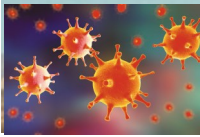


# The High Desert Observer



June 2020



The Astronomical Society of Las Cruces (ASLC) is dedicated to expanding public awareness and understanding of the wonders of the universe. ASLC holds frequent observing sessions and star parties and provides opportunities to work on Society and public educational projects. Members receive electronic delivery of *The High Desert Observer*, our monthly newsletter, plus, membership in the Astronomical League, including their quarterly publication, *Reflector*, in either paper or digital format. ASLC members are also entitled to a \$5 (per year) discount on *Sky and Telescope* magazine.

**Annual Individual Dues are \$30**

**Annual Family Dues are \$36**

**Annual Student (Full Time) Dues are \$24**

Annual Dues are payable in January. Prorated Dues are available for new members. Dues are payable to ASLC with an application form or note to: Treasurer ASLC, P.O. Box 921, Las Cruces, NM 88004. Contact our Treasurer, Patricia Conley ([treasurer@aslc-nm.org](mailto:treasurer@aslc-nm.org)) for further information.

**ASLC Board of Directors 2019;** [board@aslc-nm.org](mailto:board@aslc-nm.org)

**President:** Tracy Stewart; [president@aslc-nm.org](mailto:president@aslc-nm.org)

**Vice President:** Ed Montes; [vp@acslc-nm.org](mailto:vp@acslc-nm.org)

**Treasurer:** Patricia Conley; [treasurer@aslc-nm.org](mailto:treasurer@aslc-nm.org)

**Secretary:** John M<sup>c</sup>Cullough; [secretary@aslc-nm.org](mailto:secretary@aslc-nm.org)

**Director-at-Large:** Steve Barks; [director1@aslc-nm.org](mailto:director1@aslc-nm.org)

**Director-at-Large:** Kevin Brown; [director2@aslc-nm.org](mailto:director2@aslc-nm.org)

**Past Pres:** Howard Brewington; [comet\\_brewington@msn.com](mailto:comet_brewington@msn.com)

## Committee Chairs

**ALCOR:** Patricia Conly; [tconly00@hotmail.com](mailto:tconly00@hotmail.com)

**Apparel:** Howard Brewington; [comet\\_brewington@msn.com](mailto:comet_brewington@msn.com)

**Calendar:** Chuck Sterling; [csterlin@zianet.com](mailto:csterlin@zianet.com)

**Education:** Rich Richins; [education@aslc-nm.org](mailto:education@aslc-nm.org)

**Grants:** Sidney Web; [sidwebb@gmail.com](mailto:sidwebb@gmail.com)

**Loaner Equipment:** Sidney Webb; [sidwebb@gmail.com](mailto:sidwebb@gmail.com)

**Membership:** (Position Open)

**Observatories:**

Leasburg Dam: David Doctor; [astrodoc71@gmail.com](mailto:astrodoc71@gmail.com)

Tombaugh: Steve Shaffer; [sshaffer@zianet.com](mailto:sshaffer@zianet.com)

**Outreach:** Chuck Sterling; [csterlin@zianet.com](mailto:csterlin@zianet.com)

**Website:** Steve Barks; [steve.barkes@gmail.com](mailto:steve.barkes@gmail.com)

**HDO Editor;** Rob Westbrook; [robwest63@yahoo.com](mailto:robwest63@yahoo.com)



## Table of Content

- 2 From the President's Desk— Tracy Stuart
- 3-9 Uranograph, Virgo— The Maiden – Bert Stevens
- 9-10 Member Astrophotography
- 11 Member Astro Gear Swap Shop

## Member Info Changes

All members need to keep the Society informed of changes to their basic information, such as name, address, phone number, or email address. Please contact [Treasurer@aslc-nm.org](mailto:Treasurer@aslc-nm.org) with any updates .

## June Meeting

Our next meeting TBD later, as circumstances permit. The ASLC will not be holding meetings, gatherings or public outreach events until it is deemed safe to do so.

## Events

ASLC hosts deep-sky viewing and imaging at our dark sky location in Upham. We also have public in-town observing sessions at the Pan Am Plaza (on University Ave.) and at Tombaugh Observatory (on the NMSU campus) All sessions begin at dusk. At our Leasburg Dam State Park Observatory, we hold monthly star parties. Located just 20 miles North of Las Cruces, our 16" telescope at this site is used to observe under rather dark skies.

# From the Desk of the ASLC President

## Tracy Stewart

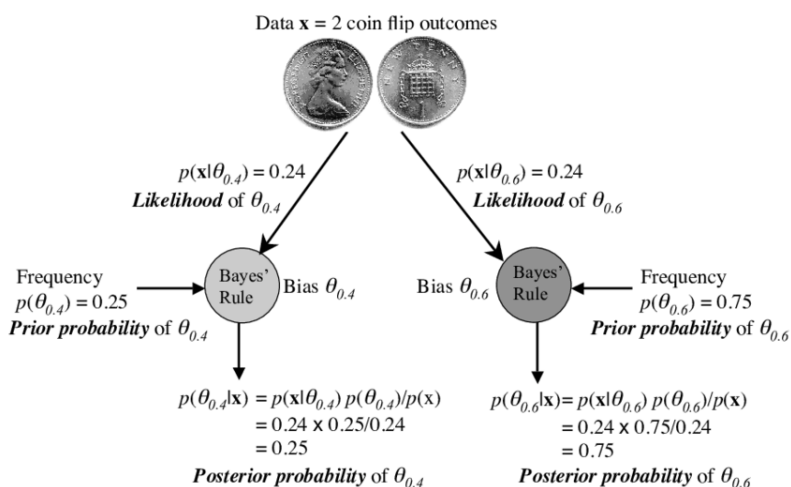
### What a time!

This has been a strange but interesting time. ASLC will (I hope) have a meeting this month via Zoom. We'll see how that works out however I don't have a speaker for this month. Any suggestions.

It looks like we won't be bumming rides into space from the Russians anymore. The US has, for the first time since the shuttle, launched astronauts from Pad 39. They docked with the space station 19 hours later. Even more interesting is that the launch vehicle and capsule were designed and built by a private company. Perhaps this is the future of manned space flight.

Just finished looking thru the July issue of **Astronomy** and found an interesting article by Jeff Hester titled The Coolest Cat On The Web in which he has a brief discussion on Schrödinger's cat and then links that to a new smart phone app called Universe Splitter. The app asks you to let it choose between two courses of action you might take. Hit "go" and the Universe Splitter contacts a machine which generates a single photon in a mixture of two quantum states; "measures" the photon finding it in one state or the other and tells you what to do. Seems to me to be a very elaborate way to flip a coin. The discussion on Schrödinger make the article worth reading in case you have forgotten about that part of quantum mechanics.

**The answer is 42.**



### Some Useful Links

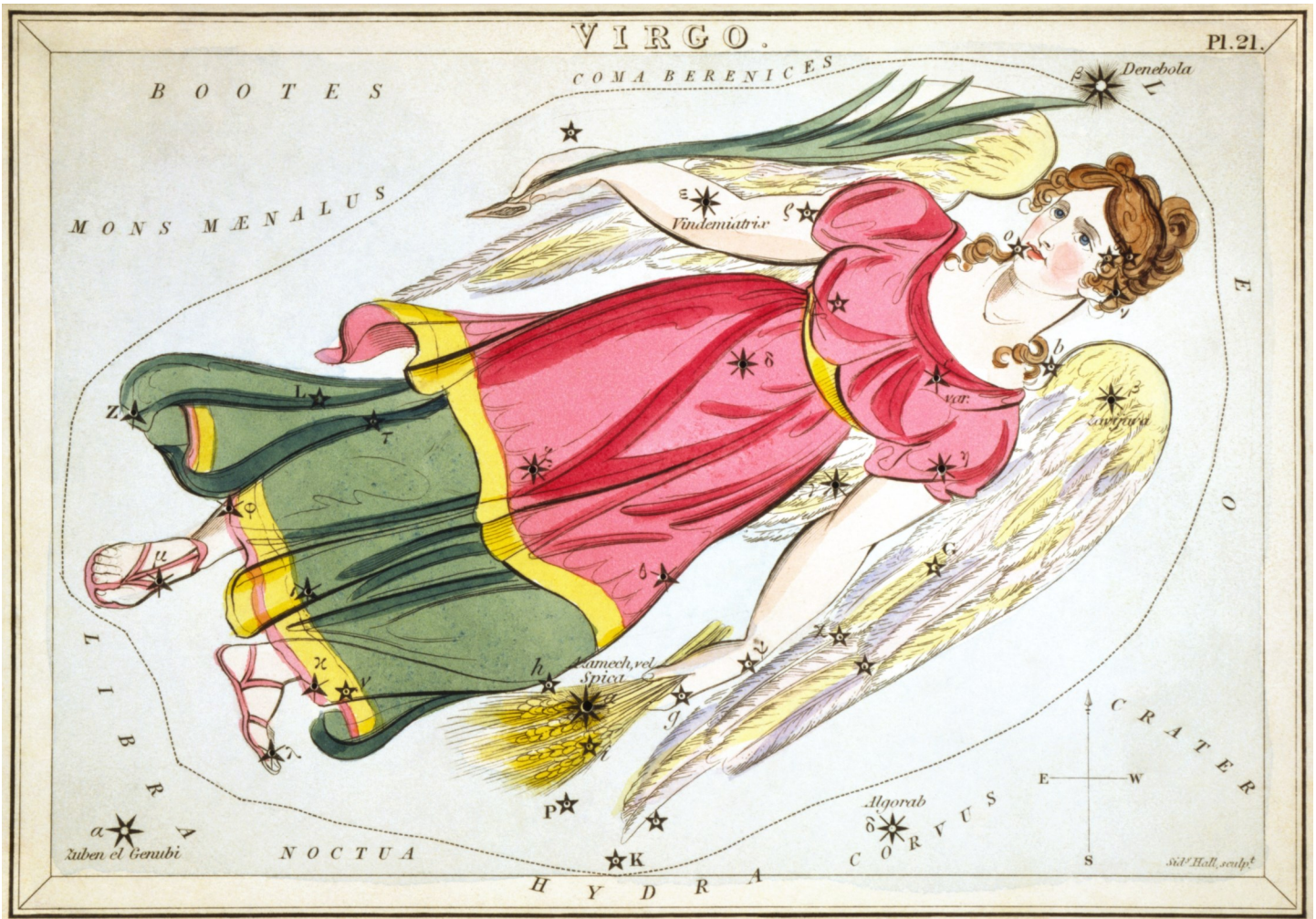
<https://www.youtube.com/watch?v=ZEMSVgGb38I>

<https://www.youtube.com/watch?v=wZTGh35kioQ>

<https://www.youtube.com/watch?v=ZBInhPFFVog>

<https://www.youtube.com/watch?v=LL8ccdst1fs>





*Uranias Mirror Virgo.jpg*

The constellation Virgo as depicted on a card from a set of constellation identification cards created in 1824 called *Urania's Mirror*. Virgo represent the goddess of fertility, whose appearance in the sky signals the beginning of the planting season in the Northern Hemisphere. The first magnitude star Spica marks the sheaf of wheat she holds in her left hand.

## The Uranograph

By Bert Stevens

### Constellation of the Month: Virgo, The Maiden

Virgo, the Virgin (or Maiden) is our constellation of the month. Because most of the ancient civilizations whose records we have were in the northern hemisphere, Virgo's June appearance is associated with the planting of the harvest. The Persians called this constellation Khosha (Ear of Wheat), while the Hebrews called her Bethulah (Abundance of Harvest). The Babylonians called her Ishtar and the Egyptians, Isis. These last two were both goddesses of fertility.

To the Greeks, Virgo embodies Demeter, the Earth-goddess. Demeter represents the arrival of spring and the bringer of the growing season. Demeter had a beautiful daughter with Zeus named Persephone. While looking up, Hades, the god of the Underworld, fell in love with Persephone. He wanted to marry her, but her mother, Demeter, disapproved. Finally, Hades, tired of waiting, drove a black chariot drawn by four jet-black horses harnessed in golden reins to Earth and carried Persephone off with him to the Underworld where he married her.

## *Uranograph cont...*

Worried when her daughter did not return home, Demeter began to search for the girl. Without her, crops failed and people began to starve. She could not find Persephone anywhere on Earth and so she called upon Zeus to help her. Zeus, bribed by Hades to not intervene, told her that Persephone was in the Underworld with Hades. Zeus asked Demeter to accept the situation and stop her search.

Demeter refused. Zeus saw that his people were starving, so he sent Hermes (Mercury), messenger of the gods, to the underworld. Hermes arrived in the Underworld with a demand from Zeus that Hades allow Persephone to return with him to Earth. Since the gods of Olympus were stronger than he was, Hades sent Persephone back with Hermes to Demeter. In a tearful reunion, Persephone told her mother that she loved Hades and wanted to be with him.

Zeus settled the matter by declaring that Persephone would spend half the year in the Underworld with Hades and half the year on Olympus with her mother. So, when Virgo rises in our eastern sky, Persephone travels to Mount Olympus to be with her mother and spring begins. In fall, Persephone returns to Hades, and her sorrowful mother's inattention allows the plants to die, giving us winter.

To the naked eye, the most prominent feature of Virgo is the bright white star Spica. Virgo is often depicted carrying two sheaves of wheat. Spica marks one of these, and indeed the name Spica is Latin for ear of corn or wheat. Spica is two hundred twenty light-years away and even at that distance, it is still a first magnitude star. With a mass of over eleven times that of our Sun, it is fusing hydrogen in its core so rapidly that it is two-thousand times brighter than our Sun.

Virgo not only has the prominent Spica, but it also contains hundreds of bright galaxies. Just as stars in our galaxy sometimes exist in clusters, the galaxies themselves are grouped together in gravitationally-bound clusters. Virgo is home to a group of galaxies called the Virgo Cluster.

The Virgo cluster consists of over two thousand galaxies spread over Virgo, Coma Berenices and the surrounding constellations. This concentration of galaxies was discovered by comet hunter Charles Messier, who noted this area contained a "cluster of nebulae". Today we know that this cluster is gigantic, almost eight million light-years across and about 60 million light years away.

There are many interesting galaxies in this area that are visible in small telescopes, though larger telescopes will provide a better view. One of the most interesting is M87, discovered by Messier in 1871.

M87 is about twenty percent larger in diameter than our own Milky Way galaxy, roughly 240,000 light-years. Unlike our Milky Way galaxy, which is a spiral galaxy with most of the stars and gas in a giant pancake, M87 is an elliptical galaxy, whose material is not confined to a plane, but spread out vertically as well as horizontally. Even though it is called an elliptical galaxy, this galaxy is classified as an E0, a huge sphere. The additional volume encompassing many millions more stars than our galaxy. This makes it over three times the mass of our galaxy.

## *Uranograph cont...*

Not only is M87 more massive than our galaxy, but it is the most massive galaxy in our part of the universe. Elliptical galaxies are believed to be the result of multiple galaxy collisions. Two galaxies in clusters will sometimes be pulled together by their mutual gravity, causing them to collide. During the collision, the two galaxies will pass through each other, but they will become distorted and both will lose stars, forming “tails” of stars stretching between them. Once a collision occurs, it is likely that there will be more collisions. Slowly, the two galaxies will lose their shapes, with the smaller one becoming completely disrupted.

The remnants will be slowly pulled together by their gravity into a galaxy without arms or any real structure, an elliptical galaxy. In this way, elliptical galaxies can grow by absorbing other galaxies in the same cluster. M87 show signs of remnants of other galaxies that it has absorbed over time. Through this process, M87 has accumulated a massive system of over twelve thousand globular clusters in addition to millions of individual stars.

While most of these globular clusters are bound to M87, one of them, HVGC-1, was found in 2014 to be travelling so fast that it is escaping that galaxy at fourteen thousand miles per second. This is the first hypervelocity globular cluster. It is possible this cluster passed close to the center of the galaxy and was boosted out of the galaxy. The globular cluster survey also turned up over a hundred ultra-compact objects that are three times the size of a normal globular cluster. It has not been determined if these are dwarf galaxies, or a new class of massive globular clusters.

The center of M87 is occupied by a supermassive black hole with a mass between 3.5 and 6.6 billion Suns, squeezed into the tiny area of the galaxy's central 120 AU, roughly six times the distance to Pluto. In keeping with M87's giant size, its black hole is the most massive known black hole. It is surrounded by an accretion disc of dust and gas around 0.39 light-years in diameter. Material from the disc is transferred to the black hole at the rate of one solar mass every ten years.

The energy of the material falling into the black hole causes intense electromagnetic radiation to be emitted. This makes the center of the galaxy very bright with broad emission lines, classifying this galaxy's core as an active galactic nucleus. Early radio telescopes detected strong radio waves coming from galaxies with active nuclei, including M87. Since in the early days the exact source of a particular radio emission was unknown, the M87 radio source was designated Virgo A, the first radio source in Virgo.

Even in visible light, American astronomer Heber Curtis of Lick Observatory observed a “curious straight ray ... apparently connected with the nucleus by a thin line of matter.” This ray is actually a jet of matter being thrown out of the nucleus by the black hole. The jet is pointed perpendicular to the accretion disc and slightly tilted to our line-of-sight. It is probably focused by the tangled magnetic fields around the black hole.

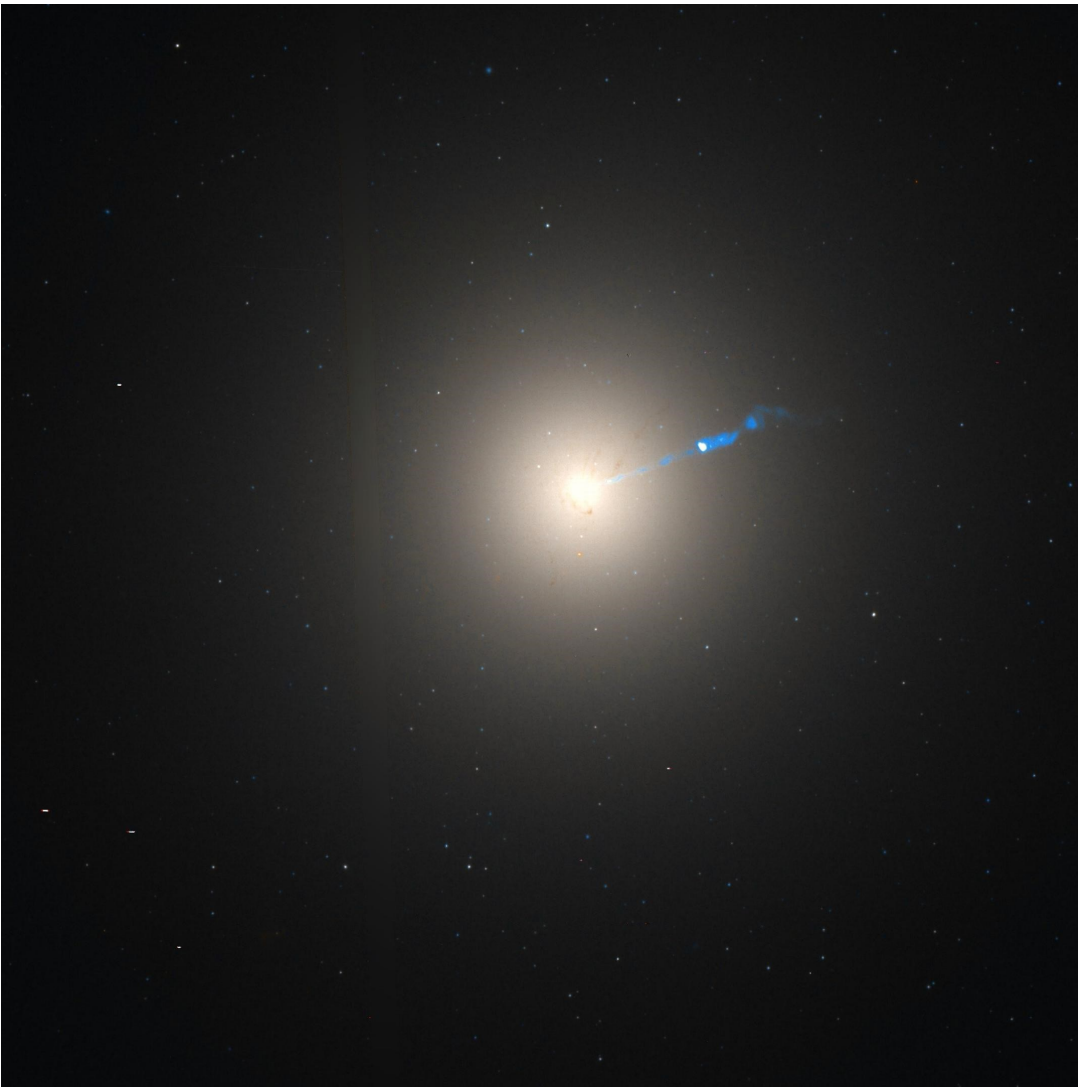
The jet is traveling near the speed of light extending out five thousand light-years from the core. It is not a uniform stream, but has many knots caused by the variable outflow from the black hole. Minor eruptions occur every few million years while a major eruption occurred seventy million years ago.

## *Uranograph cont...*

The jet is partially responsible for the X-rays coming from M87. An Aerobee 150 rocket launched from White Sands Missile Range in 1966 detected X-ray emissions from Virgo, dubbed Virgo X-1. These observations provided evidence that this X-ray source was indeed coming from M87. Possibly these X-rays come from the material in the jet hitting intergalactic gas and dust. This is a complex X-ray source that is spread across an area larger than M87.

The black hole in M87 is also a strong source of gamma rays that have been observed since the 1990s. This emission varies over periods of a few days. This indicates the gamma rays come from black hole, since such rapid variations must come from a relatively small source.

M87 is an extraordinary galaxy with many interesting features spread over the electromagnetic spectrum. Its high mass located near the center of the Virgo galaxy cluster indicates that it is a major attractor keeping the Virgo cluster together. In turn, the Virgo Cluster forms the core of the Virgo Supercluster. M87 may be the center of over a hundred galaxy groups and clusters (including our own). Truly a remarkable galaxy.



*NASA's Hubble Space Telescope took this image of M87. It combines infrared and visible images to enhance the blue jet streaming out from the central black hole. This spherical galaxy's super-massive black hole ejects matter out as jets in opposite directions. The one coming toward us is seen in this image, while the one traveling in the opposite direction is invisible behind the galaxy. The field of view here is 1.5 arcminutes across. The jet is twenty arcseconds with a width of just two arcseconds.*

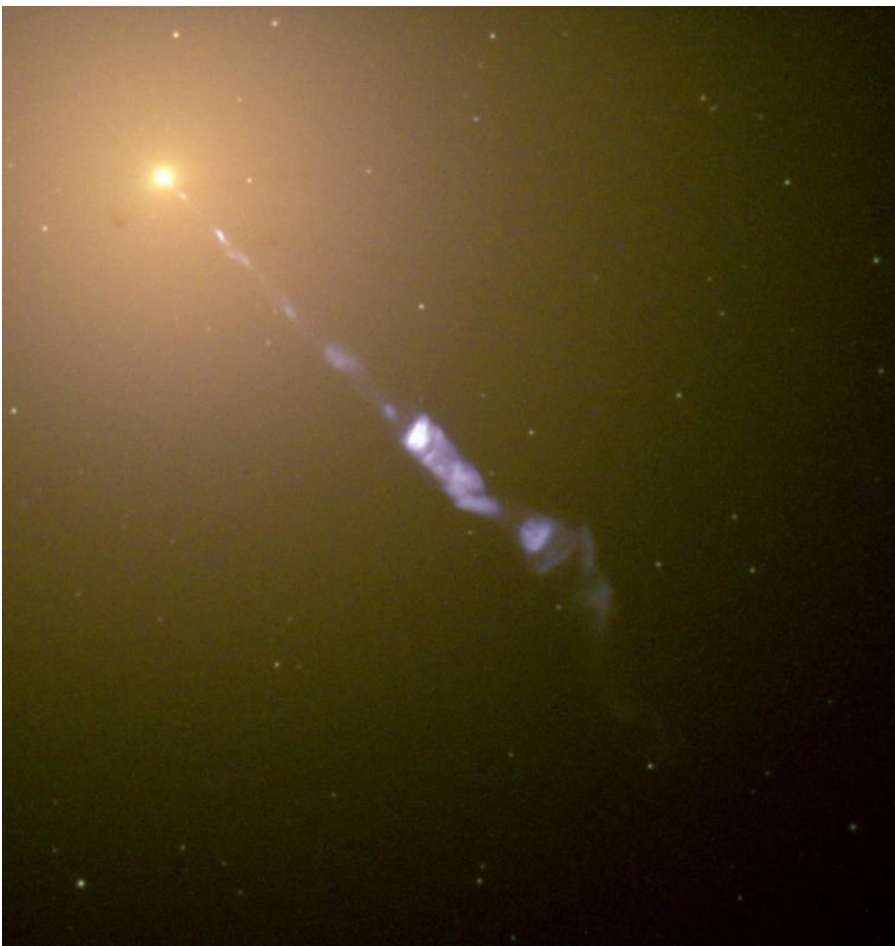
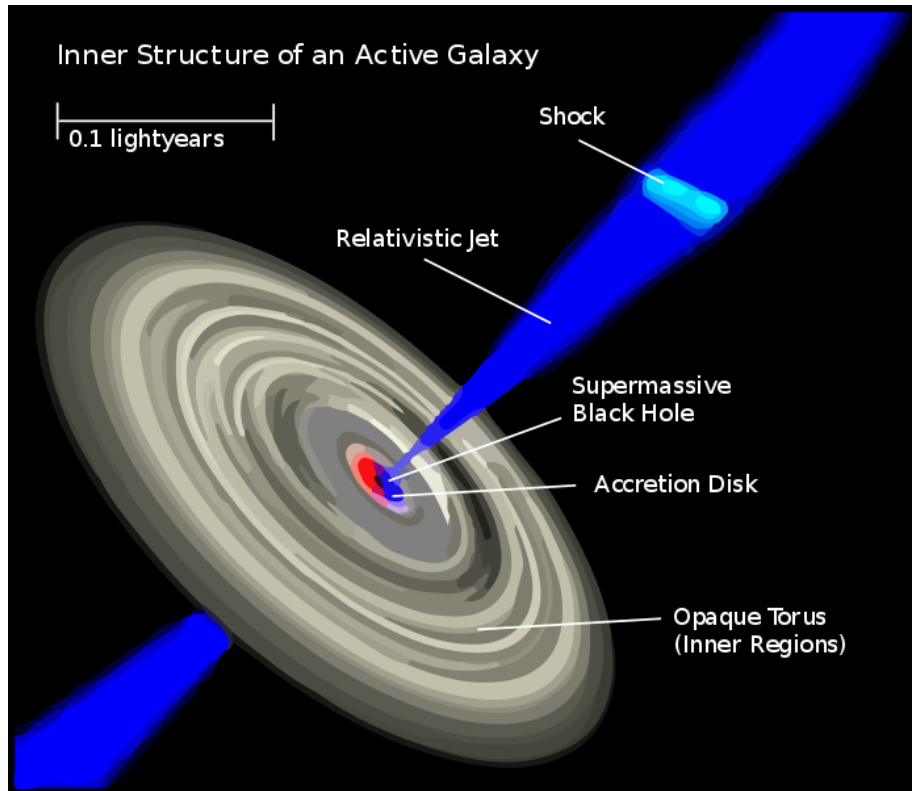
*(© STSci/NASA).*



## Uranograph cont...

### AGN-Inner-Structure.png

Active galactic nuclei have a supermassive black hole at their core. The gravitational field of the black hole provides the source of energy that powers the electromagnetic emissions from the galactic nucleus. Material is drawn in toward the core by gravity, accumulating in a rapidly spinning disc around the black hole. Some of it is drawn from the inner edge of the disc into the black hole. Other material is beamed out in two jets traveling in opposite directions perpendicular to the accretion disc.

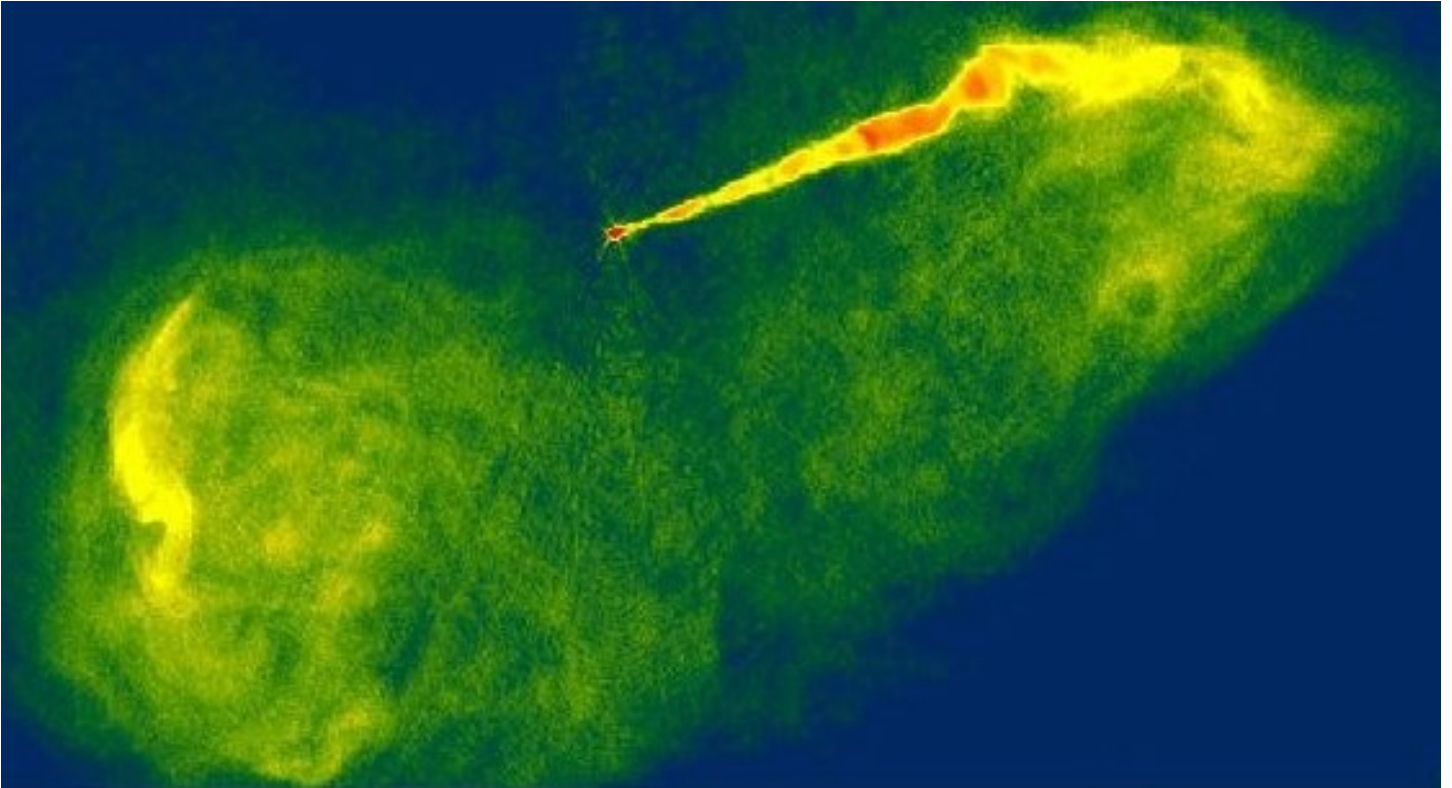


### large\_web.jpg

The visible jet emitted by the nucleus of M87 flows outward at near the speed of light. The ions and subatomic particles eventually intercept first galactic and then intergalactic material which it collides with generating electromagnetic radiation. Clumps in the jet mark times when the black hole absorbed excess material, firing some of the additional material out in the jet. The galaxy's yellow color comes from billions of unresolved small- to mid-size stars inhabiting the galaxy. The point-like objects are actual globular clusters orbiting M87.

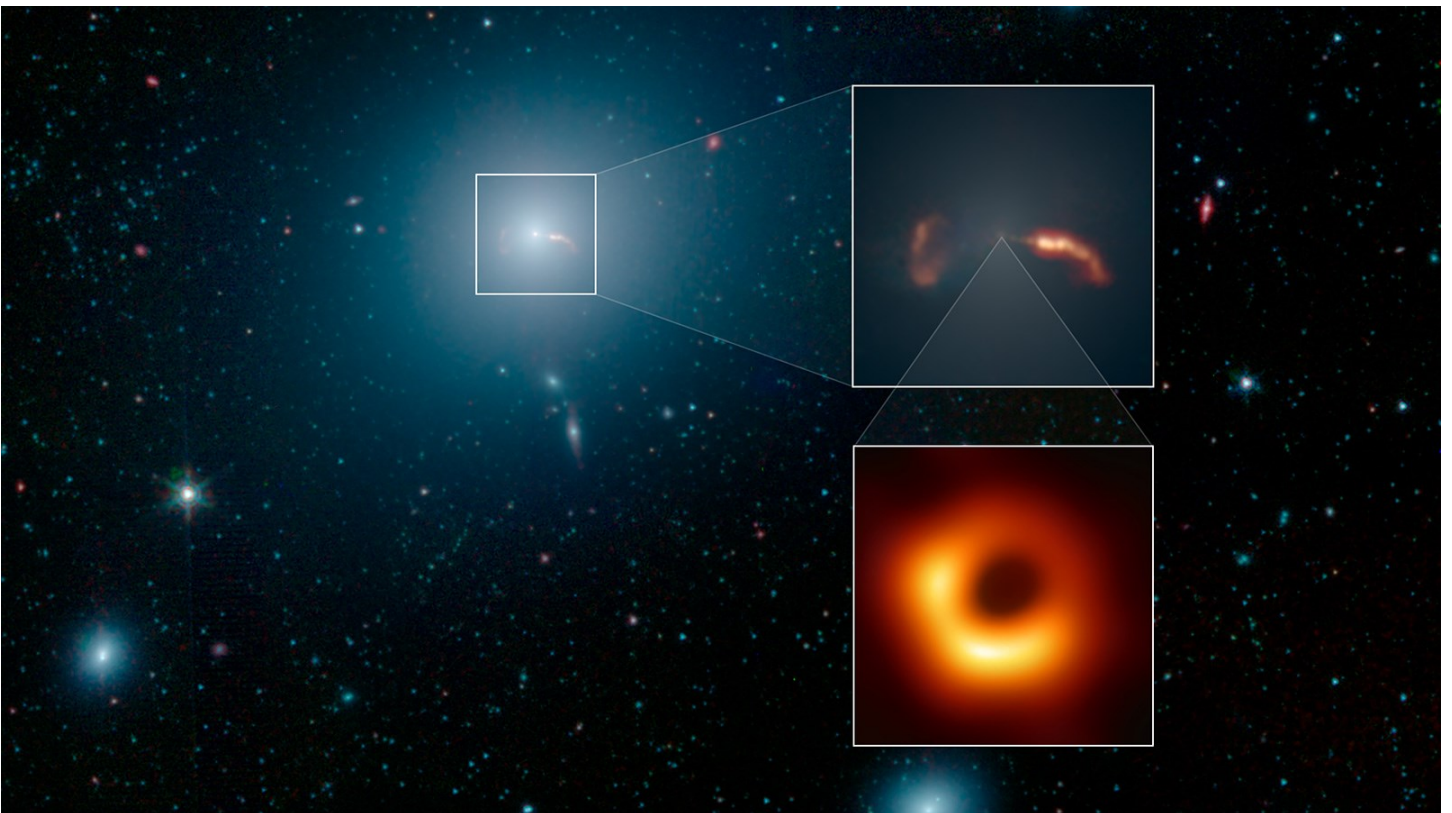
(© STSci/NASA).

## Uranograph cont...



M87 Radio VLA.jpg (ABOVE)

The Very Large Array (VLA) near Socorro, New Mexico, plotted the radio emissions from M87 in February 1989, highlighting the radio energy generated by the jet. The jet travels outward through the galaxy until it intercepts the intergalactic medium. The jet slows and becomes more scattered as it is deflected by the external material. The opposite jet is invisible behind the galaxy, but it is scattered by the intergalactic medium on the left-hand side of the image. The false color is indicative of the strength of the radio energy being emitted.





## ***Uranograph cont...***

[pia23122c-16.jpg](#) (Preceding)

*The Event Horizon Telescope took the first radio image of the black hole at the center of M87. The entire galaxy is the blue-hued image taken by the Spitzer Space Telescope in infrared light. The upper inset shows detail in the jets blasting away from the nucleus. The lower inset shows the historic image of the black hole. The dark central area is the shadow of the black hole*

---

## ***Member Astrophotography***



*M77 is a barred spiral galaxy 47 million light years away in the constellation Cetus (sea monster in Greek mythology). Fitting for this galaxy because it belongs to the Seyfert class of galaxies, one of the two largest groups of galaxies that contain active galactic nuclei which are characterized by the presence of a supermassive black hole at the center. These are the most luminous sources of electromagnetic radiation in the universe and while most of the radiation is in the form of high energy xrays and ultraviolet, 5% of Seyferts, including this one, are also strong in radio emissions. This has been studied extensively by the VLA .The strong radio source is designated “Cetus A”. -David Doctor.*

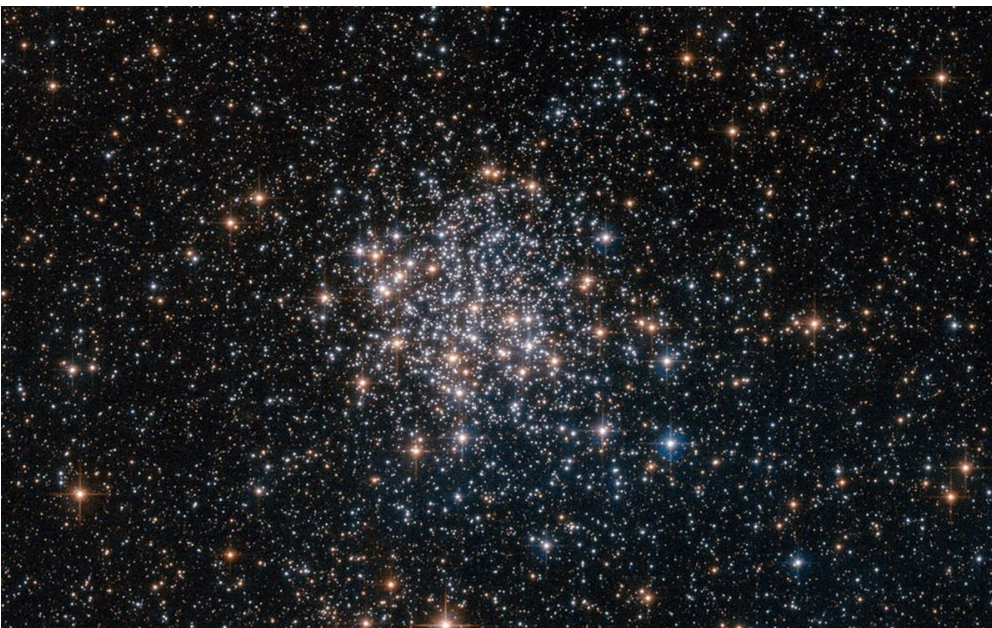


## Member Astrophotography cont....



*Edward Montes*

*I took it on the evening of May 23 just after sunset - the Moon, Venus, and Mercury*



*This NASA/ESA Hubble Space Telescope image shows the star cluster NGC 1854, a gathering of red, white and blue stars in the southern constellation of Dorado (The Dolphin-fish). NGC 1854 is located about 135,000 light-years away in the Large Magellanic Cloud, one of the closest cosmic neighbors and a satellite galaxy of the Milky Way. The LMC is a hotbed of vigorous star formation. Rich in interstellar gas and dust, the galaxy is home to approximately 60 globular clusters and 700 open clusters.*

Happy 4th of July!

**Member Astro Gear Swap Shop**

**Advertise Your used gear here.**

---