Website: https://acl.universeii.com 2, May 2024

Astronomy Club of Lompoc
Presents
The Sidereal Times

Messier 104 (see page 5)

Meeting *News* At the April club meeting we discussed the Solar eclipse and ACL participation with local population.

Reminder: ACL club meeting Friday May 10th 7:00 Pm Manzanita School Teachers lounge.

Lunar Calendar:
New Moon 8th
Full Moon 23rd

1952 me & my home made GEM and 8" scope see page 6 Note:

Feature "Name the Object Quiz", (See Page 7)
Last months object M104 Sombrero Galaxy.

Presidents Message

If you have not already seen or read about our Astronomy Club club members that came out and helped Tom at Walmart on the **Eclipse Day,** and were on **local KSBY news that night**, and on the **Lompoc Record front Page**…. On Wed. April 10th I have the paper to show you, and/or look for that broadcast that day online. Tom, who set this up said it went very well and they were extremely busy with over 50 people, shoppers and eclipse seekers that got to look through Tom's telescope and used the 20 glasses I ordered for this event. Many hung around to view the sun more times, as many had not seen this event before. I want to thank the members for helping that day Tom, Vahan, Ebbe, Steve Ball, and our new member James Aranguren. As your President, I was very proud of our club that seemed the only group to promote this last eclipse in Lompoc!

April of 2024 was crunch time for Me to get ready for the Total Eclipse of April 8, 2024. First, I was trying to get flyers to places that would enjoy seeing the Partial Eclipse of Sun for the last time in 21 years, and that will be in Northern California! I handed out many solar glasses I bought for my friends hoping they would remember to use them and most did. Then I also had to get ready for my flight to DFW Airport to stay at my brother in law's home in the totality shadow in **Arlington**, near Dallas. I could not miss that opportunity! We went to his friend's Neighborhood Eclipse Party, which drew about 25 people, and all very excited to see this historic event. I have many fun photos of that event, which will be in the newsletter in June. It was exciting to be back in Texas, as I grew up in San Antonio from age 3-15, then went back to Phoenix Arizona where I was born. It was so green with so many trees and rivers flowing. The home in Arlington where I was staying was near the huge Dallas Cowboys stadium which we drove by a couple of times, amazed by it. Our upcoming Presentation in May will be by **James Aranguren about the Sun**….more facts that you may not have known about! Hopefully Julie Levy and Steve and Kate Medvedoff will be able to share their unique experiences seeing the Total Eclipse in different parts of Texas. Hoping for more clear nights ! Jana

Events

May 6th 15th 29th ***Star Party at the Observatory***

Yes!

May 6 &7 Eta Aquarids Meteor Shower is an above average shower capable of producing 60 meteors per hour at its peak. It is produced by dust particles left behind by Comet Halley. Meteors will radiate from the constellation Aquarius but can appear anywhere in the sky.

May 8 New Moon will be located on the same side of the Earth as the Sun and will not be visible in the night sky. This phase occurs at 03:23 UTC. This is the best time to observe faint objects such as galaxies, Nebulae and star clusters.

May 9 Mercury at greatest Western Elongation of 26.4° from the Sun and is the best time to view Mercury in the morning sky low in the Eastern sky just before sunrise.

The Moon is a spherical rocky body, probably with a small metallic core, revolving around Earth in a slightly eccentric orbit at a mean distance of about 384,000 km (238,600 miles). Its equatorial radius is 1,738 km (1,080 miles), and its shape is slightly flattened in a such a way that it bulges a little in the direction of Earth. Its mass distribution is not uniform—the centre of mass is displaced about 2 km (1.2 miles) toward Earth relative to the centre of the lunar sphere, and it also has surface mass concentrations, called mascons for short, that cause the Moon's gravitational field to increase over local areas. The Moon has no global magnetic field like that of Earth, but some of its surface rocks have remanent magnetism, which indicates one or more periods of magnetic activity in the past. The Moon presently has very slight seismic activity and little heat flow from the interior, indications that most internal activity ceased long ago.

Jupiter's familiar stripes and swirls are actually cold, windy clouds of ammonia and water, floating in an atmosphere of hydrogen and helium. Jupiter's iconic Great Red Spot is a giant storm bigger than Earth that has raged for hundreds of years.

Star party's and Events

APRIL 6, 13, 27 Star Party at the Observatory, Uugh!

About 4.6 billion years ago, a giant cloud of dust and gas known as the solar nebula collapsed in on itself and began to form what would eventually become the solar system's sun and planets. Meteorites, or pieces of space rock that have fallen to Earth, have helped scientists figure out the age of the solar system. Some of these small pieces have broken off of moons or planets and can yield interesting scientific information about the chemistry and history of their home body. Others have been traveling around the solar system since its beginning, before the planets even existed. The Allende meteorite, which fell to Earth in 1969 and scattered over Mexico, is the oldest known meteorite, at 4.55 billion years old.

The Moons surface is actually dark compared to the night sky it appears very bright with a reflectance just slightly higher than that of worn asphalt. Its gravitational influence produces the ocean tides, body tides and the slight lengthening of the day.

Times to Solar System (Earth Centered)

Object	Distance (Miles)	Light Time
Sun	93,000,000	8 min 18 sec
Moon	240,000	1.2 seconds
Mercury	48,000,000	4 min 29 sec
Venus	25,000,000	2 min 23 sec
Mars	35,000,000	3 min 13 sec
Jupiter	365,000,000	33 min
Saturn	746,000,000	1 hour 11 min
Uranus	1,600,000,000	2 hours 18 min
Neptune	2,680,000,000	4 hours
Pluto	2,660,000,000	3 hours 9 min

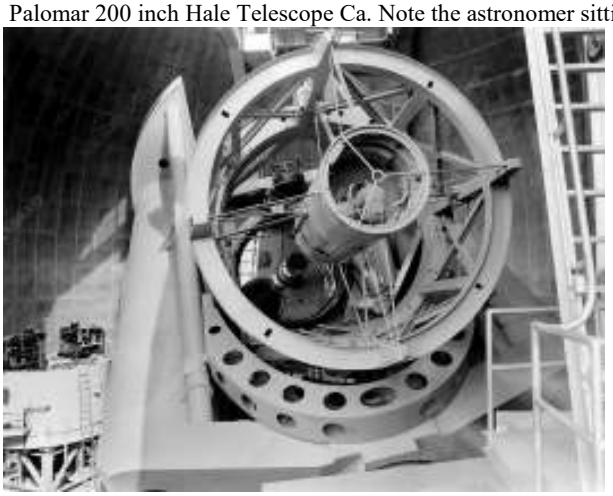
1 light second = 186,000 miles /sec
1 Light Year = 5.866 x 10^12 approx. 6 trillion miles

Note: A light year easy to visualize……
If Earth and Sun were 1 inch apart and that distance
Represents Earth Sun distance of 93,000,000 miles
Then 1 light year would be approximately a mile away.

May 2024 Moon

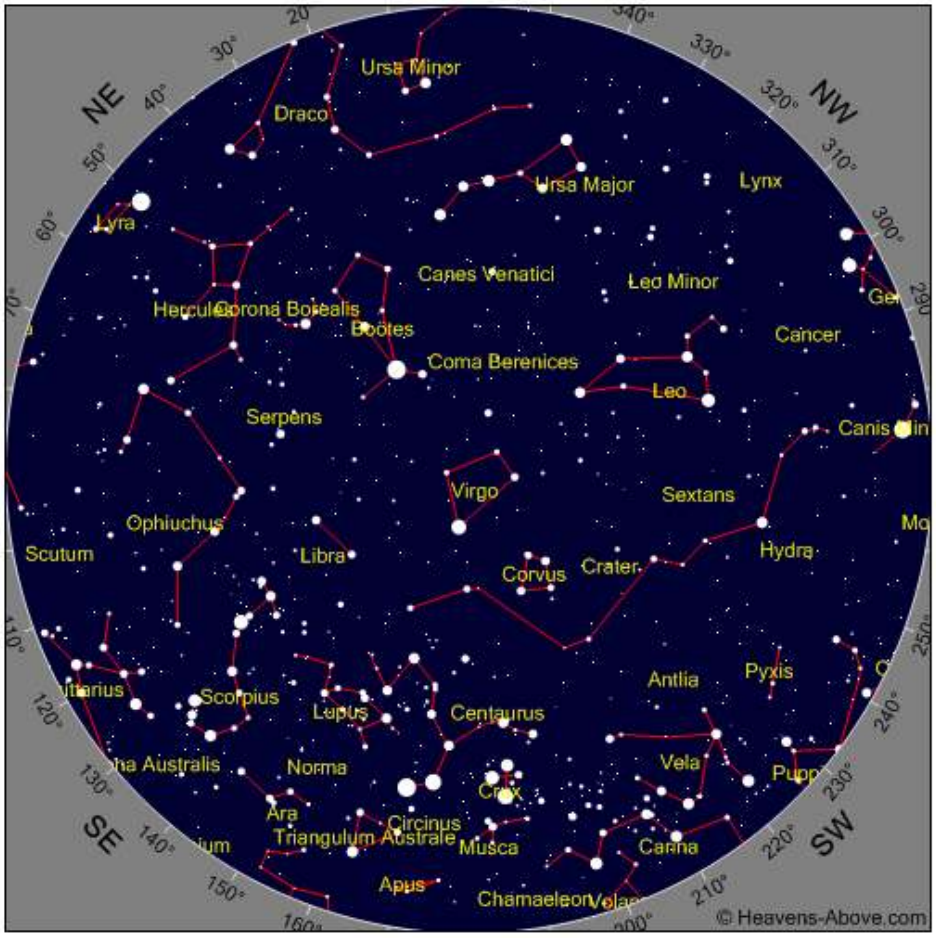
Full 23rd , New 8th , Last Quarter 1st , First Quarter 15th

The Two Photos below give one an idea of size of this instrument
Palomar 200 inch Hale Telescope Ca. Note the astronomer sitting in the Secondary housing and man on standing on floor.



May 2024 Sky

Some Objects of interest, M13



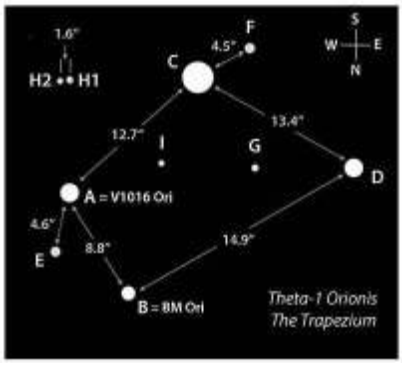
Time

Year	Month	Day	Hour	Minute
2024	5	5	22	20

100 inch Hooker telescope Mount Wilson Ca

Photo Courtesy Gary Satterfield

Messier 104 spiral galaxy known as the “Sombrero" (the Mexican Hat) because of its particular shape. It lies a distance of approximately 30 million light years. This luminous and massive galaxy has a total mass of about 800 billion suns and is noted for its dominant nuclear bulge, composed mainly of mature stars and is nearly edge-on disk composed of stars, gas and dust. The complexity of this dust is apparent directly in front of the bright nucleus but is also evident in the dark absorbing lanes throughout the disc. A large number of small diffuse objects can be seen as a swarm in the halo of M104. Most of these are globular clusters similar to those found in our own Milky Way Galaxy but M104 has a much larger number of them ranging from 1200 to 2000. This galaxy also appears to host a super massive black hole of about 1 billion solar masses, one of the most massive black holes measured in any nearby galaxy and 250 times larger than the black hole in the Milky Way. Despite having such a massive black hole at the center the galaxy is rather quiet implying that the black hole is on a very stringent diet. The galaxy is receding from us at 1024 Km/s. Its enormous recession velocity was measured at Lowell observatory in 1912 and at the time it was the largest red shift ever measured in a galaxy. Equipment AT8RC on a CGEM mount with a Canon 500D DSLR, 7 min x 36 frames at ISO 800. Darks, Flats and Bias frames. Images Plus for calibration, stacking and DDP, CS2 for final adjustments.



For What its Worth

When it comes to astronomy, you will find the term "arc second" used in three ways: (1) to express a given distance in declination on a star chart, (2) as a given unit of an astronomical object's size, and (3) as an expression of telescope's resolving power. Let's take a look at each use of the term in more detail. First, we'll examine how an arc second is expressed when applied to a star chart and to the visible night sky. Picture the entire dome of the night sky as the face of a clock. The clock is divided into hours, minutes, and tiny seconds. Much like this imaginary clock, the celestial dome is divided into degrees and each degree is comprised of arc minutes and arc seconds. There are 60 arc minutes in each degree, and each arc minute is made up of 60 arc seconds. But, just how big would that be? Let's use the full Moon as an example. It covers approximately 1/2 a degree of night sky - which equals 30 arc minutes or 1800 arc seconds. These measurements are abbreviated into a type of astronomical shorthand. Terms for the Moon's apparent size would read 30' for arc minutes or 1800" for arc seconds. When you look at a star chart, you'll see degrees of declination - measurements from north to south - marked along the edge. Each degree of sky contains 60 arc minutes, or 3600 arc seconds. When using an astronomical catalog or observing instructions, you'll be provided with an "address" of coordinates to celestial objects which utilizes arc seconds. This address may read something like RA 12h 22m 13s - Dec +22° 44' 11". Look at the second set of numbers. This means your object is located twenty-two degrees, forty-four arc minutes, eleven arc seconds north of the celestial equator. Although a single arc second would be too small to visually determine when looking at the sky, it is very important to celestial surveys and catalogs. It is like assigning a celestial "house number" to a specific target and allows astronomers to locate targets with precision. When expressing the size of an astronomical object, it is often given in terms of angular diameter as seen from Earth - not its true size. Most of the time, these angular diameters are very small since most objects are very far away from Earth, so they are expressed as arc minutes, or more frequently as arc seconds. An astronomical catalog or observing guide will provide an object's size to help observers better understand what to expect from a target before they try to locate it with a telescope. This is helpful if you have never seen a particular object. Let's use two samples to illustrate this concept - a globular cluster and a double star. For example, globular cluster M80 is listed as 10' (ten arc minutes) in size. A good star chart will show this object printed to scale in relationship to the stars around it. This makes identifying it from the surrounding stellar patterns seen in the eyepiece much easier. You knew in advance the cluster would cover a certain amount of distance between identifiable stars. However, the angular distance measurement between double stars is much smaller and is always expressed as arc seconds. A good example is Polaris. The main bright star, Polaris A, is separated from small faint star, Polaris B, by 18" (eighteen arc seconds). By knowing a double star's separation in advance, you can test your telescope's ability to resolve small distances and aid you in determining sky conditions. Most general star charts don't print separations that small, so you'll need to rely upon your astronomy catalog as a resource for those numbers. Another place in which you will encounter arc seconds is in a telescope's specifications - the resolving power. This is your telescope's ability (under ideal observing conditions) to "see" or separate a given size or distance. While there are lengthy mathematical expressions used to determine arc seconds of resolution for telescopes, a simple way to understand is to use the known separation of a double star as an example. Let's return to Polaris. If a telescope has a stated resolving power of 1.0" that means it is capable of clearly resolving an object - or distance - of one arc second. That's just 1/18th the distance between Polaris and its companion! With this information, you know our example telescope with a resolving power of 1.0" (one arc second) will be able to "split" the double star Polaris under ideal observing conditions. While these measurements might seem a little confusing at first, you'll soon understand and appreciate them. Knowing an arc second's distance on a star chart will help you better locate objects by further refining their positions. Being able to add arc minute and arc second directional numbers to a telescope's computer aiming system will make it far more accurate. Understanding an arc second in size will assist you in relating what you see to others. For example, you might observe a comet and want to record its size in your notes. If you know a given object's size in arc minutes or arc seconds, you can compare the two and make a more accurate assessment. By knowing your telescope's resolving ability in arc seconds, you'll also know if you're able to "split" a given double star in advance - or know if your telescope is capable of "seeing" very small separations, such as revealing individual members in a star cluster. Arc seconds might be tiny, but they're very important

NOTE:

The photo on page 1 is of me taken in 1952. The telescope mount is a copy of a German Equatorial Mount (GEM) made entirely of galvanized pipe and fittings. The bearings for movement in right Ascension and Declination were the pipe fitting threads. The telescope tube was an old stovepipe. The 8 inch mirror and diagonal were hand ground, polished and figured by me. A lot of hard work but lots of fun and the joy was seeing the fruits of my labor when observing the images of the Cosmos. My income was from cutting lawns and odd jobs in the neighborhood. Most of the mount etc was scrounged materials. The optics were kits I bought, mirror blank, tool, grinding and polishing compounds, pitch etc.
This was the 3rd of 9 scopes I built during the time period 1952 - 1956. (Optics kits were not very expensive back then).

Astronomy Club Officers

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Serf /Minion Vahan Yeterian

ACL Webmaster
Serf / Minion Aaron Anderson
(New Zealand)

Club Meeting

Reminder ACL Club meeting Friday May 10th 7:00 Pm at Manzanita School Teachers lounge.

Star Parties (as always weather permitting)

Other clubs and sites

http://www.centralcoastastronomy.org/

Astronomy Club of Lompoc (ACL) (universeii.com)

Sunrise and sunset times in Lompoc (timeanddate.com)

Moonrise, Moonset, and Moon Phase in Lompoc (timeanddat

http:// www.sbau.org/#AU_EVENTS_Calendar

http:// www.heavens-above.com/

https://spaceweather.com

https://www.space.com

https://skymaps.com

"Name the Object Quiz"

Answer in June News Letter

ACL Club Logo