Roanoke Valley Astronomical Society

News About Amateur Astronomy
in Southwestern Virginia

Volume 27 – Number 8 August 2010

# July RVAS Meeting Features Multiple Presentations

By Mark Poore and Clark Thomas

Our July RVAS monthly meeting was a mix of old and new. The "old crowd" in larger than usual numbers came out to meet the "new agenda" of multiple speakers. Vice President Michael Good wants to have as many of our members contribute as possible. His idea is to have more short presentations, and fewer long presentations. Judging from the initial effort, things appear good for future months.

The newsletter is also cooperating with the Executive Committee to feature new participants as they wish. This is truly a win-win.

Below are the minutes prepared by our new secretary, Mark Poore. Following the minutes are several snapshots taken by Michael Good of members sharing aspects of their love for amateur astronomy.

If you weren't there for the July meeting, be sure to attend our next regular meeting at the Science Museum, August 16, at 7:30.

## Roanoke Valley Astronomical Society Monthly Meeting Minutes July 19, 2010 - 7:30 p.m.

- Attendance 28

- **Treasurer's Report**

- Checking account balance - $2,744.98
- Certificate of Deposit value - $8,616.31
- ***Annual membership dues are currently due.***
- Individual: $20.00
- Student: $10.00
- Family: $25.00
- Seniors (65+)...
- Individual: $18.00
- Family: $22.00

- **Observing Reports** - various members shared observing reports, concluding with a short video presentation of Green Bank Star Quest by Jack Gross.



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- **Member Presentations:**

- Michael Good - Messier 16 (The Eagle Nebula)
- Genevieve Goss - August Perseid Shower
- Clark Thomas - Exo-planet discoveries
- Jack Gross - Eridanus

- **Announcements:**

- **Deaf Outreach Event**

- August 14, 2010
- Explore Park spur off the Blue Ridge Parkway
- Contact RVAS member Gary Hatfield for details

- **RVAS Picnic**

- September 2010 (in lieu of our regular monthly meeting)
- Location: Apple Ridge Farm
- Date and time: To Be Determined

- **Virginia Association of Astronomical Societies (VAAS) 2010 Conference**

- October 9, 2010 at Roanoke College
- RVAS is this year's host society

- **Apple Ridge Farm Observatory**

- Campers are there the next two weeks, and they have requested night sky tours. Contact Michael Good if you are interested in helping.
- Michael Good reminded everyone that the Apple Ridge Farm Observatory is open to RVAS members. If you are interested in being trained on the equipment, please contact Michael Good.

- **"Shakespeare Under the Stars"**

- Roanoke County Parks & Recreation's Summer Stock Dinner Theatre.
- "A Midsummer's Night Dream"
- Saturday, July 24, 2010 - Camp Roanoke
- "The Winter's Tale"
- Saturday, August 21, 2010 - Valhalla Vinyards
- More information & pricing available at http://www.roanokecountyva.gov/Departments/ParksRecreationAndTourism/SpecialEvents/SummerStock.htm

- **RVAS Newsletter**

- July edition (as well as others) available on the web http://www.rvasclub.org/rvas-news/index.shtml
- If you would like a printed version of the newsletter, please contact President Paul Caffrey.

- **New Monthly Meeting Format**

- Vice President Michael Good explained his vision for future monthly meetings where members volunteer to give a brief (5 to 10 minutes) presentation on a new scientific discovery. In addition to the presentation, a short newsletter article could be submitted for publication the month following the presentation.
- If you are interested in doing a presentation in August, please contact Michael Good.

Respectfully submitted,

Mark Poore
RVAS Secretary




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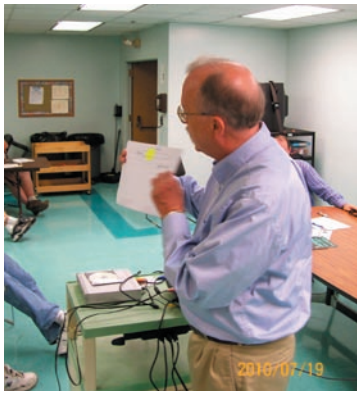
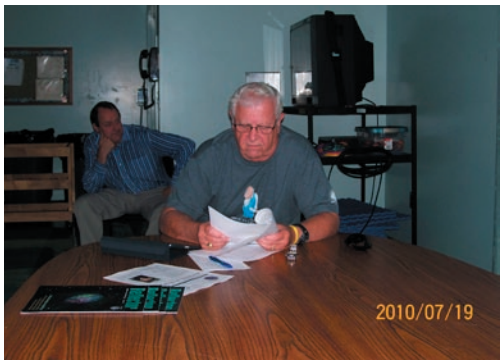


Some bald guy talking over his head about extra-solar transits.


Genevieve surprised by the camera during her Perseid presentation.




Jack Gross speculates about the possible forms of alien life.


One of Jack's interesting alien speculations.

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*

### *Officers/Executive Committee/Editor*

**Paul Caffrey,** President (*president@rvasclub.org*)
**Michael Good,** Vice President (*vicepresident@rvasclub.org*)
**Mark Poore,** Secretary (*secretary@rvasclub.org*)
**Jeff Suhr,** Treasurer (*treasurer@rvasclub.org*)
**Randy Sowden,** Immediate Past President (*immediatepastpresident@rvasclub.org*)
**Mark Hodges,** Past President (*pastpresident@rvasclub.org*)
**Carol Mesimer,** Member at Large (*memberatlarge@rvasclub.org*)
**Clark M. Thomas,** RVAS Newsletter Editor (*cmtastronomy@hotmail.com*)

# July's Apple Ridge Farm Outreach

By Michael Good and Mark Poore

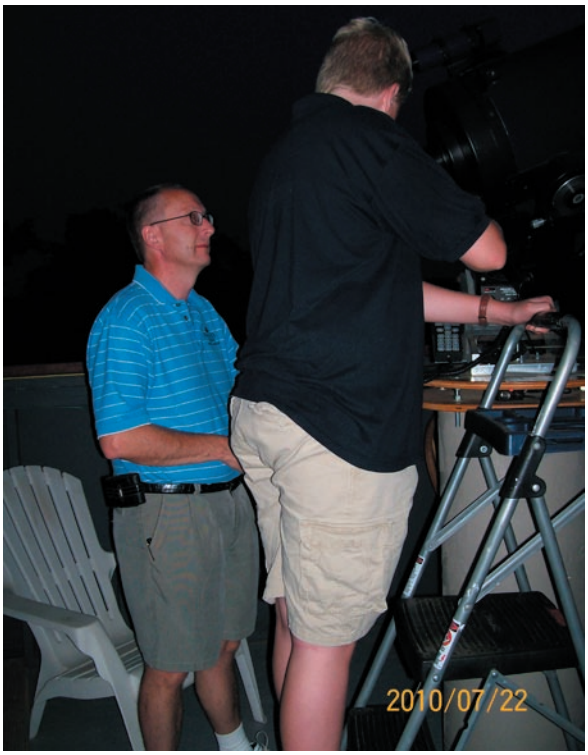
On Thursday July 22, 2010, Michael Good, Mark Poore and his son Luke drove to the GE/ RVAS Observatory at Apple Ridge Farm (ARF) and presented a sky observing program to lady campers (ages 11 to 13) who were staying at ARF that week. The ladies were very attentive, and indeed several had come in prior years and showed that many "factoids" from prior outreach events were remembered.

Despite some spotty weather, we showed the girls the "half moon" crescent of Venus, the still strongly edge-on rings of Saturn, the waxing gibbous Moon, and a number of colorful stars. The bright moon and high humidity precluded showing any DSO's, but nonetheless the group seemed quite energized from what we showed them.

On Monday July 26, Michael returned to attempt a presentation to the men (again, ages 11 to 13), albeit in much more dire weather conditions. Venus was occasionally visible, boiling in the heat and humidity, and surrounded by thick clouds. Saturn (which was higher in elevation) did present several good views. The moon was a problem, and again the focus of the evening was more on verbal instruction using the outdoor setting of the observatory.

The boys asked quite a few questions on the size of the universe, the definition of a light year, the reason for colors in the stars, up to and including what are sonic booms caused by and how fast is the speed of sound!

To the right and below are pictures taken from these two evenings at ARF.




Mark Poore and his son Luke are seen using the 12" Meade LX200 at the GE / RVAS Observatory of Apple Ridge Farm before the campers arrived.


Ladies enjoying the planet Saturn using the 12" Meade LX200 at ARF.



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During the second outreach, young men used the 8" Meade LX50 to look at Vega.

Thanks go to our Astronomical League for making flyers about astronomy available. The young man at the back right is holding one of them.

# Deaf Public Outreach

By Gary Hatfield

Earlier this year I suggested a Deaf Public Outreach for the club. My wife is deaf, and knowing the deaf community in the area has had little or no exposure to astronomy, I thought it would be a good way to expose an untapped group of people to astronomy.

It's possible some deaf people have been at some of the other outreaches done be RVAS, but they wouldn't have known what was being said, or explanations about what they were looking at. A date of **August 14th** was set several months ago. It's time to finalize the details.

I have two certified interpreters willing to donate their time for this. At least one of them has "lit" gloves which will allow her sign language to be seen in the dark. I'm not sure about the other interpreter, but if she doesn't have them we'll train a red light on her so her signing can be seen. There are two main deaf/hard of hearing organizations in the area, and I want to get info to them asap so they can post it on their websites and in their NLs.

Did you know that there are important astronomers who could not hear? Annie Jump Cannon became deaf as a young adult. She made her mark in astronomy by classifying hundreds of thousands of stars.

We have the date set, but not the location. John Goss did check it out, and on the evening of Aug. 14th the Moon will be 5.6 days old and will set at 10:41 pm. Venus, Saturn, and Mars will be too low for observing, so we will mainly be observing the Moon and some of the brighter DSOs visible.

I don't want the location to be too far out, and am looking for a suitable location that doesn't involve too much of a drive. I was thinking maybe the Explore Park Overlook would be good, but would like to hear of other sites if anyone has one in mind.

Also, I hope we can have a few people with scopes come out for a different kind of outreach.

# Two Faint Summer Galaxies

By Michael Good

I have chosen two fainter NGC galaxies for the advanced amateur challenge this month. The first is NGC 5248 in Bootes, and the second is NGC 5921 in Serpens.

**NGC 5248** is a small barred spiral galaxy south west of Bootes near the border with Virgo. It is about 6x4' in size, at magnitude 10.7. My image reveals a yellowish core (as expected - Population II stars are older, with less "metals"), and some HII (red ionized hydrogen) regions in the two primary arms, with fainter arm structure visible on a properly calibrated monitor. This galaxy is a member of the Virgo Cluster.

The second galaxy is **NGC 5921** in the constellation Serpens Caput (a long snake, held by Ophiuchus the serpent holder). This is the only constellation that is broken into two areas: Caput (the Head), and Serpens Cauda (the Tail).

As you can see in my deep image, this galaxy is also a barred spiral with a nice ring-like effect from the two primary arms, and many fainter arms visible in the image. A supernova was observed in this galaxy in 2001.

On my monitor I only get slight traces of HII regions, and some blue in the arms. I would need much more color data to improve on this, but the skies this year ... you know. Notice the fainter galaxy at the upper right, as well as other numerous background galaxies (smudges) across the field of view. [To see more details, you should enlarge these two images to 3x. -ed.]


NGC 5248 (above) as imaged by Michael Good

NGC 5291 (below) as imaged by Michael Good

# Rocks From the Moon

By Dave Thomas

Thousands of meteors enter the Earth's atmosphere on a daily basis. Most of them disintegrate in the atmosphere and settle as dust. [Some hit the ground as rocks, and roll a bit. That was the origin of rock-'n'-roll. -ed]

A study by Washington University in St. Louis finds that of the meteors that make it to the ground as meteorites, about 0.1 percent originated on the Earth's Moon. These meteorites are accelerated to the Moon's escape velocity, 1.48 miles per second, by impacting meteorites, asteroids or comets. They were flung into orbit around the Earth or the Sun. They typically take from thousands of years to millions of years to impact Earth.

(Kalahari 009 Photo by Addi Bischoff ) Africa (Weighs 13.5 kg)

These meteorites look the same as any other, the difference being in their chemical makeup. The Lunar meteorites contain anorthite which is common to the Moon, but not to other Solar system bodies.

There are about 130 meteorites classified as Lunar. The largest weighs 30 pounds and the smallest less than a gram. The largest concentrations of discoverable lunar meteorites are in Africa, and on the Antarctic ice.

More information about lunar meteorites can be found at: http://meteorites.wustl.edu/lunar/moon_meteorites.htm


(LAR 06638 Photo by NASA) Antarctica (Weighs 5 grams)

# Don't Miss This Summer's Perseids

By Genevieve Goss

"Shooting stars" & falling stars" are names for meteors caused by small bits of interplanetary rock and debris called meteoroids crashing and burning in Earth's upper atmosphere. Traveling at thousands of mph, meteoroids quickly ignite in friction of the atmosphere, 30 to 80 miles above the ground. Almost all are destroyed in this process; the rare few that survive and hit the ground are known as meteorites.

As comets orbit the Sun, they shed an icy, dusty debris stream along the comet's orbit. If Earth travels through this stream, we will see a meteor shower. The comet responsible for the Perseid meteor shower is **109P Swift-Tuttle**. Meteor showers are named by the constellation from which meteors appear to fall, known as the radiant. **The Perseid meteor shower is so named because meteors appear to fall from a point in the constellation Perseus.**

Perseus was hero of Greek mythology who killed the Gorgon Medusa to rescue the princess Andromeda. The constellation Perseus includes what could be construed as the head of Medusa with Algol (beta Persei) being the "evil eye" of the Gorgon. (Algol, known as the "demon star," is one of the best known eclipsing binaries) and Mirfak (Alpha Persei) which lies in the middle of an open cluster of stars known (not surprisingly) as the Alpha Persei Cluster, a good binocular object.

**To find Perseus**, look just to the side of Cassiopeia's "W". The triangle that forms his head, though not that bright, is an easy feature to recognize – then the rest of the figure, which is a little brighter, is easy to follow from there. His right arm is holding his shield, and in his left hand he has the head of Medusa the Gorgon. Being a man of action, he comes directly from his triumphant victory over Medusa and stumbles upon Andromeda, soon to be in the clutches of Cetus the Seamonster.

**The Perseids are known as one of the best meteor showers to observe, producing up to 60 meteors per hour at their peak. This year's shower should peak on the night of August 12 and the morning of the 13th,** but you may be able to see some meteors any time from July 23 – August 22. The crescent moon will be out of the way early, **For best viewing, look to the northeast after midnight with the prime time being between the hours of 4 & 5am.**

## Frank Baratta's Astro-Quiz

***Question:*** **What obsolete constellation was created to honor the invention of the printing press?**

**<u>Answer to Last Month's Astro-Quiz</u>: The moon's orbit is inclined to the ecliptic by a bit more than 5 degrees. As a result, any star within about 6.5 degrees of the ecliptic can be occulted (i.e. hidden) by the moon as it travels across the sky. There are only 4 first magnitude stars that lie within this distance of the ecliptic: Aldebaran, Antares, Regulus and Spica. The first magnitude star Pollux lies slightly farther from the ecliptic and is not occulted by the moon.**

**Maybe Not.**

# Music for Observing Pluto?

## By Jack Gross

Gustav Holst (seen below) finished his orchestral suite *The Planets* in 1917, well before the 1930 discovery of Pluto by Percival Lowell. Holtz died in 1934 at the age of 60, and although Pluto had been considered to be a real planet during those four years, Holst had no interest in composing a new movement to include it. In fact, the composer complained that the popularity of *The Planets* diverted attention from his other musical compositions.

Holtz was fascinated by astrology and mysticism, and he often cast horoscopes for his friends. His interest in this pseudoscience may also have influenced his desire to keep the work to seven movements. The number "seven" is very cabalistic, and has been considered to be the "perfect number" for thousands of years.

Holst devoted a movement to each of the planets, musically emphasizing the astrological characteristics of the Greek gods:

1. Mars, the Bringer of War
2. Venus, the Bringer of Peace
3. Mercury, the Winged Messenger
4. Jupiter, the Bringer of Jollity
5. Saturn, the Bringer of Old Age
6. Uranus, the Magician
7. Neptune, the Mystic

Earth was not included because it has no astrological significance. A typical performance of the seven movements takes about 50 minutes. The opening drums of Mars, the Bringer of War, are nearly as recognizable as first notes of Beethoven's 5th Symphony.

After Pluto's discovery, and long before the International Astronomical Union met in 2006, Holtz considered this new planet too small and insignificant to deserve another movement. Was that prophetic or what?

In 2000, Colin Matthews (seen below) was commissioned by the Hallé Orchestra of Manchester to write a new eighth movement for The Planets. He titled his continuation, *Pluto, the Renewer*. But, Matthews composed it in a grating, atonal style which was quite different from Holst. The ending of his musical sequel is as chaotic and unsatisfying as Pluto's origin in the Kuiper Belt. This unsettling ending was very likely a nod to the controversy surrounding Pluto's status as a planet. In 2006 Matthews said, "In my original program note I wrote 'The matter of Pluto's status as a planet has for some time been in doubt - it may well be reclassified.' So, yes, I knew it might happen from the beginning, but at least it was officially a planet when I wrote the piece!"

The Planets is an often-played part of my music collection, but I have never added the Matthews Pluto movement. Perhaps it is time for a composer to come up with a more appropriate tribute to the demoted planet - something more expressive of outrage at the humiliation? However, music like many things is a matter of taste. So, I leave it up to you. Click on this link to watch a You Tube video and listen to the Berlin Philharmonic Orchestra play *Pluto, the Renewer*, and then make up your own mind.

**http://www.youtube.com/watch?v=vX4Zs2kjVys**

# WHAT A FABULOUS NIGHT IT WAS!

BY JIRI KOLEJKA

After many weeks of mostly overcast sky, it cleared on the night of July 2nd. What a fabulous celestial display it offered to me and to Eddy Lofranco, one of my neighbors in south-west Roanoke. Eddy was curious about the red light shining from our garage on some nights, and asked me about it. After convincing him there was no illegal activity going on in the place, I invited him for stargazing from our driveway. Unlike myself, Eddy is still working for a living, and must get up early on working days – so this Friday seemed to be ideal for me to mesmerize him with views of summer deep space marvels using my Dobsonian telescope.

Eddy showed up shortly before 10 o'clock, which gave us enough time to enjoy a couple glasses of chilled Sauvignon Blanc, and to adjust our vision to the darkness. I am not sure why, but there was not a single outdoor flood light turned on in the neighborhood. I guess my neighbors left town for the Independence Day holiday.

During our chat Eddy admitted having a small telescope in the past, still being knowledgeable about many of the summer constellations; and so he knew what to ask for when I rolled out the bucket on our driveway.

Since Mars and Saturn planets were already fast receding in the western sky, they were our first targets, and Eddy was thrilled to see Saturn's rings and a couple of its moons: Titan and most probably Rhea. Normally, I would spy out more of the Saturn moons, but the planet was already low above horizon. Afterwards I gave Eddy a preview of July 4th fireworks by pointing at the M3, M13, and M5 globular clusters, and listening to his "Wow, my Lord, this is awesome!" I cannot describe how good I felt witnessing his joy.

After debating the birth, life and future of our Sun, I pointed the Dob at the Ring and Dumbbell nebulas already high above our eastern horizon. In my humble opinion, there are no better examples of planetary nebulas in the northern hemisphere than these two gems. The next objects of our observations were binary stars: Alcor-Mizar, Albireo, the pretty double star at the nose of Delphinus, and finally the famous Double-Double in Lyra, which we could resolve pretty well at 254 magnification.

Our sky tour also included the popular Cigar, Bode, and Whirlpool galaxies in Ursa Major, and a couple of the more distant galaxies in Virgo. Eddy was impressed by seeing the light originating during dinosaur times on our Earth.

Since my invitation was for approximately 45-minutes of sky observing, and we were at it already for over two hours, Eddy's cell phone rang, and he had to do some explaining. So we ended the sky tour by looking at the Lagoon, Trifid, and Omega emission nebulas, and also a couple of pretty star clusters in Sagittarius.

I am not sure what happened to Eddy after he left shortly before midnight. I have not seen him yet, but I stayed out for two more hours, continually sipping Sauvignon Blank, and enjoying myself by looking with a low power eyepiece and O-III filter at segments of the Veil and Crescent nebulas in Cygnus. It certainly was the best observing night so far this year in Roanoke. I am looking forward to enjoying more beautiful nights in the future.

**Night Sky Network**
Astronomy Clubs bringing the wonders of the universe to the public

# RVAS CAN DO THIS!

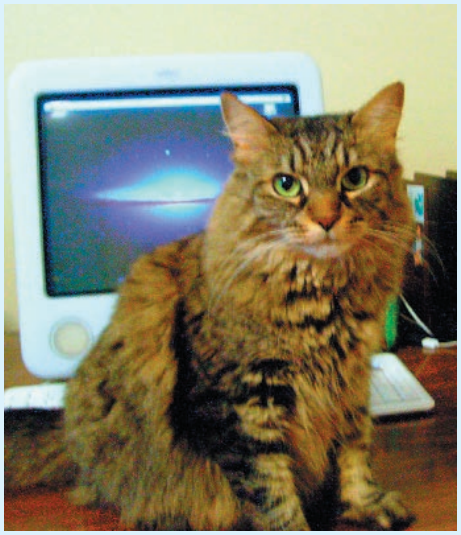
By Genevieve Goss

Described as "Astronomy Clubs bringing the wonders of the universe to the public," with almost 15,000 astronomical outreach events reaching over 1,383,600 people since its inception in 2004.....does this sound like a scene for RVAS? Does this sound somewhat like something that RVAS already does?

What I'm describing is the NIGHT SKY NETWORK, sponsored and supported by organizations such as JPL's PlanetQuest/Exoplanet Exploration program, the NASA Education Forum on the Structure and Evolution of the Universe (SEU), The Origins Education Forum of the Space Telescope Science Institute in Baltimore, and the non-profit Astronomical Society of the Pacific (ASP). The Night Sky Network is a nationwide coalition of amateur astronomy clubs, sharing their time and telescopes to provide the public with astronomy experiences at science museums, observatories, classrooms, and under the real night sky.

The Night Sky Network offers free materials, easy kits and training, and encouragement on how to reach the public. All that is required is a simple logging of the event once completed. RVAS previously participated in, and logged enough events that the club continued to receive new kits. Regrettably, club participation was stopped abruptly in 2006.

Isn't it time that RVAS reactivates its participation in the Night Sky Network? As amateur astronomers who lament the absence of a significant number of younger members in the hobby, we have a duty to bring astronomy to the public. Showing people what exists in the heavens above while they are mired in earthly activities is one way to entice people to become involved.



Here is the latest addition to the Clark Thomas household. Her name is Cassiopeia, but we usually call her Cassie.

Cassie is a healthy five years old. She was rescued from the local killing shelter with less than two weeks to live. She is an absolute joy with impeccable feline manners. Imagine being forced by space and resources to kill something that precious.

In Greek mythology Cassiopeia was the wife of the Ethiopian king Cepheus, and the mother of Andromeda. She was known for her vanity. After being turned to stone by Perseus, Cassiopeia was placed into the sky as a constellation by Poseidon.

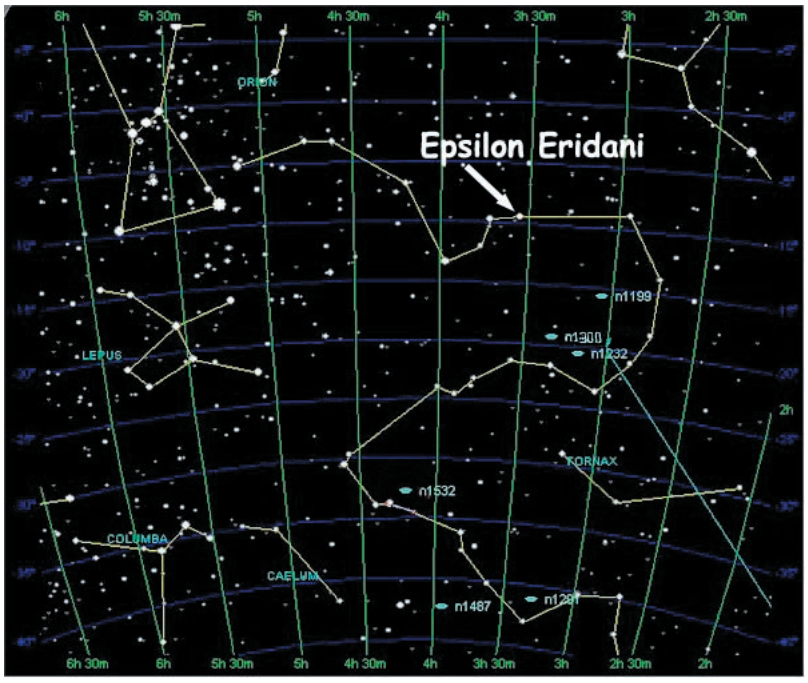
I wonder which is worse – being "euthanized," or being turned to stone.

# Things That Go Bump In The Night

By Jack Gross

Stephen Hawking: "If aliens visit us, the outcome would be much as when Columbus landed in America, which didn't turn out well for the Native Americans...We only have to look at ourselves to see how intelligent life might develop into something we wouldn't want to meet."

While NASA feverously searches for extraterrestrial life in the solar system and the SETI League relentlessly stalks distant star systems for faint radio messages from alien races, creditable scientists like Stephen Hawking are issuing dire warnings about these efforts. The most recent extraterrestrial planet count by the Jet Propulsion Laboratory is 453 - and steadily climbing - the odds of actually finding life beyond earth appear to be increasing.




Recent discoveries here on earth prove the phenomenal ability of life to adapt to hostile environments. Marine biologists have found new, multicellular animals over two miles below the surface of the Mediterranean Sea. Loriciferans (pronounced Lora sifera ins) look like tiny cups with tentacles sticking out. They live in black, sulfurous brine lacking any oxygen.

In September 2007 tiny, tubby invertebrates sometimes called "water bears" were taken into orbit on the FOTON-M3 mission. They were exposed to the vacuum and temperature extremes of space for 10 days. After they were returned to Earth, it was discovered that most had survived and laid eggs which hatched normally, proving that life can survive the vacuum of space.

Over 1,000 feet below many of our oceans, at pressures of 300 atmospheres, and temperatures of up to 750 degrees Fahrenheit, complex communities of giant tube worms, clams, limpets and shrimp thrive in hydrothermal vents called black smokers. Active hydrothermal vents are believed to exist on Jupiter's moon Europa. Colorful mats of bacteria and algae live in bubbling fumaroles which spew boiling caustic chemicals at Yellowstone National Park. All of these organisms rely on geothermal and geochemical energy which is beyond our usual understanding of the environmental conditions required for life.

If, as it has been suggested, life began in the water, perhaps we should look toward one of the lesser known of the 88 modern constellations. Perhaps Eridanus, "the river" (pronounced - eh-RID-a-nas.)? Eridanus represents a river in the sky. More specifically, the constellation's name comes from the ancient Greek name for the Po River. The Earthly "Eridanus" flows eastward for over 400 miles through Italy, emptying into the Adriatic Sea near Venice.



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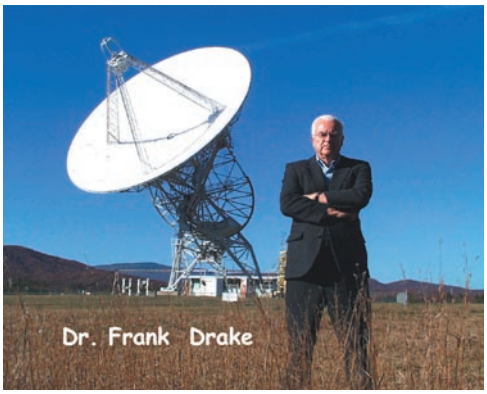
The heavenly Po River is one of the 48 star patterns recorded by the 2nd century astronomer, Ptolemy and is the sixth largest of our contemporary constellations. Best seen in the winter, it can be found next to Orion's right foot (or knee) star, Rigel. Eridanus stretches south and west and zig zags into the Southern Hemisphere skies. The brightest star in Eridanus is Achernar, which lies at the far southern end of the constellation, and is not visible from the Northern Hemisphere. Achernar is number nine of the ten brightest stars in the sky. It also spins so rapidly that its equatorial diameter is more than 50% greater than its polar diameter making it one fat dude.

The most famous star in Eridanus is Epsilon Eridani. In 2000, Dr. William Cochran of the of the McDonald Observatory at the University of Texas discovered a Jupiter-sized planet orbiting this sun-like star. which is, by the way, the third closest star to Earth. He named this planet "Vulcan." This isn't the first time that we have heard of this planet – the Star Trek series (The New Generation, The Best Of Both Worlds), mentioned Vulcan was as being located at Epsilon Eridani. Vulcan was, of course, home to the pointy-eared character known as Spock. The Epsilon Eridani planetary system is the nearest to our own, a mere 10.7 light-years away. It contains two asteroid belts which have been imaged by Spitzer, and an ice belt. The location and structure of these asteroid belts suggests the possible existence of other more Earth-like planets.


Epsilon Eridani beckoned the imagination of a young astronomer some 40 years ago. In a bold and unconventional experiment, Frank Drake aimed a radio telescope in Green Bank, West Virginia, at Epsilon Eridani to listen for radio transmissions from an alien civilization. His followers are still waiting for a "howdy-do" with a bottle of Champagne at the ready.

Another weird thing about this constellation is that it may contain the **Eridanus Supervoid**, the largest area of the universe devoid of galaxies. It has a diameter of about one billion light years and is much larger than any other known void. This anomaly would represent a challenge for our current theories of the origins of the universe - if the void actually exists. It was discovered in 2007 by linking a "cold spot" in the cosmic microwave background to an absence of radio galaxies in data of the National Radio Astronomy Observatory's Very Large Array Sky Survey. There are also suggestions that this void may be due to quantum entanglement between our universe and a parallel universe ... yet another possible location for some menacing aliens who are looking for a cosmic wormhole to crawl through in order to invade our planet.

Perhaps something is protecting us. Did the Native Americans have an enormous national debt when Columbus arrived? Or issues of global warming, over population, world-wide financial collapse, endangered species, energy dependence on limited natural resources, over consumption, world health, air pollution, water pollution, deforestation, carbon emissions, land management, war, habitat destruction, unemployment, poverty, food shortages, and our friends from the UK, British Petroleum? Perhaps the threat to our planet comes from within and not from without. As Pogo put it, "We have met the enemy and he is us."

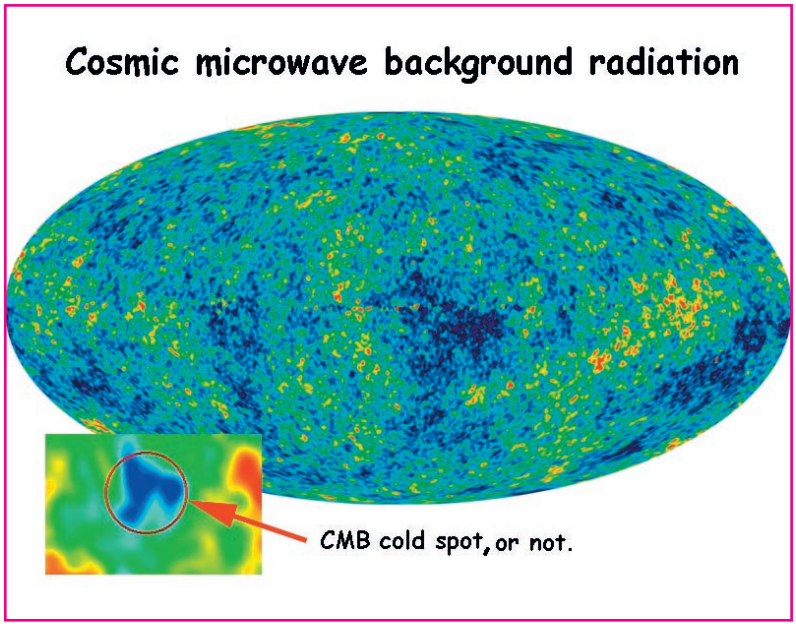
# Another View of the Eridanus Supervoid and the Centaurus-Vela Gravity Anomaly

By Clark Thomas

Jack Gross has herein presented us with a fresh viewpoint on a major anomaly in the Cosmic Microwave Background (CMB). There is yet another and larger anomaly in Centaurus and Vela. What follows is an excerpt from my earlier essay, *Six Cosmological Fallacies*. It is at http://astronomy-links.net/cosmofallacies.htm

**Fallacy #6: Our universe is The Universe**

Less than one hundred years ago we thought our galaxy was all there is. With confirmation of a Big Bang at the beginning of our universe, it became fashionable to think of our universe as all there was. Even the Roman Catholic Church got onboard with this idea, being entranced by the theological possibilities of something coming from nothing but God.




In the 21st century many cosmologists are increasingly skeptical of the idea that our visible universe is the Universe. There are many conceptions of a multiverse, usually involving some image of bubbles. The unprovable mathematical elegance of string theories takes us both inward and outward among multiple dimensions, and along strange types of membranes called branes. All of this metaphysical thought is hopefully on the road to a Theory of Everything (TOE).

I am not alone in believing that it is possible, maybe even likely, that our universe is one bubble within a community of bubbles. The relationships could be fairly static, or there could be bubbles colliding with each other over the millennia. One recent paper investigates this collision phenomenon. Three cosmologists with the University of California, Santa Cruz, published in July 2007 a paper entitled "Towards observable signatures of other bubble universes." You are welcome to access their report at http://arxiv.org/PS_cache/arxiv/pdf/0704/0704.3473v3.pdf

I believe it may be possible to see crudely beyond our own universe, using physics, not metaphysics. I am talking about seeing indirectly beyond the Cosmic Microwave Background. It may be possible to detect nearby universes juxtaposed to ours, whether they have collided with ours or not. This achievement alone will not establish a TOE, but it will open new areas of inquiry. How will we do this?

The mystery of gravity is its action at a distance. Newton saw everything attracted to everything, without any delay. Of course, Newton's 17th century universe was much smaller than today's. Einstein improved on Newtonian gravity by seeing things in spacetime. In spacetime mass warps the fabric of space and time. There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is the famous image of a large ball depressing the "rubber sheet" of space and time, so that passing photons are bent on their path by the dimple. It is interesting that Newtonian physics helped locate Neptune beyond Uranus; and discrepancies in Neptune's orbit helped open the door to Einstein's physics, which Einstein refined by solving discrepancies in Mercury's orbit.

Confirmation of this effect on light comes from observational data involving gravity lenses, such as the object known as Einstein's Cross. There is a danger in this elegance: We are equating what we measure, photons, with that which we are measuring, spacetime. Just because photons are gravitationally bent on their path by large masses, it does not necessarily follow that everything else is likewise bent. Nevertheless, going back to the simple formula for gravity, it is hard to imagine anything else involving energy/mass that would be immune to gravity.

Therefore, it is highly likely that the bending of spacetime is real and fundamental, both on macro and micro scales. We must step up our vision to include a myriad of moving dimples in the fabric, ranging in size from sub-nano to inter-universal.

In quantum theory there exists the idea of a graviton. There could also be a virtual graviton which, much like virtual photons, is a mediator between subatomic particles. In the law of conservation of energy and matter, matter can be energy, and energy can be matter; and the direction is two-ways.

Note that individual photons and gravitons do not know in which direction they are traveling. So what guides them? Spacetime. It is the sum of degrees of "slope" in spacetime that determines how many gravitons from the universal soup are drawn toward a given mass. Only when the net slope is ninety-degrees, a "vertical" drop, does spacetime end at that point, when gravity becomes simultaneously zero and infinite. That process occurred for an extremely brief moment during our universe's Big Bang, when the Yin of contraction immediately switched over to the Yang of expansion.

If photons "go out," how then do gravitons "go in"? The answer is that photons are gravitons, both influenced by vast numbers of dimples in spacetime. Their individual direction and speed are determined by differential summations of these dimple effects. Both of these bosons (force carriers) are two sides of the same coin, so to speak. Some of what we experience as incoming gravity could be bosons flowing in from universes outside our own.

We have already seen how gravity aproaches infinity in black hole cores, and actually equals it at the point of singularity, which extremely temporarily annihilates local spacetime, allowing for the escape of energy. In our Big Bang the earliest inflation occurred because there was little or no localized matter to slow down or divert the escape. Once our universe progressively organized itself, with atoms, galaxies and all that we know, including resurgent gravity, inflowing dimples in spacetime became important, imperiling the infinite expansion of our universe.

It is interesting to contemplate the Cosmic Microwave Background (CMB) itself. Why did it take some 380,000 years after our Big Bang for photons to appear virtually all at once? A possible answer is that well before then gravity had re-emerged, and along with it an event horizon that restrained the new photons inside a gravitational "jail." After 380,000 years our universe had expanded far enough that this universal event horizon vanished. Evaporation of the Big Bang Event Horizon liberated photons, and we see today that sublime event in all its noisy beauty.

A more conventional explanation is that the expanding and cooling universe from the previous dark age cooled to 3,000 K, which allowed protons to capture electrons, and which allowed the opaque haze of the previous state to vanish.


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We therefore see the nearest edge of the cosmic microwave background through the newly transparent universe.

Later on, about six billion light years ago (distance and time), a very strange thing started to happen. The rate of expansion of our universe started gradually to accelerate again. We know this from seeing our cosmic candle, the brightness of type Ia supernovae, being dimmer than we would otherwise expect beyond six billion light years. What does this mean?

If we perceive the total Universe as being much grander than our Big Bang universe, then the answer is simple: Objects toward the limits of our observable universe are NOT being subjected to awakening phantom Dark Energy. They are simply responding to the increasingly downward slope of spacetime as they approach, and are attracted by, what is beyond our own historical bubble. This multiverse gravitational explanation is more elegant than cooking up a new mystery force.

If whatever lurks beyond our own bubble universe is evenly distributed nearby to the boundaries of our universe, as in a uniform cosmic soup, then it will be impossible to detect significant differences in the rate of expansion of areas of our known universe. On the other hand, if there are other universes adjacent to our own, then their nearby-distant mass/energy concentrations could be indirectly detected.

To improve our trans-universal resolution we will need to have a much better understanding of gravitational effects, including gravity waves, from the localized distribution of matter/energy within our bubble. We will also need to expand our concept of spacetime, so that it is not confined to one universe in the Universe.

Our indirect "image" of such truly alien material beyond our Big Bang envelope will always have very low resolution, but we have to take what we can get. Only a transcendent divinity "above it all" could see better. Nevertheless, this singular low-resolution achievement would place us finite humans higher up the ladder of sentient beings on Earth and elsewhere who are living "in the image of God."

Since this essay was first written in 2007 the advance of science has continued, and will continue. In September of 2008 scientists announced their discovery of the likely presence of dark matter beyond our visible universe. That either means there was a universe preceding our Big Bang universe, with the initial inflationary expansion of our Big Bang pushing outward pre-existing dark matter; or it could also mean that there are indeed other universes in the Universe beyond our own.

This recent data comes from the WMAP satellite. Basically, a gravitationally strong patch some twenty degrees in diameter has been detected toward the Centaurus and Vela constellations. Very distant galaxy clusters are moving toward it in ways that cannot otherwise be explained. This WMAP observation opens the door for future observations of other gravitationally strong patches, and even for the concept of a broader halo of matter somewhat more distant. I invite you to read a report in *Astronomy* magazine at this URL: http://www.astronomy.com/asy/default.aspx?c=a&id=7423

Eventually, it could be demonstrated that so-called dark energy may primarily be distant energy/matter increasingly attracting our known universe, as what we know moves toward the boundaries of our observable universe. If this flow is so, then the vision of everything, even atomic cores, being totally ripped apart by phantom energy in a Big Rip some 80+ billion years hence is not true.

Of course, our own universe may vanish as such in a sea of bubble universes. Its constituent elements should survive elsewhere, to be followed by new bubbles created by future big bangs. There would be no end to everything within an infinite singularity of chaos, merely a mixing of the soup over and over again. In this extremely long term view, the more things change, the more they remain the same.

The Pillars may already be gone!

# M16 - The Eagle Nebula

By Michael Good


Two days before our Nation's Birthday, we had a cold front pass through Roanoke producing cooler temperatures, clear skies, and nice transparency. I was up late, allowing the Milky Way to rotate into view past my gorgeous 100+ years old Tulip Poplar on my property. I set the slew of my C14 to the heart of Messier 16.

While known as the Eagle Nebula, it is more popularly known as the Pillars of Creation, named after the gorgeous high definition Hubble Images revealing the multiple light years long columns of star dust, being sculpted by violent stellar winds from the bright blue O-type stars embedded in the adjoining star cluster (to upper right in my image).

M16 is a young open star cluster, and it is in the constellation Serpens. It was discovered by a Frenchman in 1745. It is a diffuse emission nebula (HII region), meaning the strong ultraviolet light from the neighboring hot stars in the star cluster are ionizing the electrons in the gas around the cluster.

You have probably heard about Quantum Physics. The electrons that orbit the nucleus of an atom do so in discreet orbits. When an ener-



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getic photon of the correct wavelength strikes an electron in its "normal" orbit, it bumps it up to the next "legal" orbit or higher. Yet the atom always wants to return to its normal energy level, so first chance it gets, the electron drops back down to the normal energy level, but when it does this, it gives off light. The light it gives off always corresponds to the energy drop.

For singly ionized Hydrogen atoms, this light produces the characteristic red glow we see in gas returning from these energy states. There are many legal states, depending on the atom and energy levels. For Hydrogen atoms, the Lyman series of transitions are in the Ultraviolet, the Balmer series in Visible to UV, and the Paschen series give off Infrared radiation. When we see pictures of red nebulae in our galaxy and in others it is normally from the Balmer transitions of electrons giving off mainly visible quanta of red light. This same color of red light can be produced in a laboratory ionizing Hydrogen atoms.

Interesting science on the Pillars in M16 involve work in 2007 (Jan 9, 2007) using the Spitzer Space Telescope that indicate a supernova about 6000 years ago (visible on Earth about 2000 years ago) may have already destroyed the pillars, but the light showing the effects of the explosion on the surrounding nebula will not reach the earth for another 1000 years.

For my image I relied on 21 short one minute exposures at 1x1 bin, with a mix of different RGB exposures at 2x2 binning. The atmospheric turbulence that cleared my skies also limited the resolution I was able to obtain from the pillars, especially given they are a more southerly object. I used strong Richardson-Lucy deconvolution, followed by a DDP to compress the dynamic range, and then Photoshop 4 for levels, curves, and use of Don Goldman's tools to increase star color. As usual, I am not happy with the image. What else is new!

Notice the "dolphin" to the lower right in the image.

# LENS CAPS OFF TO OUTGOING OFFICERS!!

BY PAUL CAFFREY

With the new RVAS Executive Committee now in office, let's take time to acknowledge the conscientious leadership of outgoing RVAS President **Randy Sowden** who admirably fulfilled his presidential duties (even while becoming a father for the second time!) and who now assumes the role of Immediate Past President on the EC.

Randy was ably assisted by Vice-President **John Goss** who leaves that local role to jump to a national one — that of Vice-President of the Astronomical League.

RVAS Treasurer **Jeff Suhr** graciously agreed to continue for another term in that office which he manages so well.

**Dave Thomas** deftly served as Member-at-Large, providing support to the other officers for multiple terms, and he will now shift his focus to assisting with VAAS 2010.

**Mark Hodges** capably advised the EC as Immediate Past President, and he will continue this year as Past President. Thanks to all of you for your leadership and time spent for the betterment of our club!

Paul Caffrey
President RVAS

PS: I received more than a little help with this homework, Thanks Genevieve!!!

# Calendar of Events

**by Frank Baratta**

*MONTHLY MEETING:* Monday, August 16th, 7:30 p.m., Center in the Square, Roanoke. The evening's program will feature several short presentations. So far, we have Mark Hodges with two short topics, Mark Poore agreeing to speak on the Messenger flight to Mercury, and Jeff Suhr speaking on Animal Astronomy. We have room for more short topics. Come join us!!!

RVAS WEEKEND OBSERVING SESSIONS: Observing sessions are held at Cahas Mountain Overlook, milepost 139 on the Blue Ridge Parkway.

- Friday and Saturday, 6th and 7th. Sunset is at 8:22 p.m. Astronomical twilight ends at 10:02 p.m. The Moon sets at 5:38 and 6:30 p.m., respectively.

- September Sessions: 3rd and 4th; 9th and 10th.

ROANOKE CITY PARKS and RECREATION PUBLIC STARGAZE: Saturday, August 7th, 9:00 p.m., Cahas Overlook, milepost 139, Blue Ridge Parkway. Nonmembers must register with Parks & Rec. at 540-853-2236. Members can call 540-774-5651 for information. (Next session: September 18th, 9:00 p.m., Green Hill Park, Salem.)

FRANKLIN COUNTY PARKS DEPT. PUBLIC STARGAZE: Next session: TBA.