Roanoke Valley Astronomical Society

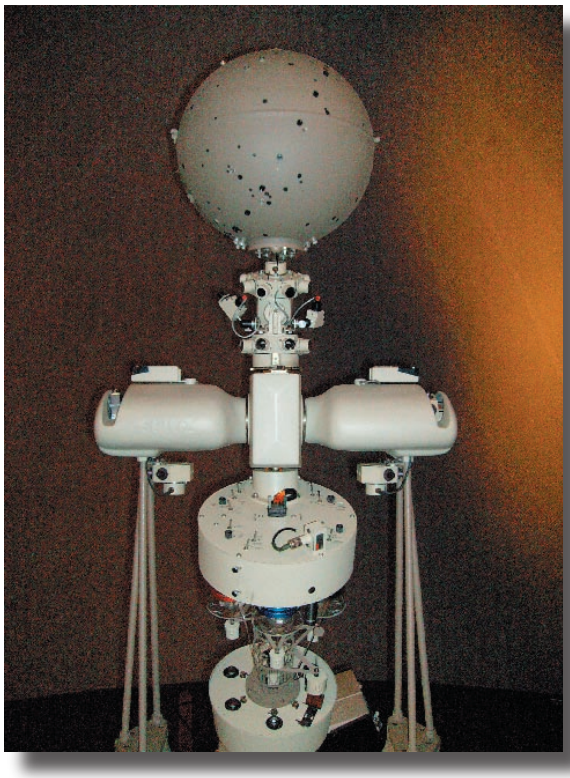
News About Amateur Astronomy
in Southwestern Virginia

Volume 26 – Number 12 December 2009

November RVAS meeting...

TAKE ME TO YOUR LEADERS

On the fall night of November 16, 2009, RVAS members were summoned by the Great Space Alien, a.k.a the planetarium projector, to gather nearby. At that time four of the leaders of our clan were commanded to entertain all in attendance. Evidently, it was pleased, as the G.S.A. returned to his hiding place below the stage without vaporizing anybody.



November weather typically gives many nights suitable for amateur astronomy. The November sky cooperates by providing many celestial sites to enjoy, some meant for everyone, some meant for more experienced observers. This month's Society meeting, held in the Hopkins Planetarium, was dedicated to learning and observing the November early evening sky. Four leading members obediently presented different aspects of amateur astronomy in November.

John Goss: Navigating November's Night Sky

When first navigating the night sky, there is no substitute for sitting under the stars with a red flashlight and basic star map. Find a constellation or grouping of stars that you know or can find easily. Use your map to triangulate to those stars that you do not know. This takes patience, but it is essential that you know your way around the celestial dome. Otherwise, how else will you find fun sky objects that aren't visible to unaided eyes? Besides, it is impressive to point out stars to people and tell them their names. They'll think you're smart.

Here is a suggested route for covering the fall sky: Begin with Pegasus, or rather its asterism, the Great Square, which is nearly overhead around 8:00 p.m. this time of year.

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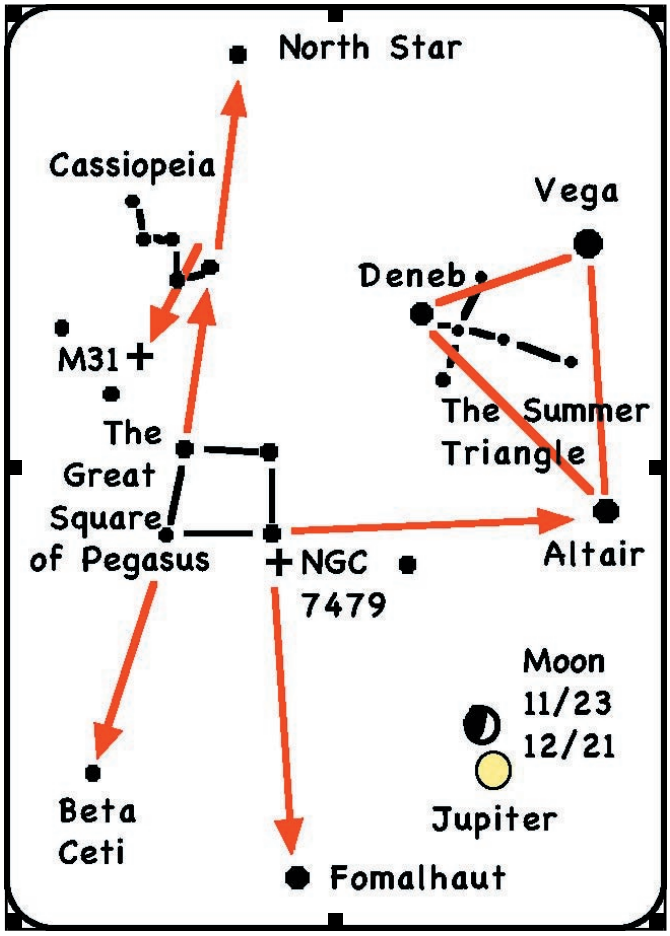

Extend a line directly south from its two westernmost stars. It will intersect Fomalhaut, easily the brightest star in this area of the sky. Do the same for the easternmost pair, and it will bump into Beta Ceti. Draw another line to the west from its two southernmost stars. That line will land on Altair, the southernmost star of the "Summer Triangle." Draw one more line, this time to the north from the Great Square's two easternmost stars. It will pass the five stars of the "W" of Cassiopeia, lying directly in the glowing band of the Milky Way. Continue that line until it hits Polaris, the North Star. Within a few short minutes, you have begun to learn the fall sky!

Dave Godman: The Attack of the Leonids

Within another eight to twenty-four hours, Mr. Godman reported, the Earth enters the debris stream of Comet 55/P Temple-Tuttle, giving us the annual Leonid meteor shower. Every thirty-three years this orbital crossing produces a great show, sometimes yielding well over 500 meteors per hour, sometimes thousands per hour for brief periods. Remember the super display of 1999?

Here is a woodcut depicting the 1833 Leonid storm.

Meteor forecasters predict a reasonable chance that this year (ie., tomorrow morning, November 17) the Earth will pass through a relatively dense section in the comet's debris trail. If we are lucky, we will see up to 500 meteors per hour. If we are even luckier, the sky will be clear for us to see those meteors! (Alas, even the G.S.A. could not transport us all above the abundant clouds.)

Jack Gross: The Wreck of the Andromeda Galaxy

Probably the most popular November sky attraction is the Great Galaxy in Andromeda, commonly called M31 by astronomers. Most people don't realize that it can be found with the unaided eye on a moonless, very clear night from a site far from city lights. Use the constellation Cassiopeia, which is shaped like a "W," as your starting point. Draw a line through the W's fourth easternmost star, bisecting its third and fifth stars. That line passes directly through M31.

If your eyesight is good, you will barely see an elongated dim smudge. Binoculars brighten

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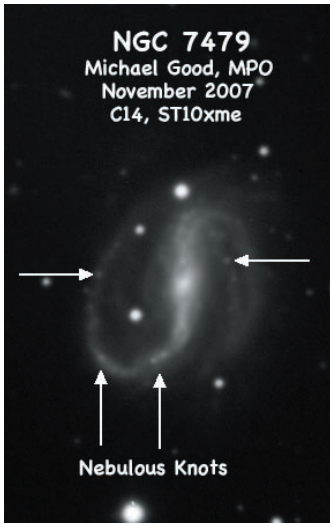
the smudge, making it relatively easy to see. That smudge is Andromeda, the galaxy whose light has taken 2.5 million years to reach us. Through a modest telescope, it will appear brighter and larger, but still a smudge. There will also be two smaller smudges belonging to M31's companion galaxies, M32 and M110. All of those smudges are the combined light of an estimated one trillion stars.

Please don't worry about it. Andromeda galaxy will merge with our own Milky Way giving birth to the "Milkomeda" giant elliptical galaxy. Mark your calendars to witness this galactic wreck and forced marriage! It's only 2.5 billion years in the future. In cosmic time, that's not very far ahead.

Michael Good: Observing Challenge

After amateurs study M31 and the other 109 sky objects on Charles Messier's famous list, they often turn to the 7000+ targets of the NGC (the New General Catalogue). One of its more intriguing galaxies in larger amateur scopes (apertures of 15 inches or greater) is NGC 7479 which is also called Caldwell 44.

NGC 7479 in Pegasus exhibits two distinct, but blurry arms that seem to wrap its well-defined internal galactic bar. The 14 inch Celestron Schmidt-Cassegrain at MPO (Mike's Place Observatory) imaged this fascinating structure in November 2007. The resulting picture clearly shows nebulous knots populating 7479's two spiral arms. Given the steep learning curve that astrophotographers must endure, followed by years of practice, it is a real achievement to capture details that can be glimpsed from amateur instruments of an object over 10 million light-years away. ★



Frank Baratta's Astro-Quiz

The lexicon of astronomy is replete with odd terms, among which is the shortest word in the English language containing 3 "y"s. What is this word, and what does it mean?

Answer to Last Month's Astro-Quiz: **The earliest known astronomical device is the Antikythera mechanism, an ancient Greek device for calculating the movements of the planets. The device dates from about 150 – 100 BC, and is the ancestor of an astronomical analog computer. It was recovered in 1901 from an ancient shipwreck discovered near the Greek island of Antikythera, but its complexity and significance were not understood until decades later. Technological artifacts of similar complexity did not reappear until a thousand years later. You can view a demonstration of a replica on YouTube at http://www.youtube.com/watch?v=4eUibFQKJqI**

8 WAHOOS IN SPACE

Did you know that eight UVA graduates have been astronauts in space? One of them was a major speaker at this year's VAAS, Kathryn C. Thornton (seen here at right). Another, Leland D. Melvin, an African-American, is from Lynchburg. He has spent part of this November working at the space station. One, Bill Nelson, has served as a United States Senator.

Within this group, one has a law degree. Only one has a degree in astronomy. One was the oldest man in space. Just one is female. One paid his own way: $20 million to joy ride a Russian rocket up to the space station.

You can learn more about this motley crew from UVA by visiting **http://uvamagazine.org/features/article/space_odyssey/** ★

The Roanoke Valley Astronomical Society is a membership organization of amateur astronomers dedicated to the pursuit of astronomical observational and photographic activities. **Meetings are held at 7:30 p.m. on the third Monday of each month, at the Center in the Square in downtown Roanoke, Virginia. Meetings are open to the public.** Observing sessions are held one or two weekends a month at a dark-sky site. Yearly individual dues are $20.00. Family dues are $25.00. Student dues are $10.00. Articles, quotes, etc. published in the newsletter do not necessarily reflect the views of the RVAS or its editor.

RVAS web page: *http://rvasclub.org*

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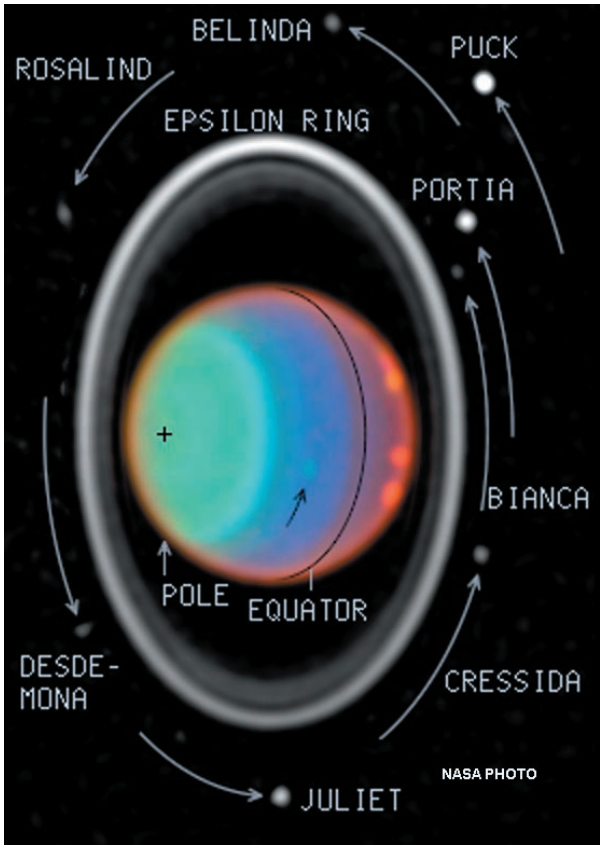
Muddled Moons of Uranus

by Jack Gross

The moons of our nine planets are named after Greek or Roman characters – all that is except one! (Wait a minute, did he say "nine planets"? Yup , I did. You see, I'm an old guy, and old guys have trouble with changing long-held beliefs. Despite what Dr. Neil deGrasse Tyson and International Astronomical Union's committee, which, by the way, is called the "Working Group for Planetary System Nomenclature" have to say — I say the jury is still out on that one. But, back to our planets and their moons.



There is a whole lot of mythology revolving around those nine planets. Of course, the planets themselves are named after Greek and Roman gods and goddesses. Jupiter, Saturn, Mars, Venus and Mercury all got their names thousands of years ago. The other three planets were not discovered until the telescope was invented, but the tradition was carried on. The name or our own planet is an English/German word which simply means "the ground." However, sometimes "Gaia" is used for designating the earth. Gaia was an ancient deity in the Greek pantheon and was considered the Mother Goddess. So, perhaps we can count our Earth among the mythological characters as well.

The plot thickens however, when Galileo Galilei discovers four moons circling Jupiter on January 7, 1610. Galileo, being a pretty savvy guy, first called his new moons the "Cosmica Sidera" ("Cosimo's stars"), in honor of his boss, Cosimo II de' Medici. But, the names that eventually prevailed were chosen by Simon Marius. He claimed to have discovered the moons at the same time as Galileo did. He named them after four young ladies that had affairs with Zeus - who is the Greek equivalent of Jupiter. He called them "Io," "Europa," "Ganymede," and "Callisto" in his "Mundus Jovialis," which was published in 1614. Until that time, the only moon anyone knew anything about was our own Luna, which is the Latin (scientific) name which distinguishes our moon from the moons of other planets. So, our guy with the naughty mind, Simon Marius, continues la mode and sets the standard for naming the hoards of moons to come after characters in mythology.

Thus far, astronomers haven't turned up any moons for Mercury and Venus, but the rest of the planets more than make up for their shoddy show with a total, as of 2008, of 172. Overall, 169 orbit the planets, three others circle, and dare I say it, dwarf planets. The dwarf planet Haumea, the Hawaiian goddess of childbirth, has two moons which are named after her two children; Namaka was a sea goddess and Hi'iaka was the goddess of hula dancers. Who says astronomers don't have a sense of humor.

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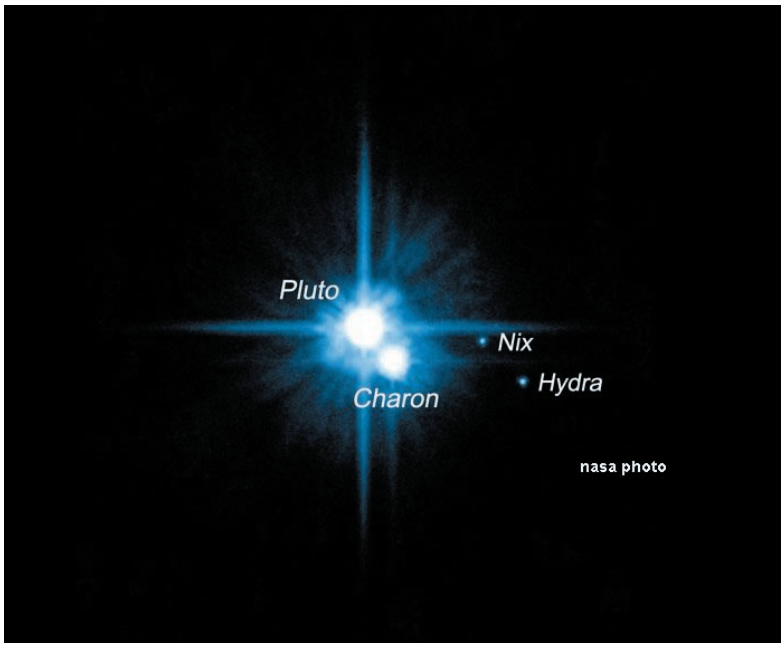
Anyway, I guess they all count for Mythological goddesses. Another dwarf planet, Eris, who was the Greek goddess of strife, also has one moon which is named after her daughter Dysnomia, goddess of disorder.

Now back to the real planets, and we'll start with my old friend Pluto, you know - the god of the underworld, discovered in 1930 by Clyde William Tombaugh, who was born in Streator, Illinois. That state has passed legislation to reestablish Pluto as the ninth planet. So there, smarty pants Working Group for Planetary System Nomenclature. The planet Pluto has three known satellites, Charon, which is nearly as big as Pluto, and is named after the ferryman who carried souls of the newly deceased across the River Styx, which is the stream that divided the world of the living from the world of the dead. And then there are the other two moons, Nix and Hydra, which were both discovered by the Hubble Space Telescope in 2005. Hydra guarded the waters of the underworld, and Nix was Charon's mother and was known as the goddess of darkness and the night.



Well, you get the idea. The moons of the planets all conform to the traditional naming scheme, that is, all the planets except Uranus. This planet has 27 fascinating moons and a complicated ring system consisting of 13 distinct rings which are completely different from the ones around Saturn or Jupiter. Another thing which is also different: the names of those 27 Uranian moons. Here's the list. See if you can figure out what's inconsistent.

1. Cordelia, 2. Ophelia, 3. Bianca, 4. Cressida, 5. Desdemona, 6. Juliet, 7. Portia, 8. Rosalind, 9. Mab, 10. Belinda, 11. Perdita, 12. Puck, 13. Cupid, 14. Miranda, 15. Francisco, 16. Ariel, 17. Umbriel, 18. Titania, 19. Oberon, 20. Caliban, 21. Stephano, 22. Trinculo, 23. Sycorax, 24. Margaret, 25. Prospero, 26. Setebos, 27. Ferdina.

Corderia? Puck? Desdemona? Juliet? What's going on here? Those names sound familiar, but not from Greek or Roman mythology. Ring any bells? How about William Shakespeare? Yup, Uranus is the only planet that has moons named for the cast of characters in Will's plays!

Also, for some odd reason, a few were named from the works of Alexander Pope. Blame it all on John Herschel, son of William Herschel (who discovered Uranus), and William Lassell. They were the guys who named the moons after characters from Shakespeare and from Alexander Pope's "Rape of the Lock". The International Astronomical Union's Rule 5 established that all newly discovered Uranian satellites and features on previously discovered satellites continue the theme established by William Lassell when he named the first four satellites for characters (mostly bright and dark spirits) from Shakespeare and Pope.

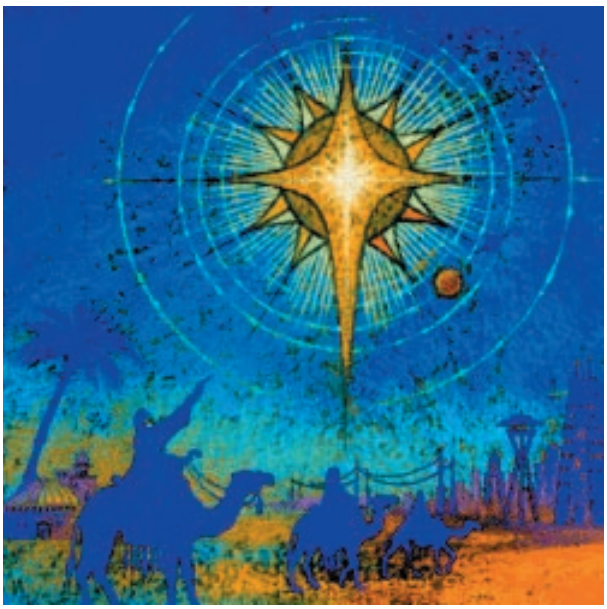
And here endeth the Gospel According To The IAU. It also appears that Pluto's fate looks bleak at the moment — except in the enlightened state of Illinois. ★

A Great Christmas Mystery...

Star of Bethlehem:
Fact or Fiction

by Clark M. Thomas

As Christmas 2009 approaches, it is time to wonder again about the identity of the so-called Star of Bethlehem. There are several theories, one of which has been detailed in my web page: **http://astronomy-links.net/StarofBethlehem** There is even the idea that the star was Jesus himself, as expressed in **http://www.crystalinks.com/starbethlehem.html**



The birth of Jesus did not take place in early winter, but likely in middle April. Biblical text and new astronomical "evidence" support a spring date. Designating December 25th as Christ's birthday was a crafty choice by the early Christian church, designed to co-opt religious competitors. Several elements have since blended into our modern idea of Christmas, such as the nordic Christmas tree, and even Santa Claus himself as portrayed by Thomas Nast in the 19th century.

My earlier analysis of the Star's what, when, and where points to **NGC 1514**, a planetary nebula, that would have been at the right place at the right time, exactly when a very interesting planetary alignment was taking place. The position of this object in the sky would have been perfect for three wise guys from the southern Fertile Crescent to hop on their camels and head west.

We think of planetary nebulae as one-time events. However, there is a class of binary stars, visually seen as one star, called **cataclysmic variables.** Some eventually develop into supernovae. Perhaps someday the stars at the center of NGC 1514 will go supernova. However, many cataclysmic variables just flare up repeatedly over irregular periods, which is what likely happened to the pre-existing NGC 1514, with a flare arriving during the time of Jesus.

To learn more about the various types of cataclysmic variables, just go to this web page: **http://members.wri.com/jeffb/poster/poster.html**

Here are the results of a spectrum analysis done earlier this decade: "New spatiokinematic observations were undertaken of the planetary nebula NGC 1514 in the [O III] line at 5007 Å using an imaging Fabry-Pérot spectrometer. Our results show an inner ellipsoidal shell and polar blobs that do not conform to bipolar morphology. It is argued that the nebula is a descendant of a common envelope binary system the periodicity of which is estimated to be about 10 days, with a progenitor mass of 4.5 M." **C. Muthu *et al*, 2003, *The Astronomical Journal*, 126 2963-2970. doi: 10.1086/379552** ★

Kangaroos and Llamas on the Moon

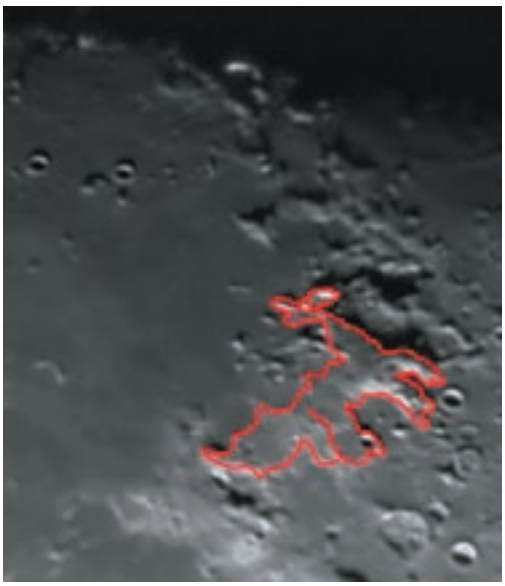
by Michael Good

Attached is definitive proof of a Kangaroo/Llama type alien creature.

This elaborate sculpture was created by an ancient space civilization when they traveled to the Moon in their UFOs.

The "face on Mars" has nothing over this "Kangaroo of the Moon," and was obviously carved by these creatures to make humans aware of them.

My only remaining question - How do they get their huge legs and tails into their spaceships?



Happy 463rd Birthday!

by Genevieve Goss

Ah, December.....a month full of celebration! In the midst of all this merriment, let's set aside a few moments on December 14 to remember Tycho Brahe on this, his 463rd birthday.

Tycho (Danish nobleman, alchemist, astronomer and colorful character) is remembered for his accurate and comprehensive planetary observations. He was the product of a rather strange childhood, in which his father had promised for Tycho to be given to his childless Uncle Jörgen — a promise on which his father reneged, causing his uncle to attempt to kidnap him.

Expected to pursue a career of politics and life at court, he left to study law and philosophy at the University of Copenhagen. While there, he saw a partial solar eclipse, and was amazed both at the event and that it could be predicted. He purchased a copy of Ptolemy's astronomical tables, and turned his studies to astronomy. He then traveled to Germany where he spent over a decade in collaborative studies in astronomy at several universities. While there, he lost part of his nose in a duel and, for the rest of his life, wore a metal prosthesis.

His astronomical contributions were enormous. Not only did he design and build instruments, he also calibrated them, profoundly changing astronomical instrumentation. His contributions to observing techniques were equally spectacular. Previous astronomers observed only the positions of planets and the Moon at certain key points of their orbits. Tycho and his assistants observed these bodies during their entire orbits, showing orbital anomalies never before noticed.

Without Tycho Brahe's complete observations, Johannes Kepler could not have determined that planets move in elliptical orbits.

Tycho's observations were also amazingly accurate. Whereas earlier astronomers made observations accurate to about 15 arc minutes, those of Tycho were accurate to 2 arc minutes, with his best observations accurate to about half an arc minute. Not bad for somebody not using a telescope.

For these major contributions, he can be forgiven his blunder in pursing a non-Copernican belief that the Earth was the center of the universe. ★

Ode to a Blue Moon

by Dave Thomas

Ode to a Blue Moon
By Unknown

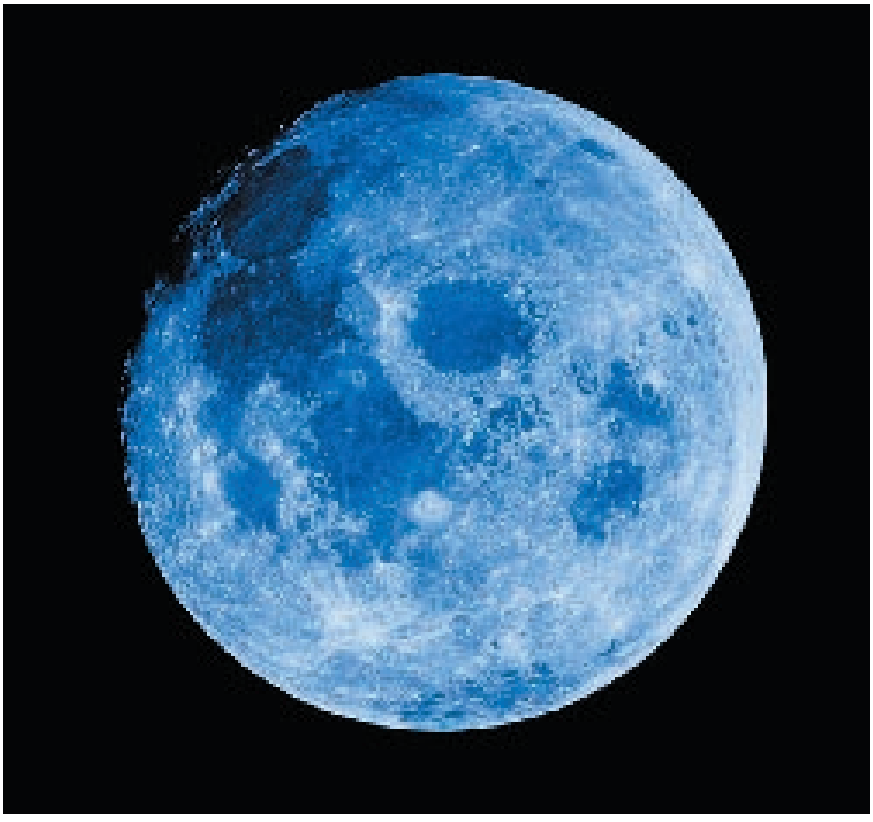
"Oh Moons of Blue
You are so few

Your beauty is rare
As a breath of fresh air

Oh Moon of Blue
When will I see you?"

This month we will be able to witness a rare event: The Moon will be blue.

Not literally. We will, however, be able to see the appearance of two, yes two, full Moons inside a single month. The second full Moon has, over the years, come to be referred to as a "blue Moon".



The term, "Once in a Blue Moon," has come to mean a rare happening. Although this modern lunar term started as a reference to an unlikely or impossible event during the middle ages, it acquired its present meaning in the 19th century.

The Moon, of course, is not blue, but is in reality varying shades of gray. It may appear to be yellow, but that's because the Sun's light spectrum is slightly yellow. Also, when the Moon is close to the horizon its apparent color can change, due to the thicker atmosphere and elements, such as dust, therein. Even the Sun itself changes color just above the horizon.

Our Moon can also appear to be a shade of blue when its light shines through a concentration of dust in the Earth's atmosphere. These dust concentrations are usually caused by dust storms or volcanic activity.

So, on December 31st, look up and see the second full Moon of the month! Maybe it will actually be blue. (If not, just look at it with a blue filter on your favorite telescope!)

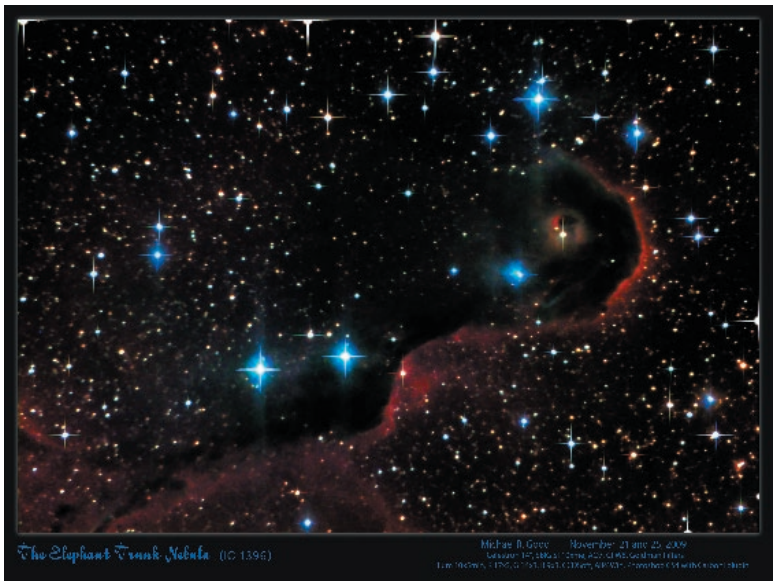
The accompanying photo is a view of the Moon from Apollo 11 on its way back home from the Moon. With no atmosphere to tint the vision, this blue tint was added with photo processing. ★

The blind Sufis have nothing on this thing...

The Elephant Trunk Nebula

by Michael Good

The Elephant Trunk Nebula is a beautiful region of gas and dust tucked inside the open star cluster IC 1396 in the northerly constellation of Cepheus (see attached star chart).



In this image at right taken from my observatory south of Salem Virginia in the Blue Ridge Mountains at 1600', the elephant's head is seen with a yellow star (mag 12.8) for his eye, an open mouth facing left below that, and his trunk extends down left past the two brightest blue stars in the image (mag. 8.42 and 9.15).

The dark dust of his trunk is well lit by singly ionized hydrogen producing the deep rich reds in this image. Quite a number of young hot blue O & B-type stars dot the field, all part of the IC 1396 cluster. The bright blue star above the elephant's head is mag 8.6.

Current theories indicate star formation is taking place within this photogenic area of gas and dust. In 2003 some baby stars younger than 100,000 years old were discovered using infrared. Within the elephant's head, the stellar winds from two older stars that make up his "eye" have blown open the cavity that allows us to see through the denser foreground matter.

It is thought that the Elephant Trunk is about 2400 light years away, where the trunk is about 20 light years long.

This region continues to yield scientific discoveries. In 2005 H2O (water, dude) masers were found close to bright infrared sources. In Nov 2008 astronomers were searching the region for protoplanetary discs.

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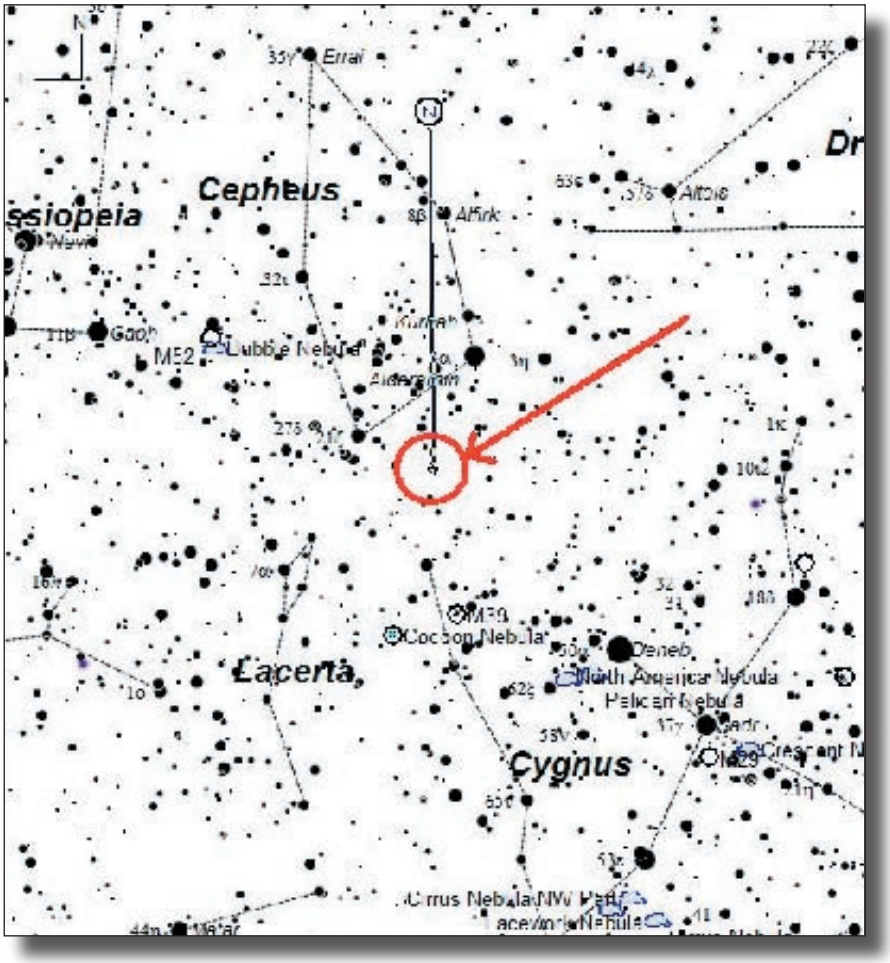
Astro-Imager details:

The attached image was the result of two mediocre nights, which makes the image all the more impressive to me.

While it could stand more than the 50 minutes of luminance data, this year continues to see abnormally large rainfall, limiting opportunities to image to the full capabilities of this instrument.

The first night had high haze, yet this was when the luminance data was collected using 1x1 binning and ten 5 minute exposures.



The scope's 14" SCT primary was under pressure from the mirror locks creating sharp stars in only one quadrant, and elongated stars elsewhere.

Heavy deconvolution of the image was performed in AIP4WIN to help round out the stars.

Even more amazing, color data was collected the night before Thanksgiving, with a waxing gibbous moon and again high cirrus. This data was collected using 2x2 binning and three minute exposures.

Skyflats were created for both the high res and medium res data using a double undershirt inside a frame placed over the dewshield of the scope facing up at dusk.

Twelve dark frames were used for both the lights as well as the flat frames, and processed images were created from the raw data using AIP4WIN.

The Luminance data was SUM stacked, but due to losing a number of frames in the color data (wind, haze), the color data was AVERAGE stacked. RGB and Lum were all combined in Photoshop CS4, where a full evening of modifications were applied.

To achieve the final image several enhancements were necessary — including removing blooming spikes from the bright stars, minimizing star sizes, adjusting levels, curves, a tiny amount of "offset" adjustment to help temper background noise.

All with the assistance of Noel Carboni's Photoshop plugin, which was used to add diffraction spikes (it's an SCT, not a Newtonian), and a final image frame. ★

Calendar of Events

by Frank Baratta

MONTHLY MEETING: We are having a Winter Solstice Extravaganza with a public viewing of the Moon and Jupiter in Highland Park, in Old SW, on Monday the 21st, from 5 to 7 p.m., weather permitting. Meet at 5th St. entrance.

☞ After all that outdoors fun... we will next gather nearby at Wildflour Restaurant, 1212 4th St. SW, at 7 p.m. for our club social, even if it's cloudy. Dutch treat. See their yummy menu at *http://wildflour4thst.com/menu/* Door prizes.

RVAS WEEKEND OBSERVING SESSIONS: Unless otherwise indicated, observing sessions are held at Cahas Mountain Overlook, milepost 139 on the Blue Ridge Parkway, weather permitting. If very cold, dress for Antarctica.

★ Friday and Saturday, 11th and 12th. Sunset is at 5:03 p.m. Astronomical twilight ends at 6:36 p.m. The Moon rises at 3:43 a.m. and 4:48 a.m., respectively.

★ Friday and Saturday, 18th and 19th. Sunset is at 5:05 p.m. Astronomical twilight ends at 6:39 p.m. The Moon sets at 7:08 and 8:07 p.m., respectively.

★ January Sessions: 8th and 9th; 15th and 16th

Other Programs:

ROANOKE CITY PARKS DEPT. PUBLIC STARGAZE: Saturday, December 12th, 6:00 p.m., Cahas Overlook, milepost 139, Blue Ridge Parkway. For City, County and other area residents; RVAS members welcome. Call 540-774-5651, for information. (Next session: January 16th, 6:15 p.m., Cahas Overlook.)