

Astronomy Club of Lompoc Presents The Sidereal Times



M33 (see page 5)

Meeting News:

At the November Club meeting we voted in the new ACL Club officers for operating year 2023 and added a Secretary position that will be filled by Kate Black. Also discussed some astronomical events forecast for the near future.

Reminder: ACL club meeting December 9th 7:00 PM
At Manzanita School Teachers lounge. Mask!



Lunar Calendar

New Moon 23rd
Full Moon 8th



Presidents Message



Thank you for five productive years together while I was President of ACL. Across our months together, we expanded our membership and, when it shrunk back under the Covid pandemic, we stuck together via Zoom meetings. We even flourished in the pandemic's latter days, gaining enthusiastic new members. We developed a friendship with Dr. Joe Bassi, who brought us several lively and educational programs. We hosted Dave Gibbs of the Central Coast Astronomical Society who gave us amazing insight into the extent of light pollution and its impacts in our world. We coordinated with JPL to host an incredible presentation by two of their young women engineers at the Lompoc Public Library on the eve of Mars InSight, Vandenberg's first interplanetary mission. We assisted ACL member and astronomy professor Vince Tobin in the operation of the portable planetarium at Hancock College's Friday Night Science Celebration. We expanded our outreach to our area, particularly its youth, through participation in school programs, Los Flores Ranch Star Nights, community activities at Vandenberg Space Force Base, and the Lompoc Old Town Market. We renamed ourselves and combined our ideas with April Johnson to create an impressive logo, which led to eye-catching buttons, spiffy mugs, and cool new t-shirts.

I used "we" throughout this "farewell message" as we are its subject, not me. *We together* wrote that list of achievements above. Thank you, each of you, for your friendship, ideas, and support, and for letting me now take a break, thus giving ACL opportunities that come with fresh leadership, the guidance of our new President, Jana Hunking. Thank you, Jana, for agreeing to become President and for giving your invaluable assistance as VP and friend. Thank you, Katharine Black, our new Secretary; you will be a great aide to Jana and all of us through your work. As for me, all of you will still have to look at my mug as I sit beside Jana at our meetings, being your Vice President. Sorry about that!

Lastly, a huge thank you to Vahan Yeterian for our newsletter; and for mentoring me, from the day you and I first became friends, into a better understanding of and love for the wonders to be explored in the celestial dome... to say nothing of your patience, waiting for my monthly President's Message to arrive in your email.

Skyward across 2023,
Tom

Events

December 17, 23 & 31 -*Star Party at the Observatory*



Yea!

December 8th Mars at opposition and will be at its closest approach to Earth and will be brighter than any other time of year. It will be visible all night long. This is the best time to view or photograph the red planet.

December 13 & 14 Geminids Meteor shower is the king of Meteor showers producing up to 120 meteors per hour. It is produced by debris left behind by Asteroid known as 3200 Phaethon. It peaks this year on the night of the 13th and the morning of the 14th. Meteors will radiate from the Constellation of Gemini but can appear anywhere in the sky.

December 21st December solstice occurs at 21:40 UTC. The South pole of the Earth will be tilted toward the Sun which will have reached its South most position in the sky and will be directly over the tropic of Capricorn at 23:44° South Latitude. This is the first day of Winter in the Northern Hemisphere (Winter Solstice) and the first day of Summer in the Southern Hemisphere (Summer Solstice).

December 21st Mercury at greatest Eastern elongation. The planet reaches greatest eastern elongation of 20.1° from the Sun. This is the best time to view or photograph Mercury since it will be at its highest point in the evening sky. Look low in the Western sky just after sunset.

December 21 & 22 Ursids Meteor Shower is a minor shower producing about 10 meteors per hour. It is produced by dust grains left behind by comet Tuttle. It peaks this year on the night of the 21st and morning of the 22nd. Meteors will radiate from the constellation of Ursa Minor but can appear anywhere In the sky.



Star party's and Events

November 15, 23 & 30 Star Party at the Observatory
Cancelled due to weather.



Nuts!



Merry Christmas



December 2022 Moon



Full 8th, New 23rd, Last Quarter 16th, First Quarter 30th .

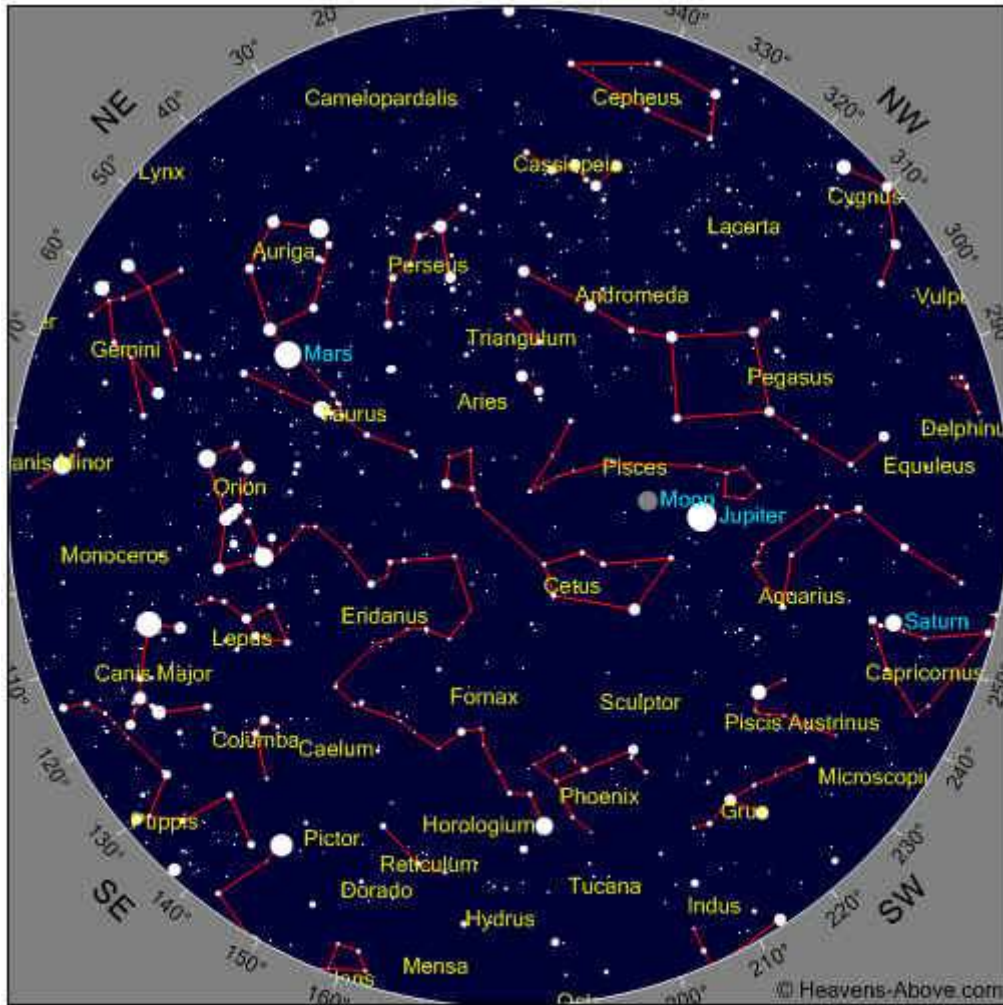
Moon Facts and folk lore

The Moon is the fifth largest natural satellite in the Solar System. At 3,475 km (2160 miles) in diameter. Earth is about 80 times the volume than the Moon, but both are about the same age.

After World War 2 rumors circulated that German astronauts had traveled to the Moon and established a top-secret facility there. Some even speculated that Adolf Hitler faked his own death, fled the planet and lived out the rest of his days in an underground lunar hideout.



December 2022 Sky
Some Objects of interest, M42, Jupiter, M31, Moon, Mars



Time

Year	2022	Month	12	Day	2	Hour	21	Minute	30
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Courtesy Gary Satterfield



M33 NGC 598 Triangulum galaxy is approximately 2.723 million light years distant and contains approximately 40 billion stars. It is the 3rd largest galaxy of the local group of galaxies behind the Milky Way and Andromeda galaxies. It is the most distant permanent object (galaxy) that can be viewed with the naked eye. It is the smallest spiral galaxy of the local group and is believed to be a satellite of the Andromeda galaxy due to their interaction, velocities, and proximity to one another. It also has an H-II nucleus a diameter of 60,000 light years and is roughly 40% the size of the Milky Way galaxy. A comparison of star population exhibits about 40 billion stars compared to the Milky Way 400 billion and the Andromeda galaxy's 1 trillion stars. The combined mass of all baryonic matter in the galaxy may be 10 to the 10th solar masses. In 2006 a group of astronomers announced the discovery of an eclipsing binary star in the galaxy. The Triangulum galaxy is a source of Water Maser emissions. Observation of two water masers on opposite sides of M33 researchers, for the first time, were able to estimate the angular rotation and proper motion of the galaxy. A velocity of 190 ± 60 kilometers per second relative to the Milky Way was computed which means that Triangulum is moving toward the Andromeda galaxy. Evidence was found around a clumpy stream of hydrogen gas linking Andromeda with Triangulum that suggests that the two may have tidally interacted in the past. A distance of less than 300 kiloparsecs between the two supports this hypothesis. Star formation is taking place at a rate that is strongly correlated with the local gas density and rate per unit area. Image capture by an AT65EDO scope w/modded Canon 500D on a Hypertuned CGEM mount and ImagesPlus Camera Control guiding with a mini Borg50 & SBIG ST-I mono using PHD2. The CGEM is controlled with NexRemote and a wireless Logitech Rumble Pad. Image data: 29 x 600 sec frames @ ISO 200. Bias, Flats and Darks x24ea. 97.385% processing with PixInsight. Touch ups in Adobe Lightroom.



For What its Worth

Mare, plural **maria**, any flat, dark plain of lower elevation on the Moon. The term, which in Latin means “sea,” was erroneously applied to such features by telescopic observers of the 17th century. In actuality, maria are huge basins containing lava flows marked by craters, ridges, faults, and straight and meandering valleys called **rilles** and are devoid of water. There are about 20 major areas of this type, most of them—including the largest ones—located on the side of the Moon that always faces Earth. Maria are the largest topographic features on the Moon and can be seen from Earth with the unaided eye. (Together with the bright lunar highlands, they form the face of the “man in the moon.”)

Samples of lunar rock and soil brought back by Apollo astronauts proved that the maria are composed of basalt formed from surface lava flows that later congealed. The surface, down to approximately 5 metres (16 feet), shows effects of churning, fusing, and fragmenting as a result of several billion years of bombardment by small meteoroids. This debris layer, **comprising** rock fragments of all sizes down to fine dust, is called regolith. Before the first unmanned spacecraft landings on the Moon in the 1960s, some astronomers feared that the surface would be so pulverized that the machines might sink in. These missions—and the manned landings that followed—revealed that the regolith was only somewhat compressible and was firm enough to be supportive.

The maria basins were formed beginning about 3.9 billion years ago during a period of intense bombardment by asteroid-sized bodies. This was well after the lunar crust had cooled and solidified enough, following the Moon’s formation, to retain large impact scars. Then, over a period lasting until perhaps three billion years ago, a long sequence of volcanic events flooded the giant basins and surrounding low-lying areas with magma originating hundreds of kilometers within the interior. Although the recognized giant impact basins are distributed similarly on the near and far sides of the Moon, most of the far-side basins were never flooded with lava to form maria. The reason remains to be clarified, but it may be related to an asymmetry of the Moon’s crust, which appears to be about twice as thick on the far side as on the near side and thus less likely to have been completely ruptured by large impacts. Most of the maria are associated with mascons, regions of particularly dense lava that create **anomalies** in the Moon’s gravitational field.

Multiringed basin, any of a class of geologic features that have been observed on various planets and satellites in the solar system. A multi ringed basin typically resembles a bull’s-eye and may cover an area of many thousands of square kilometers. The outer rings of the basins are cliff like scarps that face inward. Because of the gradation of smaller examples into ordinary craters and because of the apparent ejecta-blanket patterns of radially striated terrain surrounding them, multi ringed basins are believed to be giant impact features. The rings probably were formed as part of the crater-forming process during impact, although some hypotheses suggest that they were formed, or were enhanced, by post-impact collapse. Transitional structures between bowl-shaped craters and multi ringed basins include craters with central peaks and larger craters with central rings of peaks. Partly owing to the unfortunate placement, relative to the Moon’s visible face, of the most prominent lunar examples, multi ringed basins were only slowly recognized as coherent geologic features by geologists and astronomers.

Crater, circular depression in the surface of a planetary body. Most craters are the result of impacts of meteorites or of volcanic explosions. Meteorites craters are more common on the Moon and Mars and on other planets and natural satellites than on Earth, because most meteorites either burn up in Earth’s atmosphere before reaching its surface or erosion soon obscures the impact site. Craters made by exploding volcanoes (e.g., Crater Lake, Oregon) are more common on Earth than on the Moon, Mars, or Jupiter’s moon Io, where they have also been identified.



Astronomy Club Officers



President
Tom Gerald

Vice President &
Treasurer
Jana Hunking

ACL Support Personnel

ACL News Letter Editor
Serf / Minion Vahan Yeterian



ACL Webmaster
Serf / Minion Aaron Anderson
(New Zealand)



Club Meeting

Reminder Club meeting December 9th 7:00 Pm. Manzanita School Teachers Lounge. Mask!

Star Parties (as always weather permitting)

Other Astronomy Club Meetings

Central Coast Astronomical Society

Link to web site...

<http://www.centralcoastastronomy.org/>

Santa Barbara Astronomical Unit

Link to web site...

[http:// www.sbau.org/#AU_EVENTS_Calendar](http://www.sbau.org/#AU_EVENTS_Calendar)

*“Astronomy compels the soul to look upward,
and leads us from this world to another”.*
(Plato)

MERRY CHRISTMAS

ACL Club Logo

