Snake River Skies

The Newsletter of the Magic Valley Astronomical Society — *September 2022*

Membership Meeting
Saturday Sept 10th 2022 at 7:00p at the Herrett Center - CSI Campus

Centennial Observatory
See Inside for Details

Faulkner Planetarium
See Inside for Details

www.mvastro.org

Club Officers

Gary Leavitt, President
leavittg@cableone.net

Dr. Jay Hartwell, Vice President

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

Loretta J Cannon, Acting 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

President's Message

ON MY MIND RECENTLY IS THE ARTEMIS PROGRAM. UNFORTUNATELY, NOW THAT WE HAVE HAD TO WITNESS TWO SCRUBBED EVENTS, I CAN STILL REMEMBER, WHEN IN THE EARLY DAYS OF NASA, THIS WAS NOT UNUSUAL. ITS JUST TOO BAD THAT IT STILL OCCURS. HOPEFULLY, IT WILL BE SUCCESSFUL AND GET OFF THE GROUND. IF SO, THERE WILL BE SEVERAL ADDITIONAL STAGES AND MISSIONS THAT WILL BUILD OFF EACH OTHER. I BELIEVE EIGHT OR NINE ARTEMIS LAUNCHES ARE SCHEDULED AND THEY WILL BE CREWED BEGINNING WITH ARTEMIS TWO. AS I POST THIS MESSAGE, NASA IS SAYING THEY ARE REVIEWING OPTIONS AND THAT IT MIGHT BE SEVERAL MORE WEEKS UNTIL ANOTHER LAUNCH IS SET. WITNESSING LIVE CREWS AGAIN ON THE MOON WITH A MOON BASE AND AN ORBITING GATEWAY STATION, ETC. WOW!!! IT'S ALSO AMAZING AT THE NUMBER OF COUTRIES AND COMMERCIAL GROUPS WHO ARE CONTRIBTING TO THIS GREAT JOINT VENTURE.

WHILE I DELIVERED NEWSPAPERS IN THE SPRING OF 1961 ON MY EARLY MORNING PAPER ROUTE. …THE HEADLINES OF THE FIRST MAN IN SPACE…THE RUSSIAN COSMONAUT(GAGARIN), FOLLOWED A MONTH LATER BY ALAN SHEPHERD IN THE MERCURY CAPSULE ARE STILL VIVID MEMORIES. THERE'S A NICE READ BY GENE KRANTZ, FORMER NASA FLIGHT DIRECTOR (FAILURE IS NOT AN OPTION). IT COVERS THE EARLY DAYS OF NASA, MERCURY AND APOLLO AND HOW THEY WERE ABLE TO OVERCOME SO MANY FAILURES, MISCALCULATIONS, ERRORS, ETC TO BUILD A SUCCESSFUL SPACE PROGRAM.

MY SON IN LAW, NICK, WORKS FOR NORTHRUP GRUMANN IN UTAH. THEY ARE RESPONSIBLE FOR BUILDING THE SOLID FUEL BOOSTERS, WHICH ARE ATTACHED TO THE SIDES OF THE ARTEMIS CORE SECTION AND PRODUCE APPROXIMATELY 75 PERCENT OF THE INITIAL THRUST FOR THE FIRST TWO MINUTES OF BURN. HIS TEAM HAS WORKED ON THE ADDITIOJNAL STAGES OF ARTEMIS AND ARE DOING WORK ON THE NEXT STAGES AFTER ARTEMIS, THE MAR MISSIONS.

AS EXCITING AS IT IS TO LOOK FORWARD TO THE FUTURE OF ADDITIONAL SPACE TRAVEL, INCLUDING MARS AND OTHER DESTINATIONS, ONE MUST WONDER, WHERE CAN TECHNOLOGY TAKE US. FOR STARTERS, YOU CAN LOOK AT THE EARLY ACCOMPLISHMENTS OF THE JAMES WEBB SPACE TELESCOPE AND ALL THE STUNNING IMAGES THAT ARE BEING RELEASED ALMOST ON A DAILY BASIS. DON'T FORGET THE HUBBLE TELESCOPE AND ALL THE OUTSTANDING AND REMARKABLE IMAGES IT HAS AND WILL CONTINUE TO PRODUCE. AND OF COURSE THERE ARE OTHERS: THE JUNO PROBE, RADIO TELESCOPES, NEW HORIZONS, VOYAGER SYSTEMS, ETC.

ON TO SOME OTHER MATTERS. OUR SEPTEMBER MEETING ON THE 10TH AT THE HERRETT CTR LIBRARY AT 7PM WILL FEATURE TWO PRESENTATIONS. JAY HARTWELL WILL DISCUSS SATURN AND SOME OF THE RECENT FINDINGS ASTRONOMERS ARE DISCOVERING, WE'LL ALSO HAVE A NASA FEED (WE HAVE SEVERAL TO CONSIDER) THAT SHOULD BE GOOD. OUR TIM FRAZIER WILL HAVE AN UPDATE ON THE LATEST FROM THE IDAHO DARK SKY RESERVE AND WE'LL BE CONSIDERING A STAR PARTY AT THE JEROME GUN CLUB EARLY IN OCTOBER AT A TIME WE CAN DISCUSS AT THE MEETING.

MEANWHILE, STAY SAFE AND WELL SEE YOU SATURDAY.

GARY LEAVITT, MVAS PRESIDENT

September 2022 Calendar

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
					BSU 1st Friday Physics see Calendar of Events	**First Qtr Moon**  Visible 47% ↑ Age: 7.12 Days
4	5	6	7	8	9	10
	45th Anniversary of **Voyager 1 launch**	**American Astronomical Society** **founded 1899**			**Harvest → Moon →** 3:58 am MDT  Age: 14.85 Days	**MVAS Meeting** 7:00 pm Herrett Ctr, CSI campus see Calendar of Events
11	12	13	14	15	16	17
					Neptune at opposition visible from sunset to sunrise	**Last Quarter Moon**  Visible: 54% ↓ Age: 21.78 Days
18	19	20	21	22	23	
				Autumnal Equinox 7:03 MDT	Possible New **Launch Date** for **Artemis I**	
25	26	27	28	29	30	
New Moon  Visible 0% Age: 0.14 Days	**Jupiter at opposition** visible from sunset to sunrise	Possible New **Launch Date** for **Artemis I**		**Juno makes closest approach to Europa** (Jupiter's moon)		

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Calendar of Events

Friday, Sept 2 Boise State Physics First Friday Astronomy

Prof. Matthew Pasek, University of South Florida
"An Expectation of Aliens" https://awards.research.usf.edu/profiles/?id=689

In-person Lecture begins 7:30 pm (MT), in the Multi-purpose Classroom Bldg, BSU campus
OR watch online via this link: http://boi.st/astrobroncoslive
(the 'Astronomy at Boise State Physics' YouTube channel)

If you missed this presentation, you can view it and other previous lectures on the BSU Physics' YouTube channel.

Aug 5, 2022	Prof. Katie Devine, College of Idaho, Mathematics & Physical Sciences The PERYSCOPE Project – Involving Astronomy Students in Star Formation Research
Jul 1, 2022	Dr. Alejandro Soto, Southwest Research Institute, Planetary Science Directorate Dust Storms on Mars
Jun 3, 2022	Dr. Andres Salcedo, University of Arizona Weighing and Measuring the Universe with Galaxy Clusters
May 6, 2022	Dr. Christy Swann, U.S. Naval Research Laboratory From Venus to Pluto - Windblown Sand Throughout Our Solar System

Saturday September 10 MVAS Meeting

According to Gary's president letter, this month's meeting (starting at 7:00pm at the Herrett Center Library) will feature two presentations. First, Jay Hartwell will discuss Saturn and some of the recent findings that have been discovered. Second, we'll have a NASA feed; there are several from which to choose. It will be good. Our Tim Frazier will have an update on the latest from the Central Idaho Dark Sky Reserve, and we'll be considering a Star Party at the Jerome Gun Club in early October.

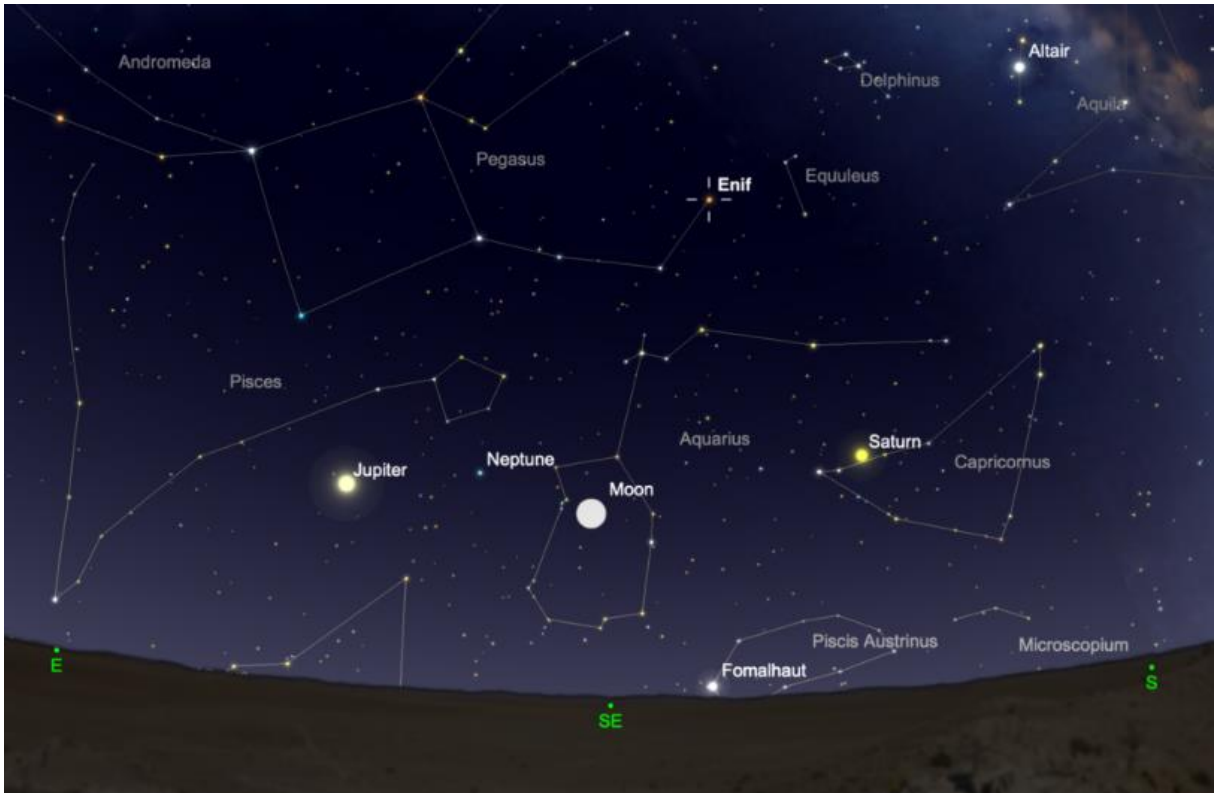
Friday, September 10 Full Harvest Moon

"September's full moon is known as the Harvest Moon, as it is the full moon that's closest to the fall equinox. In the northern hemisphere, the Harvest Moon rises very soon after sunset, providing plenty of bright light for farmers harvesting their summer crops. This moon is so well-known for its luminosity and brilliance that certain Native American tribes even named it the Big Moon. Other cultures celebrate this fall moon. A widely known tradition associated with the Harvest Moon is the Mid-Autumn Festival celebrated by Chinese communities all around the world. Also known as the Mooncake Festival, people gather with friends and family to admire the brilliant full moon while eating mooncakes and drinking tea. Mooncakes are a rich pastry traditionally filled with sweet bean paste or lotus seed paste, and sometimes even include salted egg yolks. The sweet osmanthus flower also blooms during this time, and is often used in teas and the reunion wine drunk when visiting family. It's a common tradition to celebrate by carrying brightly colored lanterns; you can often enjoy the beautiful sight of lanterns hanging in front of buildings or in parks, and sky lanterns floating towards the full moon.

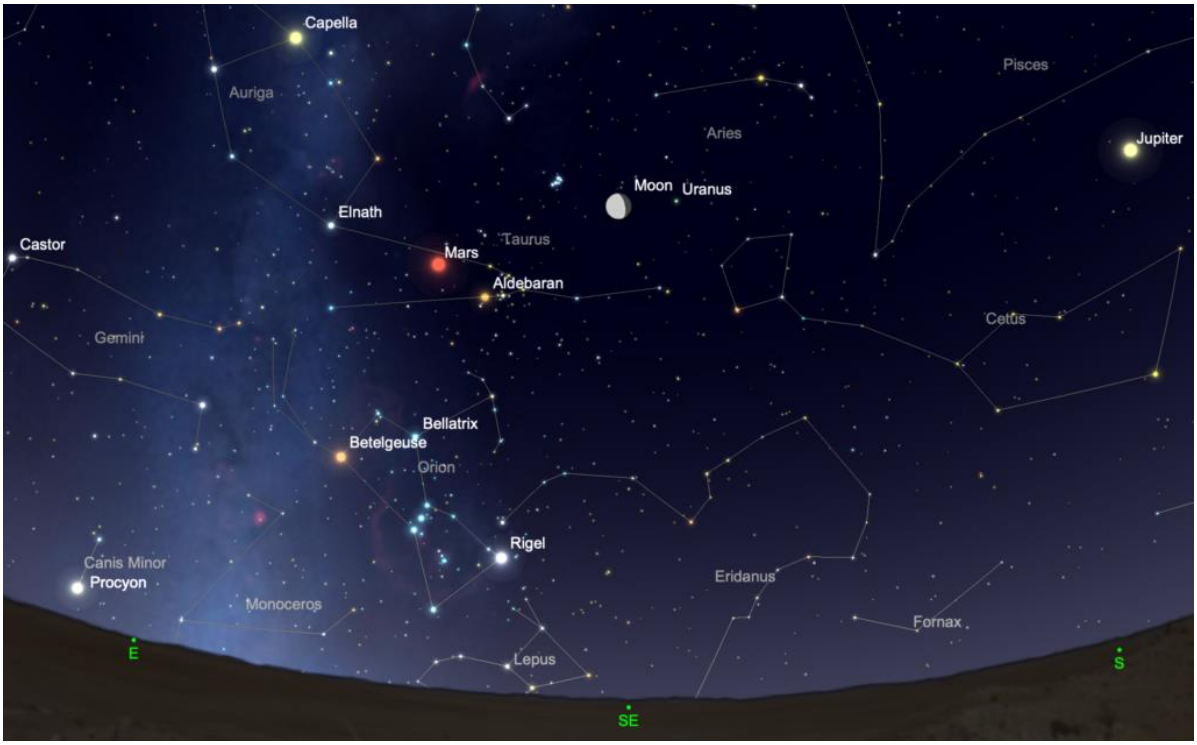
For most of the other cultures that celebrate variants of the Mid-Autumn Festival, the desserts eaten are made using fruits, nuts, and grains harvested during this season. Interestingly, the Harvest Moon is called the Nut Moon by members of the Cherokee tribes, who gather all sorts of nuts to make a bread eaten during harvest festivals." Read the full story of the Full Harvest Moon for more information.

"Cosmic Pursuits" for September

Please read Brian Ventrudo's complete Cosmic Pursuits for September. And please enjoy these amazing images!



"The Moon lies between Saturn and Jupiter on Sept. 9, 2022"
image was produced using SkySafari 6 Plus software



"The waning gibbous Moon and Mars near the Pleiades and Hyades on the early morning of Sept. 15, 2022."
image was produced using SkySafari 6 Plus software

We are the Worlds

Loretta J Cannon, Science Writer/Editor and
Brian Jackson, Boise State University, Dept. of Physics
bjackson@boisestate.edu -- twitter.com/decaelus -- www.astrojack.com/

At the 1986 Grammy awards, "We are the World" won Song of the Year for Lionel Richie and Michael Jackson, Record of the Year, and Best Pop Performance by Duo or Group. Recorded by 45 top stars, this pop single was produced for the charity USA for Africa (https://usaforafrica.org/), generating close to 60 million dollars for food and relief for the devastating 1984-85 famine in East Africa. To date, it's the eighth-bestselling record single of all time and continues to provide funds for USA for Africa's efforts around the world.
The year 1986 also marked the 300th anniversary of one of the most popular science books of all time, *Conversations on the Plurality of Worlds* – an exploration of possible life on other worlds. The upcoming NASA Clipper mission may turn those science-fiction conversations about alien life into science fact.

I Want to Know What Above Is

Published in 1686 (around the same time that New York City was granted its first charter in the Americas) *Conversations* was one of the first works to popularize ideas about alien life. Written by the French philosopher and scientist Bernard Le Bovier de Fontenelle, *Conversations* provides a sweeping and accessible survey of the then-recent discoveries and speculations by early Enlightenment thinkers like Descartes and Copernicus.

Fontenelle wrote in French rather than Latin and framed his book as a series of conversations between an unnamed natural philosopher (an obvious stand-in for Fontenelle himself) and an inquisitive noblewoman, the Marquise. While strolling in her garden under the darkening twilight sky, the philosopher and the Marquise discuss the various natures of alien lifeforms *assumed* to inhabit the worlds of the Solar System and beyond. Simplistic but impressively insightful ideas inform their speculations. Regarding Mercury, the philosopher points out that, being much closer to the Sun than Earth, it must experience much higher temperatures:

> "But what must the inhabitants of Mercury be? We are above twice the distance from the sun than they are. They must be almost mad with vivacity."
>
> From *Conversations on the Plurality of Worlds*, Grunnings's 1803 English translation

And what about worlds more distant from the Sun? Fontenelle's philosopher points out that Saturn takes 30 years to circle the Sun, while Earth takes one. Thus, like the fictional Ents of Middle-earth, Saturnians deliberate more slowly than frenetic Earthlings:

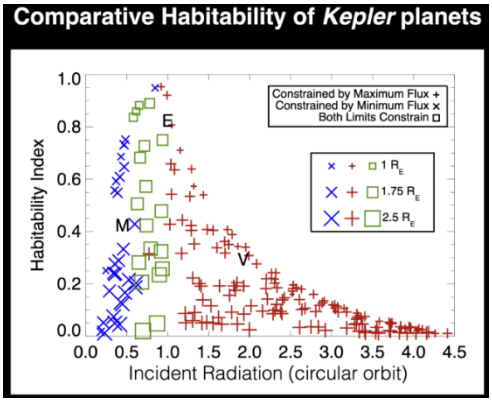
> "Then, replied she, the people are very wise in Saturn, for you told me they were all mad in Mercury.
> If they are not very wise, answered I, they are at least, I suppose, very phlegmatic. Their features could not accommodate themselves to a smile; they require a day's consideration before they answer any question … ."
>
> From *Conversations on the Plurality of Worlds*, Grunnings's 1803 English translation

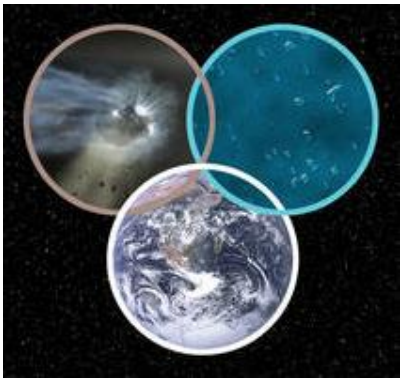
The book's conversational style, approachable analogies (and mildly suggestive setting) won it wild popularity. Although subject to occasional religious restrictions, *Conversations* was still being translated into new languages more than one hundred years after its initial publication.

The Power of Thuds

Although an understanding of science and the requirements for life was extremely limited in the 17th century (Newton's *Principia* wasn't published until the year after *Conversations*), Fontenelle did hit on some of the key considerations when it comes to what makes a world suitable for life. The dependence of a planet's temperature on its distance from its host star lies at the heart of the concept of a habitable zone, the region around a star in which an Earth-like planet could have Earth-like environments.

Indeed, scientists of today have developed a variety of ways to determine the likelihood that a distant planet could support life, including the habitability index, which combines several factors related to the host star's brightness and the planet's size and orbit in order to gauge which planets might have climates most like the Earth's. At RIGHT is the index for many of the exoplanets identified by NASA's *Kepler* mission.





Climate, of course, is not the only factor that determines whether a planet has life or not. Making life requires the right ingredients, and, for the Earth, much of the required chemicals were delivered by asteroids and comets. Most of our water probably originated from comets thudding into the Earth's surface billions of years ago. At LEFT is an illustration of a comet, ice grains and Earth's oceans. SOFIA found clues in Comet Wirtanen's ice grains that suggest water in comets and Earth's oceans may share a common origin (credit: NASA/SOFIA/L.Cook/L.Proudfit).

Water is not the only ingredient required for life. Elements like carbon, nitrogen, and especially phosphorus, are among the critical ingredients for life's building blocks that were likely delivered via cometary impacts, like dropping a rock in a pond. But what if you're a world in which all your life-giving water is sheltered from space beneath a solid sheet of ice?

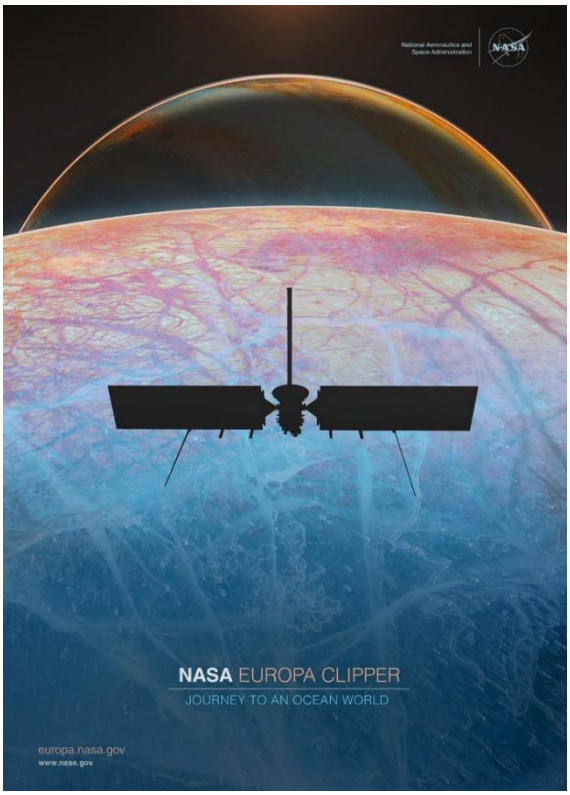
Science for Nothing (and Life-Checks for Free)

At first glance, Jupiter's moon Europa seems like a great place for life to get a foothold. A cold moon, Europa hosts a global ocean estimated to have *more* liquid water than the Earth has. But all that potential life-giving water lies beneath Europa's all-encompassing surface ice, currently estimated to be 10-15 miles thick. As such, the necessary ingredients for life that rained down on the Earth billions of years ago may have been prevented from seeding the expansive Europan seas. But the source for Europa's possible ocean life likely comes from deep within the moon.

While no plumes of escaping water were detected during the fourteen year Galileo mission that ended in 2003, the Hubble telescope observed multiple possible water plumes from Europa a few years ago; **click on the image** at LEFT to watch movie about the plumes (credit: Goddard/Katrina Jackson). Galileo did detect what may be a Europan magnetic field, most likely caused by a salt water ocean, which is more than likely in contact with the rocky mantle from which salts dissolved into the ocean. Tidal forces from Jupiter and the moons Io and Ganymede affect Europa, not only creating heat within its presumed rocky core and mantle but also constantly reforming the surface ice through convecting. As cool ice sinks and warmer ice rises, it has become the uneven, fractured, ridged surface we see today, a surface estimated to be only about 40 to 90 million years old.

While observations are suggestive, they aren't proof that the Europan ocean is bursting with life. As yet, there is no clear evidence that the ocean has all ingredients for life – water, energy, organics. NASA's upcoming Europa Clipper mission was designed to find that evidence, one way or another. The geysers may be an easy way to sample the otherwise difficult-to-probe oceans. By spewing ocean contents into space, the geysers will provide a taste of the ocean chemistry, and Clipper includes a high-precision spectrometer just for this purpose. With a launch date set for late 2024, Clipper should reach Europa by 2030.

Want to learn more about life's chemical story? Join Boise State Physics for our First Friday Astronomy event on Fri, Sep 2 at 7:30p MT when we will host University of South Florida's Prof. Matthew Pasek. Attend in-person (https://maps.boisestate.edu/?id=715#!m/89075) or virtually (boi.st/astrobroncoslive).



Europa Clipper: Journey to an Ocean World Poster
available through NASA

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NASA NEWS and MORE

APPLICATION DEADLINE APPROACHING

Are you a high school science teacher? The deadline to apply for the NASA/IPAC Teacher Archive Research Program (NITARP) for 2023 is **Monday, September 12th**. According to the website

> "The NASA/IPAC Teacher Archive Research Program, or NITARP, partners small groups of (primarily high school) educators with a mentor professional astronomer for a year-long original research project using NASA's vast archives of astronomical data from space-based and ground-based telescopes."
>
> "The program includes opportunities for educator participants and their students to visit and collaborate with scientists at Caltech and present their research results at the American Astronomical Society (AAS) Conference in January – all of which are paid for by the program. In addition to giving participants first-hand astronomical research experience, the program is designed to encourage educators to share their experiences and knowledge with colleagues and students."

KEEP UP-TO-DATE WITH MARS

Quite some time ago, I signed up to receive the monthly email "NASA Mars Exploration Newsletter". The September issue covers these stories:

Perseverance Scores Surprise Discoveries Inside Jezero Crater

Top 5 Discoveries of Curiosity's Sample Analysis Instrument

and projects like Help Scientists Study Clouds on Mars. If you'd like to sign up to receive the Mars newsletter, go to the NASA Mars Exploration Program site. Then scroll *aaaalll* the way down to the bottom of any page to the Site Map section where you'll see this (RIGHT). Enter your email address and click on the envelope.

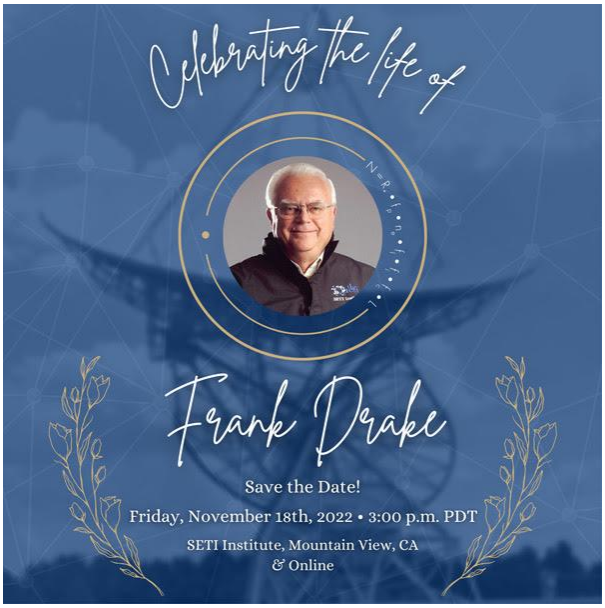
WE'VE LOST A PIONEER IN ASTROBIOLOGY

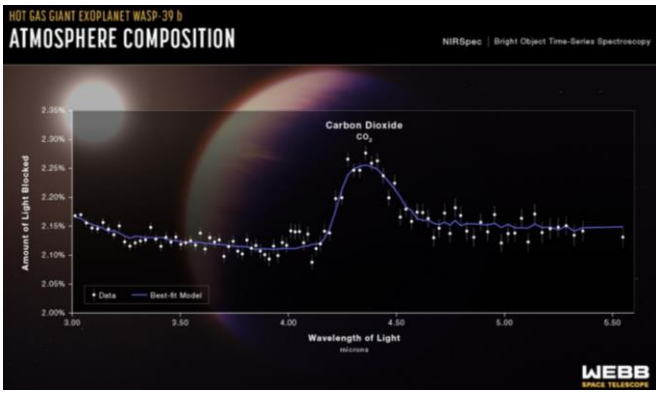
On September 2nd, the SETI institute announced the passing of Frank D. Drake, PhD. In 1960, before 'astrobiology' was a science, Drake was looking for evidence of non-terrestrial life using radio astronomy. In 1961, he formulated the famous Drake Equation:

$$N = R_* \cdot f_p \cdot n_e \cdot f_l \cdot f_i \cdot f_c \cdot L$$

This is the second most known equation after Einstein's $e=mc^2$. I wrote about Drake's equation in the Dec 2019 issue of *SkyWatcher*, in the article about *Voyager*'s golden record.

The SETI institute is hosting a Celebration of the Life of Frank Drake (1930-2022) on November 18th at the Institute in Mountain View, CA. If you can't attend in person, there is an online celebration. While there isn't a web link for this yet, I encourage you to sign up for the SETI newsletter; scroll to the bottom of any SETI site page for the sign-up field (similar to the Mars signup shown above).





JWST FINDS CO_2 IN EXOPLANET ATMOSPHERE

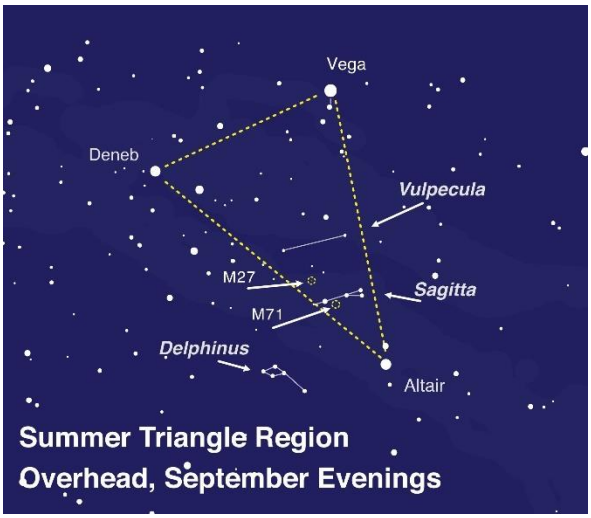
I found this stunning announcement on the SETI site also. Researchers identified carbon dioxide in the atmosphere of WASP-39b using JWST's spectrograph. According to the article, "this is the first detailed transmission spectrum ever captured that covers wavelengths between 3 and 5.5 microns." This is a must read!

Image Credit: NASA, ESA, CSA, Leah Hustak (STScI), Joseph Olmsted (STScI)

The Summer Triangle's Hidden Treasures

by David Prosper

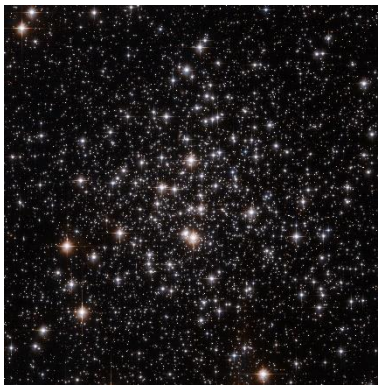
September skies bring the lovely **Summer Triangle** asterism into prime position after nightfall for observers in the Northern Hemisphere. Its position high in the sky may make it difficult for some to observe its member stars comfortably, since looking straight up while standing can be hard on one's neck! While that isn't much of a problem for those that just want to quickly spot its brightest stars and member constellations, this difficulty can prevent folks from seeing some of the lesser known and dimmer star patterns scattered around its informal borders. The solution? Lie down on the ground with a comfortable blanket or mat, or grab a lawn or gravity chair and sit luxuriously while facing up. You'll quickly spot the major constellations about the Summer Triangle's three corner stars: Lyra with bright star Vega, Cygnus with brilliant star Deneb, and Aquila with its blazing star, Altair. As you get comfortable and your eyes adjust, you'll soon find yourself able to spot a few constellations hidden in plain sight in the region around the Summer Triangle: **Vulpecula the Fox**, **Sagitta the Arrow**, and **Delphinus the Dolphin**! You could call these the Summer Triangle's "hidden treasures" – and they are hidden in plain sight for those that know where to look!



at LEFT: To improve readability, the lines for the constellations of Aquilla, Lyra, and Cygnus have been removed, but you can find a map that includes them in "Spot the Stars of the Summer Triangle" from August 2019. (Image created with assistance from Stellarium: stellarium.org).

Vulpecula the Fox is located near the middle of the Summer Triangle, and is relatively small, like its namesake. Despite its size, it features the largest planetary nebula in our skies: M27, aka the Dumbbell Nebula! It's visible in binoculars as a fuzzy "star" and when seen through telescopes, its distinctive shape can be observed more readily - especially with larger telescopes. Planetary nebulae, named such because their round fuzzy appearances were initially thought to resemble the disc of a planet by early telescopic observers, form when stars similar to our Sun begin to die. The star will expand into a massive red giant, and its gasses drift off into space, forming a nebula. Eventually the star collapses into a white dwarf – as seen with M27 - and eventually the colorful shell of gasses will dissipate throughout the galaxy, leaving behind a solitary, tiny, dense, white dwarf star. You are getting a peek into our Sun's far-distant future when you observe this object!

Sagitta the Arrow is even smaller than Vulpecula – it's the third smallest constellation in the sky! Located between the stars of Vulpecula and Aquila the Eagle, Sagitta's stars resemble its namesake arrow. It too contains an interesting deep-sky object: M71, an unusually small and young globular cluster whose lack of a strong central core has long confused and intrigued astronomers. It's visible in binoculars, and a larger telescope will enable you to separate its stars a bit more easily than most globulars; you'll certainly see why it was thought to be an open cluster!



at RIGHT: M71 as seen by Hubble shows the cluster's lack of a bright, concentrated core, which initially led astronomers to classify this as an "open cluster." Studies in the 1970s proved it to be a globular cluster – though an unusually young and small one! (credit:ESA/Hubble and NASA, https://www.nasa.gov/feature/goddard/2017/messier-71)

Delicate **Delphinus the Dolphin** appears to dive in and out of the Milky Way near Aquilla and Sagitta! Many stargazers identify Delphinus as a herald of the fainter water constellations, rising in the east after sunset as fall approaches. The starry dolphin appears to leap out of the great celestial ocean, announcing the arrival of more wonderful sights later in the evening.

Want to hunt for more treasures? You'll need a treasure map, and the Night Sky Network's "Trip Around the Triangle" handout is the perfect guide for your quest! Download one before your observing session at bit.ly/TriangleTrip. And of course, while you wait for the Sun to set - or skies to clear - you can always find out more about the objects and science hidden inside these treasures by checking out NASA's latest at nasa.gov.

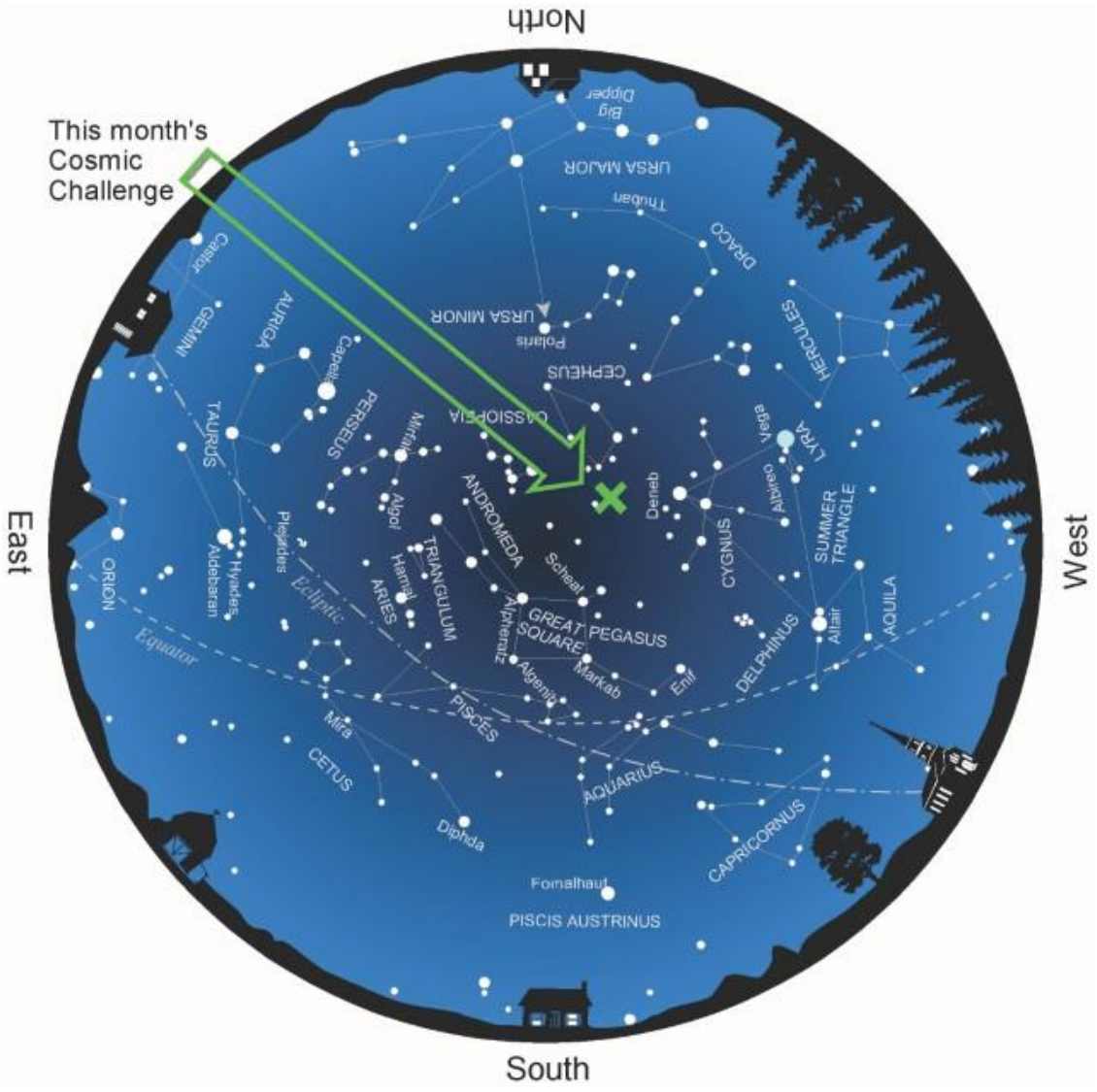
IC 5217, the Little Saturn Nebula

	6- to 9.25-inch (15-24 cm) telescopes

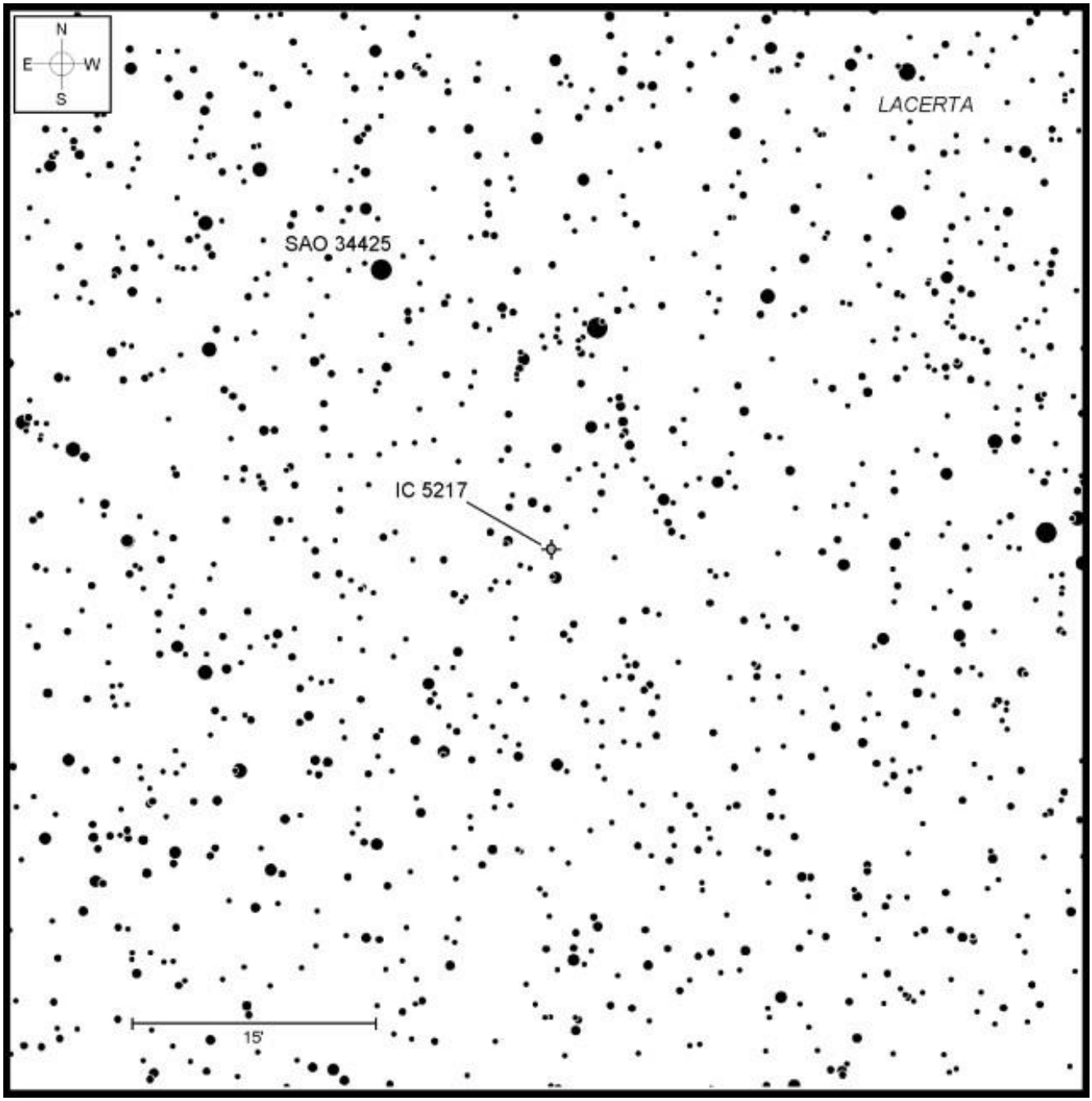
Target	Type	RA	DEC	Constellation	Magnitude	Size
IC 5217	Planetary nebula	22h 23.9m	+50° 58.0'	Lacerta	11.3	7"

As we transition from summer to autumn, let's try our luck with a taxing planetary nebula in an equally taxing constellation. IC 5217 lies among the faint stars of Lacerta the Lizard. Locating the nebula is a big part of the challenge because of its dim surroundings.

Its dimness and remote position likely led to the Herschels missing it as they surveyed the skies. It evaded detection until Williamina Fleming discovered it in 1904 while examining stellar emission line spectrum on a photographic plate taken at Harvard College Observatory.



September evening star map, adapted from Star Watch by Phil Harrington



Finder chart for this month's Cosmic Challenge, adapted from Cosmic Challenge by Phil Harrington
Click on the chart to open a printable PDF version in a new window

To spot IC 5217, use a technique offered many years ago by Walter Scott Houston in his Deep-Sky Wonders column. Begin by finding a four-star keystone asterism formed by Alpha (α), Beta (β), and 4 Lacertae, as well as 5.4-magnitude SAO 34143, about 18° east-northeast of Deneb [Alpha (α) Cygni]. The keystone measures about 3° across, small enough to fit into just about any finderscope. IC 5217 is located slightly northeast of the center of the keystone, in the same low-power field as the very red 6.5-magnitude star SAO 34425. The planetary is nestled just 3' west of a slender isosceles triangle of 11th- and 12th-magnitude stars.

Since IC 5217 shines only at magnitude 11.3 and measures just 7 arc-seconds across, an eyepiece switch will be needed to pick it out once its field is centered in view. Through my 6-inch Schmidt-Cassegrain telescope at 96x, the planetary was disguised as a star-like point. Increasing magnification to 240x, however, expanded the nebula's disk enough to identify it positively from the surrounding field. It appears grayish at this aperture and round. Try blinking the field with an O-III filter to enhance the nebula's disk.

The planetary nebula takes on a faint bluish tint through 12-inch and larger telescopes. But there is little hope of seeing the central star since it shines at magnitude 15.5. In fact, the central star remains unseen through even the largest amateur telescopes because of the nebula's brightness. At magnifications around 400x or higher, those same instruments, however, hint at this planetary's bipolar structure. Some describe it as a Figure 8.

Sketch of IC 5217 as seen through the author's 6-inch (15-cm) Schmidt-Cassegrain at 240x.

IC 5127 is nicknamed the Little Saturn Nebula owing to its resemblance to the Saturn Nebula (NGC 7009) in Aquarius, when viewed through the largest backyard instruments and crazy high magnification. With steady seeing and viewing it at over 700x, observers have mentioned that the elliptical inner disk is surrounded by fainter extensions that are reminiscent of Saturn's rings, hence the nickname. (Although NGC 6886 in Sagitta is also sometimes given the same nickname.)

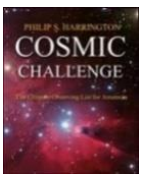
In his post of 16 August 2018, Iain Petrie (CN'er iainp) from St Neots, Cambridgeshire, UK, remarked that IC 5217 "seemed very small to me, and it took 900 magnification to see its elongation and the difference between the brighter core and the fainter shell." Photographs reveal a bright equatorial ring and fainter bipolar lobes that extend north and south. Take a look at his very impressive sketch below!

Magnificent sketch of IC 5217 as seen through Iain Petrie's (CN'er iainp) 20-inch (51-cm) reflector at 900x.

Finally, for those interested in the astrophysical aspects of this month's challenge, I would recommend reading IC 5217 as a Double-Shell, Point-Symmetric Planetary Nebula with a Very Narrow Waist by L. F. Miranda, S. Ayala, R. Vázquez, and P. F. Guillén. 2006. *Astronomy and Astrophysics* 456:591–597.

Good luck with this month's challenge! And be sure to post your results in this column's discussion forum (https://www.cloudynights.com/articles/cat/column/phil-harrington-s/cosmic-challenge-ic-5217-the-little-saturn-nebula-r3354).

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, including Cosmic Challenge: The Ultimate Observing List for Amateurs. Visit his website at www.philharrington.net to learn more.

Edited & formatted by Loretta J Cannon, Science Writer-Editor.

Dave Mitsky's Celestial Calendar

All times, unless otherwise noted, are UT (subtract 7 hours and, when appropriate, 1 calendar day for MDT)

9/3 The Lunar X, also known as the Werner or Purbach Cross, an X-shaped clair-obscur illumination effect involving various ridges and crater rims located between the craters La Caille, Blanchinus, and Purbach, is predicted to be visible at 7:11; First Quarter Moon occurs at 18:08
9/4 Venus is at perihelion today
9/5 Venus is 0.8 degrees north of the first-magnitude star Regulus (Alpha Leonis) at 1:00
9/7 Mars is 4.3 degrees north of the first-magnitude star Aldebaran (Alpha Tauri) at 12:00; asteroid 3 Juno (magnitude +7.8) is at opposition in Aquarius at 17:00; the Moon is at perigee, subtending 32' 47" from a distance of 364,494 kilometers (226,485 miles), at 18:19
9/8 The Moon is 4 degrees south of Saturn at 11:00
9/9 Mercury is stationary at 20:00
9/10 Full Moon (known as the Barley, Corn, or Fruit Moon, and this year's Harvest Moon) occurs at 9:59; the Moon is 3 degrees south of Neptune at 19:00
9/11 The Moon is 1.8 degrees south of Jupiter at 15:00
9/13 Mercury is at its greatest heliocentric latitude south today
9/14 The Moon is 0.8 degrees north of Uranus, with an occultation taking place in northwestern Alaska, the northernmost portion of Canada, Greenland, most of Russia, portions of the Middle East, Europe, and most of northern Africa, at 23:00
9/16 Neptune is at opposition at 23:00
9/17 The Moon is 4 degrees north of Mars at 2:00; Last Quarter Moon occurs at 21:52
9/19 The Curtiss Cross, an X-shaped illumination effect located between the craters Parry and Gambart, is predicted to be visible at 6:45; the Moon is at apogee, subtending 29' 32" from a distance of 404,555 kilometers (251,379 miles), at 14:43
9/20 The Moon is 1.9 degrees south of the first magnitude star Pollux (Beta Geminorum) at 8:00
9/23 The northern hemisphere autumnal equinox occurs at 1:04; Mercury reaches inferior conjunction at 7:00
9/25 New Moon (lunation 1234) occurs at 21:54
9/26 Venus is at its greatest heliocentric latitude north today; Jupiter (magnitude -2.9, angular diameter 49.8") is at opposition at 20:00

Happy Birthdays in September

I looked these up for you. I encourage you to 'google' these folks for their contributions to astronomy. *-your Editor*

Sept 7th	James Van Allen (1914-2006)	Sept 10th	Stamatios 'Tom' Krimigis (1938 - now)
Sept 15th	James W Christy (1938 - now)	Sept 18th	Leon Foucault (1819-1868)
Sept 18th	William S Eichelberger (1865-1951)	Sept 22nd	Saul Perlmutter (1959 - now)
Sept 24th	Charlotte Moore Sitterly (1898-1990)	Sept 25th	Ole Romer (1644-1710)

On this date in history . . .

Sept 1, 1804: Karl Harding discovered asteroid 3 Juno.

Sept 7, 1746: Jean-Dominique Maraldi discovered the globular cluster M15.

Sept 9, 1892: E. E. Barnard discovered Jupiter's fifth satellite, fourteenth-magnitude Amalthea, using the 36-inch refractor at the Lick Observatory.

Sept 11, 1746: Jean-Dominique Maraldi discovered the globular cluster M2.

Sept 12, 1784: William Herschel discovered the barred spiral galaxy NGC 7753.

Sept 13, 1850: John Russell Hind discovered the asteroid 12 Victoria.

Sept 14, 1751: Nicolas-Louis de Lacaille discovered NGC 104 (47 Tucanae), the second largest and brightest globular cluster.

Sept 17, 1789: William Herschel discovered the Saturnian satellite Mimas.

Sept 19, 1848: William Bond discovered Saturn's fourteenth-magnitude satellite Hyperion, the first irregular moon to be discovered.

Sept 23, 1846: Johann Gottfried Galle discovered Neptune by using Urbain Le Verrier's calculations of its position.

Sept 27, 1793: Comet C/1793 S2 (Messier) was discovered by Charles Messier.

The Sun, the Moon, & the Planets

The **Sun** is located in Leo on September 1st. It enters Virgo on September 16th. The Sun crosses the celestial equator from north to south at 1:04 UT on September 23rd, the date of the northern hemisphere autumnal equinox.

The **Moon** is 4.5 days old, is illuminated 20.2%, subtends 31.3 arc minutes, and is located in Virgo on September 1st at 00:00 UT. The Moon is at its greatest northern declination on September 19th (+27.3 degrees) and its greatest southern declination on September 6th (-27.1 degrees). Longitudinal libration is at a maximum of +6.4 degrees on September 13th and a minimum of -5.3 degrees on September 1st and -4.5 degrees on September 27th. Latitudinal libration is at a maximum of +6.6 degrees on September 8th and a minimum of -6.7 degrees on September 22nd. Favorable librations for the following lunar features occur on the indicated dates: Crater Byrd on September 8th, Crater Cusanus on September 9th, Mare Humboldtianum on September 10th, and Crater Bailly on September 22nd. Full Moon occurs on September 10th. New Moon (i.e., the dark of the Moon) occurs on September 25th. The Moon passes near the first-magnitude star Antares (Alpha Scorpii) at 17:00 on September 3rd, the bright open cluster M45 (the Pleiades or Subaru) in Taurus at 22:00 on September 15th, the first-magnitude star Aldebaran (Alpha Tauri) at 16:00 on September 16th, the bright open cluster M35 in Gemini at 13:00 on September 18th, the first-magnitude star Castor (Alpha Geminorum) at 3:00 on September 20th, the first-magnitude star Pollux (Beta Geminorum) at 8:00 on September 20th, the bright open cluster M44 (the Beehive Cluster or Praesepe) in Cancer at 13:00 on September 21st, the first-magnitude star Regulus (Alpha Leonis) at 9:00 on September 23rd, the first-magnitude star Spica (Alpha Virginis) at 14:00 on September 27th, and the first-magnitude star Antares (Alpha Scorpii) again at 23:00 on September 30th.

DETAILS for the Planets are *missing* from Dave Mitskey's September 2022 Celestial Calendar

During the month of September, **Jupiter and Neptune** are located in the east, **Saturn** is located in the southeast, and **Mercury** is located in the west, in the evening. At midnight, **Mars and Uranus** can be found in the east, **Jupiter** in the southeast, and **Saturn and Neptune** in the south. **Venus** is in the east, **Mars** is in the south, **Uranus** is in the southwest, and **Jupiter and Neptune** are in the west in the morning sky.

Brightness, apparent size, illumination, distance from the Earth in astronomical units, and location data for the planets and Pluto on September 1st: Mercury (magnitude +0.3, 7.8", 46% illuminated, 0.86 a.u., Virgo), Venus (magnitude -3.9., 10.1", 97% illuminated, 1.66 a.u., Virgo), Mars (magnitude -0.1, 9.8", 85% illuminated, 0.96 a.u., Leo), Jupiter (magnitude -2.9, 48.7", 100% illuminated, 4.05 a.u., Capricornus), Saturn (magnitude +0.3, 18.7", 100% illuminated, 8.90 a.u., Capricornus), Uranus (magnitude +5.7, 3.7", 100% illuminated, 19.10 a.u. on September 16th, Aries), Neptune (magnitude +7.8, 2.4", 100% illuminated, 28.91 a.u. on September 16th, Aquarius), and Pluto (magnitude +14.3, 0.1", 100% illuminated, 33.62 a.u. on September 16th, Sagittarius).

For more on the planets and how to locate them, browse Naked Planets.

Information on passes of the ISS, the USAF's X-37B, the HST, Starlink, and other satellites can be found at Heavens Above.

The **zodiacal light**, or the false dawn, is visible about two hours before sunrise from a dark site for two weeks beginning on September 23rd. It can be seen in Leo, Cancer, Gemini, and Taurus. Articles on the zodiacal light appear at http://www.atoptics....ighsky/zod1.htm and http://oneminuteastr...zodiacal-light/.

The famous **eclipsing variable star Algol (Beta Persei)** is at a minimum, decreasing in brightness from magnitude +2.1 to magnitude +3.4, on September 2nd, 5th, 8th, 11th, 14th, 17th, 20th, 22nd, 25th, and 28th.
Consult https://skyandtelesc...inima-of-algol/ or page 50 of the September 2022 issue of Sky & Telescope for the minima times. On the morning of September 15th, Algol shines at minimum brightness (magnitude +3.4) for approximately two

hours centered at 12:42 a.m. EDT (4:42 UT September 15th). It does the same at 9:31 p.m. EDT (1:31 UT September 18th) on the night of September 17th.

Eighty binary and multiple stars for September: 12 Aquarii, Struve 2809, Struve 2838 (Aquarius); Alpha Capricorni, Sigma Capricorni, Nu Capricorni, Beta Capricorni, Pi Capricorni, Rho Capricorni, Omicron Capricorni, h2973, h2975, Struve 2699, h2995, 24 Capricorni, Xi Capricorni, Epsilon Capricorni, 41 Capricorni, h3065 (Capricornus); Kappa Cephei, Struve 2751, Beta Cephei, Struve 2816, Struve 2819, Struve 2836, Otto Struve 451, Struve 2840, Struve 2873 (Cepheus); Otto Struve 394, 26 Cygni, h1470, h1471, Omicron Cygni, Struve 2657, 29 Cygni, 49 Cygni, 52 Cygni, 59 Cygni, 60 Cygni, 61 Cygni, Struve 2762 (Cygnus); Struve 2665, Struve 2673, Struve 2679, Kappa Delphini, Struve 2715, Struve 2718, Struve 2721, Struve 2722, Struve 2725 (in the same field as Gamma Delphini), Gamma Delphini, 13 Delphini, Struve 2730, 16 Delphini, Struve 2735, Struve 2736, Struve 2738 (Delphinus); 65 Draconis, Struve 2640 (Draco); Epsilon Equulei, Lambda Equulei, Struve 2765, Struve 2786, Struve 2793 (Equuleus); 1 Pegasi, Struve 2797, h1647, Struve 2804, Struve 3112, 3 Pegasi, 4 Pegasi, Kappa Pegasi, h947, Struve 2841, Struve 2848 (Pegasus); h1462, Struve 2653, Burnham 441, Struve 2655, Struve 2769 (Vulpecula)

Notable **carbon star** for September: LW Cygni

Fifty deep-sky objects for September: M2, M72, M73, NGC 7009 (Aquarius); M30, NGC 6903, NGC 6907 (Capricornus); B150, B169, B170, IC 1396, NGC 6939, NGC 6946, NGC 6951, NGC 7023, NGC 7160, NGC 7142 (Cepheus); B343, B361, Ba6, Be87, Cr 421, Do9, IC 4996, M29, M39, NGC 6866, NGC 6871, NGC 6888, NGC 6894, NGC 6910, NGC 6960, NGC 6992, NGC 6994, NGC 6995, NGC 7000, NGC 7008, NGC 7026, NGC 7027, NGC 7039, NGC 7048, NGC 7063, NGC 7086 (Cygnus); NGC 6891, NGC 6905, NGC 6934, NGC 7006 (Delphinus); NGC 7015 (Equuleus); M15 (Pegasus); NGC 6940 (Vulpecula)

Top ten binocular deep-sky objects for September: IC 1396, LDN 906, M2, M15, M29, M30, M39, NGC 6939, NGC 6871, NGC 7000

Top ten deep-sky objects for September: IC 1396, M2, M15, M30, NGC 6888, NGC 6946, NGC 6960, NGC 6992, NGC 7000, NGC 7009

Challenge deep-sky object for September: Abell 78 (Cygnus)

The objects listed above are located between 20:00 and 22:00 hours of right ascension.

Please access the Cloudy Nights site for many more details from Dave Mitsky.
https://www.cloudynights.com/topic/839359-september-2022-celestial-calendar/

Author Phil Harrington offers an excellent freeware planetarium program for binocular observers known as TUBA (Touring the Universe through Binoculars Atlas) at http://www.philharrington.net/tuba.htm

Free star charts for the month can be downloaded at http://www.skymaps.com/downloads.html and https://www.telescop...thly-Star-Chart and http://whatsouttonight.com/

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Dear Readers,

Hello Magic Valley Stargazers – this is the second month that I've been asked to prepare your newsletter. I am happy to share what I've done for the Boise Astronomical Society with you fine folks. There's a feature you may wish to consider – our AL-Cor highlights two Observation Challenges each month from the Astronomical League site.

The Sky & Telescope site for September has some really fun (and well-written) articles. On the main page, you'll find "This Week's Sky at a Glance" and the Sky Tour podcast for September, "Harvest Moon and More". The monthly feature article by Bob King is about "Vega, the Star at the Center of Everything", which is the fifth brightest star in the night sky and will be overhead for much of September.

SKY&TELESCOPE
THE ESSENTIAL GUIDE TO ASTRONOMY
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There's an encouraging article by journalist *and* amateur astronomer Jennifer Willis, "Stellar Confidence: On Imposter Syndrome in Amateur Astronomy", in which she describes her personal journey of frustration and discouragement using an inexpensive, 'hobby killer' telescope. But this story has a happy ending – a happy ending full of hope and awe! I felt encouraged by reading it myself.

HOW TO DETERMINE IF AN ONLINE ARTICLE IS 'GOOD SCIENCE'

Most online articles, like the ones I recommend above from *Sky & Telescope*, include links to other articles available online. But did you know that those very links are your best evidence for determining if the article you're reading is either (a) good science reporting or (b) commercially self-serving and self-promoting for a particular site brand?

Let's examine an article from *Sky & Telescope* first: "Vega, the Star at the Center of Everything". There are some 17 embedded links in this professionally-written, feature-length article. Of those 17 links, only two are for other *Sky & Telescope* articles; the majority of the remainder are from other reputable sites, e.g., Merriam-Webster, StarryNightEducation, WebbTelescope.org, naic.edu, CloudyNights. There's only one wiki link.

Now let's look at an article that 'should' be good science, an article from *Scientific American*'s site: "Where are the 'hotspots' for Europa's Purported Plumes". Your first clue is actually the author, listed as Nola Taylor Tillman with SPACE.com, a commercial science news site with ads in their articles. The second clue is the width of the article on your screen. While the *S&T* article takes up more than half of the screen, with images covering up to ¾ of the screen, the SciAmer article and illustrations cover just less than half the screen and has pop-ups. But if we look at the embedded links, there's the proof in the pudding (as grandma used to say). Of the 11 links, ***all*** of them refer to another Space.com article, even for details on the Europa Clipper! The folks at Space.com don't want you going *off site* for anything, off site and away from the advertisers. Just saying . . .

ARTEMIS I – LAUNCH DELAYED TWICE

If you're like me, you were disappointed to see the launch of Artemis I delayed twice, on August 29th and again on September 3rd. The second delay was due to a liquid hydrogen leak, but as of September 8th the NASA engineers were making progress. If all goes well, there are two upcoming potential launch windows on September 23rd and September 27th. You can even listen to the NASA media teleconference from Sept 8th on YouTube (note: it's an hour long).
If you registered for Launch Party activities, you received the following with your email on Sept 3rd:

-- Looking for an introduction to #Artemis? Check out our Google Arts & Culture story.
-- Hear from NASA's Exploration Mission Planning Chief Nujoud Merancy on the latest episode of Houston, We Have a Podcast.
-- Find the latest at the Artemis Mission Blog.

You can still Register for the Launch Event to receive all upcoming updates.

NASA EDUCATION – A LESSON for EVERY DAY of the SCHOOL YEAR

The good folks at NASA Education have compiled 180 lessons in their online catalog for Earth and Space science. And these are *standards-aligned* lesson plans! But wait, that's not all. They've coordinated their lessons with a monthly calendar of upcoming NASA events. Whether you're a teacher or a parent (or a student), there is a wealth of learning here for free.

And speaking of Europa (see p. 6 above), on September 29th, the *Juno* spacecraft will make its closest pass so far by this ocean moon. NASA shares a link to this Teaching Space with NASA talk on YouTube that includes planetary geologist Cynthia Phillips. Be sure to Subscribe to the 'NASAJPL Edu' channel.

NOT-QUITE EASTER EGGS in PROF JACKSON's ARTICLES

I don't know if many of you have noticed that Prof Jackson embeds Easter-egg like puns into his articles, in the article title and/or the section headers. This month, he has made a play on song titles. Can you figure out which other songs are being alluded to in the section headers? (Answers are on the bottom of this page.) I will do my best to include this in future issue of *SkyWatcher*.

Loretta

The End

"I Want to Know What Love Is" by Foreigner (1984), "The Power of Love" by Huey Lewis & the News (1985), and "Money for Nothing" by Dire Straits (1985).

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 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.) set up at your location. All of our outreach programs are provided by MVAS volunteers at no cost. However, MVAS will gladly accept donations, which enable us to continue to 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 are just a few of the programs that your membership dues support.

Annual Membership dues are:
$20.00 for individuals or 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.

Lending Telescopes: The society currently has three telescopes for loan and would gladly accept others. Please contact President Gary Leavitt, 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.