Temecula Valley Astronomer
The The monthly newsletter of the Temecula Valley Astronomers July 2023

Events: General Meeting, Monday, July 10, 2023, at the Ronald H. Roberts Temecula Library, Room B, 30600 Pauba Rd, and/or ZOOM, at 6:00 PM.

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- **IFI & Gallery by Clark Williams**
- **Signs in the Heavens: Arabic Contributions to Astronomy by Dr. Imad-ad-Dean Ahmad**
- **Refreshments by Chuck Dyson**
- **Star Parties at South Coast Winery every Friday evening in July.**

WHAT'S INSIDE THIS MONTH:

Send newsletter submissions to Sharon Smith <sas19502000@yahoo.com> by the 20th of the month for the next month's issue.

6/14/23 APOD – Shark Nebula spans about 15 light years and lies about 650 light years away
Credit: Stephen Kennedy

General information:
Subscription to the TVA is included in the annual $25 membership (regular members) donation ($9 student; $35 family).

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Dr. Imad-ad-Dean Ahmad

Born in 1948 at sea to Palestinian refugee parents, Dr. Ahmad was raised in Pennsylvania. He graduated *cum laude* from Harvard in 1970 and in 1975 obtained a Ph. D. in astronomy and astrophysics from the University of Arizona. He has taught introductory courses on Islam and on religion and science at the Wesley Theological Seminary, honors courses in "Religion and Progress" and on "Religion, Science, and Freedom" as a senior lecturer in the Honors Program at the University of Maryland in College Park, MD, a general education course on "Changing Views of the Universe" at American University out of its physics department, courses on Islam and Development at Georgetown University and graduate courses in Islam and Development and Theory of Social Change at the Johns Hopkins University School for Advanced International Studies. Dr. Ahmad has lectured on Islam at the Foreign Services Institute and for the Joint Special Operations University's Middle East Orientation Course. He has done postdoctoral work in astronomy at Harvard, the University of Maryland, and under contract to Goddard Space Flight Center and for private firms. He is currently President of the Minaret of Freedom Institute, an Islamic think-tank in the Washington, DC area, for which he writes a blog (blog.minaret.org).

Dr. Ahmad is an internationally sought-after speaker on matters relating to Islam and Muslims. He is author of *Signs in the Heavens: A Muslim Astronomer's Perspective on Religion and Science,* co-editor of Islam and the West: A Dialog*,* and co-author of *Islam and the Discovery of Freedom.* Dr. Ahmad's essay "An Islamic Perspective on the Wealth of Nations" appears in the International Library of Critical Writings on Economics series #129 *The Economics of Property Rights.* His most recent book is *The Islamic Rules of Order*. He is also President of the Islamic-American Zakat Foundation, Chair of the Development Committee of the Association of Muslim Chaplains, and arbitrator for the Coordinating Council of Muslim Organizations in the Greater Washington Metropolitan Area and in the past has served as an Islamic chaplain at American University, and Imam of the Dar-adh-Dhikr Mosque. He resides in Bethesda with his wife, Frances Eddy.

Dr. Ahmad has received the "Star Cup for Outstanding Public Service" award from the Montgomery County Civic Federation, the "Champion of Democracy Award" from Marylanders for Democracy, the "Samuel P. Chase Freedom Award" from the Libertarian Party of Maryland, and the "Sentinel Award" from the Montgomery County Civic Federation.

Looking Up Redux – July 2023

Compiled by Clark Williams
from these sources:
SeaSky.org
Wikipedia.com
in-the-sky.org
The American Meteor Society, Ltd.
cometwatch.co.uk
NASA.gov
TVA App (2.0.1296)
FullAndNewMoon App (2.0)
Starry Night Pro Plus 7 (7.6.3.1373)
SkySafari 6 Pro (6.8.2)
Stellarium (23.1)
timeanddate.com/astronomy
https://www.fourmilab.ch/earthview/pacalc.html

ALL TIMES ARE LOCAL PACIFIC TIME (PST / PDT) UNLESS NOTED OTHERWISE

Times are given in 24-hour time as: (hh is hours, mm minutes, ss seconds)
hh:mm:ss or hhmmss
hhmm+ (time of the next day)
hhmm− (time of the previous day)
hhmm (seconds not shown)
yyyymmddThhmmss (Full date as: year month day Time separator hours minutes seconds)

Moon Phases for the month by date:

Monday	the 3rd	@0439 FULL in SAGITTARIUS
Sunday	the 9th	@1849 THIRD QTR in PISCES
Monday	the 17th	@1132 NEW in GEMINI
Tuesday	the 25th	@1507 First QTR in VIRGO

Perigee comes on 2023-07-04 @ 1549 – 360,149 km (223,786 mi)
Apogee comes on 2023-07-19 @ 2358 – 406,289 km (252,456 mi)

2023 has: (12) new moons, (12) 1st Qtr moons, (13) Full moons, (12) 3rd Qtr moons
(1) Blue moon and (0) Black moons

Daylight Savings: Starts: 2023-Mar-12 : Ends: 2023-Nov-05 (CA does not keep PDT year-round)

Luna: Luna is waxing gibbous on the first of the month, headed for Full on the 3rd rising at 1846, transiting at 2338 and setting by 0429+. Luna by mid-month is waning crescent at 3% illumination. Rising at 0341 and transiting at 1108+ setting at 1856+. By the-end-of-the-month Luna is waxing gibbous, 99%

illuminated, rising at **1934** transiting at **0036**+ and setting by **0537**+.

Highlights: (distilled from**: SeaSky.org** and **Clark's planetary Orrey** program[s]**)**

July 1 - Conjunction of Venus and Mars. The planets Venus and Mars will pass within 3 1/2 degrees of each other. The event will take place on the morning of June 30 at 2348 (0648 UTC). Both planets will be visible with the naked eye in the constellation Leo.

July 3 - Full Moon, Supermoon**. The Moon will be located on the opposite side of the Earth as the Sun and its face will be will be fully illuminated. This phase occurs at 11:40 UTC. This full moon was known by early Native American tribes as the Buck Moon because the male buck deer would begin to grow their new antlers at this time of year. This moon has also been known as the Thunder Moon and the Hay Moon. This is also the first of four supermoons for 2023. The Moon will be near its closest approach to the Earth and may look slightly larger and brighter than usual.

July 17 - New Moon. The Moon will located on the same side of the Earth as the Sun and will not be visible in the night sky. This phase occurs at 18:33 UTC. This is the best time of the month to observe faint objects such as galaxies and star clusters because there is no moonlight to interfere.

July 29, 30 - Delta Aquarids Meteor Shower. The Delta Aquarids is an average shower that can produce up to 20 meteors per hour at its peak. It is produced by debris left behind by comets Marsden and Kracht. The shower runs annually from July 12 to August 23. It peaks this year on the night of July 29 and morning of July 30. The nearly full moon will block most of the fainter meteors this year. But if you are patient, you may still be able to catch a few good ones. Best viewing will be from a dark location after midnight. Meteors will radiate from the constellation Aquarius, but can appear anywhere in the sky.

** Supermoon is a colloquial astrology definition to try to make a Full moon at apogee seem more important than it actually is.

Algol minima: (All times Pacific Time)

07/01/2023	**1219**
07/04/2023	**0907**
07/07/2023	**0556**
07/10/2023	**0245**
07/12/2023	**2334**
07/15/2023	**2022**
07/18/2023	**1711**
07/21/2023	**1400**
07/24/2023	**1048**
07/27/2023	**0737**
07/30/2023	**0426**


01
WAX GIB
02
WAX GIB
03
FULL
04
WAN GIB
05
WAN GIB
06
WAN GIB
07
WAN GIB
08
WAN GIB
09
3rd QTR
10
WAN CRSN
11
WAN CRSN
12
WAN CRSN
13
WAN CRSN
14
WAN CRSN
15
WAN CRSN
16
WAN CRSN
17
NEW
18
WAX CRSN
19
WAX CRSN
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WAX CRSN
21
WAX CRSN
22
WAX CRSN
23
WAX CRSN
24
WAX CRSN
25
1st QTR
26
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27
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31
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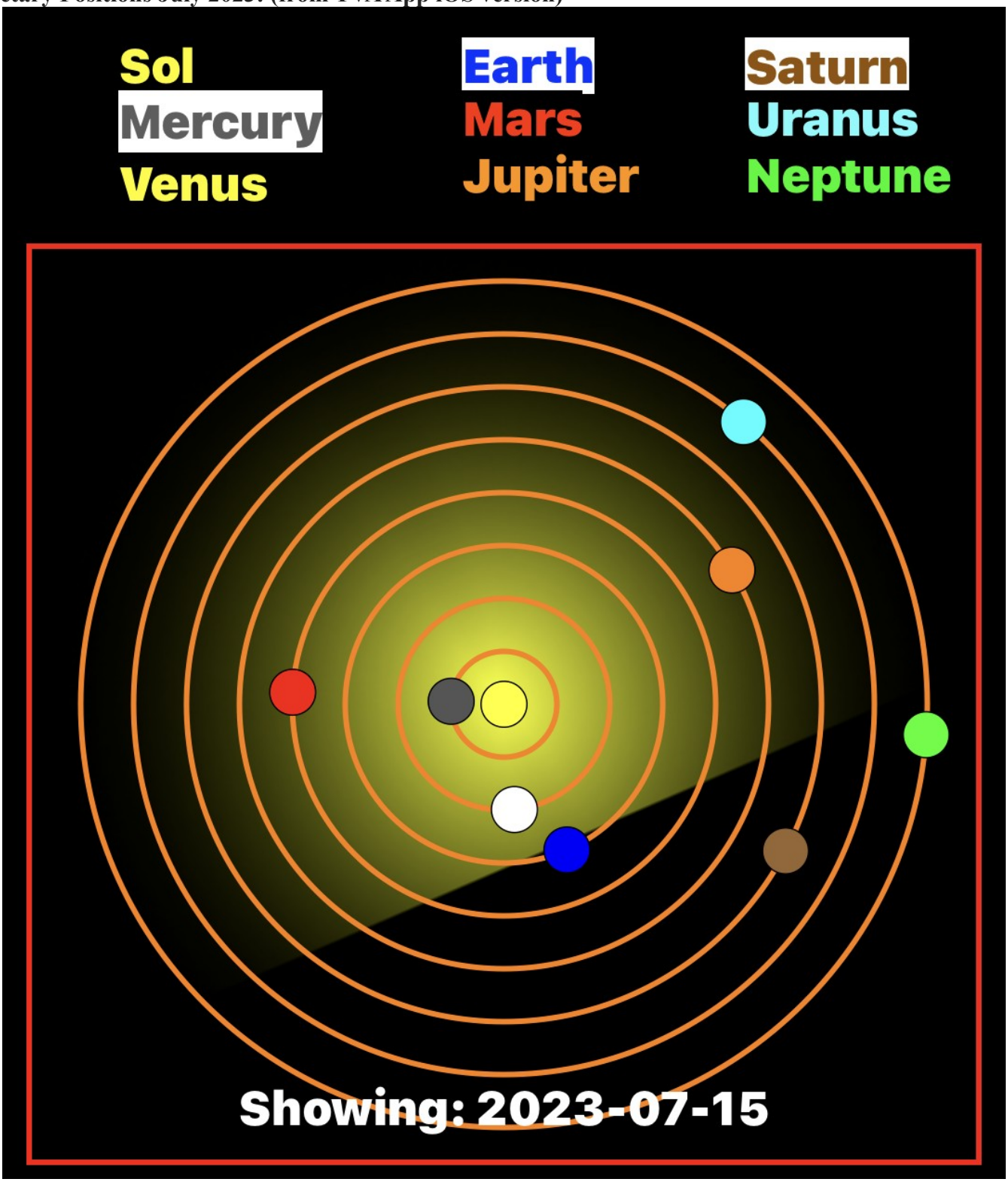
2023 July

Planets:
Planetary Positions July 2023: (from TVA App iOS version)



- **Mercury:** Mercury is a lost to the Sun in the beginning of the month rising at **0541**, transiting at **1256** and setting at **2011**. Mercury by mid-month has become a evening object rising after sunrise setting at **2101**, which is a full hour after sunset. Look to the WNW at about **2030**. By the 31st Mercury remains an evening object setting at 2105 following sunswet at **1949**. Look to the west around **2020**, low on the horizon.
- **Venus:** Is the Evening Star on the first of the month. Venus rises at **0902**, transits at **1545** and sets at **2227**. Venus is 31% illuminated and has an apparent magnitude of -4.45. Look to the west around **2030** for the bright planet. By mid-month Venus, still the Evening Star, rises at **0841**, transits at **1511** and sets by **2141**. Look to the west about 2030 and that bright light is Venus. The red dimmer light about a fist width above Venus is Mars. By end of month Venus, still the Evening Star. Is falling toward the Sun from the perspective of Earth. Venus rises at **0740**, transits at **0401** and sets at **2022**. You'll have to look fast because Venus will be low on the horizon and hot on the heels of the Sun.
- **Mars:** Mars is an evening object on the first of the month. Mars rises at **0918**, transits at **1600** and sets by **2241**. Look to the west about **2040** and the red light above bright Venus is Mars. By mid-month Mars is rising at **0904**, transits at **1537** and doesn't set until **2210**. Look to the west and find bright Venus. The red light just a fist width above and slightly east of Venus is Mars. End-of-month finds the Warrior rising at **0848** transiting at **1511** and setting at **2133**. Look due west at around **2020** and Mars is the red light hanging in the night sky. Follow the ecliptic west for about 8° and you'll find Mercury.;
- **Jupiter:** Jupiter is a morning object on the first of the month. Jupiter rises at **0201**, transits at **0840** and sets at **1519**. By mid-month Jove as a morning object rises at **0113**, transits at **0754** and sets at **1435**. Come the end-of-month Jupiter rises at **0017** and sets at **1341**.
- **Saturn:** Saturn is a evening object on the first of the month rising at **2311**, transiting at **0445**+ and setting at **1019**+. Saturn by mid month rises by **2215**, transiting at **0348**+ and setting at **0921**+. By the end-of-the-month Saturn rises by **2110**, transits at **0242**+ and set at **0814**+.
- **Uranus:** On the first of the month Uranus is a morning object rising at **0237**, transiting at **0928** and setting at **1620**. By the ides Uranus is rising at **0144**, transiting at **0835** and setting by **1527**. End-of-month finds Uranus as a morning object rising at **0042**, transiting at **0734** and setting at **1427**.
- **Neptune:** Neptune in the beginning of the month is a morning object. Neptune rises at **0008**, transits at **0605** and sets by **1201**. By the 15th Neptune rise at **2313**, transits aat **0509** and sets by **1106**. By the end of the month Neptune is rising at **2206**, transiting at **0402**+ and set by **0956**+.
- **Pluto:** Pluto on the first of the month is a evening object rising at **2120**, transiting at **0217**+. and setting at **0714**+. By mid-month Pluto is rising by **2024**, transiting by **0121**+ and sets by **0618**+. Pluto's apparent magnitude is 14.39 so good luck if you're looking. By the 31st Pluto is rising at **1920** transits at **0016**+ and sets at **0513**+.

Asteroids:

- Still a dearth of asteroids. I searched for asteroids in 2023 with a reasonable magnitude; say less than or equal to +10 in July there is nothing except the regulars: Juno, Vesta. Hebe, Eros and Herculina. So consult your local planetarium software or try: https://www.asteroids near.com/year?year=2023

Meteors:

- July 29, 30 - Delta Aquarids Meteor Shower (see Highlights above).

Comets: come in various classifications:

- 1) Short Period comets – further broken down into:
  - Halley Type: The Halley Types are believe to come from the Kuiper Belt and have periods in excess of 20-years.

- Jupiter Type: The Jupiter types have a period less than or equal to 20-years.
- Short period comets July have a near circular orbit or an elliptical orbit. The latter being far more common.

◦ 2) Long Period comets – thought to originate from the Oort cloud these comets have periods of over 200 years and have random inclinations around the celestial sphere.

No comets of interest this month at time of writing.

Deep Sky:

Notes:

L/Z abbreviation for ALT/AZ
R/D abbreviation for Right Ascension/Declination
α is right ascension
δ is declination
In each case, unless otherwise noted, you should look for the following on or about the 15th Day of July 2023 at 2100 PDT and you will have about 20 minutes of viewing time total.

Lets take a look at some favorite summer objects:

◦ M 13**:**

Illustration 1: By Sid Leach/Adam Block/Mount Lemmon SkyCenter

Messier 13 or **M13**, also designated **NGC 6205** and sometimes called the **Great Globular Cluster in Hercules** or the **Hercules Globular Cluster**, is a globular cluster of several hundred thousand stars in the constellation of Hercules.

Discovery and visibility

Messier 13 was discovered by Edmond Halley in 1714, and cataloged by Charles Messier on June 1, 1764, into his list of objects not to mistake for comets; Messier's list, including Messier 13, eventually became known as the Messier catalog. It is located at right ascension 16h 41.7m, declination +36° 28'. Messier 13 is often described by astronomers as the most magnificent globular cluster visible to northern observers.

About one third of the way from Vega to Arcturus, four bright stars in Herculēs form the Keystone asterism, the broad torso of the hero. M13 can be seen in this asterism ⅔ of the way north (by west) from Zeta to Eta Herculis. With an apparent magnitude of 5.8, Messier 13 may be visible to the naked eye with averted vision on dark nights. Messier 13 is prominent in traditional binocularsas a bright, round patch of light. Its diameter is about 23 arcminutes and it is readily viewable in small telescopes. At least four inches of telescope aperture resolves stars in Messier 13's outer extent as small pinpoints of light. However, only larger telescopes resolve stars further into the center of the cluster. The cluster is visible throughout the year from latitudes greater than 36 degrees north, with the longest visibility during Northern Hemisphere spring and summer.

Nearby to Messier 13 is NGC 6207, a 12th-magnitude edge-on galaxy that lies 28 arcminutes directly northeast. A small galaxy, IC 4617, lies halfway between NGC 6207 and M13, north-northeast of the large globular cluster's center. At low powers the cluster is bracketed by two seventh–magnitude stars. (Wikipedia)

- **M 51:**

Illustration 2: By NASA and European Space Agency

The Whirlpool Galaxy, also known as Messier 51a (M51a) or NGC 5194, is an interacting grand-design spiral galaxy with a Seyfert 2 active galactic nucleus] It lies in the constellation Canes Venatici, and was the first galaxy to be classified as a spiral galaxy. It is between 23 and 31 million light-years away and 76,900 ly (23,580 pc) in diameter.

> The galaxy and its companion, NGC 5195, are easily observed by amateur astronomers, and the two galaxies may be seen with binoculars. The Whirlpool Galaxy has been extensively observed by professional astronomers, and its pair with NGC 5195 who study it to understand galaxy structure (particularly structure associated with the spiral arms) and galaxy interactions. Its pair with NGC 5194 is among the most famous and relatively close interacting systems, and thus is a favorite subject of galaxy interaction models.. (Wikipedia)

July is great for both viewing and imaging. Spend some time outside with your scope. Summer is here!

For now – Keep looking up.

RANDOM THOUGHT July 2023
By Chuck Dyson

IS **ET** LIVING IN MY KITCHEN???

With the discovery that over 80% of the suns in our galaxy appear to have planets the enthusiasm for finding life on at least one of those planets has gone into high gear along with the funding of research proposals. And, today, astronomers who claim to be astrobiologists are considered to be real scientists not just escapees from Disney's Tomorrowland.

OK, now that we know that there is a potential for ET life in the galaxy the three big questions are: Where do we look for ET? How do we look for ET's planet? What signatures do we look for?

Where do we look would seem to be an easy question to answer, "Around stars, DUH!" However, we quickly discover there are two choices, the solar system and every other star in the galaxy. In the search for life in our solar system we have not found the civilizations and cities that H. G. Wells "War of the Worlds", Edger Rice Burroughs "John Carter of Mars" and "Carson of Venus" nor the canals of Mars and Venus that Percival Lowell predicted. In the 1970's the Viking 1 & 2 Mars probes landed on Mars and using four different tests looked for life. The first results came back and it looked as if finding life on Mars was going to be "That was easy," but as more and conflicting results came in things changed to "This sucks!" and the results of the experiments are controversial to this day. Finding life and knowing if you have really found life is not going to be easy. Because we can drop probes onto the surfaces of the planets and moons of our solar system. Finding evidence of life here is going to be a lot easier than finding life on the planets or their moons of distant stars where all we can do is analyze the light we get from those extra solar bodies once we find them.

With 300 billion stars in our galaxy rather than ask where we should look for life it is probably better to ask where we should not look as observing time on big scopes is limited and expensive. Thanks to a lot of studies of star clusters, how old they are, and which classes of stars are in them, we know that large stars do not live long, happy lives. For a star to live for billions of years it needs to be smallish and burn its hydrogen fuel slowly. A star that is only 1.5 times the mass of the Sun will live in main sequence for about three billion years; if we look at the timeline of life on Earth (Fig. 1) we see that after three

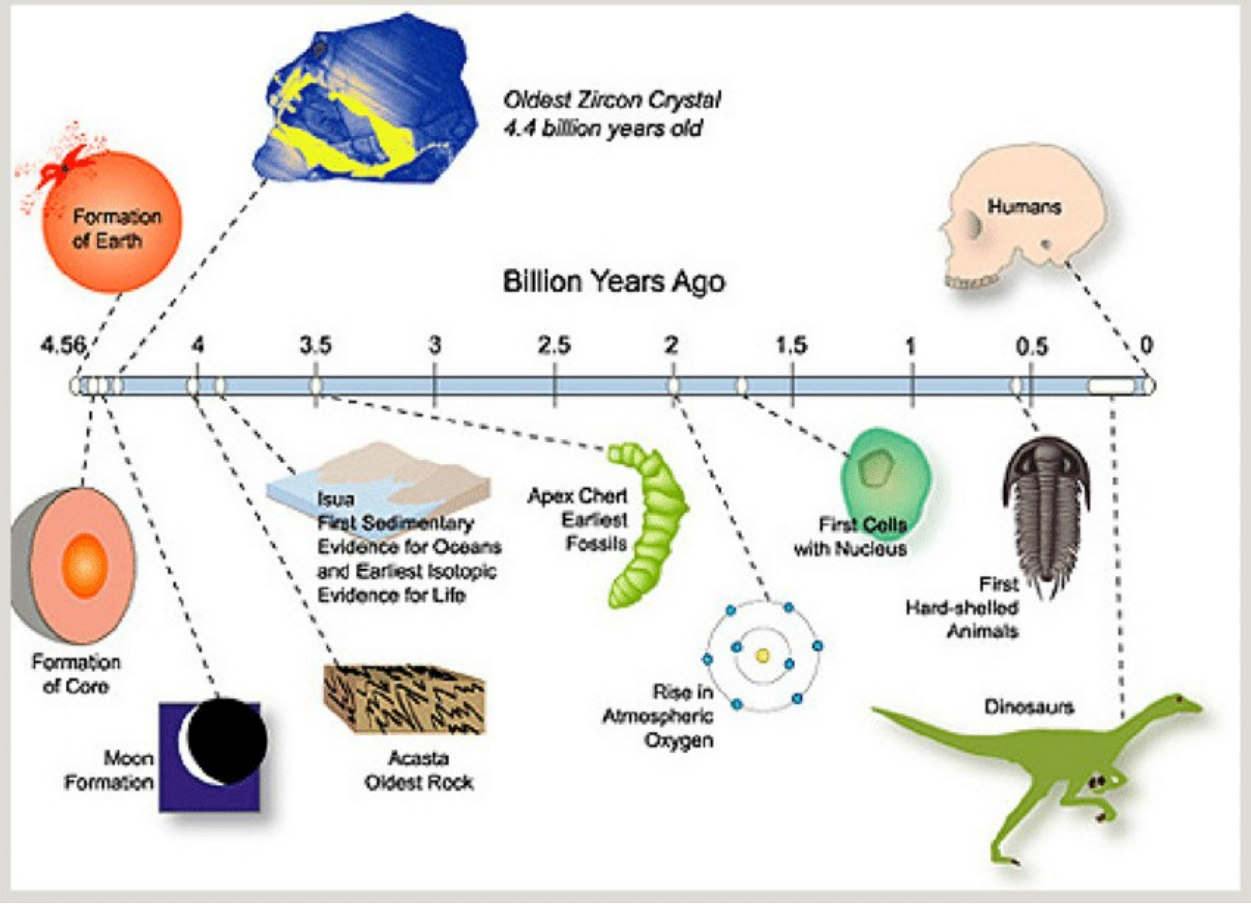


Figure 1

billion years life on Earth is advanced, eukaryotic cells and possibly some multicellular fungi. If the Earth model is typical to find advanced intelligent life in other solar systems, we are going to need smaller stars with longer main sequence times. The bad news is that the Sun is bigger than 90% of the stars in our galaxy; so, we haven't eliminated that many solar systems, but it is a start.

Marco Polo did not travel to China and other Asian countries to purchase spices for exotic meal preparation for the European rich. He was getting spices to cover the smell and taste of rotting meat; as successful storage options for fresh meat were, to say the least, limited

in the 1200's. Today your kitchen is the place in your house that is dedicated, by every means possible, to denying archaea, bacteria, and fungi a meal from the food you have in there. Just how dedicated and determined is our attack on these food hungry critters? Enter Conan the bacterium. When a sealed tin of meat started bulging because of gas production from within the owner returned it to the manufacturer. The container had been sterilized by exposing it to 15,000 grays of radiation (a gray is a rather large unit of radiation that is absorbed by the target). As a reference 10 grays will kill you and me; 1,000 grays will kill a cockroach, cockroaches are known survivors. When the tin was opened researchers were able to grow colonies of Deinococcus radiodurans A.K.A. Conan the bacterium. 15,000 grays of radiation was thought to be more than any living organism could absorb and survive. Conan proved us wrong and showed just how much radiation living things can absorb and how life could be found on planets with so much radiation even cockroaches die. Conan is actually listed in the Guinness Book of World Records for its survival feat. Earth's oceans have about 35ppt (parts per thousand) of salt in them and humans, healthy ones at least, can only survive about two weeks on seawater as we just cannot handle that much salt. The Salton Sea has about 60ppt of salt and marine fish cannot handle that much salt. The Great Salt Lake has 280ppt of salt and not only do red algae survive in it but there are large colonies of brine shrimp feeding on the red algae. Finally, in 1964 Thomas Brock, an ecologist, stopped off in Yellowstone Park just to visit the park. Brock was fascinated by the bacterial mats he found growing in the hot springs. Later, when questioning his microbiologist colleagues about them, he found they had no idea what he was talking about and had always assumed the bacteria were incidental organisms that were wind delivered and didn't really grow there. Today Brock's bacteria, Thermus aquaticus, is known to live happily in 180F (Fahrenheit) water. Humans suffer third degree burns in 160F water after only one second of exposure. Further field work has found that Methanopyrus kandleri can at least survive in 251F water (water boils at 212F). No matter what we do to preserve the food in our kitchens it appears that neither salt, nor heat, nor radiation will stay microbes from having their dinner. Where do we look for ET? On planets that we would never consider it possible for humans to survive on.

How do we find stars with planets that ET could live on? First, we need to look in our galaxy's own "habitable zone". The galaxy "habitable zone" is an area where star forming clouds have enough "metals" to form rocky planets but not so much metallicity that multiple Jupiter sized planets are formed; multiple Jupiters tend to migrate inward and outward in the planetary zone and throw Earth sized planets either into that solar systems sun or out into deep space. Metal rich areas get that way because generations of large stars have lived short lives, gone nova, and then have been reassembled into large stars (a large star is at least 10 solar masses, but the best ones are 20 to 50 solar masses, they really go BANG.) and when large stars go supernova they tend to put out enough radiation to kill all

life within a radius of 130 light years. The largest star within 100 light years of Earth is Sirius and it is 8.7 light years away and at only 2.06 solar masses this makes our neighborhood relatively safe. In the outer galactic disk it is thought that star formation is slower and this results in stars, in general, having a lower metallic content and forming fewer rocky planets per star. Note: All of the above assumptions are moderately controversial, because of a lack of large data sets on the actual metallic content of stars in the different regions {moderate means that astronomers just shout at each other when discussing this issue and do not actually throw laptops at each other}.

Once we have a region of the galaxy that is relatively life friendly and identify a star that will live long enough in the main sequence part of its life for organic life to have a chance to develop the fun really begins because we actually need to find planets. We have two main methods of finding planets. First is the doppler shift method. When two bodies orbit each other, the little body does not go around the larger body instead they both orbit a common center of gravity, their barycenter. However, if one body is really larger than the other, for example the Sun is 333,000 times more massive than Earth, the barycenter for these two bodies is well inside the Sun. The Sun is 1000 times the mass of Jupiter and the Sun/Jupiter barycenter just beyond the surface of the Sun. Obviously the Sun moves more with Jupiter than with Earth and has more of a doppler shift in its spectrum when it moves toward us and away from us. {Notes: 1) the orbital planes of the planets must be parallel to our orbital plane for us to see a doppler shift. 2) The planet is not seen but inferred from the doppler shifts. 3) This method is best at detecting big planets close to small stars.}

Second is the transit method. Just like eclipses here on earth when an exo planet crosses its sun and is between the sun and Earth there is a dip in the sun's light as the planet blocks a small portion of the light (Jupiter blocks 1% of our Sun's light and Earth only .0084%; this method also favors large planets in tight orbits around small suns.

Now that we have our target solar systems how do we look for life? The search has settled into two separate approaches both described by the Drake equation (Fig.2).

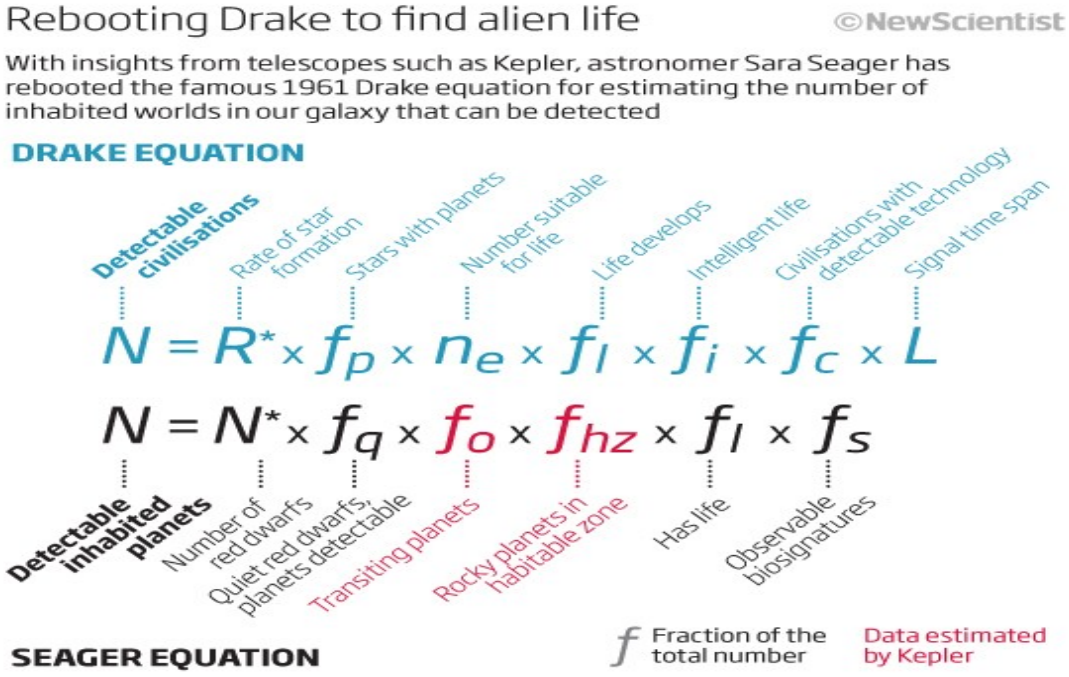


Figure 2

When Drake in 1961 created the original equation, the top equation in Fig. 2, there were no extrasolar planets and none would be found for 32 years so the only option was to listen for electronic signals from advanced civilizations. After 61 years of listening by SETI (Search for Extraterrestrials) and other groups there has been no confirmed contact despite continued improvement in the sensitivity of the equipment used, but the search goes on. In the last three years optical sensors are being used to look for possible laser signals from advanced civilizations. The main problem with this approach is that it requires an advanced communicating civilization and on our planet that is the least 122 years out of 3.5 billion years of life (I have chosen the first transmission of radio signals across the Atlantic Ocean in 1901 as the start date), lots of life no transmissions. The second approach for finding ET was proposed by Sara Seager in 2010 and she outlined her approach with a modified Drake equation, the bottom half of Fig.2. Seager's version of the Drake equation focuses on not only red dwarf stars but quiet dwarf stars (some red dwarf stars are known to be flair stars and its solar flares would cook any planet life on a regular basis). Other problems with red dwarf stars is for planets to be in the habitable zone they need to be so close to their star that they have tidal lock with it, like the Moon with one side always facing Earth, and no one is certain how this would support life. Also, red dwarf stars produce longer wavelength light, the longer the wavelength the less energy, and it could be difficult for plants to photosynthesis on red dwarf associated planets. Observing time could be more productive observing K type, orange, stars rather than M type, red, stars. In 2010 we had already discovered more than 500 exoplanets and several of those planets were in orbits that did allow them to transit their star as seen from Earth. If we get a spectrograph

of the star when the planet is behind it and second one when the planet is in transit and then subtract the first spectrograph from the second, and the planet does have an atmosphere, we are left with a verry, verry weak, dim, spectrograph that represents the planet's atmosphere Fig. 3.

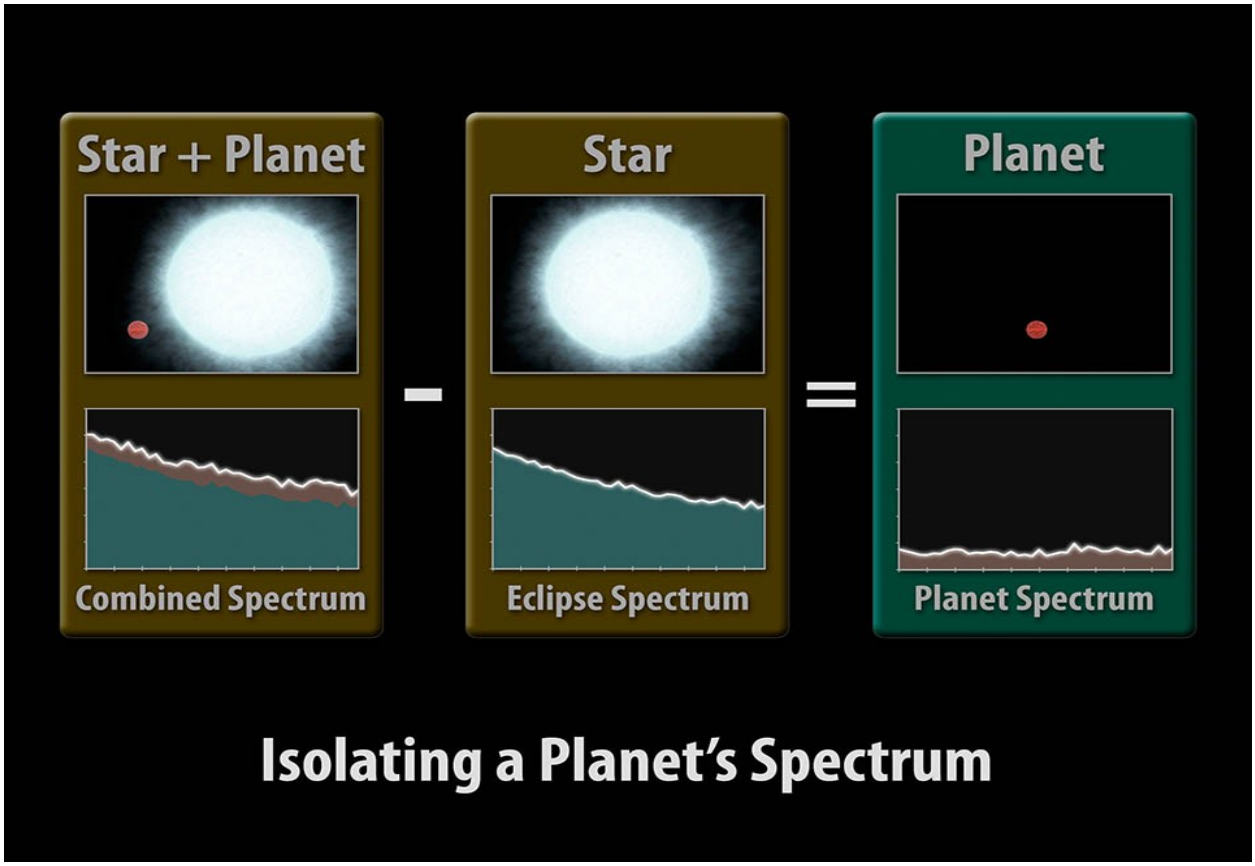


Figure 3

As of today astronomers have managed to obtain spectrographs from both space and ground based telescopes and naturally, it is the hot Jupiters. It is Jupiter-sized planets really close to their star, with puffed up atmospheres that they are the most successful with. With early successes comes the beginning of understanding the myriad of problems and challenges astronomers will face just getting that spectrograph and, just to make matters worse, trying to interpret it for actual signs of life Fig.4.

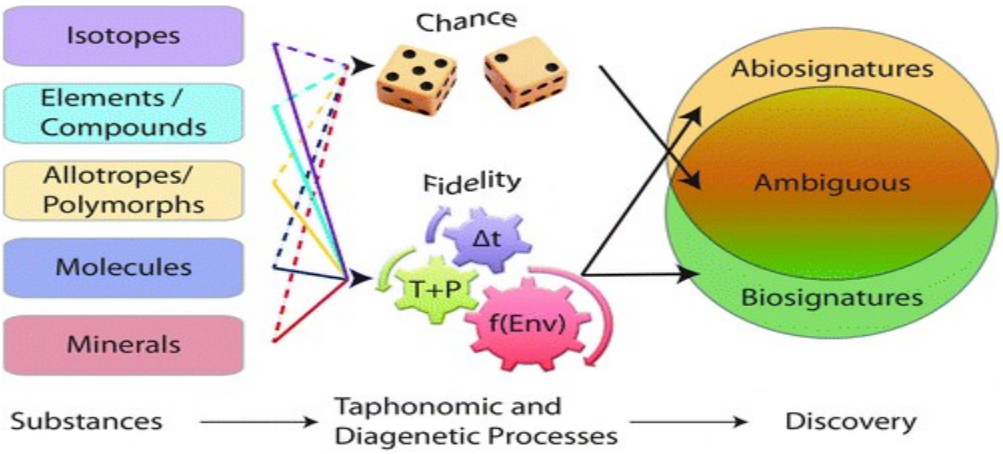


Figure 4

In one review article the author pointed out that a planet 40 to 50 light years from Earth has the same optical magnitude as the faintest galaxies Hubble has been able to observe. This reality is exactly why all astronomers are focused on the James Webb telescope as it is the only kid on the block big enough to possibly get the answers to our questions.

In 1969 the rock group Moody Blues released their fourth album entitled “The Threshold of a Dream.” Perhaps in 2023 we are on the threshold of the dream of finding life on another planet.

CHEERS CHUCK

Another Look July 2023
By Dave Phelps

New moon July 17th; full moon July 3rd

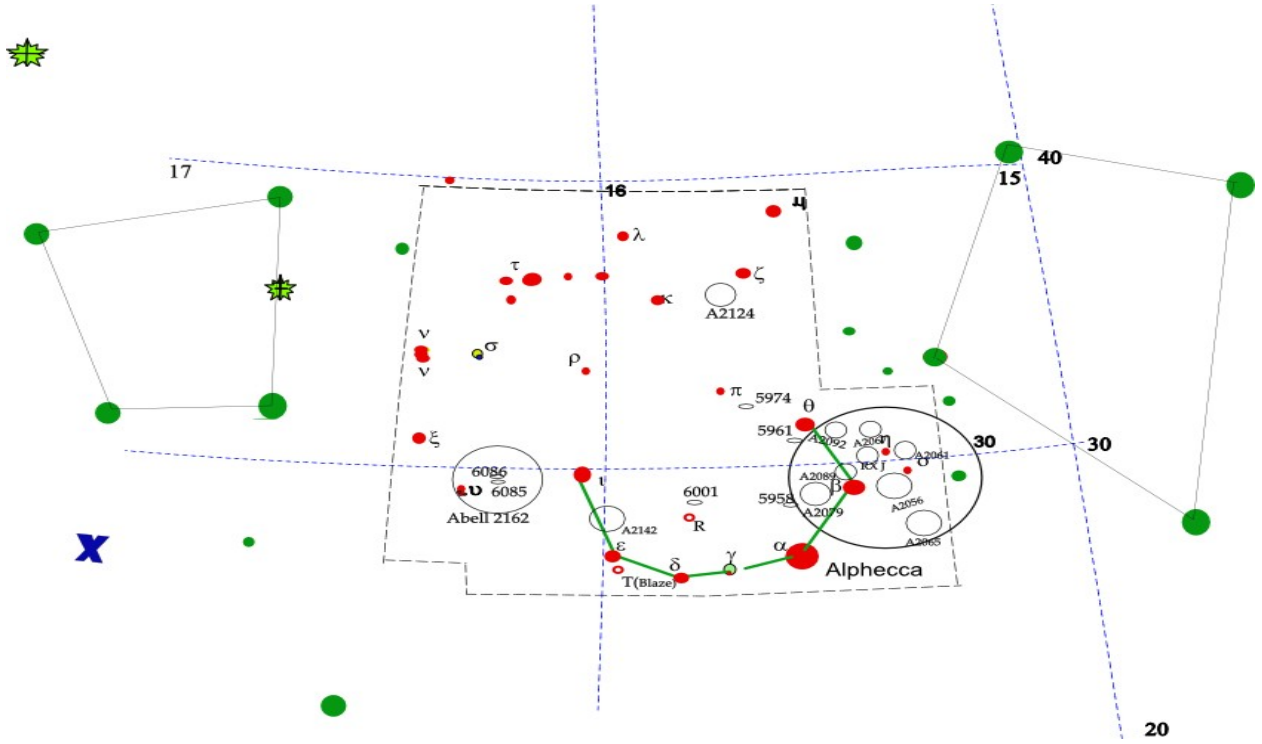
July's new moon is called the Buck Moon. Some Native American tribes called it the Thunder Moon and the Hay Moon.

In Europe the full moon is also referred to as the Budding and Birth of Spring moon. The Anglo-Saxons called it Egg Moon; the Celts had names like New Shoots Moon, Seed Moon, Growing Moon, Claiming Moon, and Horse Moon; in France it's Pleine Lune de Juillet; in Germany – Juli Vollmond; and in Spain-Luna Ilena de Julio.

Check your ephemeris. There are a number of lunar-planet and planet-planet conjunctions this month and a lunar occultation of Delta & Scorpii.

I have always like July astronomy. It is finally shirtsleeve weather and we can do galaxy and globular hunting hopping up and down the sky.

Looking up we see two constellations centrally located for us at 8:00 pm in the middle of the month: Libra and Corona Borealis.

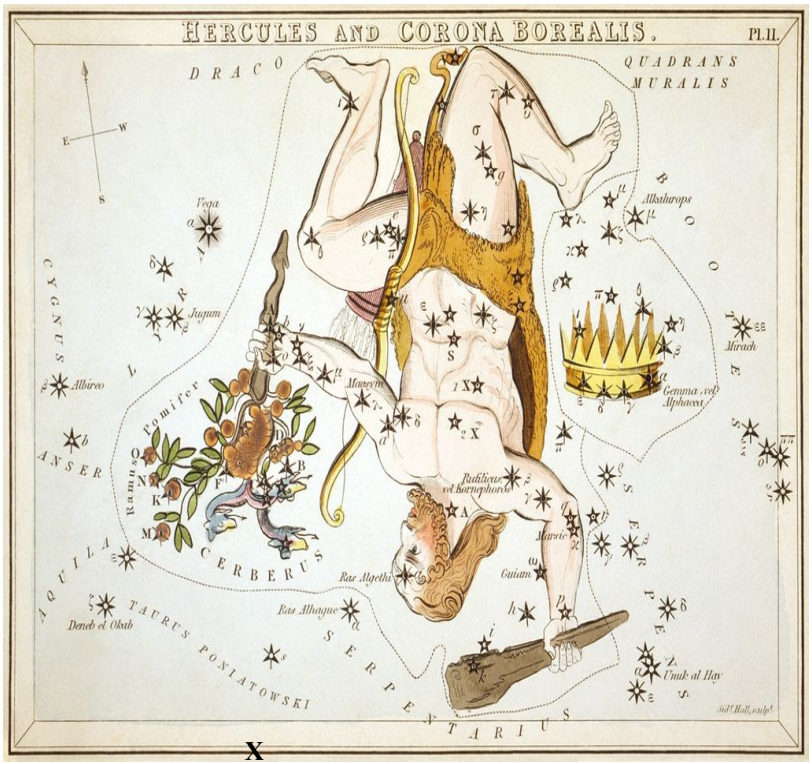


Integral to a modern discussion of Corona Borealis (CrB) has to be the Corona Super Cluster, concentrated near Beta and roughly enclosed by the larger circle. Thankfully to George Abell (I met him in the early 60's) we have smaller discrete groupings to help us organize at least a portion of the structure, though much of what we know is not in optical wavelengths. Even with our telescopes, though, we can see and image foundation galaxies and patterns of galaxies in every Abell object. A job once reserved for pros but now an objective well within the range of many of our members. For the record, Scotty Houston would consider this a worthy endeavor.

The CrB supercluster contains the galaxy clusters Abell 2056, Abell 2061, Abell 2065, Abell 2067, Abell 2079, Abell 2089, and Abell 2092. Of these, Abell 2056, 2061, 2067, and 2089 are gravitationally bound and in the process of collapsing to form a single massive cluster.

There are in excess of 400 galaxies in the super cluster; Abell 2065 being the largest galaxy cluster within the super cluster.

There are individual galaxies in CrB. Abell 2162 has NGC's 6085 and 6086. Others like 6001, 5961, and 5974 can be seen. Remarkably about the CrB supercluster is its membership in a much bigger picture. The ✖ marks the apparent center of the Hercules-Corona Super Cluster, i.e., the Great Wall, the largest structure we have found in the observable universe, about 11% of our current size of the universe. I have also placed an ✖ on the Sidney hall painting of Hercules and CrB showing the approximate location of the center of the Great Wall.



✖

The story of Corona Borealis is a rather standard myth, but the circlet has been around as an identifiable asterism since Babylonian times when it was called a bowl. In Australia, the aborigines called the constellation after their boomerang and American Indians pointed the stars out as the "Celestial Sisters." One being the wife of the hunter White Hawk; our Arcturus and to the Celts she was a Fairy Princess.

The Greeks, of course, managed to confuse the whole matter with conflicting characters and stories. The nexus of the legend revolves around a woman named Ariadne. Spencer in the "Fairy Queen" says

> Look: how the crowne which Ariadne wore
> Upon her yvory forehead…
> Being now placed in the firmament,
> Through the bright heavens doth her beams display,
> And is unto the starres an ornament,
> Which round about her move in order excellent.

Ariadne was the lady who gave Theseus the spool of yarn used to escape the labyrinth after his fight with the Minotaur. So, Theseus takes Ariadne to the Greek island Nexus (Naxos) where he promptly abandons her. A real jewel he turned out to be. All is not lost for fair Ariadne, however, she found another guy. Some say Bacchus, some say Dionysus. Upon their nuptials, she was given a crown that was placed in the sky in her honor.

There are two stars and two galaxies worth while to look up. In Abell 2162 are 12th magnitude galaxies NGC 6085 and 6086. You should be able to place both in your field of view. 6086 is one of those huge elliptical galaxies with a bright nucleus. NGC 6085 is identified as spiral/elliptica. You choose. There are two variable stars worth your choice, also. T Coronae Borealis is a recurring nova. It is nicknamed the Blaze star. Usually it sits down near 10th magnitude, but suddenly can rise to as bright as 2nd magnitude. It is quite near Epsilon, so check it out visually and if you see a star there email the AAVSO. R Coronae Borealis is a variable because of its cloud of dust that obscures its face. It normally sits at 6th magnitude before abruptly plunging down to 14th, then recovering slowly and erratically.

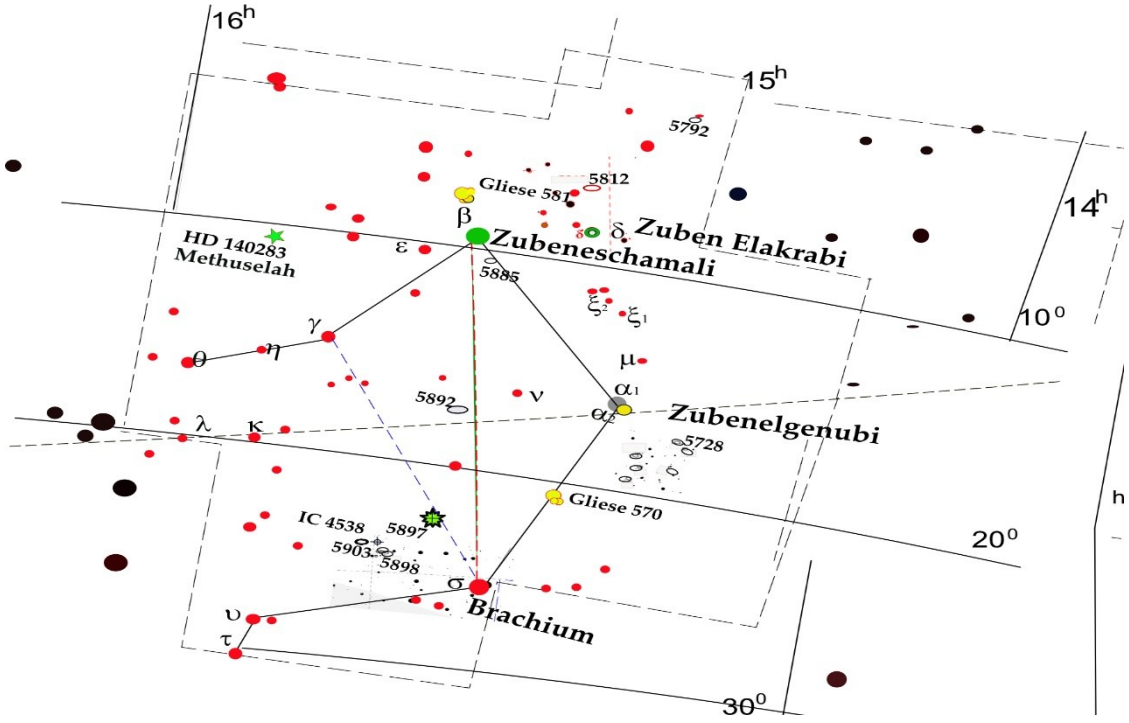
Over 3000 years ago, in Babylon, the stars we now know as Libra were called the "Balance of the Heavens." While the Egytians show a set of scales on the Denderah Planisphere. It is also interesting that Egyptians did not include the beam of the scales in their cosmology. Rather the beam, termed Milometer or Nilometer, was used as a measure of the flooding of the Nile,

Up north in Persia and surrounding regions Libra was a man holding a scale in one hand and a lamb in the other. It was the usual form of weight at that time in the east.

Later Chinses called it the "Celestial Balance," but in early China it was the Dragon.

Greeks called it *Εραφιοκ*, Weigh-beam. The sacred books of India mention it as Tula, the Tamil, Tulam, or Tolam somewhat translated as a Balance. Plus on the Zodiac of that culture it portrays a man bending on one knee and holding a pair of scales.

Both the Greeks and the Arabs identified the stars as the Scorpion's ckaws. The identification can still be found in its brightest stars' names, Zanenelgenubo and Zubeneschamali; in Arabian meaning northern and southern claw. The Romans named her for a set of balances, though even Ptolemy in 150 AD still referred to the stars as a scorpion's claw.



Centuries were interesting times in Libra's life. Early Romans likened her to a token, believing Rome was founder under her auspices. From the Greeks it is the Farnese Atlas

(https://sci.esa.int/web/gaia/-/53265-sculpture-of-atlas-with-farnese-globe). Some 200 years AD the constellation was transformed to the set of scales we now know. Eventually Libra became associated with the scales held by Virgo, representing either Dike or Astraeia, the goddess of Justice.

During Rome's founding and ascension Libra was favorably placed as the balance between day and night and the seasons,

"Then Day and Night are weigh'd in Libra's Scales Equal."
Mamillius

and,

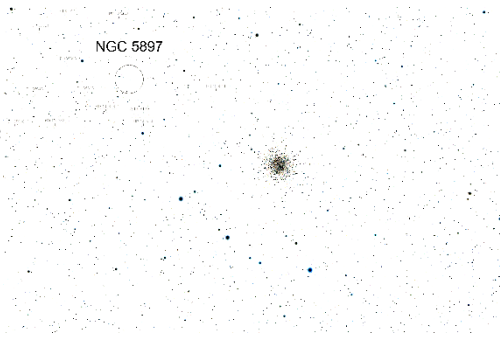
"bear the Scales, when hang in equipoise The night and day."
Longfellow

Also for the Romans per Vigil:

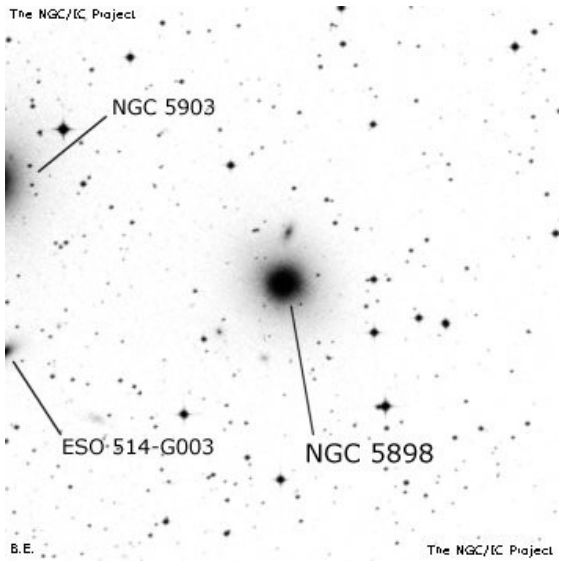
"But when Astraea's balance, hung on high,
Betwixt the nights and days divides the sky,
Then yoke your oxen, sow your winter grain,
Till cold December comes with driving rain,"

The sun was in Libra at the autumnal equinox up until 3000 years ago when precession moved it to Virgo.

NGC 5897 is an 8th magnitude globular cluster found on the line from gamma to sigma (Brachium). You will find it interesting because it is rather loose. The image shows it to be a little more concentrated than it actually is. It's XI on the SHS classification which is about as loose as you can go. It would be great if one of our CCD experts were to image 5897 across the whole frame of the chip. I imagine that would be a spectacular shot.



Near 5897 is Merrill 2-1, PK 342+7.1, a very small 11th magnitude planetary. I never found it. The charts show it next to a star (9th mag.?) **https://www.astrobin.com/goxcku/?q=5897** Finding it visually will be a bear and I have no idea how you would image it. The catalogs tell us it's 16" of arc across. That's about 1/3 the apparent diameter of Tycho in your telescope.



NGC's 5903 and 5898 are two elliptical galaxies very close in your field of view. They are not perfect, but certianly fraternal twins, both 11th magnitude and 2ish to 3ish min. of arc. They are classified E1, so they are almost perfect circles.

https://kosmoved.ru/get_ngcic.php?ID=NGC-5898&lang=eng flickr.com Dan Crowson

Above Beta β, Zubeneschamali is a small patch of sky with three rather interesting but completely different objects. We have delta δ, Zuben Elakrabi, an Algol type variable that changes a whole visual magnetic from 4.9 to 5.9 in just over two days. Then we have Gliese 581, an 11th magnitude M class, very red star that is very near to us and has three planets.

Also right there is NGC 5812, another nearly perfect circular elliptical glaxy easily visible at 11th magnitude and 2' across.

Another system we know about is Gliese 570, on a line between alpha α and sigma σ. Gliese 570 is a 5 star system with maybe a brown dwarf and maybe a planet. It's 15th magnitude and very orange. The two primary companions B and C each have a red dwarf companion. B is 9th and C is 11th, good luck splitting them.

Look for NGC 5885 near Zubeneschamali. It's a 3'x3' face-on a spiral of 11th magnitude with a hint of a bar.

There are a number galaxies east of the line between alpha and sigma. Something of a sprinkling of galaxies. One of them is NGC 5728, a ¾ face-on spiral. Many of the galaxies here are in the 11th to 14th magnitude, perhaps a little project. Square in the middle between beta and sigma is NGC 5892, a 10th magnitude open-face spiral with wide arms. Resolution will be difficult.

Quite some years ago Walter Scott Houston wrote:

> "At first, time spent under crystalline starlight has all the flash and romance of a soft embrace on a warm summer's eve"

He spoke of moving past the romance of astronomy and challenging ourselves with binoculars. He would be just as much in love today when so many amateur astronomers have mvoed from huge mirrors to Richey-Chretien optics to apochromates with stunning optical performance and larger more sensitive CCD chips. We have amateur astronomers and astro-photographes today who are producing images that rival the best of the professionals 50 years ago. We have others who have used larger instruments that vault

over the NGC and IC to visually observe fainter and more difficult objects. We have amateurs who study the massive amounts of data collected by the professionals and discover previously unknown planetary, emission, globular, and any and all types of extra-galactic objects.

Scotty would be 110 years old this year. He felt immense gratification at the promises of amateur astronomy while he was still with us and I have no doubt he would feel the same gratification at the place amateur astronomy is at today.

Dark Skys,

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Find A Ball of Stars
Linda Shore, Ed.D

French astronomer Charles Messier cataloged over 100 fuzzy spots in the night sky in the 18th century while searching for comets – smudges that didn't move past the background stars so couldn't be comets. Too faint to be clearly seen using telescopes of the era, these objects were later identified as nebulas, distant galaxies, and star clusters as optics improved. Messier traveled the world to make his observations, assembling the descriptions and locations of all the objects he found in his *Catalog of Nebulae and Star Clusters*. Messier's work was critical to astronomers who came after him who relied on his catalog to study these little mysteries in the night sky, and not mistake them for comets.

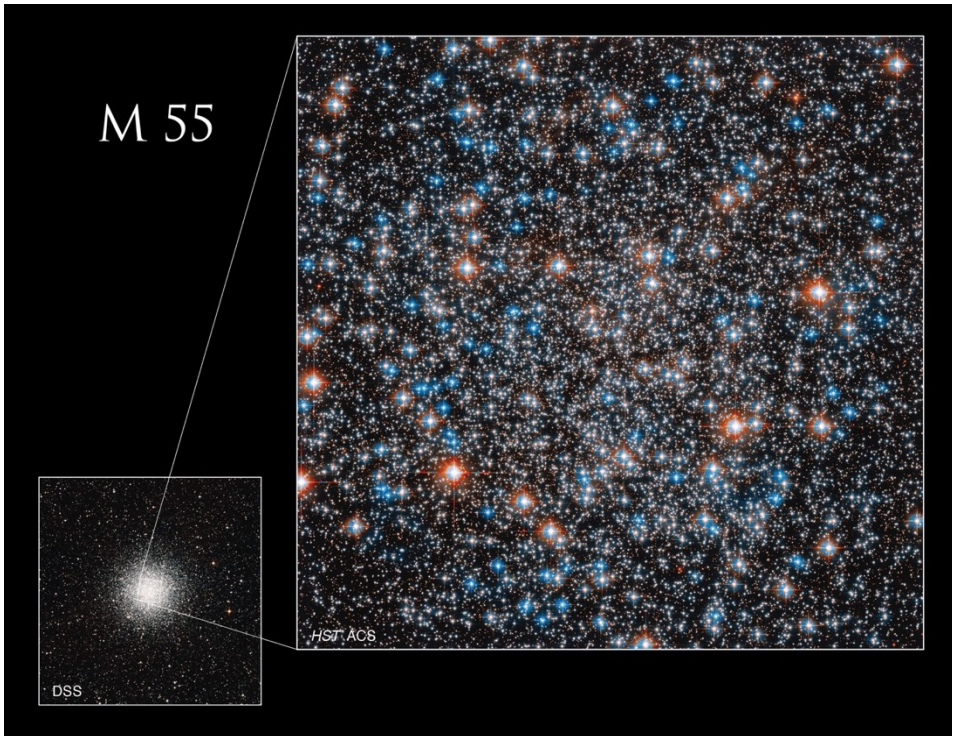
Most easily spotted from the Southern Hemisphere, this "faint fuzzy" was first cataloged by another French astronomer, Nicholas Louis de Lacaille in 1752 from Southern Africa. After searching many years in vain through the atmospheric haze and light pollution of Paris, Charles Messier finally added it to his catalog in July of 1778. Identified as **Messier 55 (M55)**, this large, diffuse object can be hard to distinguish unless it's well above the horizon and viewed far from city lights.

But July is great month for getting your own glimpse of M55 – especially if you live in the southern half of the US (or south of 39°N latitude). Also known as the "Summer Rose Star," M55 will reach its highest point in northern hemisphere skies in mid-July. Looking towards the south with a pair of binoculars well after sunset, search for a dim (mag 6.3) cluster of stars below the handle of the "teapot" of the constellation Sagittarius. This loose collection of stars appears about 2/3 as large as the full Moon. A small telescope may resolve the individual stars, but M55 lacks the dense core of stars found in most globular clusters. With binoculars, let your eyes wander the "steam" coming from the teapot-shaped Sagittarius (actually the plane of the Milky Way Galaxy) to find many more nebulas and clusters.

As optics improved, this fuzzy patch was discovered to be a globular cluster of over 100,000 stars that formed more than 12 billion years ago, early in the history of the

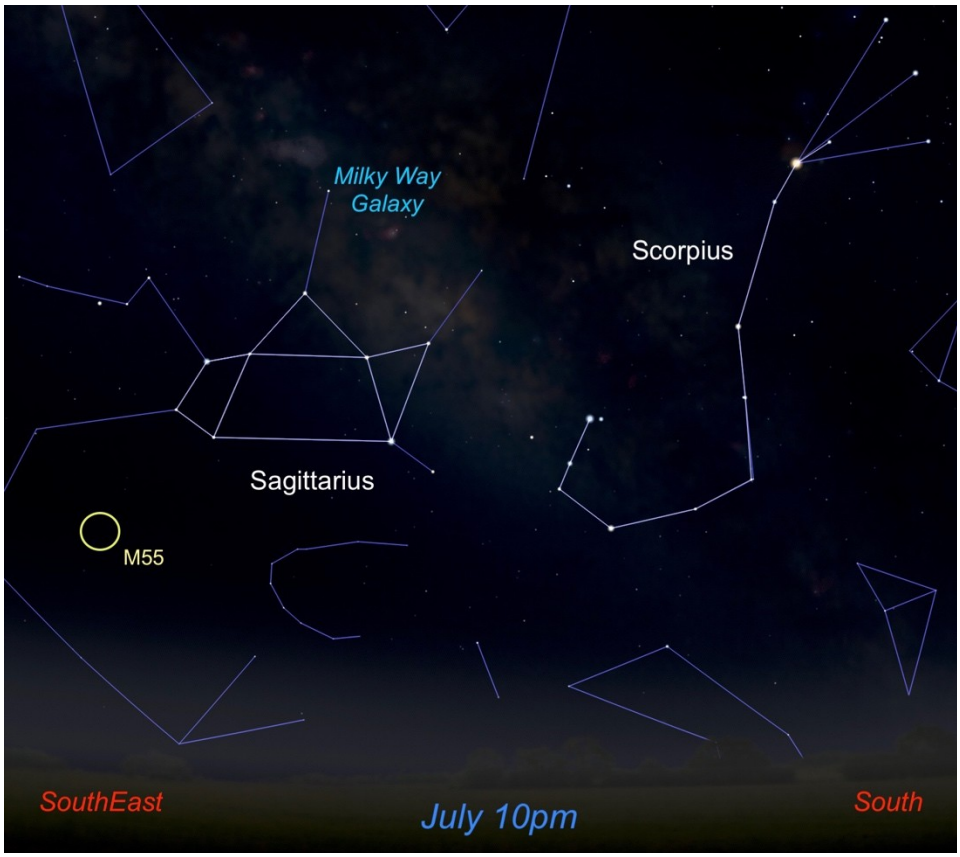
Universe. Located 20,000 light years from Earth, this ball of ancient stars has a diameter of 100 light years. Recently, NASA released a magnificent image of M55 from the Hubble Space Telescope, revealing just a small portion of the larger cluster. This is an image that Charles Messier could only dream of and would have marveled at! By observing high above the Earth's atmosphere, Hubble reveals stars inside the cluster impossible to resolve from ground-based telescopes. The spectacular colors in this image correspond to the surface temperatures of the stars; red stars being cooler than the white ones; white stars being cooler than the blue ones. These stars help us learn more about the early Universe. Discover even more: https://www.nasa.gov/feature/goddard/2023/hubble-messier-55

The Hubble Space Telescope has captured magnificent images of most of Messier's objects. Explore them all:
https://www.nasa.gov/content/goddard/hubble-s-messier-catalog/



The large image shows just the central portion of M55 taken by the Hubble Space Telescope. Above Earth's atmosphere, this magnificent view resolves many individual stars in this cluster. How many can you count through binoculars or a backyard telescope?

Original Image and Credits: NASA, ESA, A. Sarajedini (Florida Atlantic University), and M. Libralato (STScI, ESA, JWST); Smaller image: Digital Sky Survey; Image Processing: Gladys Kober



Look to the south in July and August to see the teapot asterism of Sagittarius. Below the handle you'll see a faint smudge of M55 through binoculars. More "faint fuzzies" can be found in the steam of the Milky Way, appearing to rise up from the kettle.

Image created with assistance from Stellarium: stellarium.org

(Credit: NASA/CXC chandra.harvard.edu/photo/2011/cygx1/)

The TVA is a member club of The Astronomical League