VILLAGES STAR

Newsletter of The Villages Astronomy Club

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Club Website:
http://vlgastroclub.org/

Facebook:
https://www.facebook.com/groups/vlgastroclub/

Club Officers & Assistants

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Vice President	Mark Graybill
Secretary/Historian	Burt Salk
Treasurer	Linda Meng

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FROM THE EYEPIECE

Our club's continued activities through this time have drawn the interest of our local media. We have not only had multiple articles in The Villages Daily Sun, but an article on us in in the works for Ocala Style magazine.

Also, we have been selected for a special presentation by the astronomy department at Embry Riddle Aeronautical University. The University's academic program includes astronomy as a primary course of study, issuing degrees in astronomy. They have many resources for their students, and they are excited to be able to share these resources with us as part of their community outreach. It's an exciting opportunity!

Mark Graybill
Vice President

APRIL NEWS

This month's presentation will be "The Chemical Evolution of Life on Earth--and Beyond" by Pauline Schwartz. Join us at the April meeting on the 20th at 7pm via Zoom:

https://us02web.zoom.us/j/87149101944
Our next executive board meeting will be on May 6th at 8:30am at the Laurel Manor recreation center (usually the Washington or Jefferson room, ask for the Astronomy Club at the desk.) We invite club members to attend!

Our third Telescope Workshop will be on April 6th at 7pm. The meeting will be a round table Q&A session. The meeting will be via Zoom at the following link:

https://us02web.zoom.us/j/81794411117

This month's Executive Board Meeting featured a photo shoot of members with their telescopes for Ocala Style magazine.

Observation Reports

Please send your observation reports for publication in the newsletter! They do not need to be anything formal, simply your personal impressions, whether with a telescope, binoculars, or just your eyes.

IN THE SKY THIS MONTH

The Moon

Last Quarter: 04 April, 6:02am
New Moon: 11 April, 10:31pm
Apogee (farthest point from Earth): 14 April, 1:46pm, distance 252,351 miles.
First Quarter: 20 April, 2:59am
Full Moon: 26 April, 11:32pm
Perigee (closest point to Earth): 27 April, 11:22am, distance 222,064 miles.

Use the Moon to identify constellations and nearby bright stars:
6th: The Moon is near Saturn in Sagittarius.
7th: The Moon is near Jupiter.
9th: The Moon is 4 deg south of Neptune.
13th: The Moon 2 deg south of Uranus..
17th: The Moon passes 0.1 deg from Mars.

Sky Highlights

The Lyrid Meteor Shower peaks on the 21st-22nd this month, with the best views being after midnight. The evenings both before and after will also be good nights to watch for meteors, as the shower begins on the 15th and continues through the 27th, with the three central nights of the shower having reasonably high rates of meteors.

The Lyrids do not produce a lot of meteors. Rather, they are known for bright fireballs with long tails. The Lyrids will appear to come from the northeast, where the constellation Lyra the Harp is low on the horizon. They will trail out in all directions from that point. The darkest time will be after the Moon sets, about an hour before sunrise, making this year's Lyrids a good show for early risers.

AN ANCIENT CELESTIAL COMPUTER

by Kenneth S. Katta, LtCol, USAF(Retired)

The field of archaeoastronomy continues to produce artifacts which bring into question what mainstream archaeologists and astronomers have considered the knowledge of astronomy by ancient civilizations. A reexamination of a mechanism that was originally discovered in 1900 has caused ripples in the archeology, astronomy and astrophysics worlds. I am referring to what is now referred to as the Antikythera Mechanism. This artifact was originally retrieved from the sea in 1901 in corroded bronze condition from a Roman cargo ship that was believed to have sunk in the first century B.C. near an island called Antikythera located at the edge of the Aegean Sea. It was sent to the National Archaeological Museum in Athens, Greece. In 1902 researchers examining pieces noticed Greek writing and intermeshed gears. Initially early investigators assumed the Antikythera mechanism was some sort of clock, calculating device, or navigational instrument of Greek origin. There were many questions including what such a device was doing on a 2000 year old ship. What was its purpose, and who could have constructed such a complex device a millennium before such geared devices were commonplace? These questions remained unanswered for more than 50 years until in the 1950s a Yale University English physicist named Derek J. de Solla Price carefully studied the fragments of the mechanism.

Using radiograph X-ray imaging, Price examined the subtle details of the devices two main gears and other gears. Consulting with a mathematician, Otto Neugebauer, Price identified the gears relating to the cycles of the Moon. The ancient Greeks used the phases of the Moon to set their calendars. This lunar cycle served as the

basis for many religious and ceremonial events. The Sun was used to determine the calendar year. However, the Moon's synodic cycle from one Full Moon to the next being 29.5 days played the major role in setting calendars for marking festivals and religious ceremonies.

Price also determined that some of the gears appeared to match up with the 235 month (19 year) Metonic lunar cycle of synodic months. This cycle dates back hundreds of years before the rise of Greek culture when Babylonian astronomers realized the same phases of the Moon will reoccur on the same dates of the solar year against the same background of stars once every 19 years. This was used to keep the lunar calendar in sync with the solar year. Price determined the device's gears could have been used to precisely track the Metonic cycle. Due to Price's and Neugebauer's examination of the device's gears, it was determined that the Antikythera mechanism was likely used to track the phases and the orbit of the Moon. Remember, Isaac Newton was reported to have said that calculating the motion of the Moon was the only thing that gave him a headache. Imagine if he had had access to this device!

Price also speculated that the front dial of the device tracked the movement of the Sun. There was also observations that there were moving pointers on the device dedicated to the five visible planets known to the ancients which would make the device a possible orrery or planetarium. The action of a simple hand crank would cause all interlocked gears within the mechanism to rotate producing a simultaneous calculation of the position of the Sun and Moon, the Moon phase, eclipse, calendar cycles and possibly the location of the 5 then known planets.

The prediction of both lunar and solar eclipses to the ancients had power and meaning. Babylonian astronomers had discovered that both lunar and solar eclipses occur in a repeating 18 year pattern. The Saros cycle of eclipses which occurs every 18 years occurs when the Sun and the Moon allign again at roughly the same time and position in the sky although where this is observed varies. But understanding this cycle was a powerful tool for presaging future eclipses. The Antikythera mechanism seemed to be an analog computer designed to perform this task! The mechanism drove a pointer that would tell the user the date and even the time of upcoming eclipses. Price, before his death in 1983, had declared the Antikythera mechanism to be the world's first analog computer predating our own computers by over 1000 years!

There is still the question of who designed the mechanism and were there other models. Having been a USAF navigator, it would be interesting to determine the mechanism's utility in celestial navigation especially over the open ocean. Such capability was unknown until better clocks were designed in the 18th century. There is some indication the mechanism was likely made around the time Posidonis, who was known to have his own orrery or planetarium. Posidonis was teaching and traveling across the Roman world. He was the successor of Hipparcus, who first constructed the magnitude scale-a system of ranking stars by their apparent brightness. This dates back to the second century B.C. This scale still serves as the basis of the stellar magnitude scales of today. The Greek and Roman world was alive with ideas, inventions and creativity. But the level of complexity in this device is astounding and makes one wonder where did the knowledge to produce such a device come from? And the fact that such a remarkable device was not copied is still a mystery. American scientific scholars were so shocked at how advanced this device is that they said it is equivalent to finding a jet plane in King Tut's Tomb!

The Antikythera Mechanism as discovered.

Reconstruction of the Antikythera Mechanism

References:

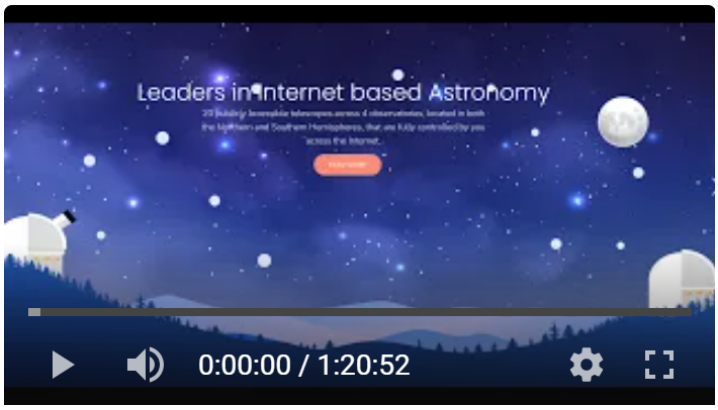
“Dissecting an Ancient Computer”, Raymond Shubinski, Astronom, March 2021, Vol 49, No. 3, pgs 40-45.

“Antikythera Mechanism”- Wikipedia, pgs 1-31,https://en.wikipedia.org/wiki/Antikythera_mechanism.

VIDEO HIGHLIGHTS

March 2021 General Meeting: ITelescope by Darrell DuBose

https://youtu.be/jdUSXwVeHjU



Why Was Spinning A Good Trick for America’s First Satellites?

https://www.youtube.com/watch?v=X_rp5slf3c4