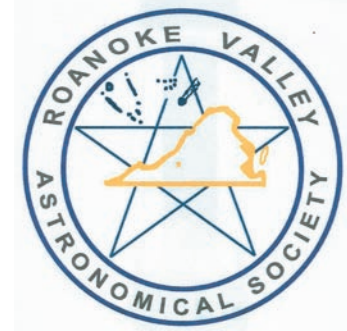




Roanoke Valley Astronomical Society



News About Amateur Astronomy
in Southwestern Virginia

Volume 27 – Number 3

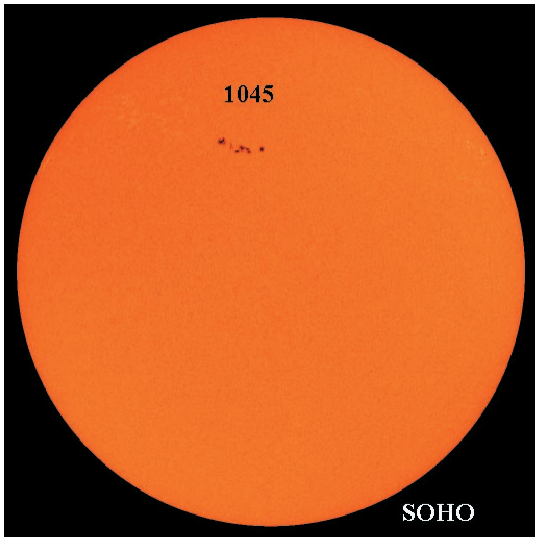
March 2010

AFTER DEEP SOLAR MINIMUM . . .

SUNSPOTS REAPPEAR

BY DAVE THOMAS

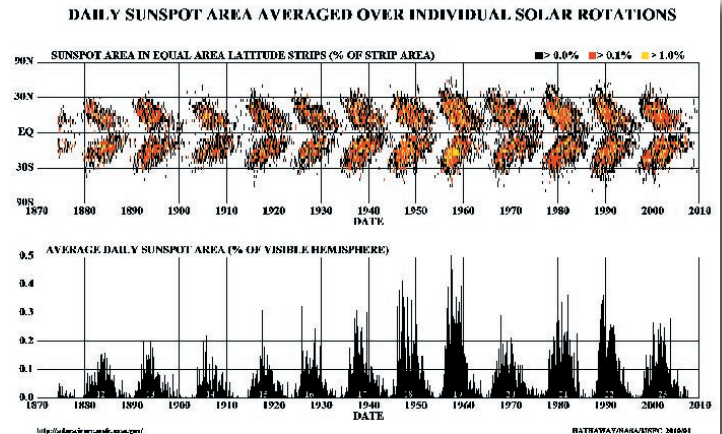
Solar cycle 24 is now underway. After more than 700 days in a deep solar minimum between



Solar Cycle 23 and 24, the Sun is showing signs of increased sunspot activity.

During January and February there

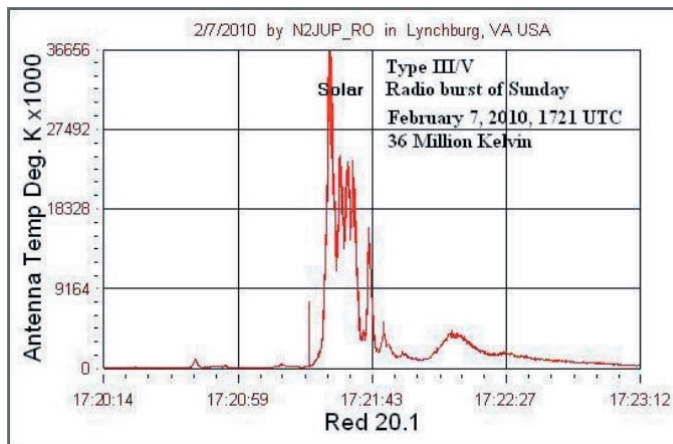
has been a marked increase in sunspot groups at the higher solar latitudes, 35 deg north and south. This is a clear sign that the new solar cycle is underway. Over the course of this new cycle the spots will migrate toward the solar equator, as illustrated by the following historical illustration.



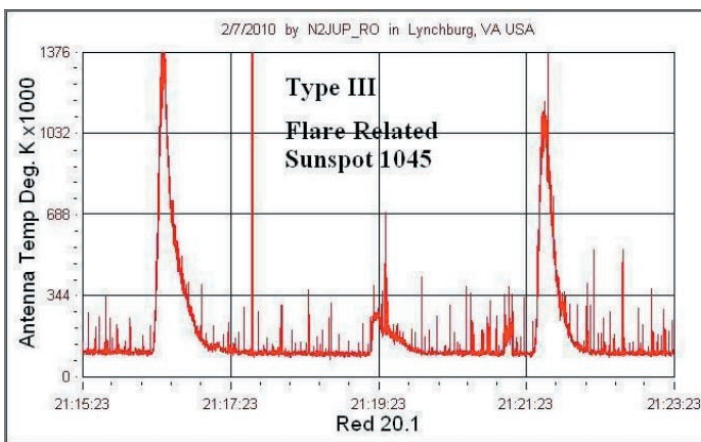
There has been a substantial increase in solar radio bursts at the decameter wavelength of 20.1 Megahertz. This increase in activity is normal at the start of a new eleven-year solar cycle. I have been recording the bursts using a calibrated shortwave single sideband receiver and PC chart program.

February 7th was especially active with the large **sunspot 1045** spread across the face of the Sun. I recorded 86 radio bursts in a seven hour period from 1600 UTC to 2300 UTC.

One such event peaked at a 36 million Kelvin equivalent antenna temperature, which would be



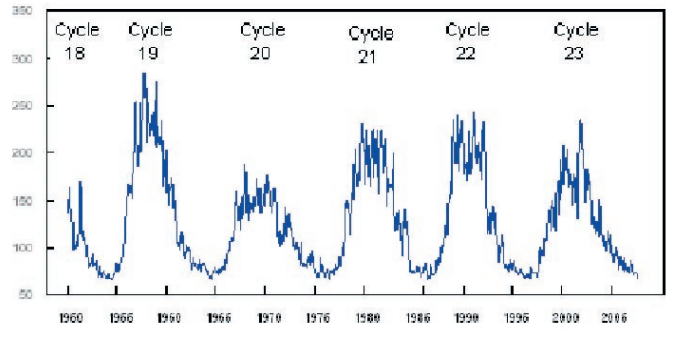
the noise generated at the antenna terminals by a hypothetical resistor, in this case 73 ohms, when heated to 36 million Kelvin



Radio emission from the Sun at a wavelength of 10.7 centimeters, 2.8 gigahertz, varies with the number of sunspots during each solar cycle. The 10.7 centimeter flux can be more easily checked than the sunspot number and is used to gauge the activity of the Sun during each solar cycle.

Some believe that the increase in the average global temperature over the years may be due to an increase in solar activity or luminosity.

Monthly Mean 2800 MHz Solar Flux (Observed)
Jan 1950 - Sep 2007

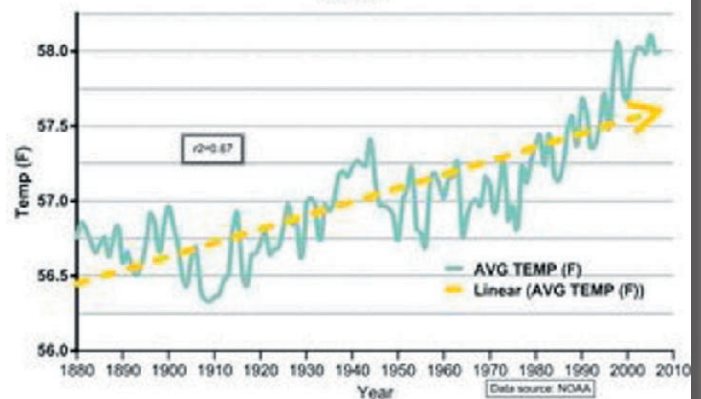


Others say it is due to human influences, such as the generation of greenhouse gases since the start of the industrial revolution.

Since 1947, when the Solar flux at 10.7 centimeters was first recorded, it has tracked closely with the sunspot number over the Solar cycles, indicating solar output has not changed significantly during that time.

Solar cycle 24, while delayed by a deep minimum, seems to be on the way up and gaining strength. The year with the fewest spots in the last century was in 1913, with 311 spotless days. All in all, given slight differences in how data was applied over the years, the sunspot cycles don't show any radical change in solar activity overall.

Global Avg Temp
1880-2007



Caroline Herschel

By Genevieve Goss

Caroline Herschel was born into a working class family in Hanover, Germany, on March 16, 1750. Although her father wanted all of his six children to study French, mathematics and music, her mother saw no need for a girl to become educated, and preferred to make Caroline a house servant to the rest of the family. So, her father secretly tutored Caroline.

Stricken with typhus at the age of ten, her growth was stunted to 4'3", and her face was scarred for life. Her parents kept her at home, convinced that no one would ever marry her.

When she was twenty-two Caroline's brother William took pity on her isolation (and was also in need of a housekeeper!), and moved her to Bath, England to live with him.

As a composer and musician, William trained Caroline's singing voice, and also encouraged her study of mathematics. When her brother was the conductor, she performed publicly, and her music brought her acclaim.

With astronomy as his hobby, William spent much of his free time making larger and more powerful telescopes. As his interest in astronomy deepened, and his reputation as a telescope-maker grew, he put aside music for astronomy, with Caroline as his very capable assistant.

She learned to grind mirrors and build telescopes, as well as make her own astronomical observations. Caroline discovered a number of deep sky objects in the years from 1783-1787, including M110, the second companion to the Andromeda Galaxy. When William Herschel discovered the planet Uranus, he credited Caroline for her help in the discovery.

She then discovered a comet, making her the first woman known to have done so. In total, she is credited with the discovery of eight comets.

When King George III heard of her discoveries, he awarded her a stipend of 50 pounds annually, making her the first woman in England with a paid government appointment.

Caroline published her own catalogue of stars and nebulae. She also organized and indexed a catalogue by John Flamsteed, and she worked with her nephew John Herschel, William's son, to publish a catalog of nebulae, many of which she had discovered.

After William's death in 1822 Caroline returned to Germany, and continued writing. She was recognized for her contributions by the King of Prussia when she was 96, and died at 97. A lunar crater (C. Herschel) and an asteroid (Lucretia 281) have been named in her honor.



William and Caroline Herschel at work, colored lithograph, 1890

RVAS News and Views

June RVAS Elections

On the summer solstice, June 21, elections will be held for all of the five offices: President, Vice-President, Secretary, Treasurer, and Member-at-Large. You are encouraged to help guide the club by running for an office. Nominate another member, or even yourself. Your age, sex, race, or anything else will not be a barrier to serving. Just be a member.

March is still a bit early, but look in your mirror to find somebody who would make a great new Executive Committee member. If you have served in the past, but not lately, why not step up again? If you have never served, why not now? Unless you are our president or vice president, your duties will be occasional.

This year we will be hosting the statewide VAAS convention, so you will be more involved than usual. Then again, we hope that all RVAS members will be quite involved with the VAAS convention that we will proudly host in 2010.

Parkway Closed?

Before your next drive up to Cahas, or elsewhere on the BRP, call this number: 828-298-0398. It is the most up-to-date source for road closures by section, and access to Parkway weather reports. The recent snow and ice storms have caused massive numbers of tree limbs and other debris to accumulate on the road surfaces. Some may still be blocking roads.

Wine Nebula?

The RVAS is scheduled to offer a special observing session at Blue Ridge Vineyards on March 20. At that time you may be able to see the "Wine Nebula." Just drink enough of the local liquid, and objects will look nebulous. If you don't choose to seek that one, there will be plenty more beautiful things to see from this dark sky site. For additional details, contact any member of the Executive Committee.

Frank Baratta's Astro-Quiz

New Moon in March is typically the time to conduct the madness known as the Messier Marathon. Of the 110 objects on the list, which two most often defeat Marathoners?

Answer to Last Month's Astro-Quiz: The "star test" can assess the quality and alignment of a reflecting telescope's mirror. Defocus a star in a moderate power eyepiece a bit until its image bloats into a number of concentric light and dark rings. If instead of nice concentric rings the out-focus star seems oval-shaped and bunched up to one side, you may be seeing air currents as the tube adjusts to the outdoor temperature. More likely, your scope needs collimating. Work on that until the shape is circular, and the rings are concentric. See H. R. Suiter's *Star Testing Astronomical Telescopes* to learn more about what this test can tell you.

Deep Sky Object of the Month

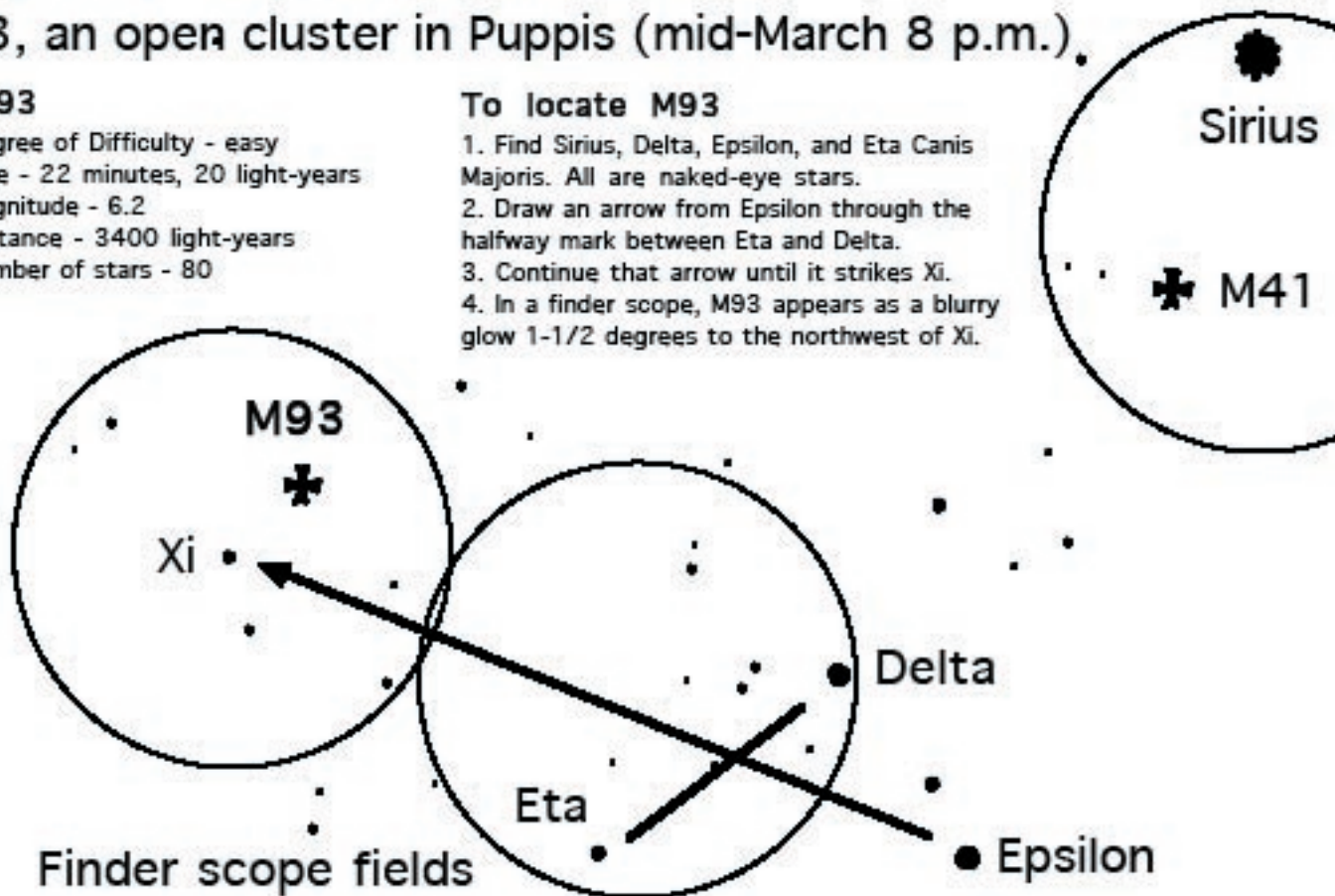
M93, an open cluster in Puppis (mid-March 8 p.m.)

M93

Degree of Difficulty - easy
Size - 22 minutes, 20 light-years
Magnitude - 6.2
Distance - 3400 light-years
Number of stars - 80

To locate M93

1. Find Sirius, Delta, Epsilon, and Eta Canis Majoris. All are naked-eye stars.
2. Draw an arrow from Epsilon through the halfway mark between Eta and Delta.
3. Continue that arrow until it strikes Xi.
4. In a finder scope, M93 appears as a blurry glow 1-1/2 degrees to the northwest of Xi.



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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FEBRUARY MEETING

BY RANDY SOWDEN

February 15th, 2010
Roanoke Valley Astronomical Society

- **There were no visitors or observings this month. Given the poor weather all month, including on meeting night, this can hardly be a surprise. Hopefully we will find things warming up nicely by the March meeting.**

- **We have several upcoming outreaches. Please try to participate in at least one of them. Information about each will become more detailed as the date approaches.**
 - Blue Ridge Vineyards, March 20th. Sunset is at about 6.30. Please contact John Goss if you plan to attend.
 - Astronomy Day, April 23rd and 24th, at the Mill Mountain Star. Starts 30 minutes before sunset. A similar event was held in the fall, and it was a huge success.
 - Summer Outreach for the Hearing Impaired (Gary Hatfield initiating).
 - Gainsboro Library - spring or summer 2010

- **Upcoming Events**
 - The Triad Starfest, March 6th, Greensboro. Meet at Towers Mall at 6:45am if you want to car pool. Contact John Goss if interested in going.
 - Northeast Astronomy Forum (NEAF) on Saturday and Sunday, April 17th-18th
 - Greenbank, WV during the second week of July
 - VAAS 2010 in Roanoke
 - ⊙ Saturday October 9th
 - ⊙ Roanoke College, Massengill Auditorium
 - ⊙ Registration at 9am. Programs from 10am-5pm with appropriate breaks.

- **Other announcements:**
 - John Goss has Guy Ottowell calendars for Joe Reagan and Vipin Trivedi.
 - Club Officers elections will be held in June.
 - We need a volunteer to be club secretary until the June election.
 - At some point the Center in the Square renovation will affect where we meet for several months.

- **This month's meeting had no main speaker as it was Movie Night. The movie was "Roving Mars" by George Butler: The expedition of the twin Mars Exploration Rovers, Spirit and Opportunity, led to breathtaking shots and much excitement.**

"The Open Cluster"

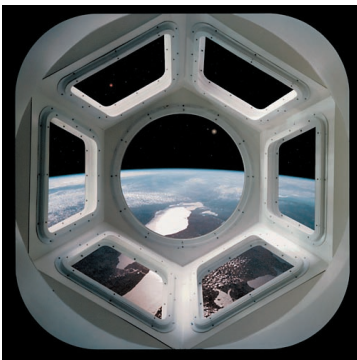
Thanks, Contributors!

The editor wishes to thank both John and Genevieve Goss for everything they do for our club's newsletter. But they are not alone:

Whether you often write major essays (such as those recently contributed by Jack Gross, Jiri Kolejka, and Michael Good, among others), or occasional modest contributions, it is important that you simply write for us as often as you can. We love every RVAS contributor!

Editors are nags, but for good reason: the hungry membership and other eager readers. The February RVAS NL had TEN bylines. Wow! It is rare that a publication such as ours has more than two or three. Let us celebrate all the many talents and viewpoints we publish.

From Portholes to 360° Panoramas



The sky-high inhabitants of the world's greatest hotel, a.k.a., the International Space Station, had been forced to peer out of small portholes, unless they were chosen to go outside very

briefly on a repair mission.

NASA's Shuttle has just delivered to these lonely inhabitants a marvelous 360° cupola module, with views that will seem like an IMAX show. Officially, this expansive dome portal is to help with EVAs, but you know what the "guests" aboard will mostly be doing there. Hopefully one of them will be an artist or poet. Does NASA ever send visionaries to the ISS? With Alan Bean, they did send one to the Moon.

NASA Spanked. Really?

The new Obama budget really spanks NASA, it would seem. Essentially, the planned junkets to the Moon in 2020+ are kaput, and so are the greater junkets to Mars. Megabillions will NOT be spent for human tourism. What's left?

How about some real science? Already we see the fruits of cheap robotics on Mars, with Spirit and Odyssey lasting for years. We see what the Hubble and other great near-Earth observatories can do. And much more will follow — all without spending billions to protect human cytoplasm in hostile space environments.

Even though the "sexy" has been taken out of NASA's budget, a lot of real science remains. What remains is critical for keeping the voting public on board the overall mission of space exploration. A public that turned on Wall Street could turn on Houston in this time of deep unemployment and deep budget deficits.

The new budget does slightly increase the overall NASA budget. Remaining are initiatives to develop space ships without humans, along with more sophisticated robotics. Near term, we will have more sophisticated cybernetics. Longer term, we may accidentally create some preconditions for the emergence of comphumans, which I have repeatedly written about.

Going back to the Moon never? Not likely. Remember that the first flights to the Moon were inspired by the Cold War with Russia. The next Americans on the Moon and Mars will be sent by us in competition with the emerging Chinese space program. Most likely, the USA, Russia, India, and Japan will cooperate against the Chinese. That scenario emerges at least twenty years away. Meanwhile, enjoy with awe the fabulous space science we already have.

Orloj – The Prague Astronomical Clock

By Jiri Kolečka



nomical clock was to precisely represent the course of the Sun, the Moon and the stars in the sky. However, the Orloj's main task was to show precisely the exact time when the Sun was at its highest point.

The Walk of Apostles

The twelve Apostles come in two groups out of windows in the upper part of the structure. The Apostles carry objects representing professions and trades of which they are patrons. In the left window St. Paul appears holding a sword, followed by St. Thomas with a spear, St. Thaddeus with a book, St. Simon with a saw, St. Bartholomew also with a book, and finally St. Barnabas holding a papyrus.



Orloj, the Prague astronomical clock, is an ancient clock on the portal of Prague's Old Town City Hall Tower. The Orloj has a rich history, and there are intriguing legends about it. For six centuries the Orloj entertained Prague citizens and tourists on every hour by a three-minute display. My wife Anne, daughter Paula, and her husband Duncan, and I, had this lovely experience in September 2008.

The Orloj consists of three parts: the Walk of Apostles on the top, the Sphere (or Clock Dial) at the center, and the Calendar at the bottom. The purpose of the Orloj as an astro-

In the right window St. Peter appears with a key, St. Mathew with an axe, St. John slaughtering a snake, St. Andrew with a cross, St. Philip also with a cross, and finally St. Jacob with a tool for making flax.

The Sphere (or Clock Dial)

The Sphere in the center of the Orloj is a primitive planetarium displaying their view of the Universe by depicting common astronomical events such as sunrise & sunset, time and



other celestial phenomena. The astronomical dial has a background representing the Earth and the local view of the sky – and surrounds it with four moving components: the zodiacal ring, an outer rotating ring and the icons of the Sun and the Moon. The blue circle in the sphere center is the Earth, and the light blue part above it is the portion of sky above the horizon.

During day time the Sun icon is in the sky above the horizon. The horizon is represented by a boundary in blue and red colors and the dark circle below it displays night. At night the Sun icon is in the black circle, but during dawn or dusk the Sun icon sits over the red part of the background. Written on the left (eastern) part of the horizon is Aurora Ortus (dawn rising) and on the right (western) part is Occasus Crepusculus (sunset twilight).

The Sun's golden hand position over Roman numbers at the outer edge of the blue circle indicates the hour in Central European Time. At the clock outer edge the golden Arabic numerals indicate Old Czech Time, with 24 indicating the time of sunset, which varies during the year from 16:00 in winter to 20:16 in summer.

This ring moves back and forth during the year to coincide with the time of sunset.

Inside the large outer dark circle lies off-center another movable circle with the signs of the Zodiac in anticlockwise order indicating actual Sun location on the ecliptic. A small golden star shows the position of the vernal equinox.

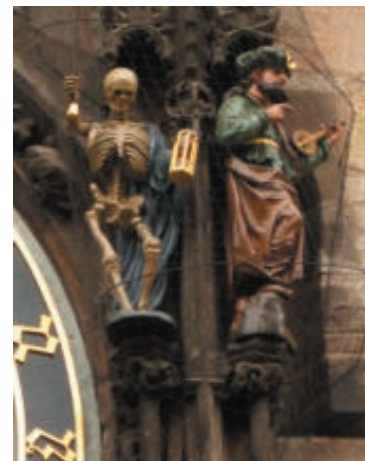
The Moon icon, half silver and half black ball, rotates during the month and displays its phase.

The clock mechanism includes several co-axial wheels with different number of cogs driven by the same pinion, which allows for faster motion of the Moon on the ecliptic than the Sun.

The Calendar

The Calendar at the clock bottom was added in 1870, and is decorated with symbols painted by famous Czech artist Josef Manes. It counts days and months. An angel with sword, scepter and shield stands on the side of the Calendar. Together with the figures of three citizens they are the symbol of fair governing the city.

There is a golden raven on the tower top and several puppets along the clock middle section. Half of the puppets represent sciences, arts and professions: music, letters, mathematics and astronomy – while the other half represents Death, Danger and ridicules common human vices: Vanity and Greed.





Legends

Many legends surround the Orloj, but the most popular legend is about the master clockmaker Hanus Carolinum who maintained the clock late in 14th century. The legend said the Old Town Councilors had his eyes burned out with a hot poker, so that he would not be able to build another such clock elsewhere. He then allegedly asked an apprentice to take him to the clock, which he deliberately damaged so that nobody for centuries could repair it. Those who tried either died or went mad.

Another legend tells of the Orloj's magical power of foretelling the future. Hard times shall befall on the Czech lands if the clock is left damaged for a long time period.

The Orloj hourly show starts when the skeleton of Death rings a small bell and turns over an hour glass. Afterwards the two doors open and start the procession of the Apostles. The puppet play includes the Turk shaking hand and reminding threat, the Vanity gazing herself in a mirror, Greed depicted in the medieval cliché as a Jewish moneychanger. The show ends when the golden raven croaks, and the clock beats the exact time.

Notes

Most of the technical and historical information included in this article was collected from free access web sites including *Orloj.com*, and *Wikipedia: Prague Astronomical Clock*.

History

The Orloj is one of the world's oldest clocks of its kind. The Prague Old Town City Hall Tower was built in 1381, and the Orloj was installed in 1410 by clockmaker Mikulas of Kadan, with the help of the Prague Charles University professor and astronomer Jan Sindel.

The original Orloj had the Sphere only and the individual wheels had to be wound up separately. The puppets were added at the end of 14th century, and the Orloj was completely mechanized around 1566. There were times when the Orloj was neglected and even stopped for long time periods. The Walk of Apostles was added at the end of 17th century. Major repairs of the Orloj in the 1860's gave it the present day look. During Prague's uprising in May 1945 the Orloj took a direct hit from a German anti-aircraft cannon, and burned down. After the war it was carefully restored, and is fully functional since.

The Orloj co-creator Jan Sindel later became Doctor of Medicine and private physician to the King Wenceslas IV and later to the Emperor Sigismund. He was also colleague and close friend of Jan Hus, whose martyrdom in 1415 brought in the period of Hussite Wars in central Europe.

According to testimony by Tycho Brahe, who lived in Prague, and is buried in the Tyne Church on the Old Town Square (shown in the second photograph), Sindel performed many valuable astronomical observations.



Why Not Put My Canon T1i DSLR in the Hubble Telescope?

by Roger Pommerenke

This is a continuation of the February newsletter article on the HST inspired by a series of emails with high school classmates, including **Prof Steve Skinner**, Center of Astrophysics and Space Astronomy at the University of Colorado.

Question:

The CCD in my new DSLR camera has more pixels than the CCDs on the HST. Why couldn't the HST team use an off the shelf camera?

Answer (Prof Skinner):

“In terms of number of pixels, your digital camera may have more pixels. But, number of pixels is only part of the story. The CCD in your digital camera is optimized to be sensitive in the visible part of the spectrum. The CCDs in HST are not (see below: Improving a DSLR for astro photography). For example, the new WFC3 camera has two channels, and each channel uses a different set of CCDs. One of the channels is optimized for infrared imaging at wavelengths of 9000 - 17000 Angstroms. By comparison, visible light spans roughly 4000 - 7000 Angstroms. The CCDs in the ACS camera cover a large wavelength range, but

are sensitive down to wavelengths as short as 1150 Angstroms (which is in the ultraviolet).

Also, the HST CCDs are optimized to operate at very low temperatures of around -80 Celsius. Not sure how well your digital camera CCD would hold up at those low temps. Check your camera specs. (see below: Canon spec problems).

In addition, HST CCDs are built to withstand constant bombardment by cosmic rays in space. Over time, cosmic rays will destroy a CCD in space. But, they can last a decade or more. The CCDs on the Chandra X-ray observatory, which

I use frequently, are still working good and have been in space for roughly 12 years. Not sure how well a Canon camera CCD would hold up against particle radiation. Probably not very well.

The Earth's atmosphere does filter out some cosmic rays. But, space-based telescopes like Hubble lose this filtering effect

so they get bombarded by even higher cosmic ray fluxes than we do on Earth's surface. The angle at which a cosmic ray strikes the CCD is important for assessing the damage. A cosmic ray particle which strikes the CCD nearly dead-on (e.g. at right angles to the plane of the CCD array) doesn't



do much damage. It just goes right through and only affects a pixel or two.

But, a cosmic ray that hits the CCD at a shallow angle ('grazing incidence') can affect many pixels and will leave a long 'trail' in your otherwise beautiful image. We routinely filter out 'cosmic ray trails' in our Chandra images, since some of our Chandra exposures last for two days or more. For cosmic ray impact on the HST WFC3 see: http://www.stsci.edu/hst/wfc3/documents/handbooks/currentIHB/c05_detector5.html#359487"

Improving a DSLR for Astro Photography

The insensitivity to IR is one reason not to use my DSLR in the HST. But another classmate, Joe Hoener, who is not a professional astronomer, had an idea and wrote this:

"All digital cameras have sensors that are naturally sensitive to infrared light. The manufacturers install IR filters to keep most IR energy from reaching the sensor to maintain correct color balance similar to what our eyes see (and insure the camera will focus on the point of visible, not IR, light). Unfortunately, these filters also attenuate hydrogen-alpha light which is important for capturing nebulosity in astronomical photographs.

In the Canon DSLR's, the response to hydrogen-alpha is down to about 20% of the sensitivity to other colors. This causes astronomical photographs of emission nebulae to appear washed out. Unfortunately, it is virtually impossible to make up the difference by simply exposing longer or stacking more images since the signal-to-noise ratio at the critical hydrogen-alpha wavelength is so low.

The solution is to remove the camera's IR filter. This opens up the imaging chip's full sensitivity to hydrogen-alpha and also makes the entire spectrum almost one f-stop more sensitive. How-

ever, as in all good things, there is a price to pay. Since removing the filter removes a section of glass in the light path that is behind the lens but in front of the imaging chip, the auto-focus mechanism becomes un-calibrated as well as the optical viewfinder. The back focus also changes preventing normal camera lenses from focusing to infinity, and since the balance of colors arriving at the imaging chip has changed, the auto-color balance is no longer calibrated.

However, for a camera that will be dedicated to astronomical photography through a telescope and focused by software (DSLRFocus, Images-Plus, MaximDSLR, AstroArt, etc.), these issues are of little concern and the simple filter removal provides the most economical path to a sensitive astronomical camera.

For those wanting to retain the capability to use normal lenses for astronomical work, as well as the ability to do daylight terrestrial work with an external IR blocking filter, a replacement section of clear optical quality glass can be fitted into some cameras. Modification cost \$300."

Canon Spec Problem:

When I told Steve the specs of my camera only go down to 0 degree C, he wrote: "The 0 degree Celsius rating on your camera may not be CCD-driven. It might have something to do with mechanical functions. Does your camera have a zoom lens that slides in and out, or a lens cover that opens and closes? Lubrication issues are not such a big deal with the newer cameras. But battery life drops way off as you go down below 0 C. So, it may not be the CCD itself that sets the low-end operating temp. of your camera. It could well be the battery."

Conclusion:

I think a lot of club members said to themselves, "I already knew this stuff." It was new to me, and I enjoyed reading the emails from a professional astronomer. I hope you did too.

A KO from the KB?

by Jack Gross

In last month's RVAS newsletter we considered the remote possibility of a smack from the asteroid belt. To further help you sleep well tonight we'll reflect on the second of the three areas of possible danger, from which could come a cataclysmic impact to our planet: The Edgeworth-Kuiper (E-K) belt.

This is a region in a frigid zone beyond the orbit of Neptune. It surrounds our Sun, and is located out from it about 5.1 billion miles. This area is similar to the asteroid belt, but it is much larger — about 20 times as wide, and 20 to 200 times as massive! Pretty scary, huh? Try counting KBOs tonight, rather than sheep.

Much like the asteroid belt, it consists mainly of remnants from the Solar System's early formation. However, the Kuiper belt objects are made up largely of frozen ices, such as methane, ammonia and water; while asteroid belt objects are composed mostly of rock and metal.

Named for The Irish astronomer Kenneth E. Edgeworth who speculated about its existence 1943 — and also Gerard Kuiper, a Dutch born astronomer who provided convincing arguments in 1951 — the Edgeworth-Kuiper (E-K) belt is more commonly called the "Kuiper belt".

Kuiper is considered to be the father of modern planetary science, because of his proposal that the planets had condensed from a disk-shaped cloud of gas and dust that was in orbit around the young Sun, an idea first proposed by the philosopher Immanuel Kant in 1755. (Therefore, it would also be fair to refer to the KB as the Kant belt. But tradition says we can't do this.)



The Kuiper belt is the origin of the short-period comets such as Encke and Temple 2. These are the comets that have orbital periods of less than 20 years. The gravitational influence of Neptune and Uranus is thought to occasionally perturb some of the Kuiper belt objects, causing them to ricochet into cometary orbits.

Some of these newly altered trajectories are near-Earth-crossing. Any one of these inner Solar System visitors has a small, but potentially catastrophic, chance for eventual collision with our home sweet home. This possibility, along with threats



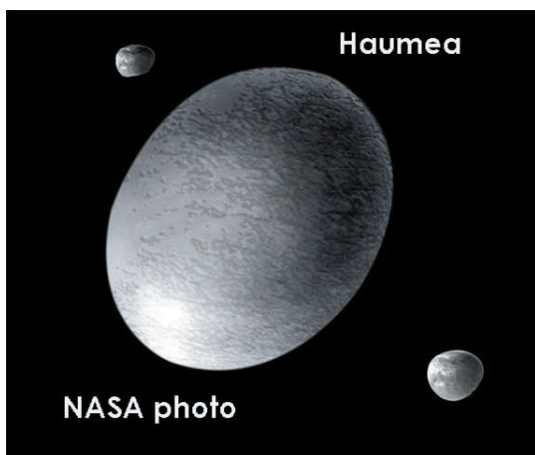
from the asteroid belt and the Oort cloud, have prompted several major astronomical survey projects to catalog and monitor the matrix of these assorted Near Earth Object (NEO) hazards.

Stephen Hawking commented, "Asteroid impacts are the biggest threat to intelligent life

in the galaxy." It has been suggested that we can expect about one large asteroid to impact Earth every 100 million years or so. For that reason, several programs such as the Lincoln Near-Earth Asteroid Research (LINEAR) project at the Massachusetts Institute of Technology have been undertaken around the world to discover and monitor potentially Earth-threatening asteroids and other objects going rogue.

Also, a joint effort by the Canadian Space Agency and Defense Research Development Canada (DRDC) will make Canada the first nation to launch a space-based telescope designed to monitor the approximately 100,000 asteroids with diameters greater than 140 meters that orbit the Sun near Earth. The project, dubbed the Near-Earth Object Surveillance Satellite (NEOSSat), aims to shed light on the location and path of near-Earth asteroids, and catalogue those with diameters larger than one kilometer. Several other searches are presently underway or in the planning stage.

The Kuiper belt is also home to several dwarf planets, including **Eris**, **Haumea**, **Makemake**, and, oh it breaks my heart to say it, **Pluto**. The International Astronomical Union voted in August of 2006 of to officially demote Pluto after more than 75 honorable years as a planet.



Although their definition of a "planet" is severely flawed, and only 424 of the nearly 10,000 IAU members actually voted (not even a quorum?), poor Pluto has been rudely relegated

to just another Kuiper Belt Object. The final nail was driven into the canine coffin of Pluto's status as a "dwarf planet" after the 2009 IAU meeting in Rio de Janeiro at which the matter was never discussed.

New Horizons, the NASA spacecraft currently en route to explore Pluto and the Kuiper belt, will reach the Pluto system on April 12, 2015. The year 2015 will be the 54th anniversary of the spaceflight of Yuri Gagarin, the first person to orbit the Earth, as well as the 34th anniversary of the first Shuttle launch. New Horizons is a NASA New Frontiers mission managed by the Johns Hopkins University Applied Physics Laboratory.

The spacecraft was launched on January 19, 2006, and is en route to photograph and examine Pluto and other objects in the Kuiper belt. Currently traveling at over 51,000 miles per hour, New Horizons is the fastest spacecraft ever launched, but it will still require five more years to reach Pluto. This great distance explains why petite Pluto always looks stellar to amateur astronomers.

After the Pluto-system get-together, New Horizons will continue on to explore some of the Kuiper belt, then escape the Solar System and fly off into interstellar space. New Horizons is the first-ever planetary flight experiment developed by undergraduate students. It is also carrying ashes of Clyde Tombaugh, who discovered Pluto in 1930 while searching for Percival Lowell's Planet X.

Let us hope that Clyde's spirit is forgiving, and that it doesn't send one of those big KBOs careening in our direction in retribution for the International Astronomical Union's quite controversial decision to steal Pluto's planethood!



Feeling The Speed of Life

by Clark M. Thomas

Remember when you were a small child in a car on what seemed like a very long trip? Maybe you don't, but I do. A simple drive across town felt like it took forever. Sure, my mother never broke a speed limit, but she wasn't always in first gear either. When you have little personal history, and the future seems infinite, time seems to move slowly. Decades later, time itself seems to accelerate as you approach THE END, which is precisely when you want time to slow down!

Humanity's relationship with the visible universe is very similar. There was an era when bright things on the spirit-filled celestial dome seemed to stand still relative to each other — except for the Sun, Moon, those five odd planets, falling stars, and evil comets. It was easy for each traditional generation to envision a stable, flat Earth at the center of it all.

Fast forward to the post-Galilean world. Our view of The Above has quantitatively and qualitatively transformed. Our modern culture no longer looks up at a simple stellar dome. We now perceive great depth and mystery. This emerging cultural consciousness is similar to the journey of a single human mind full of curiosity.

Discovery is the reward for persistent curiosity. Throw in totally new tools (telescopes, space ships, nuclear energy, and computers) to amplify our native senses — and you have an "adult" society accelerating toward an end stage where we will either destroy ourselves, or emerge with wisdom to enjoy consciousness everywhere.

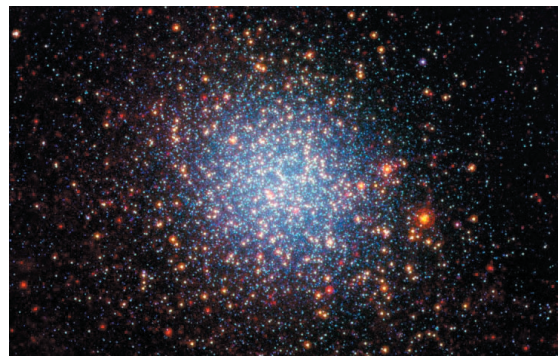
I am left asking myself which is better: the comfort of traditional simplicity, or the discomfort of modern complexity.

In astronomy/astrology, for millennia the heavens were the abode of our tribal ancestors and gods. Now, many aren't even sure about God "up there in the clouds." We at least know that Earth's clouds are meteorological phenomena at the top of our biosphere; so where are God and the gods? Is there a cosmic Gaia, a "universal biosphere" that flows among planets, stars, and even galaxies? Would this be God?

As modern astronomers, we can live with this ambiguity, because the perpetual hunt is too much fun. We talk about the speed of light, while we experience the speed of life.

Beyond our brief presence on Earth even stars and entire galaxies come to their end. This we intellectually know. Celestial events are far beyond our everyday visceral consciousness. So, it feels like everything macro goes on without an end, even though everything has a beginning and an end (said the *Matrix* oracle).

Our human desire for a permanent Sun and planets helps us feel that we live in a stable universe — just like the child feels who looks up and only sees beautiful stars floating above. In this innocent context, knowing that astronomical reality does not match our psychological reality is of little consequence to how we feel.



Spitzer view of Omega Centauri:
http://antwrp.gsfc.nasa.gov/apod/image/0805/OmegaCen_

More Goodies

Two Kooool URLs

Here's a free online space events calendar, along with a weekly photo. <http://www.yearinspace.com/the-week-in-space>

Strange, and possibly true. <http://news.discovery.com/space/do-the-meeek-inherit-the-galaxy.html>

Last Call For TriStar

On Saturday March 6, there is an all-day amateur astronomy conference near Greensboro, NC. Several RVAS members have attended in past years, and all of us have enjoyed it. This conference is excellent and FREE.

John Goss can take a few riders. If you are interested please let John know. He will leave from the Towers parking lot at about 6:50 a.m. on Sat. March 6. We will return about 8 p.m. If his vehicle is fully loaded, others may give you a ride.

Making up for Winter

Ok, so winter has been cruel to everybody who doesn't have a home observatory. How are you going to make up for lost seeing opportunities this spring? We are still good with Mars, and Saturn is coming into view. How about all those nice Virgo galaxies? We have sunspots forming, and many other opportunities in the much nicer weather. Why not write down your spring viewing goals, and see how well you did on the first day of summer?

Globe at Night

GLOBE at Night is an annual 2-week campaign in March. People all over the world record the brightness of their night sky by matching its appearance toward the constellation Orion with star maps of progressively fainter stars. They submit their measurements on-line and a few weeks later, organizers release a map of light-pollution levels worldwide. Over the last four GLOBE at Night campaigns, volunteers from over 100 nations have contributed 35,000 measurements.



Get Out and Observe the Night Sky!
March 3-16, 2010

Engage students worldwide in observing the nighttime sky

Encourage citizen and family science with a hands-on learning activity outside of the classroom

Gather light pollution data from an international perspective

www.globeatnight.org

Participation is open to everyone!



Calendar of Events

by Frank Baratta

MONTHLY MEETING: Monday, March 15th, 7:30 p.m., Center in the Square, Roanoke.

The evening's program will feature several of the most experienced observers in the RVAS in a "round table" discussion about eyepieces for your telescope.

RVAS WEEKEND OBSERVING SESSIONS:

Unless otherwise indicated, observing sessions are held at Cahas Mountain Overlook, milepost 139 on the Blue Ridge Parkway.

* **Friday and Saturday, March 5th and 6th.** Sunset is at 6:19 p.m. Astronomical twilight ends at 7:45 p.m. The Moon rises at 12:26 a.m. and 1:26 a.m., respectively.

* **Friday and Saturday, March 12th and 13th.** Sunset is at 6:25 p.m. Astronomical twilight ends at 7:52 p.m. The Moon sets at 3:41 and 4:38 p.m., respectively.

Other Programs:

ROANOKE CITY PARKS DEPT. PUBLIC STARGAZE: Saturday, March 13th, 7:15 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: April 10th, 8:30 p.m., Cahas Overlook.)

FRANKLIN COUNTY PARKS DEPT. PUBLIC STARGAZE: Saturday, March 6th, 7:00 p.m., Franklin Co. Recreational Park. For Franklin County residents; RVAS members welcome. Call 540-774-5651, for information. (Next session: May 1st, 8:45 p.m., Cahas Overlook.)