Roanoke Valley Astronomical Society

News About Amateur Astronomy
in Southwestern Virginia

Volume 27 – Number 2 February 2010

Life Environments in our Cosmic Neighborhood

by John Goss

Many people, including amateur astronomers, talk about life elsewhere in the universe as if it is a given that exolife really exists. No such life has yet been discovered.

The Roanoke Valley Astronomical Society was very pleased to have at our January meeting speaker **Jane Haddad**, former Cave Spring biology teacher. She provided her keen insights on the *tenacity* of life on Earth, and how well that bodes for the possibility of life existing on Mars.

Defining "life" can be quite difficult and involved. A working definition is needed that excludes all non-living natural phenomena, such as crystal growth.

Life must have these seven qualities:

a.) have a defined order,
b.) be able to reproduce,
c.) be able to grow and develop,
d.) utilize energy,
e.) respond to its environment,
f.) be able to regulate its internal chemical processes, and
g.) be able to adapt to environmental changes.

It is likely that the physical circumstances found of other worlds are vastly different from what we experience on Earth, and that, in some cases, life as we know it simply could not exist. But, what if under some alien conditions life could exist?

What physical conditions are required by life? A good start to answering that question is to examine the extreme circumstances of where life exists on

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our Earth. Organisms living under these severe conditions are known collectively as "*extremophiles*." Some are common; many are exotic:

- Anaerobes. Single-celled organisms surviving without oxygen. Yeast is a good example.

- Thermophiles. Some hot springs are home to single-celled life. Volcanic vents on the seabed attract a wide variety of complex organisms.

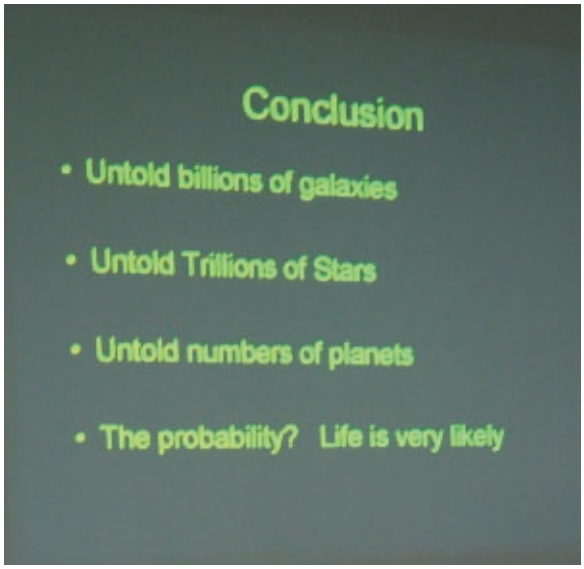
- Psychrophiles. Temperatures of nearly -100°F don't prevent some lichens and protists from surviving the Antarctic environment.

- Acidophiles. Some acidic hot springs contain active bacterial colonies.

- Alkalophiles. Some alkaline waters contain bacteria and blue-green algae.

- Halophiles. Very salty water can support blue-green algae.

- Barophiles. Complex creatures such as eight feet long tube worms do live on the ocean floor under many tons of pressure.



The nearest world that is a good candidate for either past or present life is Mars. It may be colder than anywhere on Earth, but temperatures may not be too extreme in caverns and underneath its recently discovered "topsoil" layer of rock, water ice, and frozen carbon dioxide.

Giving support for possible sites for life, the Mars Reconnaissance Orbiter has imaged caves, and has identified ice along crater slopes. It sure seems that the more our probes examine the Red Planet, the more evidence is discovered that supports the likelihood of the existance of primitive forms of life.

With all the planets being discovered almost daily by giant telescopes on Earth, and with the Kepler Space Telescope, soon some will be identified as being hospitable to life as we know it. The answer to "Just us?" may be just around the corner.

Even if we find direct evidence of primitive life beyond our planet, how much longer could it take to identify intellectually advanced life? The only honest answer is somewhere between tomorrow and never.

TRI*STAR

The Triad Starfest, *Tri*Star* for short, is a gathering of astronomers of all types, from novice to professional, for a full day of presentations, displays, and observing. This event allows astronomy enthusiasts to share ideas, learn about a range of astronomical topics, and get together with old and new friends.

The upcoming edition of *Tri*Star* will take place on **Saturday, 6 March** 2010, in the Percy H. Sears Applied Technologies Center on the campus of Guilford Technical Community College, in Jamestown, NC, not far below the Virginia state line. In addition to a series of fine speakers scheduled throughout the day, there will be a wide range of astronomical displays, assorted astronomy-related vendors, prize drawings, "how-to" help for astronomy beginners, an astrophotography exhibition, and daytime and nighttime observing sessions (weather permitting).

RVAS nearly always has several members carpooling there. It's free to attend. If you are interested and need a ride, contact an Executive Committee member.

The Michael Jackson Crater

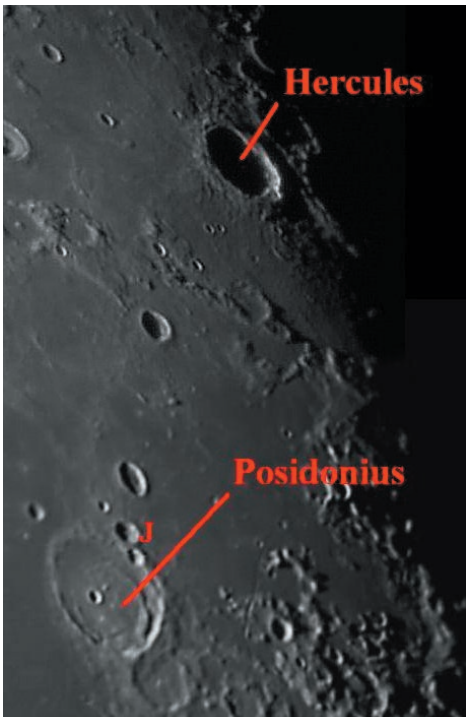
by Dave Thomas

This month we will explore a region of the Moon that is home to craters Posidonius and Hercules.

Posidonius lies on the western shores of Mare Serenitatis. It is 95 km in diameter, and 2.3 km in depth. This crater is an example of an older impact. The floor has been partially covered by subsequent lava flows, and the walls are collapsed in places.

There are several small satellite craters associated with Posidonius. One is designated "J" herein. It has a diameter of 22 km. This particular crater was renamed by The Lunar Geographic Society, "**Michael Joseph Jackson,**" in remembrance of the moonwalking pop star Michael Jackson.

To the north of Posidonius, crater **Hercules** sits in the Mare Frigoris, east of crater Atlas. Hercules is 69 km in diameter, and 3.2 km deep. A satellite crater along its southern edge has been the location of transient lunar phenomena.



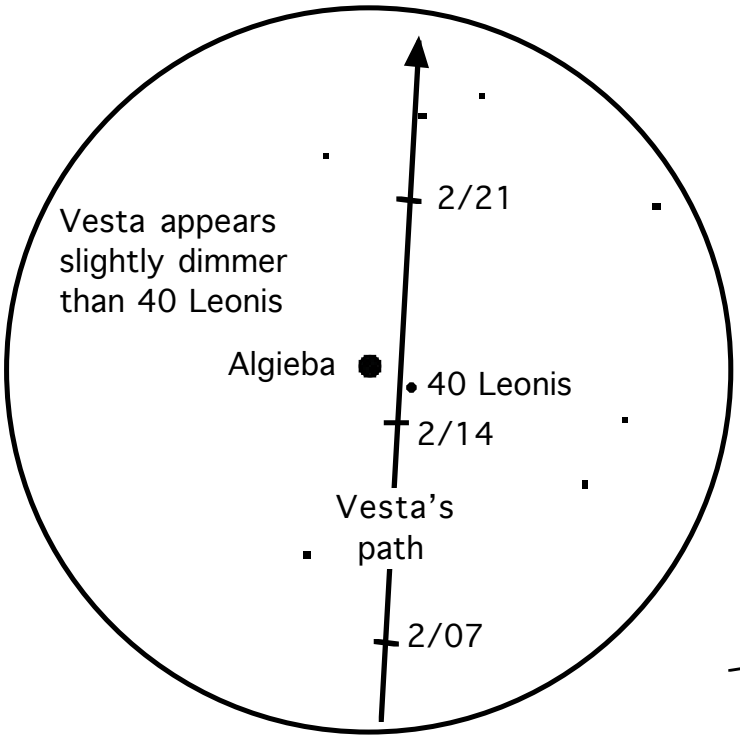
The photo accompanying this article was made by club member, Michael Good. It consists of two of his photos that I stitched together for a panoramic view of the region. Photo details: Nov 5, 2009. Waning gibbous moon. Celestron 14", f22. Meade lunar and planetary imager. Multiple images stacked at a resolution of 640x480, using Registax.

Frank Baratta's Astro-Quiz

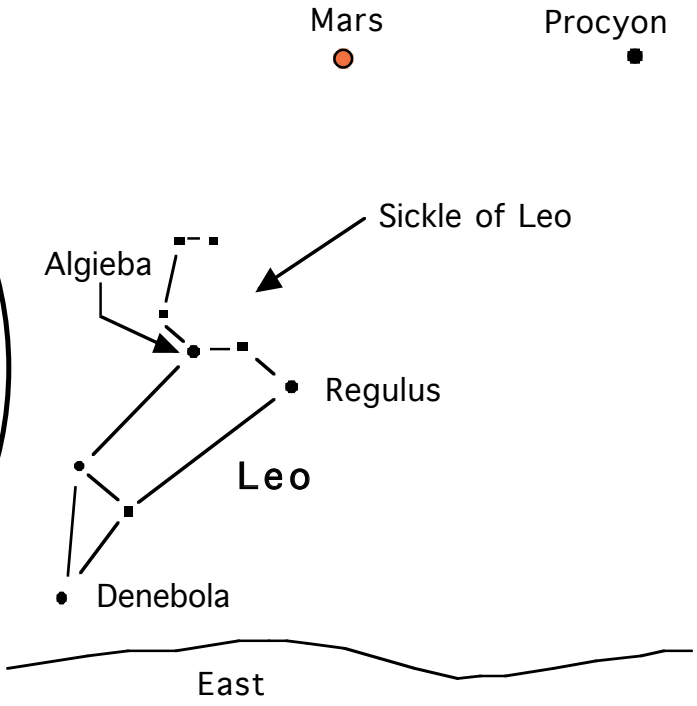
You've just set up your reflector, popped in an eyepiece, and notice that the ring pattern of a bright, out-focus star seems oval-shaped and bunched up to one side. What's up?

Answer to Last Month's Astro-Quiz: **Beach walks in the cold of January don't sound that great, but avoiding them on the 30th of this month makes even more sense. That day, Earth experiences the Proxigean Tide. The Proxigean Tide occurs when the Moon is at the point in its orbit closest to Earth and in its New or Full phase. At this time, its tidal effect on the Earth is at its maximum. Proxigean Tides at New phase, when Sun and Moon are on the same side of the Earth, are more intense than at the Full phase, when they are on opposite sides, the latter being the case on the 30th. But with Earth also still close to perihelion, the tide promises to be stronger than usual.**

Your February Viewing Challenge...



Binocular view



Sky Scene at 8:00 p.m., February 14

Vesta passing Algieba in February

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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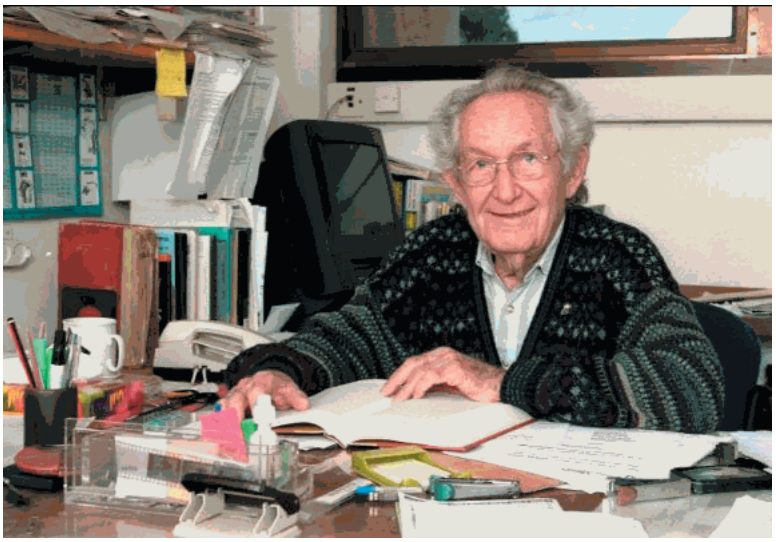
Dr. Gerald Soffen — Viking Project Manager

by Genevieve Goss



Of course, the obvious choice for a February astronomer birthday honoree would be the Italian astronomer, physicist, mathematician and philosopher Galileo Galilei (February 15, 1564 – January 8, 1642). However, Galileo had IYA 2009, a whole year of astronomical activities, dedicated to him....so, enough with Galileo for awhile!!

Instead, we'll recognize **Gerald Soffen (February 7, 1926--November 22, 2000)** as our February luminary.

Dr. Gerald Soffen served as **project scientist of the NASA Viking space team at Langley, directing over 70 scientists in performing the first experiments of the surface of Mars.** The Viking space probes were a huge success and these experiments comprised the body of knowledge of the red planet for a quarter-century. A brilliant researcher, Dr. Soffen's work paved the way for NASA's astrobiology program, and he was a guiding force in NASA's search for life in the Universe. Soffen worked for NASA for more than thirty years, both at JPL in Pasadena and at Goddard and Langley on the East Coast.

Perhaps, almost as noteworthy as his scientific career, was his lifelong passion for sharing his knowledge with young people. He had the power to interest and excite the next generation of young scientists and leaders to carry on his search for extraterrestrial life and to expand the understanding of our universe.

The so-called Face on Mars, as originally imaged by Viking in 1976.

In the "Mission to Planet Earth" program, he sought to study the effects of natural and human-induced changes on the global environment. As the first Project Scientist in the Earth Observing System (the key program of Mission to Planet Earth), his work helped provide long-term data needed to understand global climate change.

Gerald Soffen's work ushered in a new era of discovery, not as a superstar like Galileo, but as an important legacy nonetheless.

"The Open Cluster"

RVAS on Facebook

By now the membership should be aware that the Roanoke Valley Astronomical Society has a presence on Facebook. This could be very good, or less so. Facebook is what you make of it. Same holds true for the RVAS Yahoo group, which has been well "attended" by a large minority of the membership. The only better source of breaking news would be our president's emails to everybody.

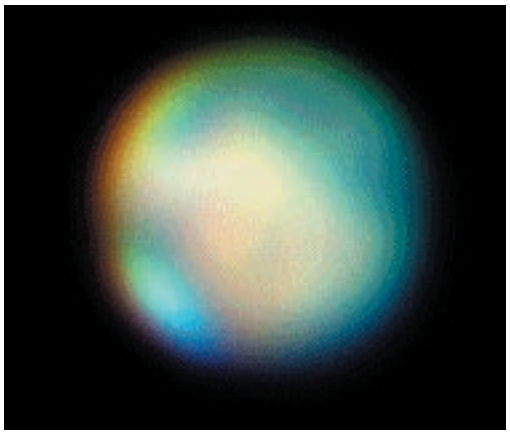
In contrast, our RVAS monthly newsletter is full of news and views, conceptionally and literally. This publication is a major "face" of our club, and a forum for detailing many of the amazing things our membership does. However, it is not a flash news service.

As newsletter editor, I am concerned about information spreading thinly as it spreads widely to an active minority. Everybody has access to the newsletter. However, not everybody is on Yahoo's group. The same could be said for Facebook, which has less than a quarter of the membership, so far. If we all joined either or both, that would be good, but it won't happen. I also have some concerns about Facebook's cavalier attitude toward personal privacy.

Whatever evolves among the members, rest assured that you will be fully informed of key events, such as meetings and outings — and you will always be offered the opportunity to write at length for the newsletter.

Access our new Facebook presence by first joining Facebook itself. You can keep your personal data very minimal, if you wish. You can find us by typing into the Facebook search bar: Roanoke Valley Astronomical Society.

Mars



Have you seen Mars yet? "No hurry." It looks like a space eyeball, and it's about this size at a zillion magnification. Mars is only slightly larger than our Moon, but much farther away, making it a challenge for any telescope.

This image was taken by Michael Good on the 16th of January when seeing conditions were so-so. Yes, Mars is best when seeing is excellent, allowing great magnification. Still, a small telescope can get a glimpse of the great ice cap, and maybe some features. Actually, you *should* hurry. Mars has just passed its closest point to Earth. Every day it gets even smaller.

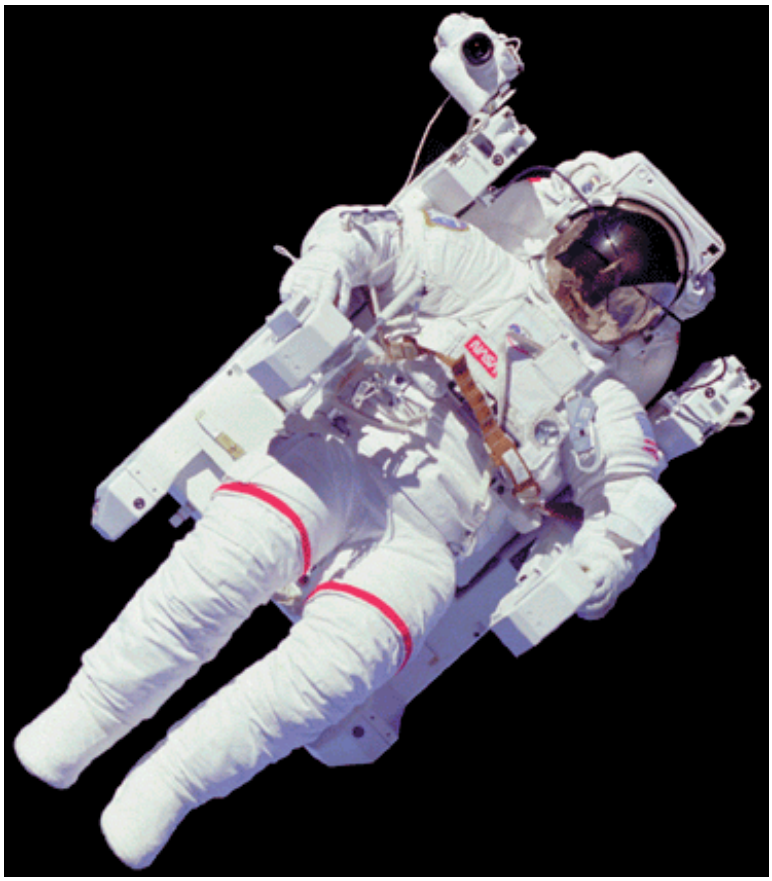
VAAS in 2010

The Executive Committee has begun active planning for Roanoke's hosting of the annual Virginia Association of Astronomical Societies meeting. We are hoping that every member of our club will find a way to do something to help us plan and carry out the finest VAAS meeting ever. We can do it with your help! Contact any Executive Committee member to ask questions, and to offer whatever help you can provide.

Space and Astronomy Quotations

by Clark Thomas

I was sent a wonderful collection of space and astronomical quotes by its collector, Dave English. His link shall become a part of astronomy-links.net. His site is **SpaceQuotations.com**. Here are a few of the gems he found:



"Be glad of life, because it gives you the chance to love and to work and to play and to look up at the stars."
— Henry Van Dyke

"The contemplation of celestial things will make a man both speak and think more sublimely and magnificently when he descends to human affairs."
— Cicero

"Many discoveries are reserved for ages still to come. Our universe is a sorry little affair unless it has in it something for every age to investigate."
— Seneca

"No one regards what is before his feet; we all gaze at the stars."
— Quintus Ennius

"We do not ask for what useful purpose the birds do sing, for song is their pleasure since they were created for singing. Similarly, we ought not to ask why the human mind troubles to fathom the secrets of the heavens. The diversity of the phenomena of Nature is so great, and the treasures hidden in the heavens so rich, precisely in order that the human mind shall never be lacking in fresh nourishment."
— Johannes Kepler, *Mysterium Cosmographicum*, 1596

"There is in the universe neither center nor circumference."
— Giordana Bruno, *On the Infinite Universe and Worlds*, 1584.

"I have loved the stars too fondly to be fearful of the night."
— Sarah Williams

"In the country the darkness of night is friendly and familiar, but in a city, with its blaze of lights, it is unnatural, hostile and menacing. It is like a monstrous vulture that hovers, biding its time."
— Somerset Maugham

"Astronomers, like burglars and jazz musicians, operate best at night."
— Miles Kington, *Welcome to Kington*.

"To consider the Earth as the only populated world in infinite space is as absurd as to assert that in an entire field of millet, only one grain will grow."
— Metrodorus of Chios, 4th century BC.

The Star named "Jiri & Anne"

by Jiri Kolejka

Anne and I got a surprise gift on Christmas Day from our children, a 12.6 magnitude star in Orion constellation named by our given names.

The source of my gift is a private enterprise established in 1979 that offers naming selected stars in both celestial hemispheres for individuals and groups by names selected by them.

This source asks the enquirer what constellation the star should be selected from, and comes with a package including 12" x 16" or 16" x 20" parchment certificate, available framed or unframed, with the star name of choice, dedication date and astronomical coordinates of the selected star. The package includes also an informative booklet and detailed 12" x 16" chart of the specific constellation with the selected star encircled in red. The chart includes the star name, dedication date, coordinates and the star magnitude.

The pricing of the star package ranges from $54 to $155, plus shipping and handling costs. Well, I must point out proudly that our son Michael spent the upper limit on us.

Because it is a profit-making, commercial enterprise, the star name is not officially recognized by astronomers — so what Anne and I got is a nice certificate and a nice Orion constellation chart fitting very well on our home office wall.

However, it gives our children, living far away from us in Arizona and in London, England, a reference point in the winter night sky to look at and spiritually connect with us, even after we'll be long gone.

30 arc sec. DSS image with the "Jiri and Ann" star at dead center, with two arrows drawn in. It is the brighter middle star in the line of three. Seen even closer (enlarge this image), it appears to be a tight double star, which is appropriate! [ed.]

The Chicken Little Scenario

by Jack Gross

The August RVAS Club meeting was highlighted with a presentation by Matt Cleveland on the 8.4 meter Large Synoptic Survey Telescope which will be constructed in Chile. With a 3.5 degree field, LSST will identify near-Earth objects which include both asteroids orbiting the Sun and comets arriving from the outer solar system. While the frequency of any impact to our planet is exceptionally low, the damage they could cause is catastrophic. The impact of an asteroid with a diameter of only 1,000 feet would be equivalent to 1600 megatons of TNT. In an ocean basin, the resulting tsunami could devastate coastal areas. There may be a million asteroids with a diameter of a mile or more! The Binzel Committee report to the Astronomy and Astrophysics Survey Committee has documented the following threats:

- The wide-ranging geologic consensus that the Cretaceous-Tertiary extinction was caused by the impact of a large asteroid or comet 65 million years ago (Alvarez et al. 1980).
- The recognition and confirmation of more than 100 impact scars on the surface of the Earth (Grieve 1991).
- The discovery of a substantial population of objects in near-Earth space and their correlation with the estimated cratering rate for the Earth and Moon (Shoemaker 1983; Shoemaker et al. 1990; Rabinowitz et al. 1994).
- The discovery and spectacular demise of comet Shoemaker-Levy 9, punctuating the reality that impacts are a continuing planetary process in the solar system today.
- Increasing discoveries of future Earth close encounters.

So, among many other missions, the LSST will catalog the orbits of hundreds of thousands of meteors and provide an early warning of any impending doomsday scenario. Since it appears to be a matter of "when" and not "if" - let's take a closer look at this gunslinging asteroid belt.

Asteroids are primordial objects left over from the formation of the Solar System. They are probably the space garbage that never successfully coalesced into a planet when our solar system formed from a nebula of gas, dust and ice.. Within the disk, tiny dust grains consolidated into large objects called planetesimals. Several of these eventually accreted into planets. But, between the orbit of Mars and Jupiter, the gravitational interference from these developing planets kept a band of this clabbered mess from accumulating into objects much larger than about 620 miles although most asteroids are only the size of pebbles. Hundreds of thousands of these mostly stone bodies continue to orbit the sun in a zone known as the "Main Asteroid Belt."

Two dense clouds of asteroids are found in the orbit 60° ahead and behind Jupiter at points called "L4" and "L5" These two swarms are called "Jupiter Trojans" and the two areas of these asteroid concentration are not part of any lumbar spinal column (which often cause

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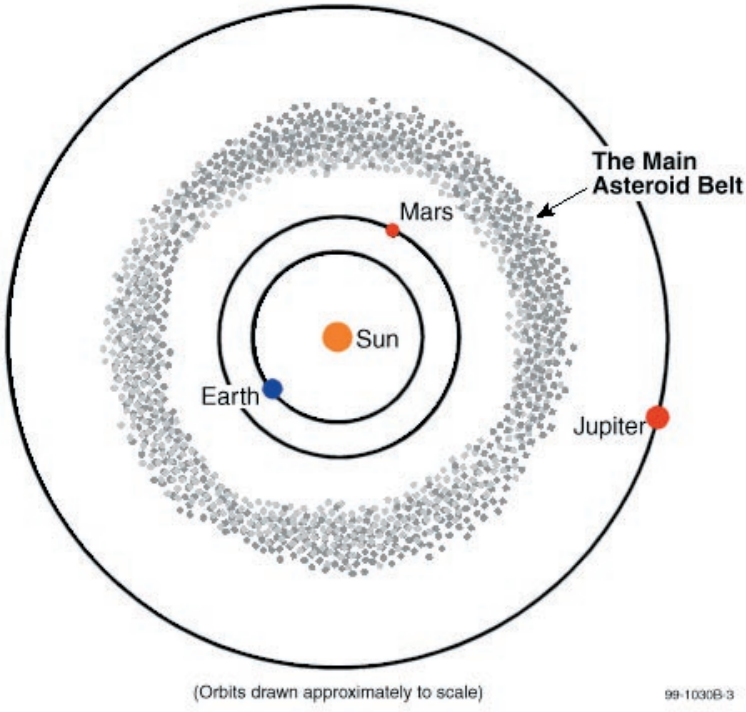
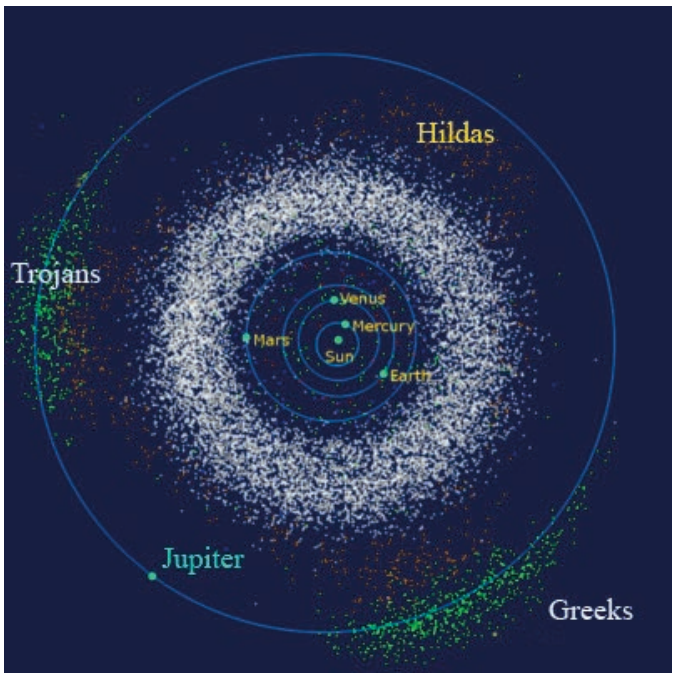
sciatica) but, rather they are "Lagrange points". These Lagrange points are locations in space where gravitational forces and the orbital motion of a body exactly balance each other. They were discovered by French mathematician Louis Lagrange in 1772.



Once again myth and science join hands as astronomers have chosen to commemorate the Trojan War in the naming of these two groups of asteroids. They have pitted the Greeks against the people of Troy in a never-ending celestial pursuit. Small fragments from the raging battle which is going on between the asteroids and forces of gravity hit the earth every day as meteorites. In the past, bigger asteroids have bombarded our planet with impacts that killed off a significant share of life on earth. While most asteroids may be only the size of pebbles, 16 of these bad boys have a diameter of over 150 miles and in recent times there have already been a few alarms raised about near-earth collisions.



Another gang of hooligans has claimed turf in the Main Asteroid Belt. This mob is called the "Hildas" after their leader, 153 Hilda, discovered by Johann Palisa in 1875. There are more than 1,100 known Hilda asteroids in this neighborhood. The Hilda asteroids are locked in a 2:3 orbital resonance with Jupiter. (Jupiter goes around the Sun in 11.9 years, while Hilda goes around the Sun in 7.9 years.) This means that Jupiter orbits the Sun 2 times for every 3 times that Hilda goes around – this orbital dance results in a dynamic orbital stability avoiding dangerous approaches to the planet.

Thus all three asteroid clusters, the Trojans, Greeks, and Hildas, have managed reasonably stable orbits over many eons. However, tidal forces continually act on these bodies and occasionally a foot soldier is sent careening out of the ranks. These rogues, along with the thousands of other unassociated mercenary asteroids, constitute a very small but very real threat to our planet.

This is why the Large Synoptic Survey Telescope's mission includes an early warning task in much the same way as the 63 radar stations known as the DEW line. They once stretched from Alaska to the Baffin Island in the frozen artic. Perhaps the war analogy used in the naming of these swarms of asteroids may be closer to the truth than we like to think. Soviet nukes come and go, but asteroids are forever.

SML Radio Astronomy Lecture

by Roger Yeager

The 8th annual Winter Lecture Series at Smith Mountain Lake State Park kicked off its first program of the year with a fascinating talk by Dr. Mark Adams, who discussed imaging the universe in the radio portion of the spectrum. This spans approximately one milimeter to 30 meters, almost all of which is accessible from ground-based observatories, day and night.

Dr. Adams (mtadams@nrao.edu) is the Assistant Director for Education & Public Outreach at the National Radio Astronomy Observatory headquarters in Charlottesville, Virginia. He received his astronomy degree from the Pennsylvania State University, and then attended the University of Arizona, where he completed a Ph.D., in astronomy. Previously he was the site director for the University of Texas - McDonald Observatory in west Texas before moving to Virginia in 2004. During his career, he has conducted research at radio, optical, and infrared wavelengths, and has published papers on star formation, gravitational lenses, radio galaxies, Wolf-Rayet stars, supernovae, quasars, fiber optics, and large telescope operations. Dr. Adams has also written popular articles on astronomy and natural history.

His January 10th talk at the Smith Mountain State Park Discovery Center revealed a universe which is hidden from us at visual wavelengths. The lecture was illustrated by many pictures taken in both the optical and the radio spectrum. He also discussed the need for research in all portions of the universe's electromagnetic radiation.

Dr. Adams also showed photographs he had taken at major international radio astronomy research facilities now under construction: the Expanded Very Large Array (EVLA) in the southwestern United States, and the Atacama Large Millimeter/sub-millimeter Array (ALMA) in the high-elevation desert of northern Chile.

He also discussed a third new international research facility, the Square Kilometer Array (SKA), which is in its early design phase.

He concluded remarks by telling an appreciative audience that approximately 80% of the discoveries of new, cutting-edge telescopes are completely unexpected. He suggested that we all "stay tuned..."

Rating: Easy for beginners, to hard for advanced...

M33, and the largest nebula known (NGC 604)

by Michael Good

Our local group of galaxies includes the great face-on galaxy **M33** in the constellation Triangulum. At a distance of 3 million light years, this galaxy is farther away than the Andromeda galaxy, but is only about 50,000 light years in diameter, making it the third largest in our Local Group. It only has about one tenth the number of stars of our own Milky Way galaxy.

Despite its giant size (70.8 x 41.7 minutes of arc), and bright *integrated* magnitude (5.72), don't be upset if you have trouble finding this galaxy within the city limits. I grew up in the then smaller "town" (now city) of Salem, and NEVER saw M33 in either my binoculars or in my 6" reflector.

I then moved to Poages Mill in Roanoke County and boom, there it was. This object does not like light pollution. It is listed as a naked eye object, but you better have dark skies. It makes an easy binocular object, again when viewed from darker skies like our Cahas overlook on the Blue Ridge Parkway, or our Apple Ridge Farm GE Dark Sky observatory site.

History suggests Giovanni Hodierna may have discovered this object before 1654. Charles Messier "re-discovered" it in 1764. Wikipedia tells us that William Herschel cataloged this object on Sep 11, 1784, and that M33 was among the first "spiral nebulae" identified as such by Lord Rosse.

Herschel also separately cataloged what is now known as **NGC 604**. This is a large nebula of ionized Hydrogen (H II region), similar to the Orion Nebula in our galaxy. **With an estimated size of 1500 light years across, this nebula**

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is over 40 times the size of our own Orion Nebula. NGC 604 is listed as only 1.93′ x 1.2′ in size, with apparent magnitude 14, but given its smaller size this faint magnitude does not present a problem visually.

A search of the web found a nice write-up by Kim Gowney, observing NGC 604 with an 8" (200mm actually). She thought she was seeing another galaxy or a comet, but then she checked her star charts, and realized she was seeing the inner core (she estimates 15") of NGC 604. This inner core, over-exposed in my photograph, was estimated by Kim as magnitude nine, hence observable by an 8" telescope.

Good's 2005 "deeper" image of M33 also shows NGC 604 much more overexposed.

As an astrophotographer, I resisted the urge to go "deep" with this object, and instead again applied the techniques used in my M42 Orion Nebula image. I shot both color and luminance using 1x1 binning (normally 2x2 is used for color data), with only one minute exposures (galaxies normally like 5 to 10 minutes exposres). I did not have any blooming spikes to worry about.

Can you spot the multiple satellites in my 2009 image? I had an amazing four images with satellite trails. I deleted the one where I was using Clear (luminance), so it did not overpower the image. I left green and red satellite tracks in the image.

To the left of the image is the core of M33, with a nice cluster of bright blue giant stars just south (left) of the yellow core of older population stars. M33 is filled with active young stars (blue dots along the spiral arms), and I can count at least 20 large HII (nebular) regions on my image. The 100 giant baby stars in the core of NGC 604 (the large red blob above and right of center) are over-exposed and not resolved in my image. Compare this resolution with the incredible scale and resolution of the Hubble Image of NGC 604.

Each image of color data was summed, and then a log(X^(1/2)) stretch function was applied by the ESA/ESO/NASA Photoshop FITS Liberator 2 plugin, flipping the mirror image at the same time.

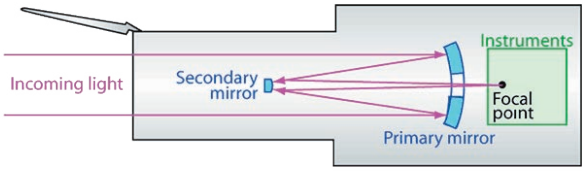
The fits image was copied and pasted into The Sky (Software Bisque), and an image link was applied to determine the exact plate scale (0.594 arc seconds per CCD pixel), yielding about f6.8 for the focal ratio after the Celestron "f6.3" focal reducer is applied to the native f/11 Celestron optical path, passing through an 2" focuser (with Robofocus glued to the shaft), thru the reducer into an SBIG Adaptive Optics AO7 tip-tilt mirror system, thru the color filter and onto the CCD chip of the ST10XME (micro-lens) detector.

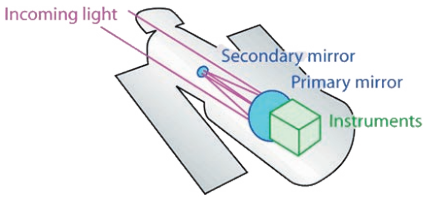
A college professor provides a glimpse into the life of professional astronomers

by Roger Pommerenke

Early in 2010 I exchanged emails with **Prof Steve Skinner of the University of Colorado Center for Astrophysics and Space Astronomy (CASA).** This article (and perhaps a few more) is based/inspired on those emails and internet sites recommend by Dr. Skinner. First the basics.

Hubble Space Telescope (HST) is a Cassegrain telescope (No explanation needed for this audience)





drawing courtesy of hubblesite.org

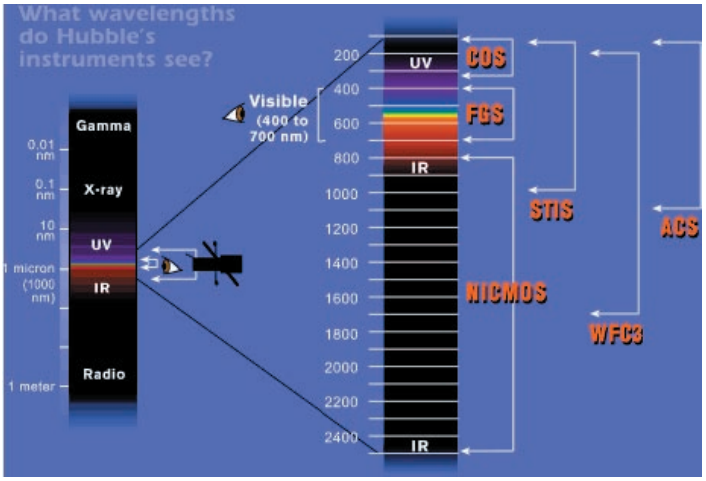
The Cool Instruments (pun intended) on HST In the diagram above there is a box labeled "instruments" that contains six really cool instruments (some of them operate at -80 degrees C.) The best known are the **Wide Field Camera 3 (WFC3) and the Advanced Camera for Surveys (ACS)** both of which have taken many of the well known Hubble photos. (Well actually WFC2 took those pics. But WFC2 was replaced by better WFC3 in May 2009).

Club members may also be interested in the **Fine Guidance Sensors (FGS)** that lock Hubble onto guide stars without deviating more than 7/1000th of an arcsecond, or about the width of a human hair seen at a distance of 1 mile.

Other instruments in the 2009 version of the HST include the **Space Telescope Imaging Spectrometer (STIS), the Near Infrared Camera and Multi Object Spectrometer (NICMOS), and the Cosmic Origins Spectrograph (COS).**

We will look at the COS this month, with the help of Prof Skinner, In later months we will look at WFC3 and ACS and how you can make your own Hubble photographs from FITS images.

Each of these six instruments is designed to observe the universe in a unique way. This



drawing courtesy of **hubblesite.org** shows the part of the RF spectrum they were designed. With the exception of FGS, only one instrument can be used at a time.

Continued next page...

Notice too that HST can sample wavelengths below and above the ability of the human eye, but does not look at X-rays, gamma rays, and microwaves. That is the reason NASA has launched the **Chandra** satellite to study X-rays http://www.nasa.gov/mission_pages/chandra/main/index.html) and the **Fermi** satellite to study Gamma rays http://fermi.gsfc.nasa.gov On the other extreme NASA launched **WMAP** to study microwaves http://map.gsfc.nasa.gov (Perhaps someone would give the NL editor an article about one of those satellites).

Cosmic Origins Spectrograph

Prof Skinner is familiar with COS and has given permission to quote him in this NL. He emailed Jan 7, 2010, from Washington, DC where he was attending the American Astronomical Society conference:

"Our group at Colorado University (led by Dr. James Green) now has a new instrument flying on Hubble: the Cosmic Origins Spectrograph (COS). COS does not produce 'oh wow' images, but instead provides beautiful spectra which are much more useful and interesting from a scientific standpoint than images. Jim Green - and his students and post-docs- has spent the last 15 years of his life working on and designing COS. It was built by Ball Aerospace in Boulder.

"First results from COS and WFC3 were presented at the AAS meeting in Wash, DC (the first week of Jan.) and Dr. Green and his group are now being rewarded with some marvelous HST results for their many years of hard work. Jim is now the only person at U. of Colorado still working on COS. It was cancelled once, when the last HST servicing mission was nixed. But, he stuck with it and a new servicing mission was revived after NASA got a new director. Persistence sometimes pays off.

"COS will (and already has) produced early results on :

- quasars (QSOs) and OSO absorption lines (AAS Abstract 464.04)
- the warm-hot intergalactic medium (AAS Abstract 464.01 & 464.21)
- chemical element abundances [e.g. in unusual Milky Way stars that may have been previously captured from a satellite of our own galaxy: Abst. 464.11]
- supernova remnants
- gas inflows and outflows in distant galaxies (Abst. 464.15)
- the influence of the central star on the atmosphere of a closely-orbiting planet (Abst. 464.17).

The Abstracts are on line somewhere, but I don't have the link at the moment"

COS is one of six specialized instruments aboard the HST. It was installed May 2009 into the axial instrument bay previously occupied by the Corrective Optics Space Telescope Axial Replacement COSTAR (see next section). While STIS operates across a wider wavelength range, COS is 10-70 times more sensitive.

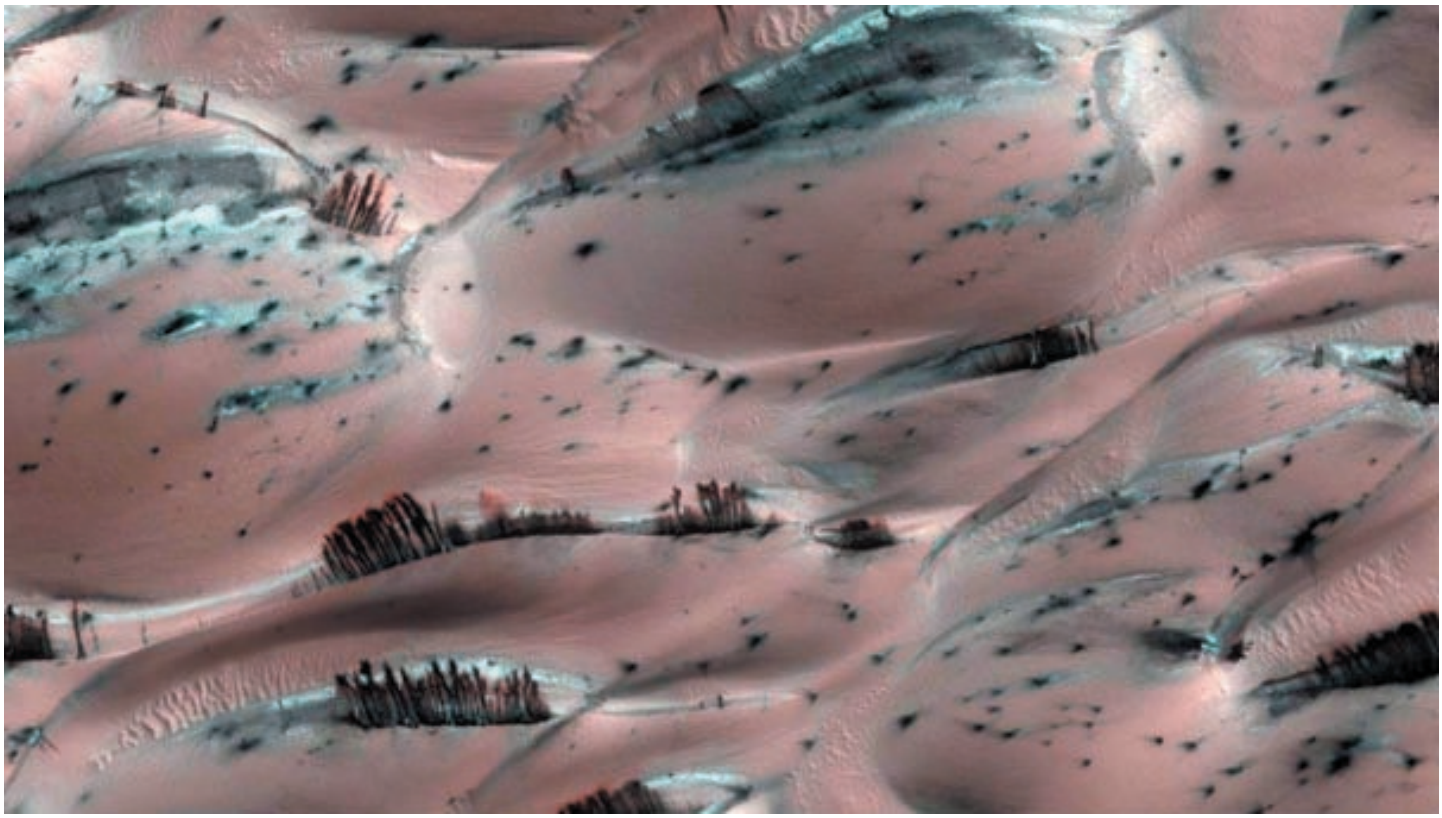
Another difference: COS excels at studying points of light like stars and quasars, while STIS is best at large areas like galaxies. Together, the two instruments complement each other with different areas of expertise.

Why was the Corrective Optics Space Telescope Axial Replacement (COSTAR) Removed?

Shortly after Hubble's deployment in 1990, scientists found that the curve to which the primary mirror was ground was incorrect, causing spherical aberration. Fortunately, corrective optics were able to solve this problem. The correction was done by adding COSTAR on the first Hubble servicing mission in 1993. COSTAR was built by Ball Aerospace Corp, the same people who built COS.

COSTAR produced dramatic improvements in Hubble imaging capabilities. So why was it removed? Answer: All of Hubble's original instruments have been replaced by instruments designed with that correction built-in, so COSTAR was no longer needed.

Trees on Mars?



Here's a fun mystery for you that's as tall as a tree...

Does Mars have trees? We already know Mars has, or has had, near-surface water. It also has a giant face, it was said, until better images revealed it to be a natural feature. Well, trees are natural too, and they grow in soil with water.

A tantalizing high resolution image from NASA's Mars Reconnaissance Orbiter has just been released. It could appear to show spruce-like trees on a hilly area. If true, these Martian trees would revolutionize all of science and human civilization, or not.

It is said in law that eyewitnesses are among the least accurate sources of evidence. Maybe we have confusion here, or maybe we just have some vegetation that Martians enjoy. What do you think? Is this an "asterism on the ground"? Is this a clever optical trick perpetrated by merry Martians? Or, is this ***S O M E T H I N G M O R E*** ?

Because of copyright restrictions, your editor will now refer you to the "Space Dot Com" web page that purports to explain in detail what this most unusual image shows:
http://www.space.com/scienceastronomy/mars-tree-photo-illusion-100113.html

Calendar of Events

by Frank Baratta

MONTHLY MEETING: **Monday, February 15th, 7:30 p.m., Center in the Square, Roanoke.** The evening's program will be "ROVING MARS"----"Not your usual dutiful science documentary. Produced for Disney by Frank Marshall (Steven Spielberg's producer), with narration by Paul Newman and music by Philip Glass, "Roving Mars" conjures the intense human emotions that inform scientific endeavor and exploration.

RVAS WEEKEND OBSERVING SESSIONS: Unless otherwise indicated, all club observing sessions are held at Cahas Mountain Overlook, milepost 139 on the Blue Ridge Parkway.

❊ Friday and Saturday, 5th and 6th. Sunset is at 5:50 p.m. Astronomical twilight ends at 7:18 p.m. The Moon rises at 1:36 a.m. and 2:38 a.m., respectively.

❊ Friday and Saturday, 12th and 13th. Sunset is at 5:57 p.m. Astronomical twilight ends at 7:25 p.m. The Moon sets at 4:50 and 5:48 p.m., respectively.

❊ March Sessions: 5th and 6th; 12th and 13th.

ROANOKE CITY PARKS DEPT. PUBLIC STARGAZE: Saturday, February 13th, 6:45 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: March 13th, 7:15 p.m., Cahas Overlook.)

FRANKLIN COUNTY PARKS DEPT. PUBLIC STARGAZE: Saturday, March 6th, 6:45 p.m.