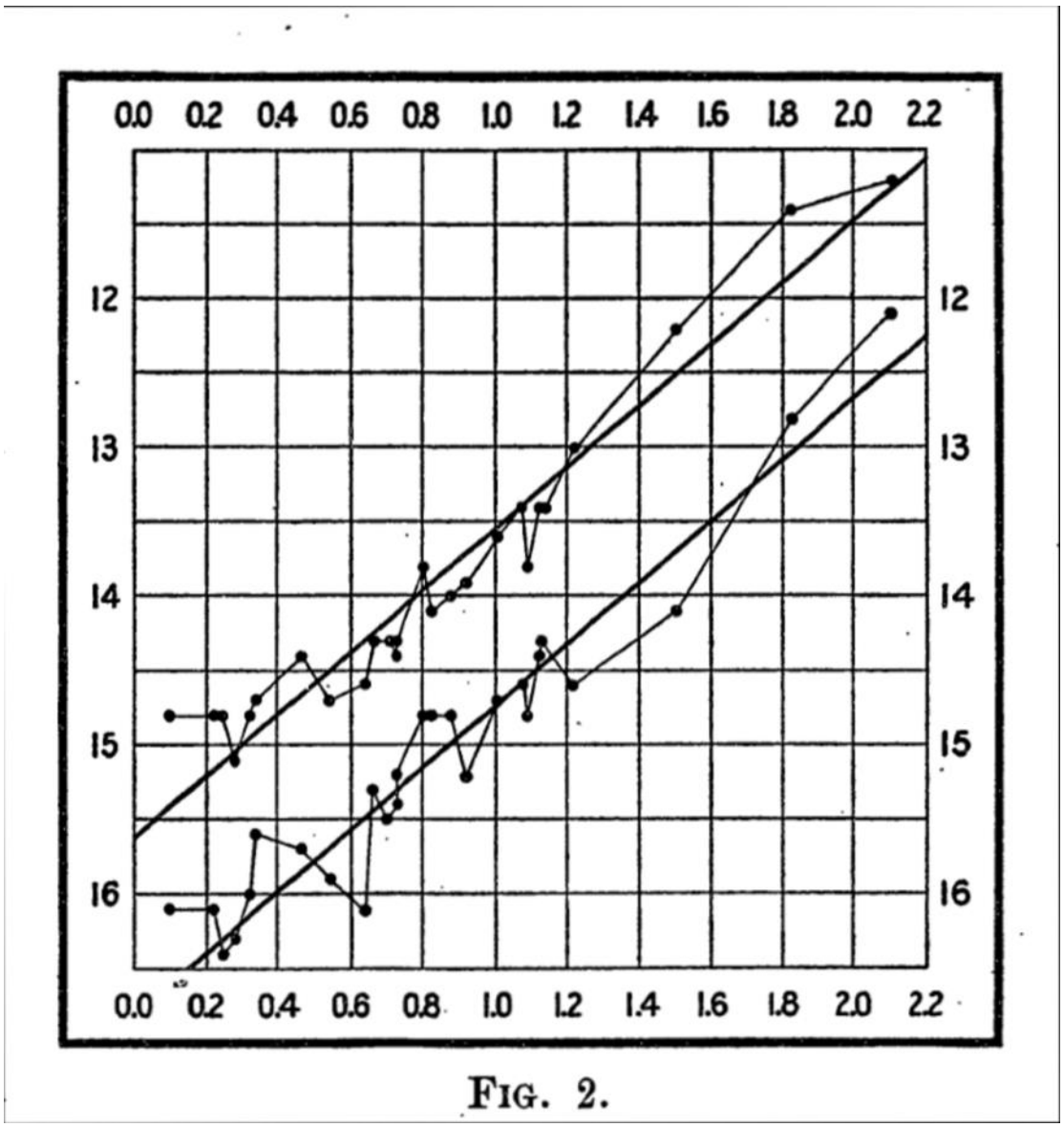
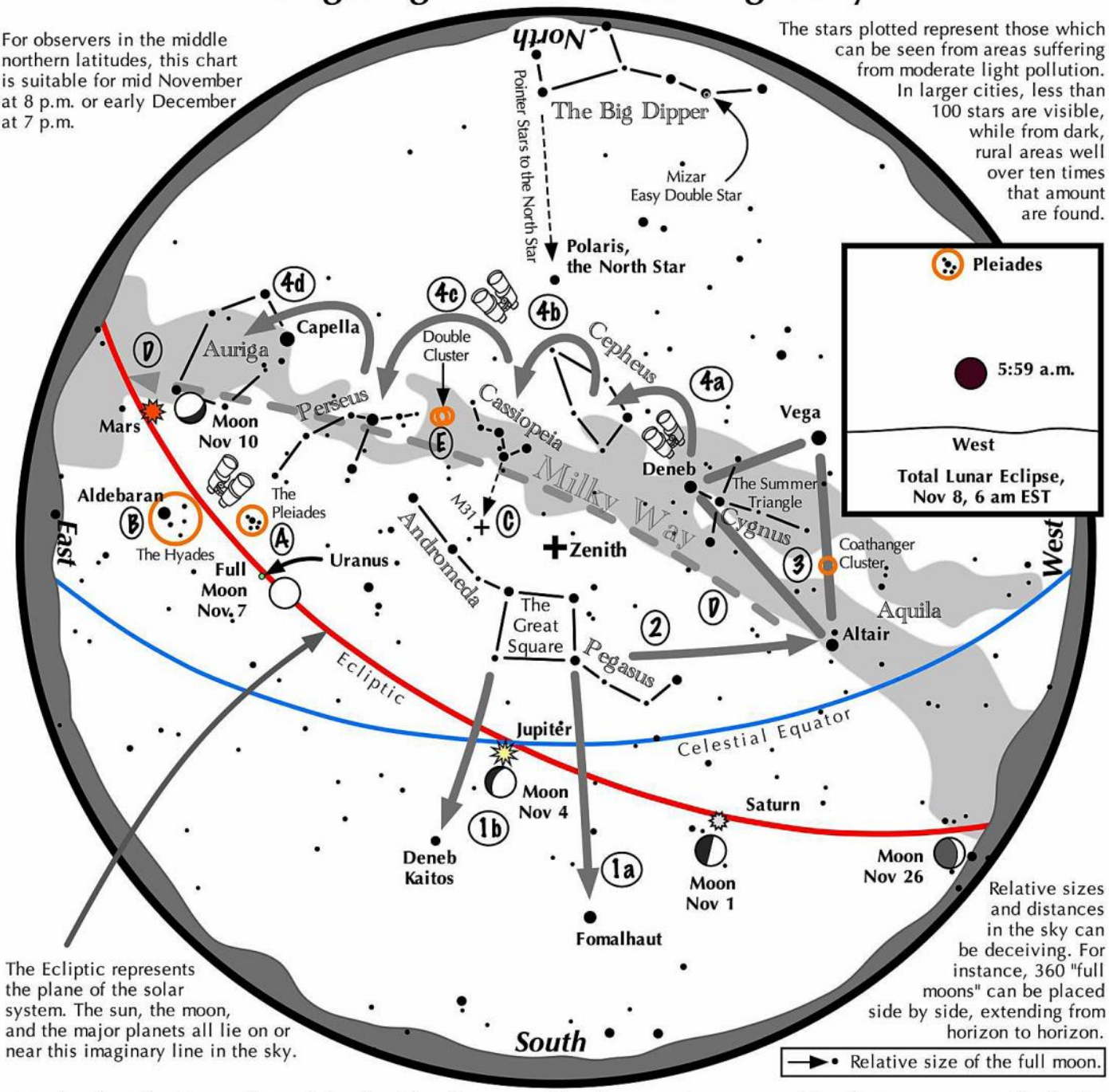


FIG. 2.

This historical diagram from Henrietta Leavitt's revolutionary publication shows the luminosity of a selection of Cepheid Variables on the vertical axis, and the log of their periods on the horizontal axis. The line drawn through these points shows how tight that relationship is between all the stars in the series. From Henrietta Leavitt and Edward Pickering's 1912 paper, "Periods of 25 Variable Stars in the Small Magellanic Cloud," a copy of which can be found at: https:// ui.adsabs.harvard.edu/abs/1912HarCi.173....1L/abstract

Navigating the November Night Sky



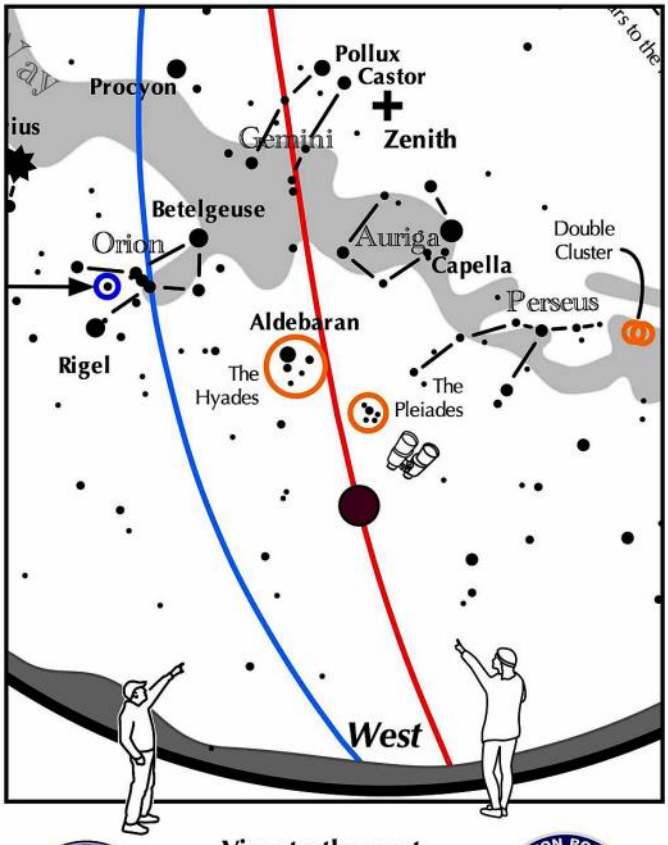
Navigating the November night sky: Simply start with what you know or with what you can easily find.

1. Face south. Almost overhead lies the "Great Square" with four stars about the same brightness as those of the Big Dipper. Extend a line southward following the Square's two westernmost stars. The line strikes Fomalhaut, the brightest star in the south. A line extending southward from the two easternmost stars, passes Deneb Kaitos, the second brighest star in the south.
2. Draw a line westward following the southern edge of the Square until it strikes Altair, part of the "Summer Triangle."
3. Locate Vega and Deneb, the other two stars of the Summer Triangle. Vega is its brightest member, while Deneb sits in the middle of the Milky Way.
4. Jump along the Milky Way from Deneb to Cepheus, which resembles the outline of a house. Continue jumping to the "W" of Cassiopeia, then to Perseus, and finally to Auriga with its bright star Capella.

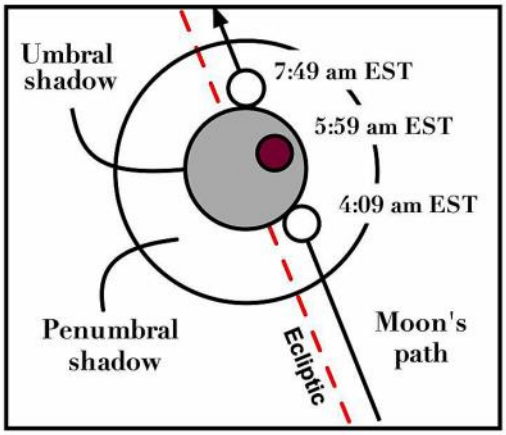
Binocular Highlights

A and B: Examine the stars of the Pleiades and Hyades, two naked eye star clusters. **C:** The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval. **D:** Sweep along the Milky Way from Altair, past Deneb, through Cepheus, Cassiopeia and Perseus, then to Auriga for many intriguing star clusters and nebulous areas. **E.** The Double Cluster.

In the early morning of November 8, try this challenge:



View to the west on November 8 from 1:09 a.m. PST to 4:49 a.m. PST



The Moon slides through a total eclipse

In the early morning hours of Nov. 8, the brilliant full moon slides into Earth's shadow. East coast viewers can view until mid eclipse before the morning twilight becomes too bright. Viewers farther west in the US can witness the complete total and partial phases.

- Even though the partial umbral eclipse begins at 4:09 EST, darkening may not be noticed for another 5 minutes.
- At mid eclipse, what color is the moon? How dark is it?
- Before the eclipse begins, the moon's sky glow blocks viewing the Pleaides star cluster and many other sky objects. During totality, though, the Pleiades, the Double Cluster, and M42 will all be visible. Now you can say that you've seen these celestial wonders during a full moon!

Auburn Astronomical Society

Membership Application Form

Name:
_____

Address:
_____

City: _____ **State:** _____ **Zip:** _____

Phone: _____ **Date of Application*** _____/_____/_____

E-mail:
_____

Telescope(s):
_____

_____

Area(s) of special interest:
_____

_____

Enclose: $20.00 for regular membership, payable in January. *Full-Time* student membership is half the Regular rate.

*** For *NEW* members joining after January, refer to the prorated Dues Table below:**

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

Make checks payable to: Auburn Astronomical Society and return this application to:

Auburn Astronomical Society
c/o John Wingard
5 Wexton Court
Columbus, GA 31907

For questions about your dues or membership status, contact: jwin1048@gmail.com

Thank you for supporting the Auburn Astronomical Society