



Newsletter of the Pomona Valley Amateur Astronomers

The most likely outcome is the most ironic outcome.

Elon Musk



Volume 43 Number 5

nightwatch

May 2023

Club Events Calendar

May 5 Virtual General Meeting David Vartanyan, PhD, Hubble Einstein Fellow “Deaths of massive stars as core-collapse supernovae (CCSNe)” 7:30 PM

May 20 Star Party – GMARS
May 24 Board Meeting 6:15 PM

Jun 2 Virtual General Meeting 7:30 PM
Jun 17 Star Party – GMARS
Jun 28 Board Meeting 6:15 PM

July 7 Virtual General Meeting 7:30 PM
July 15 Star Party – GMARS
July 26 Board Meeting 6:15 PM

Aug 4 Virtual General Meeting 7:30 PM
Aug 19 Star Party – GMARS

Sep 16 Star Party – GMARS
Sept 20 Board Meeting
Sep 29 Virtual General Meeting 7:30 PM

Oct 14 Star Party – Joshua Tree Night Sky Festival
Oct 18 Board Meeting 6:15 PM
Oct 27 Virtual General Meeting 7:30 PM

Nov 8 Board Meeting 6:15 PM
Nov 17 Virtual General Meeting 7:30 PM
Nov 18 Star Party – GMARS
Nov 29 Board Meeting 6:15 PM

Dec 9 Holiday Party

The memorial service for Eldred Tubbs is planned for Saturday, June 3, 2023 a 10:30 am at:

His family let us know that anyone from the PVAA who lives locally and would like to attend is welcome.

St. Ambrose Episcopal Church
830 W. Bonita Ave
Claremont, CA 91711

PVAA Officers and Board

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PVAA General Meeting 04/07/23

Our speaker for the night was Salem Emara, NASA Solar System Ambassador. The title of his presentation was “The Invisible Beauty through JWST IR Cameras.” James Webb IR cameras are designed to look in the .7 to 25 micrometer range. The Spitzer Space Telescope (2003 – 2020) had a wider band of IR (Infrared): 3.6 to 160 micrometer range. It used liquid helium to cool the telescope down to see the longer wavelengths. When the helium ran out it could only see the shorter wavelengths.

The reason we want infrared telescopes in space is because most things on Earth radiate a glow in the 10-micron range. The atmosphere also absorbs IR, and creates noise, so that is why we launched the James Webb Space Telescope (JWST) to the L2 LaGrange point. It is a stable point in relation to the Earth and Sun that takes very little fuel to maintain its position.

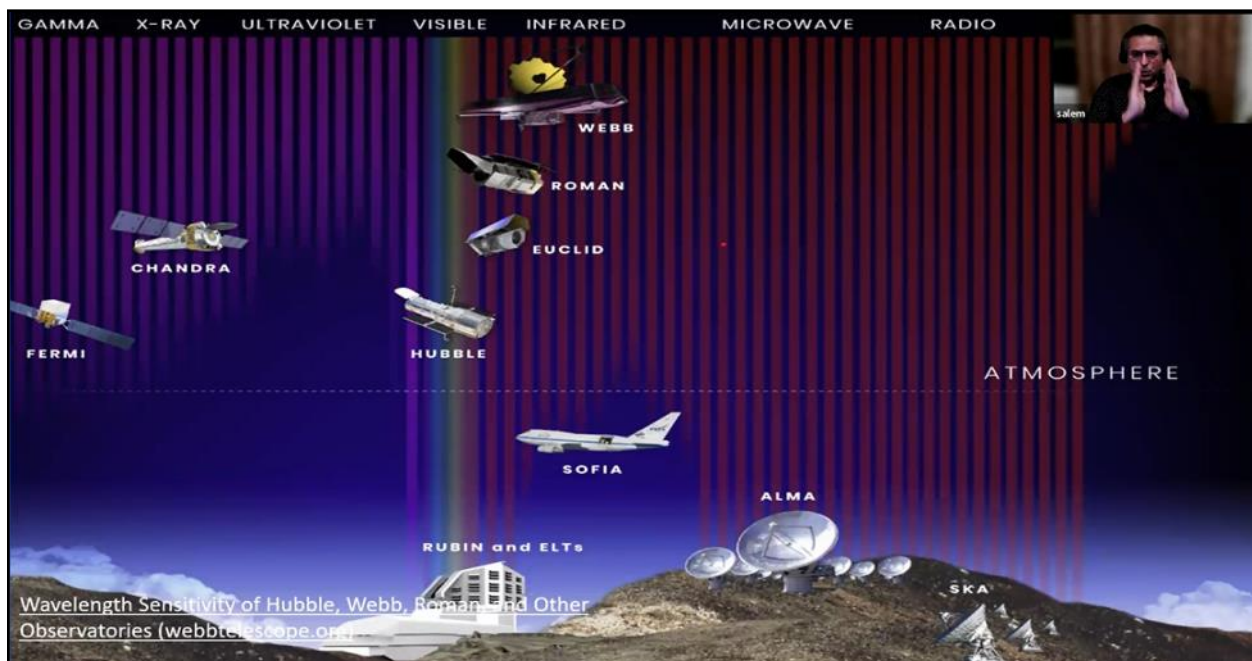
Salem then talked about JWST’s IR sensors and filters and compared Hubble’s Deep Field picture to JWST’s. JWST is providing new data that is requiring the scientists to tweak their models on the origin of the universe. James Webb is giving scientists more questions to figure out - and it is only getting started.

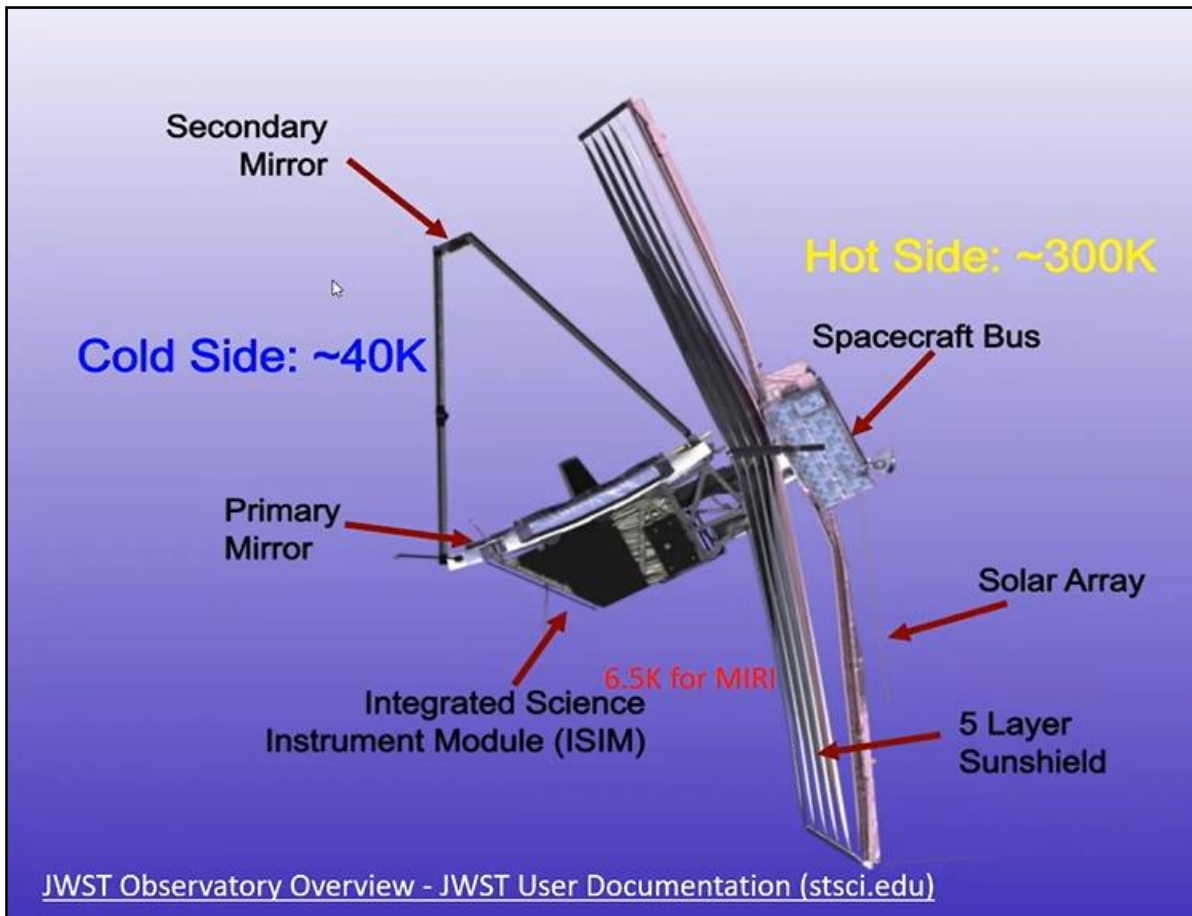
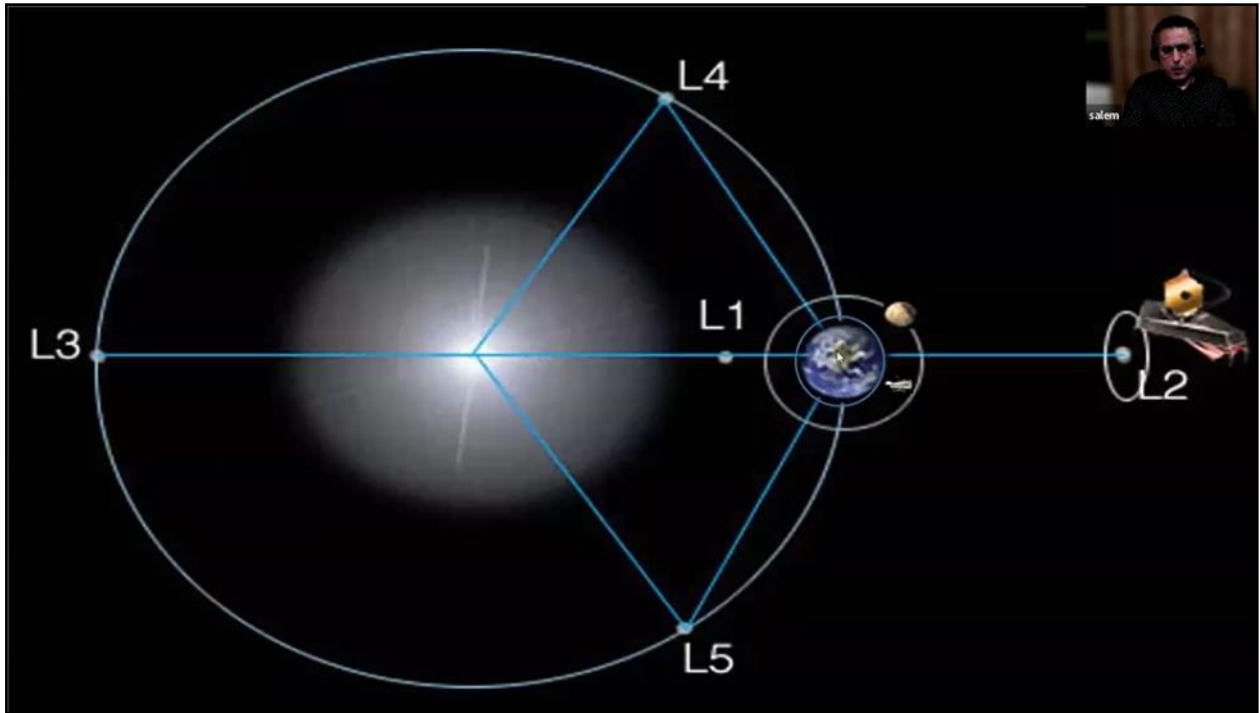
Gary Thompson

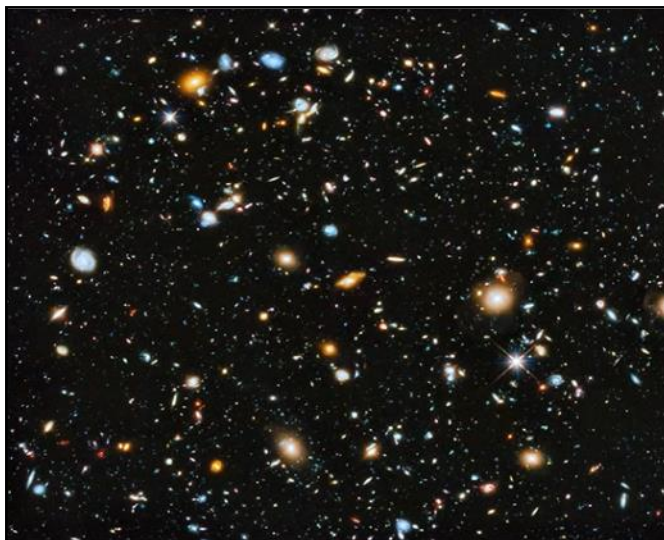
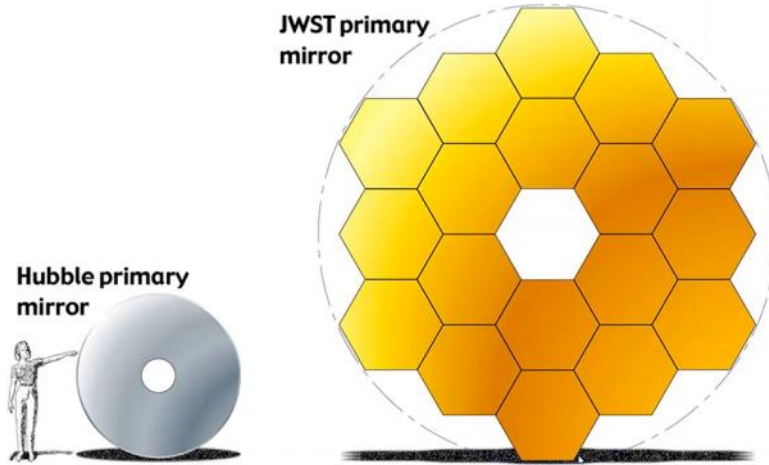
Sources Of IR Emission

SPECTRAL REGION	WAVELENGTH RANGE (microns)	TEMPERATURE RANGE (degrees Kelvin)	WHAT WE SEE
Near-Infrared	(0.7-1) to 5	740 to (3,000-5,200)	Cooler red stars Red giants Dust is transparent
Mid-Infrared	5 to (25-40)	(92.5-140) to 740	Planets, comets and asteroids Dust warmed by starlight Protoplanetary disks
Far-Infrared	(25-40) to (200-350)	(10.6-18.5) to (92.5-140)	Emission from cold dust Central regions of galaxies Very cold molecular clouds

RED Shift galaxies are also a source of IR emissions







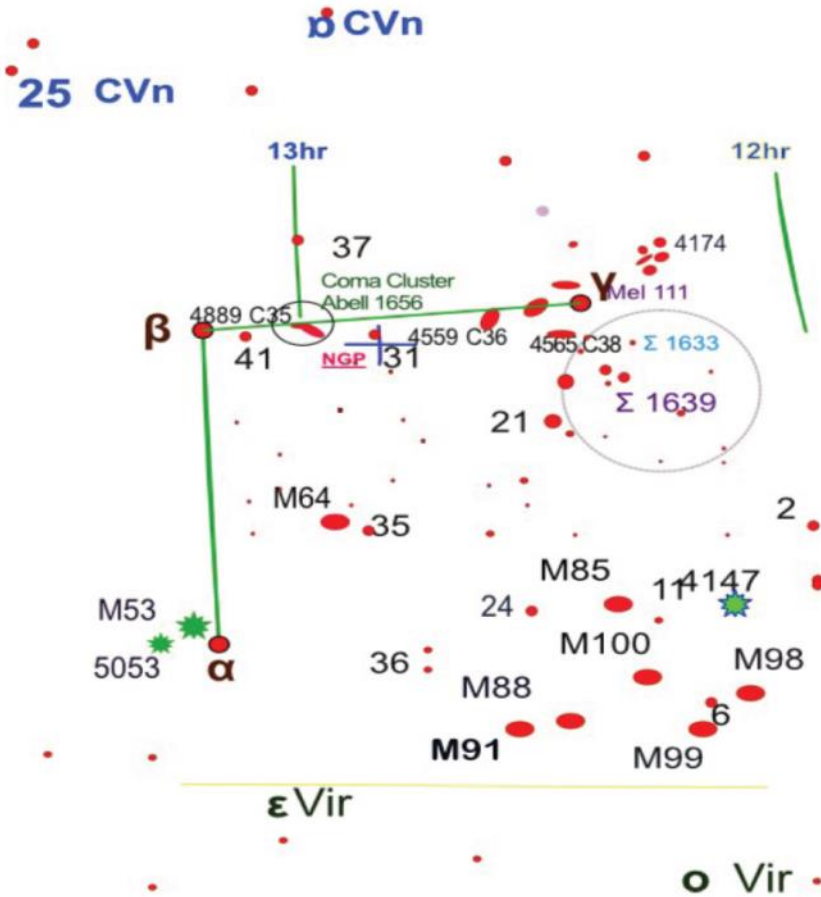
- Hubble Ultra Deep Field
- Composite image shows the most distant galaxies possibly observed by current technologies before JWST
- More than 800 Hubble orbits used to generate this image
- (STScI) - <http://hubblesite.org/newscenter/archive/releases/2014/27/image/a/>

JWST 12-hour Deep Field exposure vs Hubble's 21-day exposure.



Another Look - May 2023

New Moon! The New Moon in May is Friday May 19, 2023 11:53 AM EDT or 3:53 PM UTC May Full Moon is May 5; The Full Flower Moon in May describes all the flowers blooming in spring. Native Americans called it Budding Moon, Egg Laying Moon, and Planting Moon. The Anglo-Saxon name is Milk Moon, while the Celtic and Old English names are Mothers' Moon, Bright Moon, Hare Moon, and Grass Moon. In Spanish it is La Luna Ilena, in French it is La Plein Lune and in Italian La Luna Piena.



Berenice II
<https://www.britannica.com/biography/Berenice-II>

Galaxies, Galaxies, Galaxies and even more Galaxies.

Directly overhead around 2100 hours In the middle of May lie the two constellations of Coma Berenices and Canis Venatici, both packed to

the gills with galaxies...There are so many galaxies that its makes more sense to only talk about the ones Messier listed as not comets.

In Ptolemy's time, Coma Berenices was not a constellation but a sprinkling of stars he assigned to Leo, a sort of a tuft in its tail that was probably what we see now as Melotte 111, over by Gamma γ. Then, Caspar Vopel included her on his globe in the mid 1530's. Mercator placed her on his globe in the mid 1500's, in Mercator's case he named the constellation Hair. then, none other but the illustrious personality Tycho Brahe, in 1602, cataloged the stars separately.

Looking at Coma Berenices the constellation, Wow, she's great. Then, when you read the histories of Berenice the person, you'll find that her life was full of politics, family and sadly, loss. Berenice was a queen of Egypt in the later years of the Ptolemaic dynasty during Greek's ascendancy. Berenice's

husband, also her brother, went to war and we are told that Berenice promised her hair to Aphrodite if her husband came home safely. Thus, it happened and Berenice's hair was placed in a temple to Aphrodite soon after which it was promptly stolen. Clearly this was done by divine intent and Berenice's hair was placed in the heavens for all to admire.

Of course there is not all that much to admire with just your eyes alone. Back in her time, the dark skies along the Nile allowed us to see a sprinkling of fainter naked eye stars. Alpha, Beta and Gamma are the three brightest stars in Coma, each at 4th magnitude. Alpha's name is Diadem and is a double of equal 5th magnitude stars. 5th magnitude 41 Comae Berenices has a planet and 31 Comae Berenices has been foisted with the rather unfortunate name of Polaris Galacticum Borealis, a misspelling, as the closest star to the North Galactic pole. By the way, since Polaris is feminine, the correct spelling should be Polaris Galactia Borealis. I doubt either will catch on.

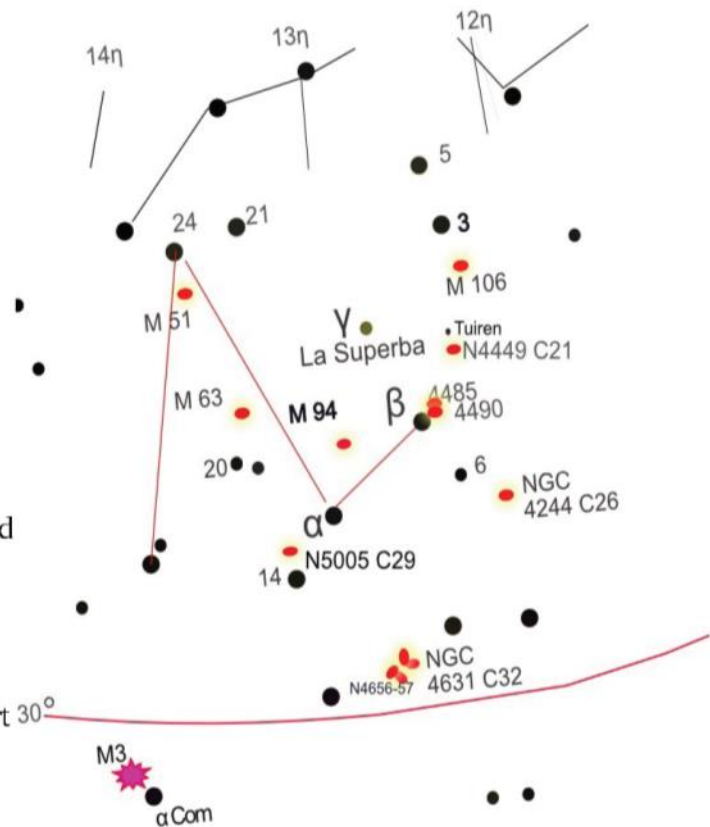


Firmamentum Sobiescianum

Canis Venatici is another story. Considered by Ptolemy as "unformed" stars in Ursa Major it wasn't until Hevelius added the dogs to his atlas in 1687 that that area was identified as a constellation.

Again, as happened before, Canis Venatici became a constellation by miss-translation. In Ptolemy's text, some of the stars in [Boötes](#) represent the Herdsman's club or even a shepherd's crook as can be seen on a few very old celestial globes. This was before the alternate designation of Bootes as hunting the bear rather than a shepherd or herdsman. The translator loosely translated the Greek word for club to the Arabic for spear-shaft with a hook, what we would identify today as a Halberd. When the Arabic phrase he used was later translated to Latin, the translator erred again and mistook one of the Arabic words as meaning dogs.

Early in the 1500's a mathematician and mapmaker named Petrus Apianus drew his chart with dogs. Later that century Mercator, same one as before, followed with his globe showing



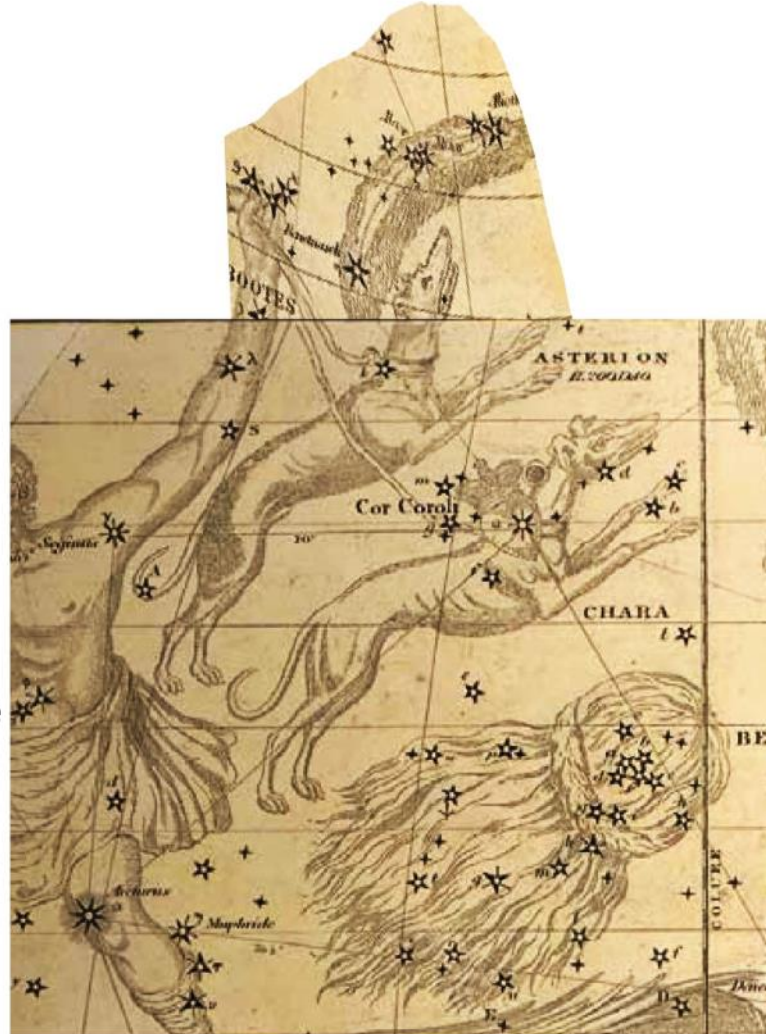
the dogs. Hevelius was next in the 17th century showing his now famous collection of new constellations.

The constellation chart of the dogs is from two pages of Elijah Burrit's "Geography of the Heavens" published in 1873 and found in the Library of Congress. I clipped pieces from two separate maps and merged them together.

The northern dog Hevelius named Asterion or Star and the southern dog Chara, meaning Joy.

The name Chara later began to be used specifically to refer to the star Chara – β Canum Venaticorum.

So, in 1690 Hevelius added the Giraffe, the Unicorn, the Little Lion, the Little Triangle, Herschel's Telescope and the Lynx. The drawing above is a portion if the frontispiece of Hevelius's atlas "Firmamentum Sobiescianum" printed in 1687. It shows Lynx, Canis Venatici, Vulpecula, Leo Minor and Lacerta. In the top left is Cerberus, since forgotten as is Herschel's Telescope.



Canes Venatici contains four named stars. The star names are Chara, Cor Caroli, La Superba, and Tuiren.

La Superba has interest because it is the brightest carbon star of its designation in the sky, meaning it is very red. Cor Caroli is a double but the interesting one is 12th magnitude Tuiren, HAT-P-36. Tuiren has a Jupiter sized planet named Bran. The names come from Irish folklore.

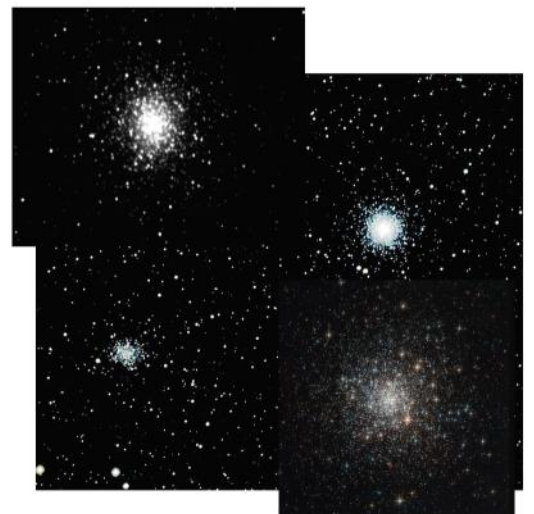
Between the two constellations are four globular clusters; M3-6th mag., M53-7th mag, NGC 5053-9th mag and NGC 4147- 10th magnitude.

<https://ocastronomers.org/wp-content/uploads/2019/01/M53-00X-LRGB-A2B-OCA.jpg>

<https://ocastronomers.org/wp-content/uploads/2019/01/m003.jpg>

<https://www.flickr.com/search/?text=ngc 4147>

Coma Berenices contains Messier objects: M53, M64 (Black Eye), M85, M88, M91, M98, M99, M100. and the Caldwell objects: C35, C36, C38.



Canis Venatici has Messier's M3, M51 (Whirlpool), M63 (Sunflower), M94, M106, and the Caldwell objects: C21, C26, C29, C32 (Whale).

In addition there is NGC 4565 (Needle) [Joe Neu's favorite], Melotte 111, the Coma Star Cluster and the Coma Galaxy Cluster.

There are a number of Caldwell objects close to each other at the border between the two constellations, all great star party objects. Caldwell's 32-Whale, 35-Coma Star Cluster, 36 and 38-Needle. [Coma_Cluster_CE_20040409_01.jpg](#)

Needle Galaxy (NGC 4565) – Bill Hall

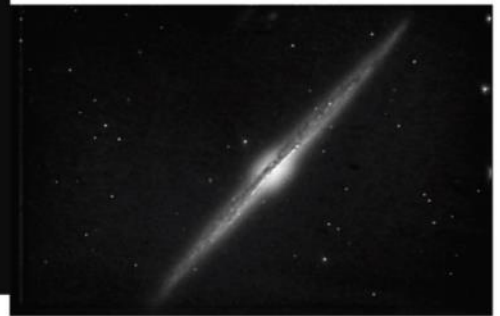
<https://ocastronomers.org/wp-content/uploads/2018/12/NGC4565-80mC6F875r.jpg>

Whale Galaxy (NGC 4631, Caldwell 32, Arp 281)

<https://ocastronomers.org/wp-content/uploads/2018/12/ngc4631-whale.jpg> Greg Pyros2007

Larry Arnold

https://ocastronomers.org/wp-content/uploads/2018/12/NGC4559_CE_20050312_01.jpg Chuck Edmonds 2005



The individual galaxies are each in the 9th magnitude, so easy to find. C35, the Coma Cluster is more for pleasurable galaxy hopping, striving to identify each galaxy as you find it.

The other three Caldwell objects are Caldwell 21, C26- the Silver Needle and C29, all big and all 10th magnitude.

NGC 5005 (Caldwell 29) [https://www.astrobin.com/3iza07/?q=ngc 5005](https://www.astrobin.com/3iza07/?q=ngc+5005) Aurelio55

[https://www.flickr.com/search/?text=caldwell 26](https://www.flickr.com/search/?text=caldwell+26) Crowson 2020

NGC 4449 [https://www.astrobin.com/ccnrzb/J/?q=ngc 4449](https://www.astrobin.com/ccnrzb/J/?q=ngc+4449) Robert S



Also near the border between the two constellations near Gamma Com is the Coma Star Cluster, also known as Melotte 111 and Collinder 256. Mel 111 is a nice

sprinkling of 5th magnitude stars. As previously mentioned, some references state that Mel 111 was the original Berenices Hair.

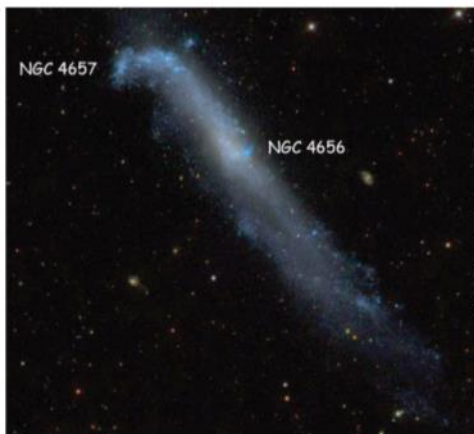
Melotte 111 <https://nicolasillustrations.co>

There are some very interesting regions sprinkled about the two constellations. Between Beta and Gamma Comae Berenices is a number of stunning areas. Close to Beta is the North Galactic Pole (Polaris Galactica Borealis). Between it and Beta is NGC 4889 13th mag.– Caldwell 35 and one of the central galaxies of the Coma Cluster – Abell 1656. Further along are NGC 4559, 10th mag. – Caldwell 36, followed soon after by NGC 4565 10th mag. – Caldwell 38 and Gamma Comae Berenices, anchored by the huge Comae Berenices Star Cluster, Melotte 111, chock full of 4th and 5th magnitude stars. Near Gamma is 10th magnitude NGC 4274, brightest member of a compact group.



[https://www.astrobin.com/245205/?q=ngc 4490](https://www.astrobin.com/245205/?q=ngc+4490) Carsten Dosche 1916

There is also an interesting area around Beta Canum Venaticorum. The planet Tuiren is near. Very close to the “Cocoon” galaxy, NGC 4485 and its companion NGC 4490.

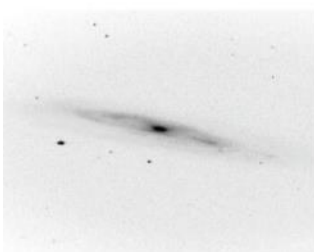


Down near the bottom of Cvn near C32, the Whale, is a very interesting galaxy that deserves some study. NGC4656 and NGC4647 are what appears to be a single highly distorted 11th magnitude galaxy spread out on its long axis, slightly resembling a hockey stick. In actuality, there are two galaxy nuclei to find.

Near the center is NGC 4656 and at the top of this image at the crook of the shaft is NGC 4657.

<https://cseligman.com/text/atlas/ngc46a.htm>

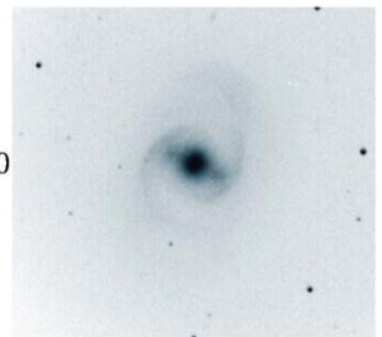
At long last we come to that swarm of galaxies near Coma Berenices border with Virgo. There are seven bright Messier galaxies grouped together: M’s 64, the black eye, 85, 88, 91, 98, 99 and 100.



M98

<https://ocastronomers.org/wp-content/uploads/2019/01/m098.jpg>

M98 has an almost edge on tilt towards us so it is narrow and long. At 10th magnitude it is bright and should hold up to some magnification. It is almost 10 min across, so you may be able to see some detail in the arms.



M91

<https://ocastronomers.org/wpcontent/uploads/2019/01/m091.jpg>

M91 is interesting. Although it is a magnitude fainter than many of its neighbors at 11th, it is one of those distinct barred galaxies that show off very nicely. I massaged this image to bring out the spiral arms a little more. You can see the original by clicking on the hyperlink.



<https://ocastronomers.org/wp-content/uploads/2019/01/m088.jpg> - 30-second exposure, taken on 15 May 1994

Tilted away or maybe towards us at what looks like a 60° angle, 10th magnitude M88 is one of the crown jewels of the Virgo cluster.



<https://ocastronomers.org/wp-content/uploads/2018/12/M99-colored.jpg>

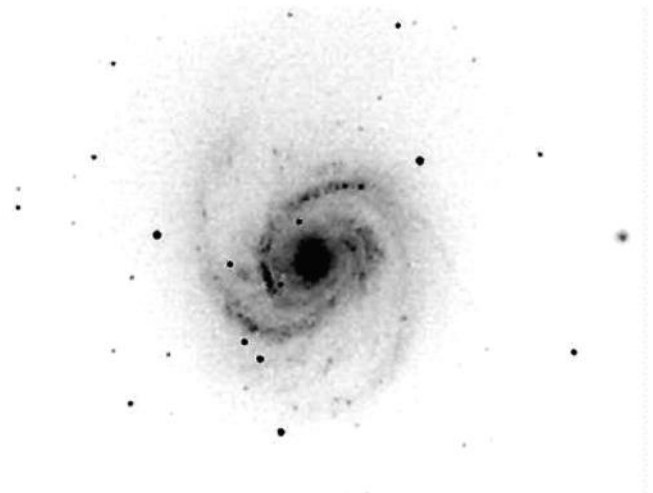
M88

M99 is another supernova hunting ground. It is 10th magnitude. Be sure to try to see how the one spiral arm juts out from the main galactic disk. Is there maybe an invisible companion near?

<https://ocastronomers.org/wp-content/uploads/2019/01/m100.jpg>

M100 is one of the largest members of the Virgo cluster and is very bright at 10th magnitude. It has two bright spiral arms and a bright nucleus. M100 is also a happy hunting ground for supernova searchers, the last one in 2006. If you have a slightly larger telescope, look for M100's 15th magnitude companion galaxy NGC 4323.

The [Black Eye Galaxy](#) (Messier 64) is a spiral galaxy with an apparent magnitude of 9.36, it is a laboratory in the study in galactic dynamics.



<https://ocastronomers.org/wp-content/uploads/2018/12/M64-36mddpcccdshpr1-copy>.

M85 is a double galaxy field made up of a large 10th magnitude spiral and a smaller 11th magnitude barred spiral. It is also a hunting ground for supernova.



<http://www.astronomersdoitinthedark.com/index.php?c=135&p=500>

This is beautiful piece of sky. Of course this is just a primer on these beautiful spring constellations. Deep dives into galaxies and clusters of galaxies and even more await you.

Dark Skys

Dave Phelps

M94 and Moon

Wow, three months since my last image. I planned to miss February due to hand surgery, which was successful, and we were traveling in March. So here we are in April, past the epic rains of late winter! We were under dark skies the nights of April 21 and 22, both of which were forecast to be clear. But after arriving, the Saturday night forecast was for cloudy skies. Fortunately, the forecast was wrong, which was a blessing because I used new software to acquire the photos and messed up the filter settings. The first night was mistakenly shot through only the red filter instead of red, green, and blue, along with twice as many through the luminance filter. This was also the first time using my new telescope, a 120mm refractor whose field of view is nearly exactly between the fields of my other two imaging scopes.

It's galaxy season again, so looking through possible targets for the new scope, I settled on M94, also known as the Croc's Eye Galaxy. It's located in a small constellation, Canes Venatici, the Hunting Dogs, under the handle of the Big Dipper. The galaxy is unusual in that it has two ring structures and has very little dark matter. About a quarter of the galaxy's mass is in the faint outer ring and it's unknown exactly how the outer ring formed. At a mass of about 60 billion suns, it is about 1/25 as massive as the Milky Way; and at a size of about 25,000 light years across, it's about 1/3 the size. The galaxy is classified as a barred spiral, but the bar appears more like an oval than a bar. Two spiral arms can be seen emanating from the center. Located about 15-17 million light years away, the galaxy spans about 10 arcsecs of the sky. Finally, in the image, several small galaxies can be seen scattered throughout the background.



The image is an LRGB photo from stacking 80 3-minute luminance frames and 46, 22, and 18 5-minute red, green, and blue frames, respectively. 20 dark, 21 flat dark, and 21 flat frames were used for calibration. Stacking and processing was done in PixInsight while data was collected using NINA software. Except for the user error, NINA worked well and will

allow me to get a little more sleep since nearly all the imaging steps are automated. The RGB channels were combined, noise reduction was performed, and the image stretched. Afterward, gradients were removed. I found that stretching before removing gradients worked better than the other way around, which created color blotches in the background. The color image

was stretched again to improve contrast and color saturation was increased. Similarly, the luminance stack had noise reduction applied and then was stretched and gradients were removed. Stars were removed and the image was stretched

again to improve contrast. The galaxy was sharpened using high-dynamic range multiscale transformation and the stars were added back. The luminance and color images were then combined, the background level adjusted, and a final round of noise reduction was done.



As a bonus, because of the weather forecast for Saturday night, I took a series of quick photos of the moon through the red, green, and blue filters. These were registered, stacked, and combined into an RGB image in PixInsight. Slight stretching was done and multiscale linear transformation was used to sharpen the details. Not much processing was done on this one.

I hope you enjoy both of the images. Until next month, clear skies!

Ron Ugolick

<https://www.astrobin.com/users/ruccd/>

PVAA Modernizes Payments!

In addition to using checks and cash, PVAA Members can now pay their dues using Zelle. Send your payment to mathew.wedel@gmail.com using Zelle and it will go into the PVAA bank account.

You can also use this QR code.

Thanks to Matt for setting this up and to John Elliott for the suggestion.

PVAA Membership Renewal for April 30, 2023

- \$30 - Individual Membership
- \$40 - Family Membership
- \$18 Student Under age 18 Membership

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