Snake River Skies

The Newsletter of the Magic Valley Astronomical Society March 2020

Membership Meeting

Saturday, February 14th 2020
7:00pm at the
Herrett Center for Arts & Science
College of Southern Idaho

Public Star Party
at the Centennial Observatory
7:00pm - Midnight

www.mvastro.org

Club Officers

Robert Mayer, President
mayerrbrt@gmail.com

Gary Leavitt, Vice President
leavittg@cableone.net

Dr. Jay Hartwell, Secretary

Jim Tubbs, Treasurer / ALCOR
jtubbs015@msn.com
208-404-2999

David Olsen, Newsletter Editor
editor@mvastro.org

Rick Widmer, Webmaster
rick@developersdesk.com

Magic Valley Astronomical Society is a member of the Astronomical League

M-51 imaged by
Rick Widmer &
Ken Thomason
Herrett Telescope
Shotwell Camera

MVAS President's Message

Colleagues,

Of the research missions on Mars, the one that's drawing the most attention now is the InSight program. Its full name is The Interior Exploration using Seismic Investigations, Geodesy and Heat Transport, and it has been in the news for both bad and good. One of the activities is to hammer a heat-flow probe into the surface, but that has literally run into a standstill since March 2019. NASA hasn't been quite able to figure out why they haven't been able to get deeper into the surface, but we are seeing reports of engineers again applying the noted NASA ingenuity, this time by using InSight's scoop to press down on the top of the mole. We wish them all the best.

At the same time as NASA works on this part of the project, data from other aspects of InSight has led to five important papers. Among those findings are that at one point – 3.9 billion years ago – Mars had as strong a magnetic field as the earth, and that Mars has had 174 Marsquakes since InSight got to work. Of those 174, 20 were greater than a magnitude three on the Richter scale.

Talking about Mars allows us to talk about two things. First, if you're into planetary observations, you're likely going to have to be a morning person. If you are or do become a morning person, you will be in for a treat. On March 17th and 18th, Mars, Jupiter, and the moon will be dancing in the southeast about 45 minutes before sunrise, with the ultimate show on the 18th. Poor Saturn – it's in the just to the east of the three, but it likely feel left out. We look forward to your pictures.

Secondly, this is the time of year that suggests we need to be ready for ups and downs just as InSight is going through. On Friday, March 20th, we're going to try a Messier Marathon at the Jerome Gun Club. Sunset is around 7:50 p.m., so we look forward to you coming in around 7:30 or so. Don't worry about making it a marathon: A 6K would suffice. Rumor has it one member has obtained a copy of a Double Star Marathon guide from *Astronomy* columnist Glenn Chapple, and might try it out then. You can only guess who that member will be.

However, March is a tempestuous month, and weather has a history of getting in the way. With that in mind, we'll have a back-up on Saturday, March 21st, and we do ask that you pay attention to the E-mail feed for the evening of the 20th in case we need to put out a No-Go notice.

Winter and Spring astronomy can be a challenge, but like InSight, it has its moments. Many of us can tell you that yes, the March star party gets blown over by the weather from time to time, but the times the weather does cooperate, the event is fantastic. We look forward to seeing you there. If you can't make that, please do attend the regular meeting at the Herrett Center on Saturday, March 14th in the Rick Allen Room at 7 p.m. Tim Frazier will be talking to us about, of all things, dust. Don't let that get in your way of attending. You would be amazed at what that seemingly interesting word can mean for astronomy.

Until then,
Clear Views,
Rob Mayer

Calendar

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2 First Quarter Moon  Visible 47% ↑ Age: 7.08 Days	3	4	5	6	7
8 **Daylight Saving** set clocks ahead 1 hour 	9 Full Moon 7:42 pm  Visible 100% Age: 14.49 Days Snowcrust Moon	10	11	12	13	14 **MVAS Meeting** at 7:00pm at the Herrett Center. **Public Star Party** Centennial Obs. 8:30p - 12:00a
15	16 Last Quarter Moon  Visible: 49% ↓ Age: 22.23 Days	17	18 The waning crescent moon is joined by three planets – Mars, Jupiter, and Saturn.	19 **Vernal Equinox** 	20 **Messier Marathon** Jerome Gun Club 7:50pm Alternate date on Saturday	21
22	23	24 New Moon  Visible 0% ↑ Age: 0.09 Days	25	26	27	28 **Earth Hour** 
29	30	31				

Be Careful – Be Safe – Get Out There – Explore Your Universe

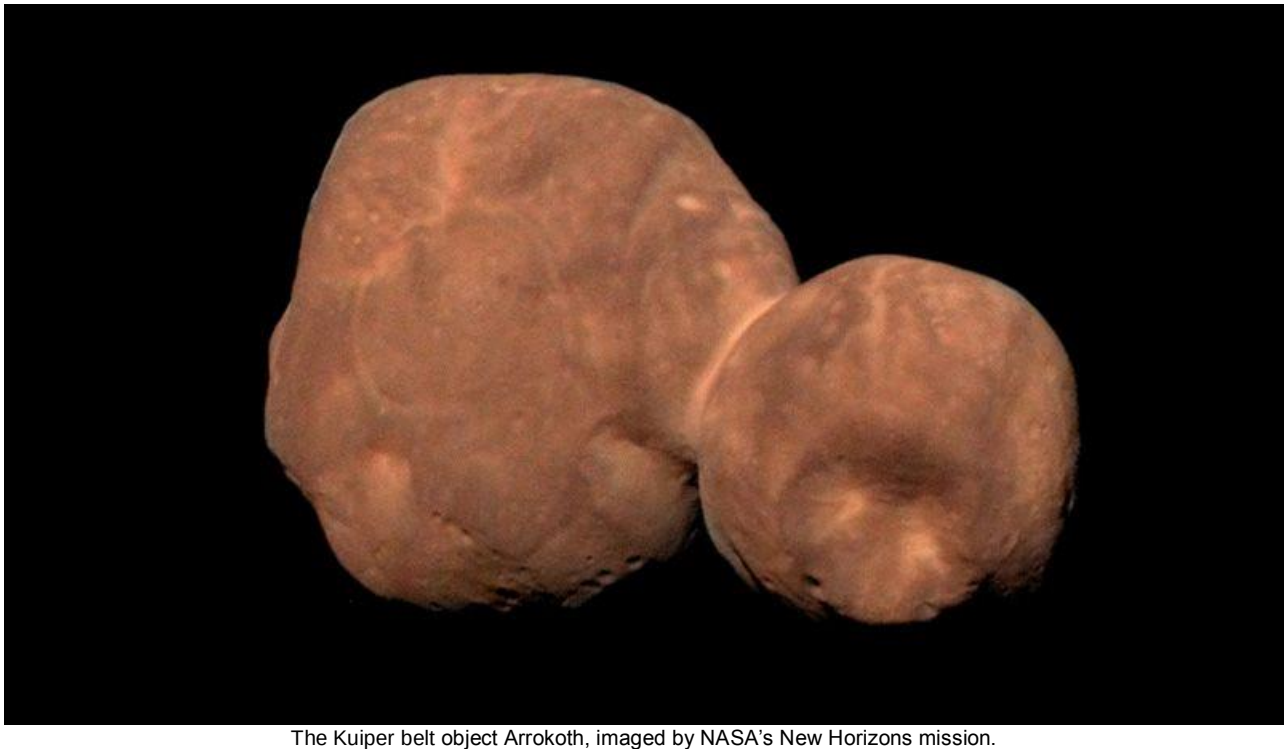
Currents in Space

Did you hear . . .?

That ***Voyager 2*** **experienced a potentially catastrophic event**? On Jan 28th, NASA reported that an autonomous fault protection routine was triggered. "On Saturday, Jan. 25, Voyager 2 didn't execute a scheduled maneuver in which the spacecraft rotates 360 degrees in order to calibrate its onboard magnetic field instrument. Analysis of the telemetry from the spacecraft indicated that an unexplained delay in the onboard execution of the maneuver commands inadvertently left two systems that consume relatively high levels of power operating at the same time. This caused the spacecraft to overdraw its available power supply. The fault protection software routine . . . appears to have turned off Voyager 2's science instruments to make up for the power deficit. . . . Voyager engineers have successfully turned off one of the high-power systems and turned the science instruments back on but have not yet resumed taking data." As of Feb 5th, science data is being gathered and communicated to Earth.

That **March 14th is National Pi Day?** (Divide the circumference of a circle by its diameter to get 3.1415926535 etc.) Each year NASA creates an "illustrated Pi Day math challenge that features real-world problems [that] NASA scientists and engineers solve to explore Earth and space." NASA will post this year's online challenge on March 6th. Click here now to see previous challenges AND click back here on March 6th. Answers to the 2020 Challenge will be released on March 16th. https://www.jpl.nasa.gov/edu/nasapidaychallenge/. Here is another website for Pi Day: https://www.piday.org/ For a fictional theory about Pi, read *Contact* (1985) by Carl Sagan.

That **recent analysis of data** captured last year by NASA's **New Horizons** spacecraft **reveals Arrokoth** in sharp detail? The 36-kilometer Kuiper belt object "is extremely red, probably because cosmic rays have blasted its surface to create red organic molecules." Read Nature notification here: Nature

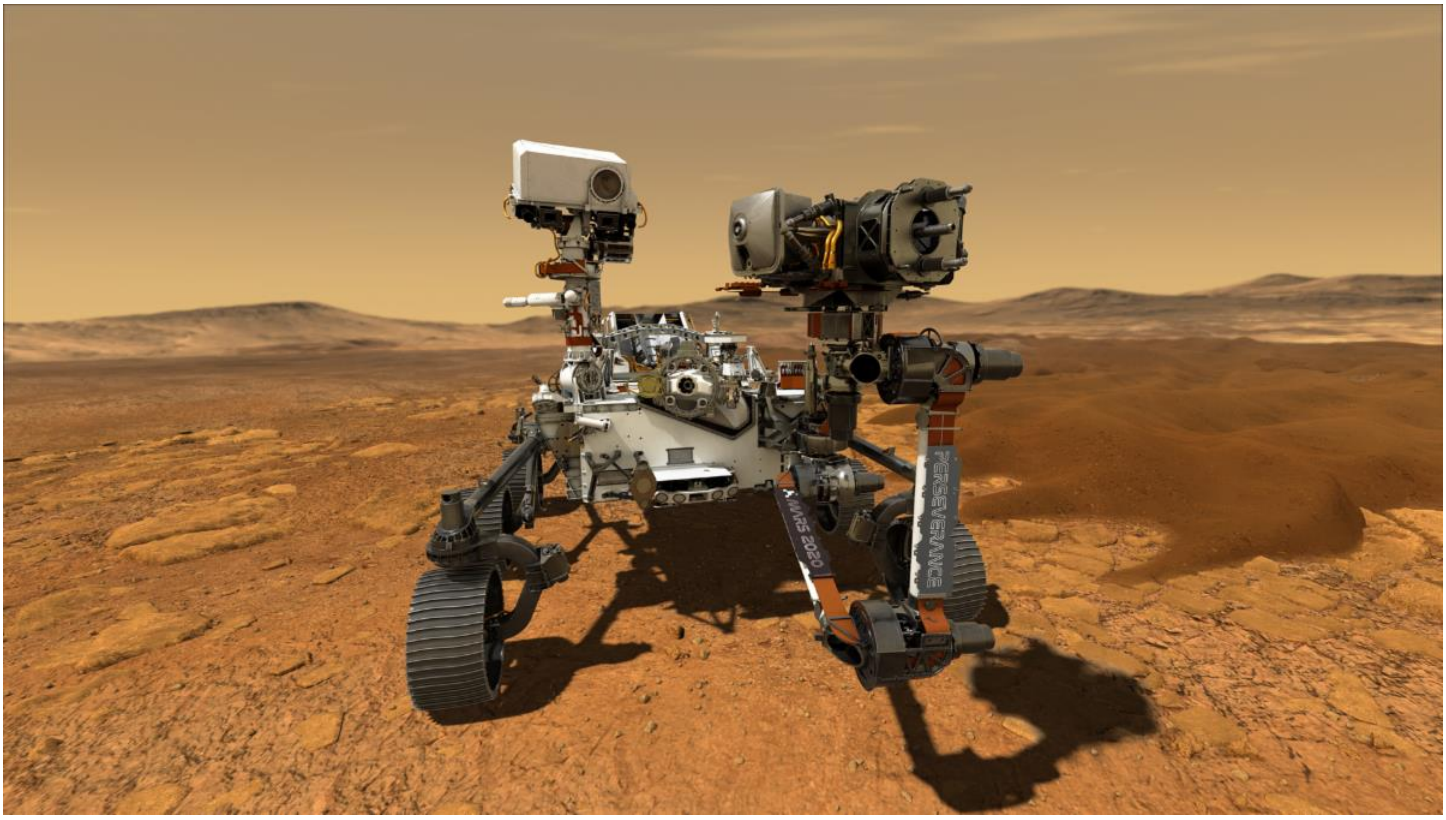


The Kuiper belt object Arrokoth, imaged by NASA's New Horizons mission.
Credit: NASA/Johns Hopkins University Applied Physics Laboratory
Southwest Research Institute/Roman Tkachenko

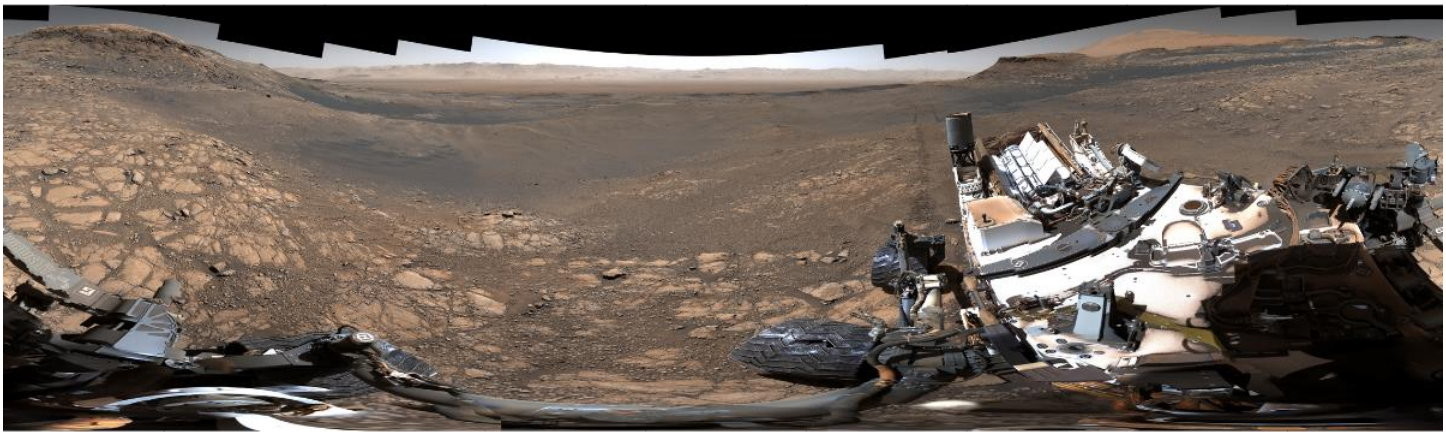
Nature magazine reported in late February that our fading star, Betelgeuse, has begun to brighten again. Here is the link: https://www.nature.com/articles/d41586-020-00561-z

Introducing Perseverance

The Mars 2020 rover has a new name that captures the spirit of exploration – **Perseverance**. Alexander Mather, a 13-year-old student from Virginia, submitted the winning name to our "Name the Rover" contest, which received 28,000 entries from K-12 students from every U.S. state and territory.



Mars 2020 Rover Perseverance concept photo Credit: NASA



Over the holidays, our Curiosity rover took a series of high-resolution photos of the Martian surface. Made up of a crisp 1.8 billion pixels, this panorama is the rover's most detailed view of the Red Planet.

Mars Landers

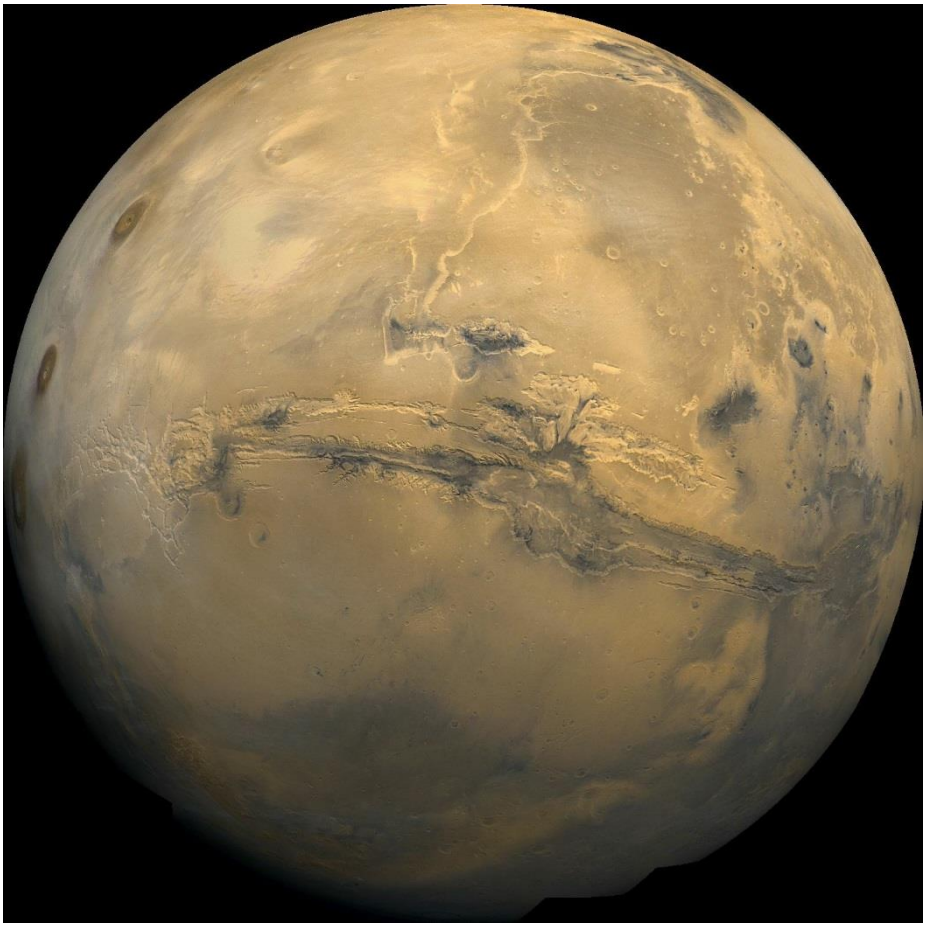
InSight is the first Mars mission specifically dedicated to uncovering the secrets beneath the surface. It landed on Mars in November 2018 and set up its seismometer. Insight detected a quake in April, 2019 and has detected over 450 “Marsquakes” so far. These measurements reveal that Mars is tectonically active in some areas, possibly due to volcanic activity or other internal heat sources.

Magnetometer data shows that Mars has areas with strongly magnetized basement rock. Billions of years ago, Mars had a magnetic field. It is no longer present, but it left ghosts behind, magnetizing ancient rocks that are now between 200 feet (61 meters) to several miles below ground.

Insight’s heat probe is a 16-inch-long (40-centimeter-long) spike “mole” equipped with an internal hammering mechanism. As it burrows into the soil, it pulls a ribbonlike tether attached to its back cap. The ribbonlike tether extends from the lander to the back cap of the mole. The tether has embedded temperature sensors along its length.

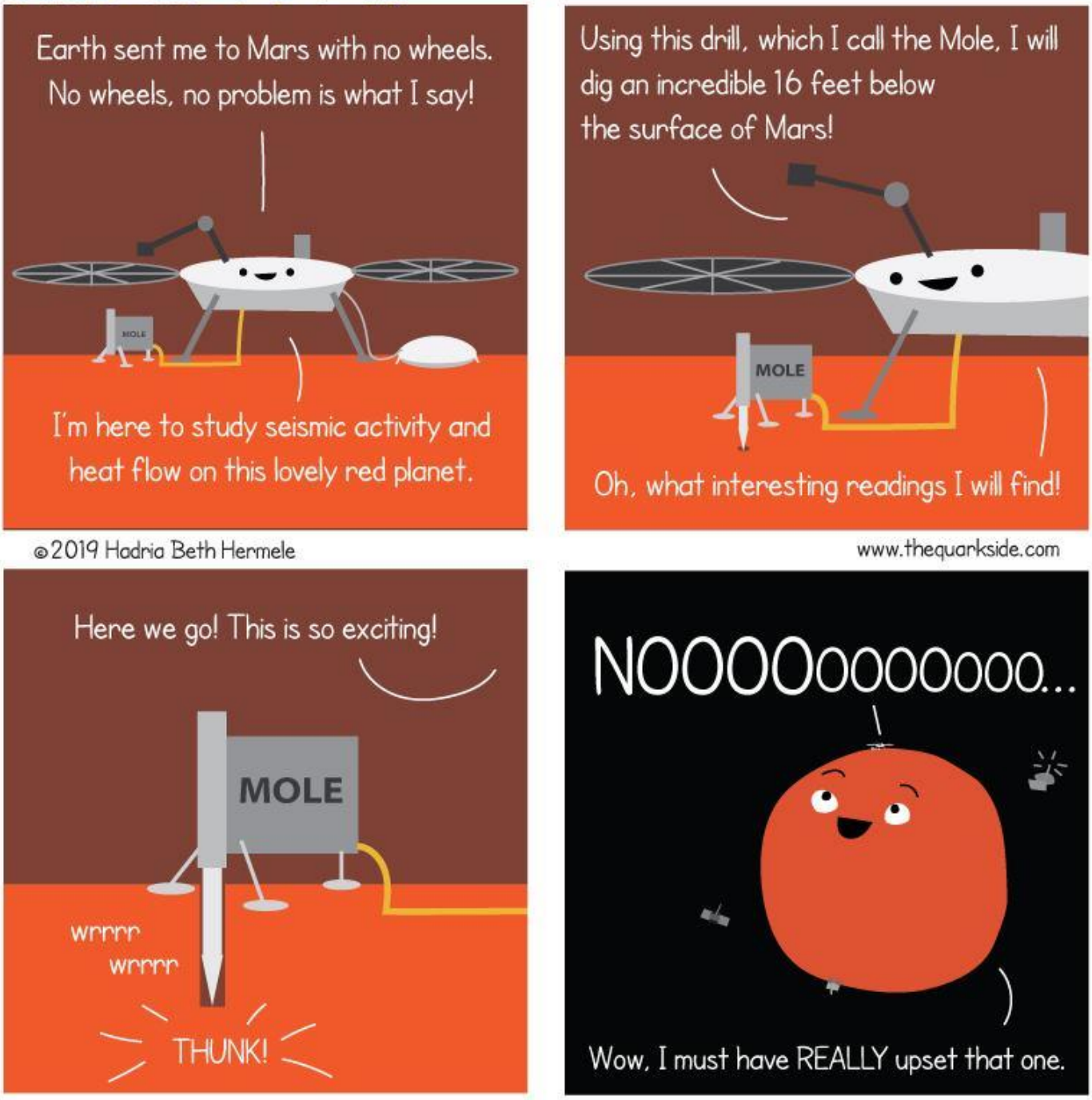
The mole has had difficulty digging through the cohesive “duricrust” near the surface. There is insufficient friction between the mole and sides of the hole causing the mole to bounce in place when hammering. It became lodged at a very shallow depth then popped out of the hole in October. The probe drilled another 1.25” on Nov. 21 when side pressure was applied with the robotic arm. On Dec. 16, the mole achieved another 2.5” of depth. On Jan. 21, digging was interrupted as the mole backed out about 2 centimeters. After the limited success with side pressure the team decided to investigate ways to push down on the back cap while avoiding damage to the tether.

Curiosity is on the border Glen Torridon, the clay-bearing unit in the valley adjacent to Vera Rubin Ridge on 16,404 foot Mt. Sharp at the center of Gale Crater, the ancient remnant of a massive impact. Younger rocks comprising the Greenheugh pediment lie beyond and above the valley. The Greenheugh pediment sandstones represent a totally different environment of deposition than the older mudstones of the valley. From Sol 2656 (January 27) to Sol 2689 (February 26) the rover studied the youngest rocks in Glen Torridon, obtaining drill samples at Hutton Crater on Sol 2670 (February 10). After extensive analysis, mission scientists decided to risk a short cut to get up onto Greenheugh pediment, instead of a safer months-long circuitous route. The rover will, for the first time, attempt to ascend a series of 30 degree slopes.



MICROCOSM

The Mole



Cartoon used with permission of the creator

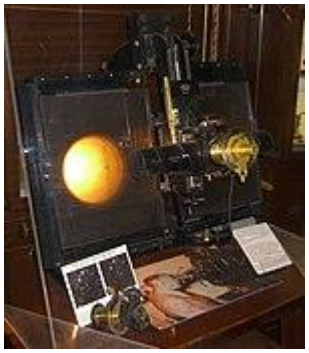
New Horizons – to Pluto and Beyond
Chapter 1: Discovery of Pluto
by Loretta J Cannon

"I was interested in telescopes and the way they worked because I had an intense desire to see what things looked like, so I learned how to use telescopes and find things in the sky." - Clyde Tombaugh

Clyde Tombaugh was born on February 4, 1906 in Streator, IL. By 1922, his family was living on a farm in Burdett, Kansas. His interest in other worlds began when he was young. In his autobiography[1], he notes that as early as sixth grade he was wondering about the geography on distant planets. His father bought him his first telescope, a 2¼-inch from the Sears Roebuck catalog. Tombaugh read everything he could on astronomy. And he made his own telescopes, including grinding the lenses. The image at left, taken from Wikipedia, shows Tombaugh with one of his homemade telescopes in 1924. Using these scopes, he made detailed drawings of his observations, including images of Mars and Jupiter.

At the same time that Tombaugh was making observations, he was reading everything he could find on astronomy. He read about Percival Lowell's prediction of a yet-to-be-discovered planet beyond Neptune, a prediction based on observations of Neptune's orbit that indicated the gravitational pull of a substantial body, a theoretical Planet X. Lovell died in 1916 without having found the elusive 9th planet. [FUN FACT: The actual calculations were done by mathematician/computer Elizabeth Williams, another 'hidden figure' of history. Even those two English prats Watson & Crick based their Nobel-prize winning 'discovery' on the exhaustive x-ray crystallography work of Rosalind Franklin, which eventually killed her. You must be alive to be recognized for a Nobel.] Tombaugh also read about the Lowell Observatory in Flagstaff, Arizona which Lowell started in 1894. Though doubtful of being able to afford college, Tombaugh was eager to contribute to the field. He sent some of his detailed Mars drawings to the astronomers at Lowell. Interestingly, he received a response in 1928, an invitation to come work at the Observatory as an assistant.

In January 1929, Clyde Tombaugh began work at the Lowell Observatory. His assignment: use their brand new 13" telescope and look for the proposed planet beyond Neptune – Planet X. Most every night, for almost a year, Tombaugh sat in the unheated observatory dome, exposing photographic plates while the telescope was aimed at a specific small area of the sky (based on Lowell's {Williams'} calculations). Because the light reaching Earth from Planet X was expected to be incredibly faint, each plate required a 60+ minutes exposure. During this hour, Tombaugh had to carefully ensure the telescope remained focused on the target location while the Earth slowly moved. Clear, moon-free nights found Tombaugh at the telescope. Cloudy, moonlit nights found Tombaugh developing and analyzing the plates. In order to identify a point of light as Planet X, he used a blink comparator, invented in 1904 by physicist Carl Pulfrich in Germany. Two images taken of the same piece of night sky, but days apart, are placed in the instrument. The astronomer can then 'blink' rapidly between the two images looking for a point of light which 'moves' position against the background stars. The image at right from Wikipedia shows the instrument used at Lowell Observatory.



On January 21, 1930, though Tombaugh took images, they were blurred due to high winds that buffeted the telescope. Luckily, he took images of the same piece of sky again on the 23rd and the 29th. It wasn't until February 18th that Tombaugh was able to analyze these images. And suddenly, on one of those January plates, there 'it' was – a faint speck of light that 'moved'. He looked at other plates of the same piece of sky, double-checking what he saw for almost an hour before he knew he'd found Planet X. It wasn't announced officially until March 13, 1930, a day which marked what would have been Percival Lowell's 75th birthday.

About the Author: Loretta J Cannon is a 3rd generation Idahoan. She earned both of her Bachelor degrees (Anthropology, Microbiology) from Boise State University, her Masters degree (Physical Anthropology) from Arizona State University, and completed four years towards a PhD in Microbiology & Biochemistry. These days she devotes her time to science writing & editing and real estate. She can be reached at LorettaJCannon@gmail.com.

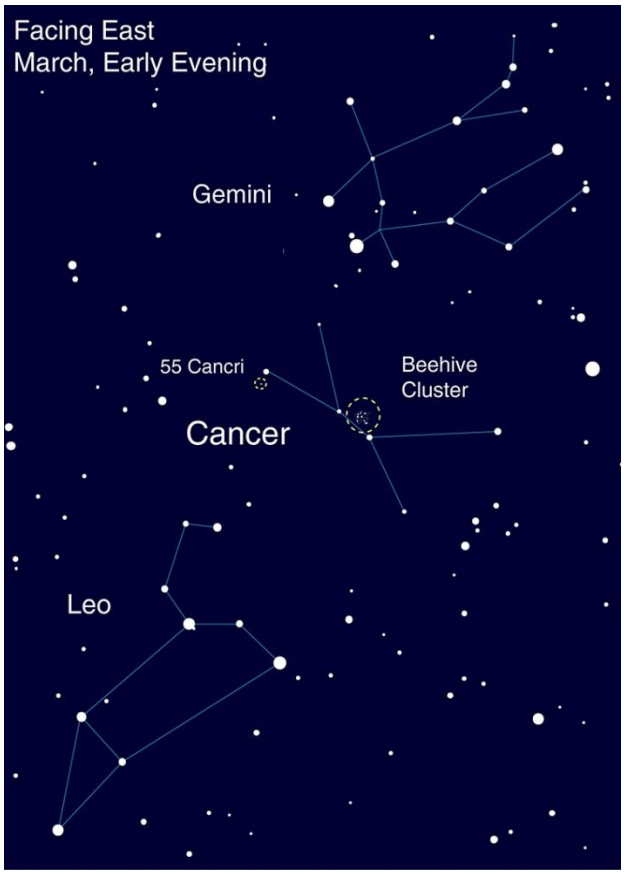
[1] Clyde Tombaugh and Patrick Moore, *Out of Darkness* (Harrisburg, PA: Stackpole Books, 1980).

NASA Night Sky Notes

Dim Delights in Cancer

by David Prosper

Cancer the Crab is a dim constellation, yet it contains one of the most beautiful and easy-to-spot star clusters in our sky: the **Beehive Cluster**. Cancer also possesses one of the most studied exoplanets: the superhot super-Earth, **55 Cancri e**. Find **Cancer's** dim stars by looking in between the brighter neighboring constellations of Gemini and Leo. Don't get frustrated if you can't find it at first, since Cancer isn't easily visible from moderately light polluted areas. Once you find Cancer, look for its most famous deep-sky object: the **Beehive Cluster**! It's a large open cluster of young stars, three times larger than our Moon in the sky. The Beehive is visible to unaided eyes under good sky conditions as a faint cloudy patch but is stunning when viewed through binoculars or a wide-field telescope. It was one of the earliest deep-sky objects noticed by ancient astronomers, and so the Beehive has many other names, including Praesepe, Nubilum, M44, the Ghost, and Jishi qi. Take a look at it on a clear night through binoculars. Do these stars look like a hive of buzzing bees? Or do you see something else? There's no wrong answer, since this large star cluster has intrigued imaginative observers for thousands of years.

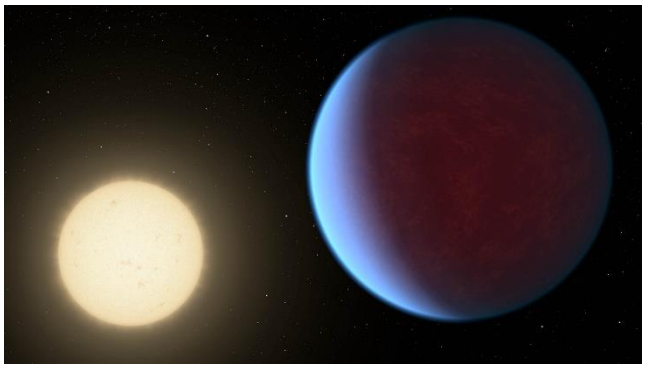


55 Cancri is a nearby binary star system, about 41 light years from us and faintly visible under excellent dark sky conditions. The larger star is orbited by at least five planets including **55 Cancri e**, (a.k.a. Janssen, named after one of the first telescope makers). Janssen is a "super-earth," a large rocky world 8 times the mass of our Earth, and orbits its star every 18 hours, giving it one of the shortest years of all known planets! Janssen was the first exoplanet to have its atmosphere successfully analyzed. Both the Hubble and recently-retired Spitzer space telescopes confirmed that the hot world is enveloped by an atmosphere of helium and hydrogen with traces of hydrogen cyanide: not a likely place to find life, especially since the surface is probably scorching hot rock. The NASA Exoplanet Catalog has more details about this and many other exoplanets at bit.ly/nasa55cancrie.

Look for Cancer in between the "Sickle" or "Question Mark" of Leo and the bright twin stars of Gemini. You can't see the planets around 55 Cancri, but if skies are dark enough you can see the star itself. Can you see the Beehive Cluster?

How do astronomers find planets around other star systems? The Night Sky Network's "How We Find Planets" activity helps demonstrate both the transit and wobble methods of exoplanet detection: bit.ly/findplanets. Notably, 55 Cancri e was discovered via the wobble method in 2004, and then the transit method confirmed the planet's orbital period in 2011!

Want to learn more about exoplanets? Get the latest NASA news about worlds beyond our solar system at nasa.gov.



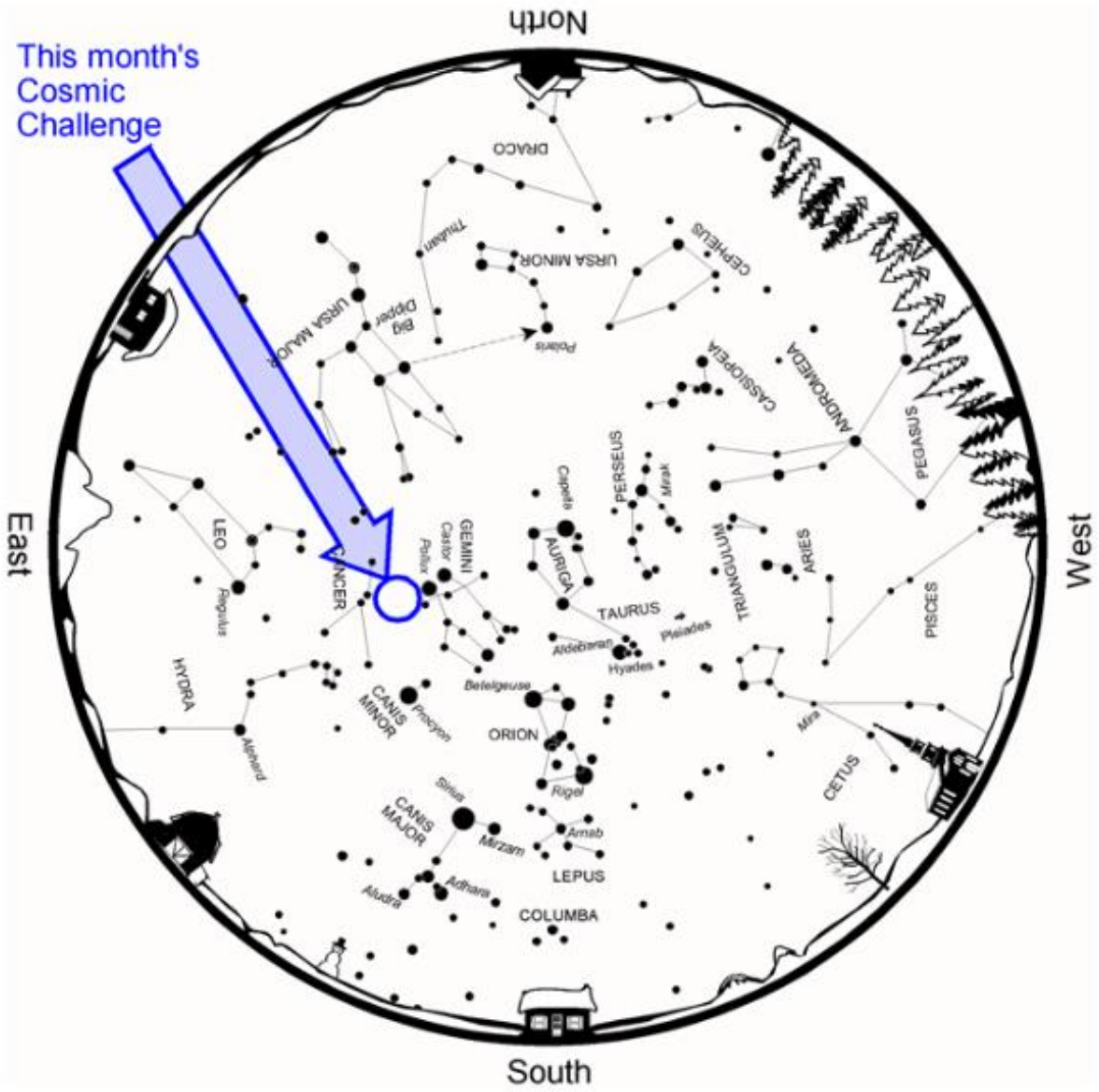
Artist concept of 55 Cancri e orbiting its nearby host star. Find details from the Spitzer Space Telescope's close study of its atmosphere at: bit.ly/spitzer55cancrie and the Hubble Space Telescope's observations at bit.ly/hubble55cancrie Credit: NASA/JPL-Caltech

Arp 82

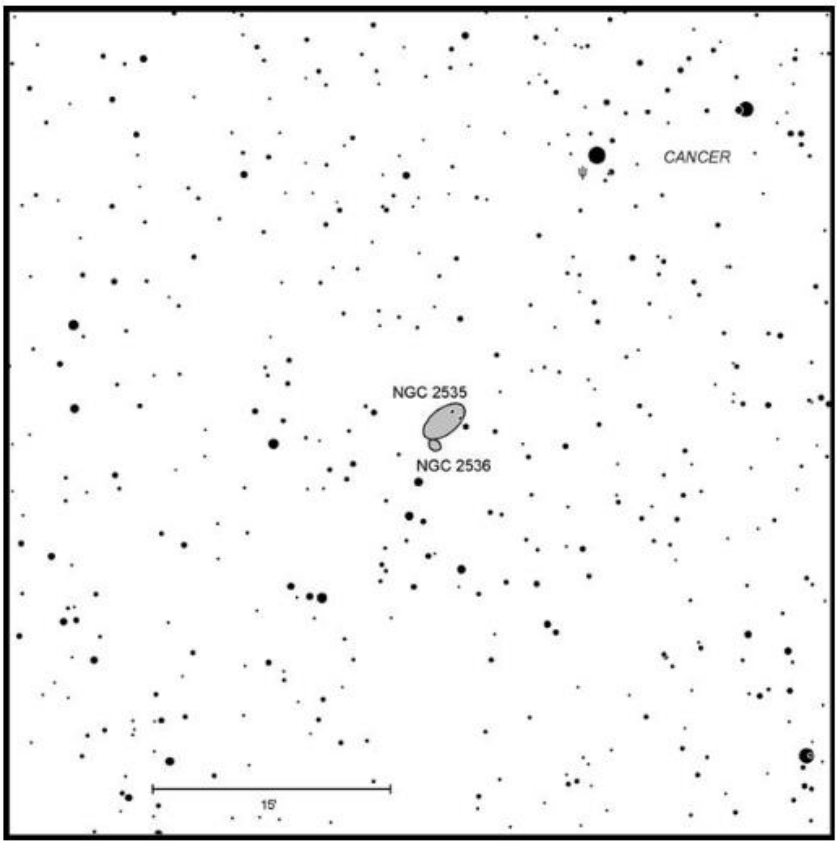
	10- to 14-inch (25-36 cm) telescopes

Target	Type	RA	DEC	Constellation	Mag	Size
NGC 2535 NGC 2536	Galaxy pair	08h 11.2m 08h 11.3m	+25° 12.4' +25° 10.8'	Cancer	13.3 14.7	3.3'x1.8' 0.9'x0.7'

The constellation Cancer the Crab may not be much to look at, but it holds some fascinating objects within its emaciated body. Case in point: **Arp 82**, the 82nd entry in Halton Arp's Atlas of Peculiar Galaxies. Made up of **NGC 2535** and **NGC 2536**, Arp 82 is a strange pair that seems to be experiencing a galactic version of arrested development. As galaxies formed in the early universe, theory says that massive amounts of nebulosity came together in quick succession, triggering vast expanses of rapid star formation. Then, as each galaxy aged, the rate of star formation slowed.



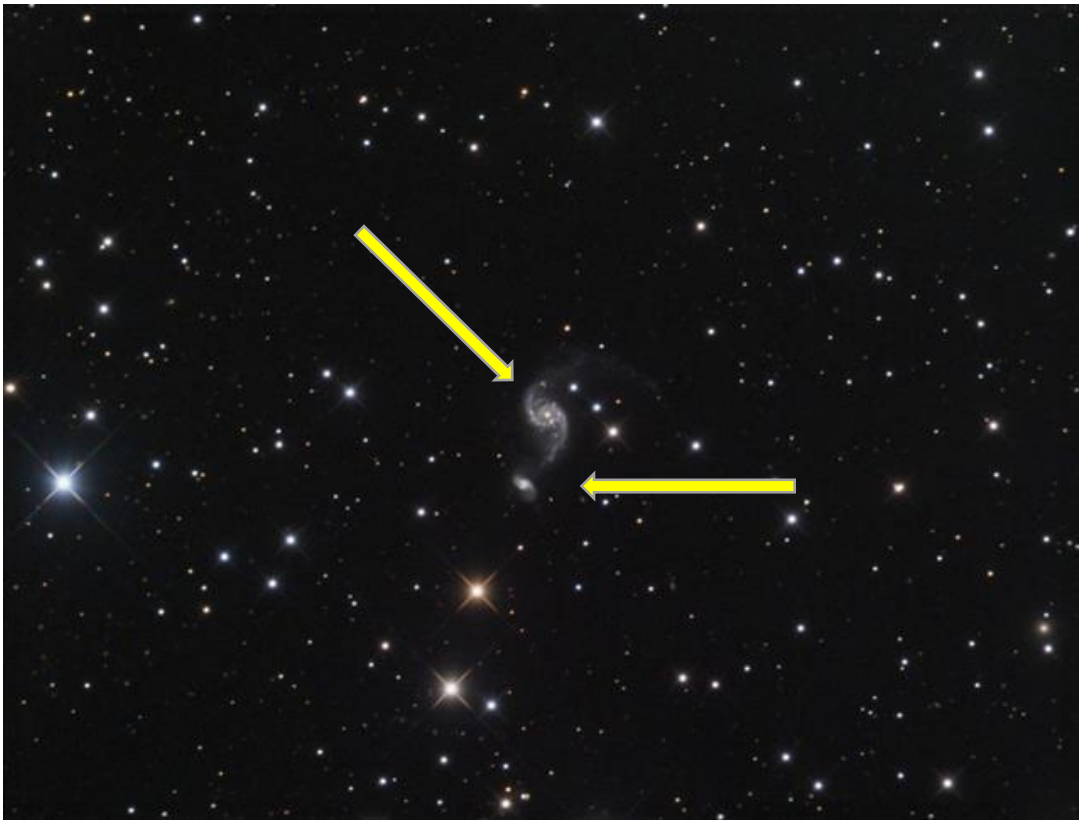
Evening star map. Credit: Map adapted from Star Watch by Phil Harrington



Finder chart for this month's Cosmic Challenge

Not to worry, however; NGC 2298 will be around for a while longer. You can take your time finding it. To starhop its way, begin your quest at Aludra [Eta (η) Canis Majoris], the tail star of the Large Dog. Slipping 3° southward, brings a right triangle of three bright stars into view, accompanied by many fainter points that collectively form the little-known star cluster **Collinder 140**. Its large size and sparseness masked the cluster's true nature until 1931, when Swedish astronomer Per Collinder included it as number 140 in his catalog. As I wrote in my February 2015 column here on CN, Collinder 140 is an easy target through just about any binocular. Its 30 stars range in brightness from 5th magnitude to fainter than 9th and span about 3/4°. Arizona deep-sky observer Steve Coe suggests the nickname "The Tuft" because of its location at the very tip of the dog's tail.

Two images of the colliding galaxies NGC 2535 (top/larger) and NGC 2536 (bottom/smaller), known collectively as Arp 82.



At Left: Ground-based image taken by CN moderator Dan Crowson from Dark Sky New Mexico at Rancho Hidalgo (Animas, New Mexico). Details available here.

Below: Composite image taken by the Spitzer Space Telescope (red), NASA's Galaxy Evolution Explorer (blue), and SARA telescope (green). Credit: NASA/JPL-Caltech/ETSU

As we study individual stars within each galaxy, we find few that are greater than about 2 billion years old. That's a small fraction of the universe's estimated age of 13.7 billion years. Apparently, before the galaxies swung past each other about 2 billion years ago, they were both mostly nebulosity. Only after the gravity of one galaxy swirled up the material in the other was star formation accelerated. A second close passage around 2 million years ago resulted in a second burst of activity. Why the galaxies in Arp 82 didn't begin to form stars earlier like other galaxies remains the stuff of future studies.

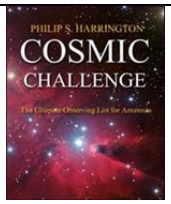
To see this unusual pair for yourself, begin at 4th-magnitude Kappa (κ) Geminorum and scan eastward about one finder field to 6th-magnitude Psi (ψ) Cancri. Arp 82 is 21' southeast of Kappa, next to a line of 12th- and 13th magnitude stars. That line of stars makes an excellent reference to estimate the apparent size of each galaxy as well as their separation. In photos of the area, the full span of NGC 2535, arms included, matches the length of that line of faint stars very closely, although in deep photos, the spiral arm opposite NGC 2536 actually curves completely around the northwestern end of the line. Whether or not that effect can be seen visually, however, remains doubtful.

The view through my 10-inch reflector at 106x is an interesting study in surface brightness versus magnitude. Although NGC 2535 has the brighter magnitude value, its larger apparent size causes the resulting surface brightness to be lower than "fainter" NGC 2536. As a result, NGC 2536, although nearly stellar in appearance at that magnification, impresses me as a bit brighter. Larger NGC 2535 appears slightly oval and oriented northeast-southwest. Its weak concentration only hints as a centralized core, although photos show a sharp nucleus surrounded by an active ring of star formation. Despite the complex nature of its spiral arms, no hint of structure was seen with the 10-inch. Indeed, even my 18-inch offered little help beyond brightening up the galaxies some. Perhaps even larger instruments can reveal the complex nature of these galaxies that images show so spectacularly.

Arp 82 as seen through the author's 10-inch (25 cm) reflector..

Good luck with this month's Cosmic Challenge!

Until next month, remember that half of the fun is the thrill of the chase. Game on!



About the Author: Phil Harrington writes the monthly *Binocular Universe* column in Astronomy magazine and is the author of 9 books on astronomy. Visit his web site at www.philharrington.net to learn more.

Solar System

The Sun, the Moon, & the Planets

The Moon is 6.4 days old, is illuminated 32.3%, subtends 29.8 arc minutes, and is located in the constellation of Aries at 0:00 UT on March 1st. The Moon attains its greatest northern declination (+23.4 degrees) for the month on March 5th and greatest southern declination (-23.4 degrees) on March 18th. Longitudinal libration is at a maximum of +7.5 degrees on March 16th. It's at a minimum of -7.8 degrees on March 5th. Latitudinal libration is at a maximum of +6.5 degrees on March 24th and a minimum of -6.5 degrees on March 11th. Favorable librations occur for the following craters: Inghirami (March 8th), Pingré (March 9th), Casatus (March 10th), and Boguslawsky (March 11th). The largest Full Moon of the year occurs on March 9th. Large tides will take place in the days following the Full Moon. New Moon occurs on March 24th. The Moon is at perigee (at a distance of distance 56.00 Earth-radii) on March 10th and at apogee (at a distance of 63.76 Earth-radii), the farthest of the year, on March 24th. The Moon will occult asteroid 4 Vesta on March 1st and March 29th and Mars on March 18th from certain parts of the world. Browse http://www.lunar-occ...ota/iotandx.htm for information on lunar occultation events. Visit https://saberdoesthe...does-the-stars/ for tips on spotting extreme crescent Moons and http://www.curtrenz.com/moon06.html for Full Moon data. Consult http://time.unitariu...moon/where.html or download http://www.ap-i.net/avl/en/start for current information on the Moon. See https://svs.gsfc.nasa.gov/4768 for a lunar phase and libration calculator and https://svs.gsfc.nasa.gov/4768 for the Lunar Reconnaissance Orbiter Camera (LROC) Quickmap. Click on https://www.calendar...ndar/2020/march for a lunar phase calendar for this month. Times and dates for the lunar crater light rays predicted to occur this month are available at http://www.lunar-occ...o/rays/rays.htm

The Sun is in Aquarius on March 1st at 0:00 UT. It enters Pisces on March 11th. The Sun crosses the celestial equator at 3:50 UT on March 20th, bringing spring to the northern hemisphere. At the equinox, the Sun is located in Aries and has a longitude of zero degrees.

Brightness, apparent size, illumination, distance from the Earth in astronomical units, and location data for the planets and Pluto on March 1st: Mercury (magnitude +3.7, 10.6", 4%, 0.63 a.u., Aquarius), Venus (magnitude -4.3, 18.8", 63%, 0.89 a.u., Pisces), Mars (magnitude +1.1, 5.5", 91%, 1.71 a.u., Sagittarius), Jupiter (magnitude -2.0, 34.2", 99%, 5.77 a.u., Sagittarius), Saturn (magnitude +0.7, 15.5", 100% illuminated, 10.73 a.u., Sagittarius), Uranus (magnitude +5.9, 3.4", 100% illuminated, 20.58 a.u. on March 16th, Aries), Neptune (magnitude +8.0, 2.2", 100% illuminated, 30.92 a.u. on March 16th, Aquarius), and Pluto (magnitude +14.3, 0.1", 100% illuminated, 34.47 a.u. on March 16th, Sagittarius).

In the evening, Venus and Uranus can be seen in the west. Mercury is in the east and Mars, Jupiter and Saturn are in the southeast in the morning sky.

Mars, Jupiter, and Saturn are all located to the east of the Teapot asterism in Sagittarius this month. The three planets span nineteen degrees along the ecliptic on the morning of March 1st. By March 18th, Mars, Jupiter, Saturn, and the waning crescent Moon lie within ten degrees of each other. The closest grouping of the three planets since April 14, 2000, when they were less than five degrees apart, takes place on March 31st. For more on this planetary massing, listen to this month's Sky & Telescope podcast March 2020: A Planet Trio and More! at https://skyandtelesc...oAMu4Uc3KPhx2P8

During **March**, Mercury increases in brightness from magnitude +3.7 to magnitude 0.0. It shrinks in apparent size from 10.6 arc seconds to 6.7 arc seconds but increases in illumination from 4% to 62%. Mercury is stationary on March 9th, is at the descending node on March 16th, reaches greatest western elongation on March 24th, and is at aphelion on March 27th. The Moon passes less than four degrees southeast of Mercury on March 21st. Southern hemisphere observers are favored during this apparition.

Venus increases in magnitude from -4.3 to -4.5 and increases in angular size from 18.8 arc seconds to 25.2 arc seconds during March. It decreases in illumination from 63% to 48%. The brightest planet is 50% illuminated on March 26th. Venus is located in eastern Pisces in early March, passes through Aries, and finishes the month in western Taurus a few degrees below M45 (the Pleiades). Venus is at perihelion on March 19th and is at greatest eastern elongation on March 24th, at which time it will be 19 degrees north of the Sun in declination. The waning crescent Moon passes seven degrees south of the planet on March 28th.

Mars brightens to magnitude +0.8 and increases in angular size to 6.4 arc seconds. The apparent brightness of Mars exceeds magnitude +1.0 on March 12th. The waning crescent Moon passes less than one degree south of Mars on March 18th and will occult Mars from some parts of the world. Mars passes within one degree of Jupiter on March 20th and within one degree of Saturn on March 31st. The Red Planet lies between the two gas giants on the morning of March 26th. Mars departs Sagittarius and enters Capricornus on March 30th. Mars and Jupiter are separated by six degrees on March 31st.

Jupiter increases in brightness from magnitude -2.0 to magnitude -2.1 and grows in apparent size from 34.2 arc seconds to 36.9 arc seconds this month. The waning crescent Moon passes less than two degrees south of the planet on March 18th. Jupiter and Mars are separated by just 42 arc minutes on the morning of March 20th. Transits by Callisto take place on March 14th and March 31st. Double Galilean shadow transits take place on March 17th, March 24th, and March 31st. Data on these and other Galilean satellite events is available online at http://www.shallowsky.com/jupiter/ and https://skyandtelesc...watching-tools/ and on page 51 of the March 2020 issue of Sky & Telescope. Click on http://www.skyandtel...watching-tools/ or consult pages 50 and 51 of the March 2020 issue of Sky & Telescope to determine transit times of the central meridian by the Great Red Spot. Additional information on Jupiter can be found at https://curtrenz.com/jupiter.html

During March, Saturn's equatorial diameter measures 16 arc seconds. Its rings span 37 arc seconds. Saturn exits Sagittarius and enters Capricornus in the middle of the month. The waning crescent Moon passes about two degrees south of the Ringed Planet on the morning of March 19th. Click on https://curtrenz.com/saturn.html for a wealth of information on Saturn. For information on the major satellites of Saturn, browse https://skyandtelesc...watching-tools/

Uranus and Venus are separated by 2.2 degrees on the evenings of March 7th and March 8th. The Moon passes less than four degrees south of the seventh planet on the night of March 26th. See http://www.curtrenz.com/uranep.html for additional information on Uranus. A finder chart for Uranus can be found at http://www.nakedeyep....com/uranus.htm

Click on https://skyandtelesc...watching-tools/ for JavaScript utilities that will illustrate the positions of the five brightest satellites of Uranus.

Neptune is in conjunction with the Sun on March 8th and will not be visible again until April.

Pluto is not a viable target this month.

Vernal Equinox

The Vernal Equinox on March 19 is at 21:50PM MDT. Easter Sunday (on April 12) is on the Sunday following the Full Moon (April 7) closest to the Equinox. Two thousand years ago, the Sun, Earth, and the constellation Aries were lined up on the Vernal Equinox, placing Earth in the age of Aries. The equinoxes are defined as the places in Earth's orbit where a line connecting Earth and Sun is perpendicular to Earth's axis. The wobbling axis completes a circuit in 26,000 years causing the line perpendicular to the axis to sweep through each of the 13 zodiacal constellations in 2000 years (Yes, there are13. Too bad astrology ignores Ophiuchus in its horoscopes.) On March 19, the Sun, Earth, and the constellation, Pisces are lined up, placing us in the age of Pisces. The age of Aquarius is yet to come, and the 5th Dimension were well ahead of their times.

Planet	Constellation(s)	Magnitude	Planet Passages	Time, Date
Sun	Aquarius, Pisces	-26.8	New Moon	3:38AM MDT, 3/24
Mercury	Aquarius	+3.2 to +0.2	Max. West Elongation	8:00PM MDT, 3/23
Venus	Pisces, Aries, Taurus	-4.1 to -4.3	Uranus, 2.0°S Max. East Elongation	9:00AM MDT, 3/9 4:00PM MDT, 3/24
Mars	Sagittarius, Capricornus	+1.1 to +0.8	Jupiter, 0.7° Saturn, 0.9°N	12:00AM MDT, 3/20 5:00AM MDT, 3/31
Jupiter	Sagittarius	-1.8 to -2.0	Mars, 0.7°S	12:00AM MDT, 3/20
Saturn	Sagittarius, Capricornus	+0.7	Mars, 0.9°S	5:00AM MDT, 3/31
Uranus	Aries	+5.8	Venus, 2.0°N	9:00AM MDT, 3/9
Neptune	Aquarius	+8.0	Solar Conjunction	6:00AM MDT, 3/8

Planet Plotting

Venus (-4.1 to-4.3) in Pisces, Aries, and Taurus and Uranus (+5.8 to +5.9) in Aries are evening planets in March. On the 9th, brilliant Venus will appear to be 2.0° from dim Uranus. Binoculars are required for viewing Uranus which is 1900 million miles from Earth. Venus will be at a distance of almost 70 million miles and, on the 24th, will be at greatest eastern elongation when it is 46° from the setting Sun. On the 23rd, the Sun and Earth will be at equal distances from Venus at 66.46 million miles because Venus is 45° degree from the Sun and is at the vertex of a right angle with Earth and the Sun. Theoretically, Venus should be half lit at maximum elongation, but the actual timing of half-Venus usually varies from predictions (9:00PM EDT, 3/26) and from the elongation by a few days for reasons not quite understood. Determination of the actual time of this "Venus dichotomy" is a good observing project.

The predawn sky is replete with planets shining brightly in the southern skies. Jupiter (-1.8 to -2.0) is in Sagittarius, Saturn (+0.7) and Mars (+1.1 to +0.8) are in Sagittarius and Capricornus. Mars (+1.1 to +0.8) orbits in front of the two giant planets during March, making close passes of Jupiter on the 20th and Saturn on the 31st. Neptune (+8.0) and Mercury (+3.2 to +0.2) are in Aquarius with the former reaching conjunction with the Sun on the 8th and the latter at greatest western elongation (28°) from the Sun on the 23rd.

On the 18th, the waning crescent Moon is 0.7° from Mars at 4:00AM EDT, 1.5° from Jupiter at 6:00AM EDT, and 2.0° from Saturn at 8:00PM EDT. It is 4.0° from Mercury at 2:00PM EDT on the 21st and 3.8° from Neptune at 11:00PM EDT on the 22nd. The waxing crescent Moon passes 4.0° from Uranus at 5:00PM EDT on the 26th, 7.0° from Venus at 7:00AM EDT on the 28th, and 0.09° from Saturn at 7:00AM EDT on the 31st.

March Moon

The New Moon of March is on the 24th at 5:28AM EDT is the beginning of Lunation 1203 which ends 29.77 days later with the New Moon on April 22 at 10:26PM EDT. The Full Moon of March on the 9th at 1:48PM EDT is commonly known as the "Sap, Crow, or Lenten" Moon. It was called the "Fish Moon" in colonial times and in Medieval England it was the "Chaste Moon." Celts named it the "Moon of Winds" and the Chinese call it the "Sleepy Moon". Anishinaabe (Odawa and Ojibwe) people recognize it as "Onaabani-giizis" (Snowcrust Moon).
Lunar Perigee (minimum orbital distance) occurs on the 10th at 2:30AM EDT when the Moon is at a distance of 221,905 miles (56.00 Earth radii). Apogee is on the 24th at 11:23AM EDT when the Moon's distance is 252,707 miles (63.76 Earth radii).

Planet	Constellation	Magnitude	Moon Passages	Moon Phase, Moon Age
Sun	Pisces	-26.8	5:28AM EDT, 3/24	New, 0 days
Mercury	Aquarius	+0.4	4.0°SE, 2:00PM EDT, 3/21	Waning Crescent, 27.14 days
Venus	Aries	-4.3	7.0°S, 7:00AM EDT, 3/28	Waxing Crescent, 4.06 days
Mars	Sagittarius	+0.9	0.7°S, 4:00AM EDT, 3/18	Waning Crescent, 23.73 days
Jupiter	Sagittarius	-1.9	1.5°S, 6:00AM EDT, 3/18	Waning Crescent, 25.81 days
Saturn	Sagittarius	+0.7	2.0°S, 8:00PM EDT, 3/18	Waning Crescent, 24.39 days
Saturn	Capricornus	+0.7	0.09°S, 7:00AM EDT, 3/18	Waxing Crescent, 7.06 days
Uranus	Aries	+5.9	4.0°S, 5:00PM EDT, 3/26	Waxing Crescent, 2.48 days
Neptune	Aquarius	+8.0	3.8°SE, 11:00PM EDT, 28.52	Waning Crescent, 28.52 days

---

Asteroids

Asteroid 4 Vesta shines at eighth magnitude as it exits Aries and enters Taurus this month. The First Quarter Moon occults 4 Vesta on February 1st for observers in Alaska and western Canada. Asteroids brighter than magnitude +11.0 that reach opposition this month include 37 Fides (magnitude +10.1) on February 2nd and 30 Urania (magnitude +10.6) on February 29th. A finder chart for 37 Fides can be found on page 49 of the February 2020 issue of Sky & Telescope. Consult http://asteroidoccul.../2020_02_si.htm for information on asteroid occultation events taking place this month. Visit http://www.curtrenz.com/asteroids.html to learn more about a number of asteroids.

Comets

Comet C/2017 T2 (PANStarrs) is located a degree northwest of NGC 869 (the western half of the Double Cluster) on February 1st. By the middle of February, the comet is located a degree to the west of the open cluster Stock 2 (the Muscle Man Cluster). It can be found several degrees west of IC 1805 (the Heart Nebula) and IC 1848 (the Soul Nebula) as the month ends. Comet PANStarrs may brighten to magnitude +8.8 by the end of February. Both article and finder charts appear on pages 48 and 49 of the February, 2020 issue of Sky & Telescope. Visit http://cometchasing.skyhound.com/ and http://www.aerith.ne.../future-n.html for additional information on comets visible this month.

C/2019 Y1 (ATLAS) was discovered on December 16, 2019 and is moving northward through Pegasus at 10th magnitude in March. It will enter Andromeda in the middle of the month when it may reach 8th magnitude at perihelion and will enter Cassiopeia in early April. The comet will be closest to Earth on May 2nd when it will be in Camelopardalis.

C/2019 Y4 (ATLAS) was discovered on December 28, 2019 and is moving northwestward through Ursa Major at 11th magnitude in March. It appears to be a fragment of a once larger comet that split. The other fragment may have been the Great Comet of 1844. Y4 Atlas could potentially brighten more than expected if further splitting occurs. It will be closest to Earth on May 24 and at perihelion on May 31 in Taurus when it may be bright enough to see with the naked eye!

Meteor Showers

The major meteor showers that will occur this year are discussed at https://www.skyandte...howers-in-2020/.

Orbiting Earth

Information on passes of the ISS, the USAF's X-37B, the HST, and other satellites can be found at http://www.heavens-a...ns-above.com/.

Stars

The famous eclipsing variable star Algol (Beta Persei) is at a minimum, decreasing in magnitude from 2.1 to 3.4, on February 3rd, 6th, 9th, 11th, 14th, 17th, 20th, 23rd, 26th, and 29th. Consult page 50 of the February 2020 issue of Sky & Telescope for the times of the minima. The Demon Star is at minimum brightness for approximately two hours centered at 12:21 a.m. EST on February 6th (4:21 UT), at 9:10 p.m. EST on February 8th (2:10 UT on February 9th), at 10:55 p.m. EST on February 28th (3:55 UT on February 29th).http://stars.astro.i.../sow/Algol.html
and http://www.solstatio...rs2/algol3.htm .

Deep Sky

Forty binary and multiple stars for February: 41 Aurigae, Struve 872, Otto Struve 147, Struve 929, 56 Aurigae (Auriga); Nu-1 Canis Majoris, 17 Canis Majoris, Pi Canis Majoris, Mu Canis Majoris, h3945, Tau Canis Majoris (Canis Major); Struve 1095, Struve 1103, Struve 1149, 14 Canis Minoris (Canis Minor); 20 Geminorum, 38 Geminorum, Alpha Geminorum (Castor), 15 Geminorum, Lambda Geminorum, Delta Geminorum, Struve 1108, Kappa Geminorum (Gemini); 5 Lyncis, 12 Lyncis, 19 Lyncis, Struve 968, Struve 1025 (Lynx); Epsilon Monocerotis, Beta Monocerotis, 15 (S) Monocerotis (Monoceros); Struve 855 (Orion); Struve 1104, k Puppis, 5 Puppis (Puppis)

Fifty deep-sky objects for February: NGC 2146, NGC 2403 (Camelopardalis); M41, NGC 2345, NGC 2359, NGC 2360, NGC 2362, NGC 2367, NGC 2383 (Canis Major); M35, NGC 2129, NGC 2158, NGC 2266, NGC 2355, NGC 2371-72, NGC 2392, NGC 2420 (Gemini); NGC 2419 (Lynx); M50, NGC 2232, NGC 2237, NGC 2238, NGC 2244, NGC 2245, NGC 2251, NGC 2261, NGC 2264, NGC 2286, NGC 2301, NGC 2311, NGC 2324, NGC 2335, NGC 2345, NGC 2346, NGC 2353 (Monoceros); NGC 2169, NGC 2174, NGC 2194 (Orion); M46, M47, M93, Mel 71, NGC 2421, NGC 2423, NGC 2438, NGC 2439, NGC 2440, NGC 2467, NGC 2506, NGC 2509 (Puppis)

Top ten binocular deep-sky objects for February: M35, M41, M46, M47, M50, M93, NGC 2244, NGC 2264, NGC 2301, NGC 2360

Top ten deep-sky objects for February: M35, M41, M46, M47, M50, M93, NGC 2261, NGC 2362, NGC 2392, NGC 2403

Challenge deep-sky object for February: IC 443 (Jellyfish Nebula) Right Ascension: $06^h\ 17^m\ 13^s$ | Declination +22° 31′ 05″

The objects listed above are located between 6:00 and 8:00 hours of right ascension.

Miscellaneous

The zodiacal light should be visible in the western sky after sunset from dark locations after March 11th. An article on the zodiacal light can be found on pages 48 and 49 of the March 2020 issue of Sky & Telescope.

Information on Iridium flares and passes of the ISS, the USAF's X-37B, the HST, Starlink, and other satellites can be found at http://www.heavens-above.com/.

For more on the planets and how to locate them, browse http://www.nakedeyeplanets.com/.

A wealth of current information on solar system celestial bodies is posted at and http://nineplanets.org/

Various events taking place within our solar system are discussed at http://www.bluewater...ed-4/index.html

Information on the celestial events transpiring each week can be found at http://astronomy.com/skythisweek and https://skyandtelesc...ky-at-a-glance/

Free star maps for March can be downloaded at http://www.skymaps.com/downloads.html and http://www.telescope...thly-Star-Chart

Betelgeuse (Alpha Orionis) has rebounded from a historic dimming over the past four months. For more on this unusual event, see https://www.nature.c...586-020-00561-z and https://www.universe...ghtening-again/ and https://www.syfy.com...ght-on-schedule

The famous eclipsing variable star Algol (Beta Persei) is at a minimum, decreasing in magnitude from 2.1 to 3.4, on March 3rd, 5th, 8th, 11th, 14th, 17th, 20th, 23rd, 25th, 28th, and 31st. Consult https://skyandtelesc...g-tools/page/2/ for the times of the eclipses. Favorable dates for observing Algol at mid-eclipse from the eastern United States include March 2nd (7:45 p.m. EDT or 0:45 UT March 3rd), March 20th (1:40 a.m. EDT or 5:40 UT), and March 22nd (10:30 p.m. EDT or 2:30 UT March 23rd). For more on Algol, see http://stars.astro.i.../sow/Algol.html and http://www.solstatio...rs2/algol3.htm

Data on current supernovae can be found at http://www.rochester...y.org/snimages/

It is possible to observe all 109 (or 110) Messier objects during a single night around the time of the vernal equinox, if the Moon phase and local latitude are favorable. For information on running a so-called Messier Marathon, browse http://messier.seds....n/marathon.html and http://www.richardbe...t/marathon.html

Information on observing some of the more prominent Messier galaxies is available at http://www.cloudynig...ur-astronomers/

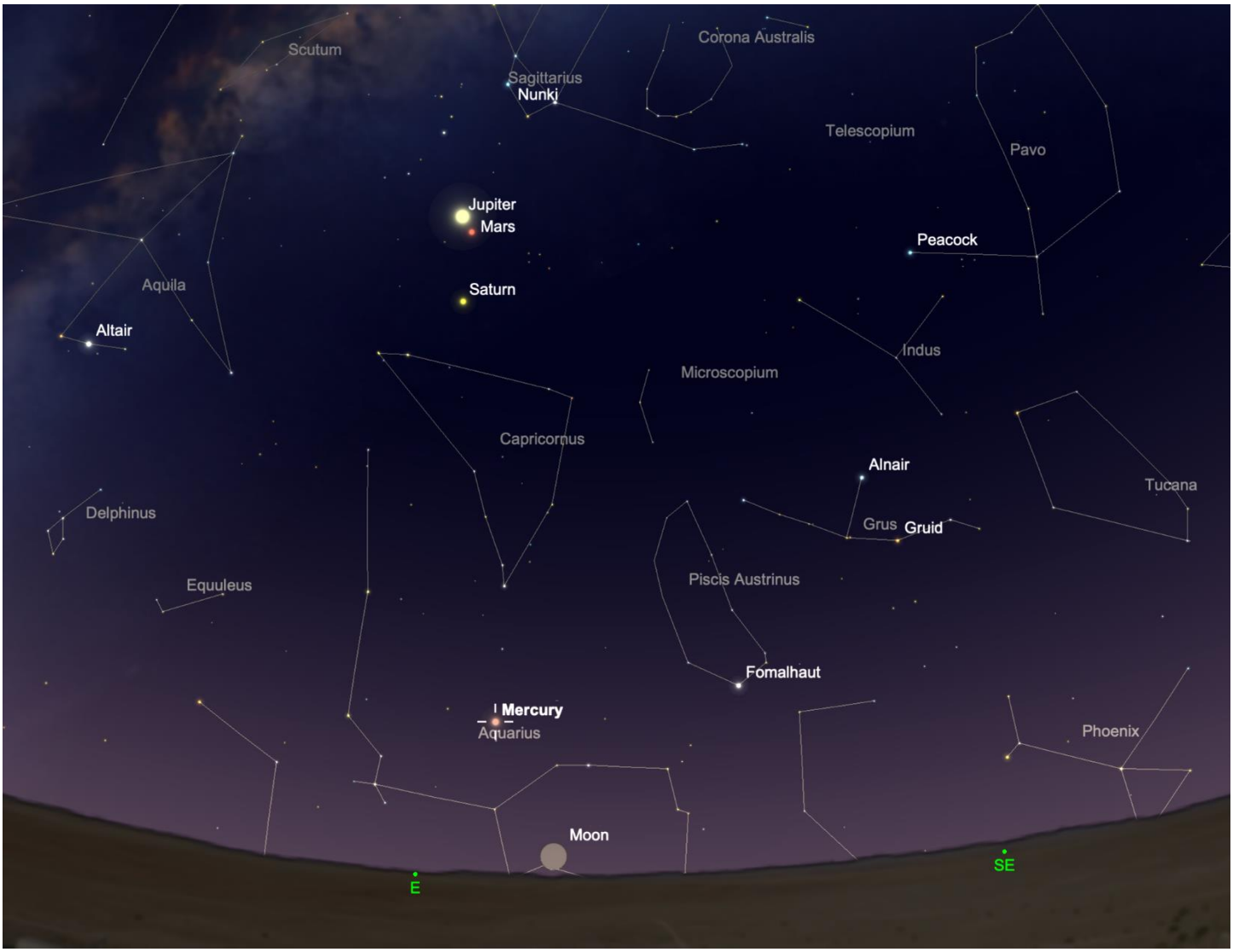
Finder charts for the Messier objects and other deep-sky objects are posted at https://freestarcharts.com/messier and https://freestarcharts.com/ngc-ic and http://www.cambridge...nuary-march.htm

Telrad finder charts for the Messier Catalog are posted at http://www.custerobs...cs/messier2.pdf and http://www.star-shin...ssierTelrad.htm

Telrad finder charts for the SAC's 110 Best of the NGC are available at http://sao64.free.fr...ataloguesac.pdf

Deep-sky object list generators can be found at https://dso-browser.com/ and http://www.virtualcolony.com/sac/ and https://tonightssky.com/MainPage.php

Free sky atlases can be downloaded at http://www.deepskywa...-atlas-full.pdf and https://www.cloudyni...ar-charts-r1021 and https://allans-stuff.com/triatlas/



Mercury rising above the eastern horizon before dawn on March 23, 2020 as seen from 35-degrees south latitude.

Observatory and Planetarium

CSI Centennial Observatory / Faulkner Planetarium Herrett Center

Event	Place	Date	Time	Admission
Monthly Free Star Party	Centennial Observatory	Saturday, March 14th, 2020	8:30 PM to midnight	FREE
"Earth Hour" Telescope Viewing	Centennial Observatory	Saturday, March 28th, 2020	8:30 to 9:30 PM	FREE

College of Southern Idaho Campus Twin Falls, ID
Faulkner Planetarium / Show Times

Now Showing

About the Magic Valley Astronomical Society

Magic Valley Astronomical Society
550 Sparks St.
Twin Falls, ID

The Magic Valley Astronomical Society (MVAS) was founded in 1976. The Society is a non-profit [501(c) 3] educational and scientific organization dedicated to bringing together people with an interest in astronomy.

In partnership with the Centennial Observatory, Herrett Center, College of Southern Idaho - Twin Falls; we hold regularly scheduled monthly meetings and observation sessions, at which we share information on current astronomical events, tools and techniques for observation, astrophotography, astronomical computer software, and other topics concerning general astronomy. Members enthusiastically share their telescopes and knowledge of the night sky with all who are interested. In addition to our monthly public star parties we hold members only star parties at various locations throughout the Magic Valley.

MVAS promotes the education of astronomy and the exploration of the night sky along with safe solar observing through our public outreach programs. We provide two types of outreach; public star parties and events open to anyone interested in astronomy, and outreach programs for individual groups and organizations (e.g. schools, churches, scout troops, company events, etc.), setting up at your location. All of our outreach programs are provided by MVAS volunteers at no cost. However, MVAS will gladly accept donations. Donations enable us to continue and improve our public outreach programs.

Membership is not just about personal benefits. Your membership dues support the work that the Magic Valley Astronomical Society does in the community to promote the enjoyment and science of astronomy.
Speakers, public star parties, classes and support for astronomy in schoolrooms, and outreach programs just to name a few of the programs that your membership dues support.

Annual Membership dues will be:
$20.00 for individuals, families, and $10.00 for students.
Contact Treasurer Jim Tubbs for dues information via e-mail: jtubbs015@msn.com

Donations to our club are always welcome and are even tax deductible. Please contact a board member for details.

Membership Benefits:
Lending Telescopes: The society currently has three telescopes for loan and would gladly accept others please contact President Robert Mayer, for more information on these and other benefits.

Telescopes are an individual thing and not practical for public use. However, everyone should have the experience of a good look at the moon for at least 5 minutes in their life time. It is a dimension and feeling that is unexplainable. Pictures or TV can't give this feeling, awareness, or experience of true dimension. A person will not forget seeing our closest neighbor, the moon. Norman Herrett in a letter to Dr. J. L. Taylor, president of the College of Southern Idaho, Twin Falls, ID, USA.