

Bays Mountain Astronomy Club

☞ *Next Meeting: May 6* ☞

SKYWARD

OK mother nature, we get it. April showers bring may flowers.... April showers also brings far too many clouds! As much as I love to see spring finally get here, I can't stand all these clouds.

The April meeting started with Wayne Manly showing us his new side-by-side "GOTO" mount that he recently purchased for his 9.25" Celestron SCT. Wayne explained that after working out a few of the bugs, he was very pleased with the accuracy of the mount. If you missed the last meeting you can find Wayne at any of the spring StarWatches and check out his new mount.

Dr. J. Kelly Smith from ETSU gave a great talk on solar radio astronomy at the April meeting. He explained how radio astronomy can be a great way to enjoy the sky during the daytime and even when it's cloudy out, which is something most of us don't get to enjoy very often. I was very impressed with Dr. Smith's knowledge of radio astronomy and with the system of antenna's and documentation equipment that he has set up at his home.



BY BRAD DUNN

After the presentation, we discussed some upcoming events that will be coming up soon. The Tennessee Spring star party will be held from April 29th - May 1st, 2011 at Fall Creek Falls State Park in Pikeville TN. If you have any questions about this event, see Bob or Terry, or visit

www.cumberlandastronomicalsociety.org. The new zip line is scheduled to open on April 13th. It will be open to the public on certain Wednesday's and Saturday's and admission will be 10 dollars per person. Check the Park's site, www.baysmountain.com for the details.

The July picnic will be held at Natural Tunnel, VA in the gazebo on July 30. It starts around 5-6 p.m. Bring a dish/snack to share (all of you) and a chair. There will also be a public star viewing held that evening so bring your scopes.

An only-electronic version of the newsletter was brought up again at the meeting. At some time in the near future, this will probably be the case. But, we have provided an electronic version of the newsletter

Calendar

Special Events

May 7 Astronomy Day! The event starts at noon, so please show up by 11:45 to set up.

July 30 BMAC annual picnic. Natural Tunnel, VA at the gazebo. Bring a dish/snack to share and a chair.

SunWatch

Every Sat. & Sun., 3 - 3:30 p.m.,

Mar. - Oct., weather permitting.

BMACers are always welcome to help.

StarWatch

8:30 p.m.: Apr. 23, & 30

BMACers need to arrive 30 min. early to set up.

BMAC Meetings

7 p.m., Planetarium Theater

May 6 "Planetary Visions" will be shown along with getting ready for Astronomy Day and then possible observing.

7 p.m., Discovery Theater

June 3 Topic TBA.

on the Park's website for years now. It is released at the same time the newsletter is mailed. Just go to: http://www.baysmountain.com/Astronomy/AstroClub/bmac_nwsltr.html.

Our meeting in May will be held in the planetarium. We will start the evening by watching "Planetary Visions." It is best described as an adventurous tour of the Solar System. Afterwards, we will set up the Discovery Theater for Astronomy Day. Please bring whatever you would be displaying then so there's no rush on Saturday. Speaking of which, please think about what you would like to bring to demonstrate or display to the public about our cool hobby, astronomy. Depending on the weather after getting ready for Astronomy Day, we can either go out to the observatory, or we can stay in

(continued on page 6)

EYE TO THE SKY

BY BOB SMITH

Nighttime observing is looking up with our much warmer weather even if we have to stay up a little later for a dark sky. This should be an exciting month ahead of us with a grand gathering of planets. But, you'll have to get up early to catch them. The first half of May finds the brilliant Venus and Jupiter showing the way to the lesser lights of Mercury and Mars by the dawn's early light.

Now is the time to locate that perfect eastern viewpoint and make your camera and tripod ready. Venus at magnitude -4 is the easiest planet to locate about 20° above the eastern horizon in the dim constellation Pisces. If you look at the planet in a telescope, you'll find that it is almost completely illuminated (90%) and a little more than 10" in diameter. On May 1, a slender crescent Moon rises with Venus. The same morning look about 3° to the lower left of Venus for the dimmer Mercury at magnitude +0.8. Data is starting to come back from the MESSENGER spacecraft soaring over Mercury's surface and lots of new ideas about the tiny planet are going to be floating around soon.

If you're viewing Venus and Mercury the first day of May you might spy Jupiter directly below the crescent Moon by about 5°. The planet is magnitude -2.1 and should pierce the dawn glow as the sky lightens. As the month progresses, Venus stays about the same height while Jupiter rises a little higher each day. The dynamic duo are in conjunction on May 11th when Venus is ½ degree south of Jupiter and Mercury is in turn about 1 ½ degrees south of Venus. The arrangement begs for a photograph. Set up your

digital camera on a tripod or sturdy table, turn off the flash and slowly squeeze the button. If you're able to adjust the time exposure (many cameras let you take up to about a 30 second exposure) try several shots from one second to about 15 seconds. Always put a tree or house or maybe yourself in the foreground to give some sense of depth.

Dim Mars is also close by but much harder to locate. At magnitude 1.3, it will be lost in the morning's glow. But, you may be able to locate it half a degree north of Jupiter on the 11th if you use binoculars. On May 22nd, Venus glides just 1° south of Mars. Jupiter continues to rise each morning and is a respectable 15° high by the end of the month. This should be enough elevation to allow a good view of the planet and its moons through your telescope.

Saturn is the sole planet in the evening sky and perfectly placed for observing all month. The "Ringed World" was at opposition back in April and is high enough this month to catch our attention as soon as the Sun fades away. It can then be observed almost all night. At magnitude 0.6, Saturn is brighter than any of the stars of the surrounding constellation Virgo. Do look at first magnitude Spica a little more than 15° southeast of Saturn. With just your naked eye, compare the colors of the two similar lights. Spica is about as white as a star can get and is a stark contrast to the buttery-yellow of Saturn. Look for the 8th magnitude moon Titan in the same eyepiece field. The largest of Saturn's moons is directly north of the planet on May 11th and 17th and south on May 3rd and 19th. With a moderate-size telescope, try to pick

out 10th magnitude Tethys, Dione and Rhea.

We've had few bright comets lately but that may be changing over the coming few months. Comet C/2009 P1 Garrard should reach 10th magnitude this month as it glides north through Aquarius. If you're up early taking in the conjunction of Venus and Jupiter in early May, spend a few minutes looking for this dim comet. It is located just south of the "Water Jar" asterism, shooting the gap between Lambda (λ) and Phi (φ) Aquarii about mid month. Garrard is very close to 81 Aquarii on the 17th. A comet this dim requires a trip out to your best dark sky location; the warmer weather will help. Comet Garrard is expected to brighten to maybe 6th magnitude this fall and possibly even better in early 2012.

STAR STUFF

BY TERRY ALFORD

Just over a year ago, I wrote about the Samsung SDC 425 security camera that I purchased to use for astronomy during public outreach sessions. For the Moon, planets and brighter deep sky objects, it gave good images in color and in near real time. Fainter objects were more challenging as the camera's integration time was limited to 4.25 seconds. Guess what? Late last year Samsung introduced the SDC 435. This model had several notable improvements including better noise reduction, a wider zoom range, more sensitivity AND an integration time of up to 8.5 seconds. While I was (and still am) happy with the 425, the increased capabilities of the 435 were very enticing. To top it off, the new 435 was being offered on the internet at a price 40% LESS than what I had paid for the 425. Of course I had to order one.

The 435 is one heck of a sensitive camera. Used with the 12-in Meade Schmidt/Cassegrain and a 0.5 focal reducer, it is easy to get nice images on objects that would be faint and hard to see with a conventional eyepiece. At a StarWatch last November 13, there was a bright Moon overhead and scattered clouds. I set the scope to go to M27, the Dumbbell Nebula. The camera was set on Black and White mode for increased sensitivity. A good image of the Dumbbell was on the screen. I increased the integration time to the maximum of 8.5 seconds and turned on the Color mode. A very attractive image with

red at the edges of the nebula and blue-green in the middle.

Next up was M57, the Ring Nebula. The nebula was too bright, so I cut the integration time in half. Very striking with subtle color and the ring shape distinctly visible. After everyone viewed it I moved the scope to the globular cluster M13. By this time of night it was no more than 30° above the horizon. Still the camera did a good job of resolving it after I dropped the integration down some more.



Image from Selena Saferight.

Over the winter I read on an astronomy forum how these cameras can be made even more sensitive by removing the built-in infrared filter. There was even an on-line tutorial showing how to do it step by step. I am an electronics dummy but it looked like even a caveman could do this simple mod. It was an easy 15 minute task. Did this make the camera more sensitive? Definitely.

As the Sun set at the start of StarWatch the night of March 19, the sky was not too promising. There were thin clouds everywhere. A full "Super Moon" would be soon rising putting even more light in the sky. Even though it was twilight and only the very brightest stars could be seen I set the scope on M42, the Great Orion Nebula. The Trapezium and several other stars were easily visible. As it got darker, I kept increasing the exposure time and more and more nebulosity became evident.

Even though the "Sword" stars were only occasionally visible by naked eye, the Nebula was bright and detailed on the monitor.

As it neared the end of StarWatch, the visitors that were still there were eagerly watching the evil Super Moon rise in the East. On a lark, I changed the "Day/Night" setting to full "Color." The nebula exploded with color, mostly reds. This was simply the best image I have ever seen with this camera and scope combination. Another club member came over and brought up a NASA image of M42 on his Ipad. Except for more detail and a larger image scale the monitor view was surprisingly similar. Before finishing that night we also got a good image of Hubble's Variable Nebula.

So, the 435 is definitely one heck of a sensitive camera. With the IR filter removed it seems to magically look right through thin cloud cover and ignoring most light pollution.

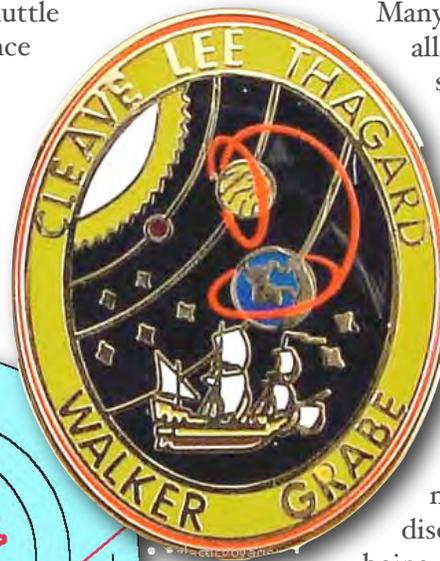
HAPPY BIRTHDAY MAGELLAN SPACECRAFT

BY ROBIN BYRNE

This month we celebrate the launch of a spacecraft that taught us more about the planet Venus than any mission before. Because of its dense cloud cover, the surface of Venus was a mystery. As early as the late 1970's, scientists began promoting the idea of a mission to Venus that would use radar to map the surface through the clouds. An initial mission, the Venus Orbiter Imaging Radar, ended up being canceled due to budget limitations. A more cost-efficient version was proposed, called the Venus Radar Mapper, and was given the green light for construction in 1983. It was renamed Magellan in 1985. Just as Ferdinand Magellan was the first to circle Earth and map regions never before seen, this spacecraft would circumnavigate and map the surface of Venus.

As part of the cost-saving design, many of the parts used on the Magellan spacecraft were leftovers from other NASA/JPL missions. Spare parts from the Voyager missions provided the main structure and the high gain antenna used for communication and radar imaging. The medium gain antenna was leftover from the Mariner 9 mission. Under construction almost simultaneously was the Galileo spacecraft, which was going to orbit Jupiter. The computer and power systems on Magellan were originally built as back-ups for Galileo. Magellan was powered by solar panels. The lifetime of the panels would ultimately determine the lifetime of the spacecraft.

Originally, Magellan was to have launched in 1988, but the Challenger disaster delayed all launches and affected the acceptable payload designs. Magellan was supposed to be powered by a liquid fueled booster, but the new payload designs required it be changed to a solid fuel booster, which was less powerful. Meanwhile, the Galileo launch was given a higher priority, which left Magellan with a long, slow journey to Venus. On May 4, 1989, Magellan flew into space aboard the Space Shuttle Atlantis. Once in orbit around Earth, the shuttle's cargo bay doors opened,



and Magellan was released and then launched free from Earth using its Inertial Upper Stage motor. The route to Venus took 15 months, during which, Magellan orbited the Sun 1.5 times before encountering Venus and going into a highly elliptical orbit in August of 1990.

The orbit of Magellan was polar, allowing it to map North-South

swaths up to 17 miles wide on each pass. Due to the slow rotation of Venus, each 3 hour 15 minute orbit took Magellan over a slightly different swath of the planet. In the first eight months (one Venusian day), Magellan had mapped 84 percent of Venus' surface. For the next cycle, Magellan mapped during its route South to North. The third eight month cycle concentrated on areas that were missing, allowing Magellan to map a total of 98 percent of the Venusian surface.

Many areas were mapped during all three cycles, allowing scientists to look for changes over time. Also, since the angle of imaging was different each time, they could construct 3D views of selected areas. Once the radar mapping was complete, the next three cycles were devoted to mapping the gravitational field. By monitoring the spacecraft's motion, scientists could discern when Magellan was being affected by higher or lower gravity fields. Between the fourth and fifth cycles, a "new" technique, called aerobraking, was used to lower Magellan's orbit. The idea of using a planet's atmosphere to provide drag and slow a spacecraft had been around for a long time, but had never been tried. Magellan was the first to actually implement this method. The lower orbit allowed even better gravity field measurements. Ultimately, Magellan mapped the gravity field of 95 percent of Venus.

(continued on page 6)

NASA SPACE PLACE

Cosmic Recount
by Dr. Tony Phillips

News flash: The Census Bureau has found a way to save time and money. Just count the biggest people. For every NBA star like Shaquille O’Neal or Yao Ming, there are about a million ordinary citizens far below the rim. So count the Shaqs, multiply by a million, and the census is done.

Could the Bureau really get away with a scheme like that? Not likely. Yet this is just what astronomers have been doing for decades.

Astronomers are census-takers, too. They often have to estimate the number and type of stars in a distant galaxy. The problem is, when you look into the distant reaches of the cosmos, the only stars you can see are the biggest and brightest. There’s no alternative. To figure out the total population, you count the supermassive Shaqs and multiply by some correction factor to estimate the number of little guys.

The correction factor astronomers use comes from a function called the “IMF”—short for “initial mass function.” The initial mass function tells us the relative number of stars of different masses. For example, for every 20-solar-mass giant born in an interstellar cloud, there ought to be about 100 ordinary

sun-like stars. This kind of ratio allows astronomers to conduct a census of all stars even when they can see only the behemoths. Now for the real news flash: The initial mass function astronomers have been using for years might be wrong. NASA’s Galaxy Evolution Explorer, an ultraviolet space telescope dedicated to the study of galaxies, has found proof that small stars are more numerous than previously believed. “Some of the



Astronomers have recently found that some galaxies have as many as 2000 small stars for every 1 massive star. They used to think all galaxies had only about 500 small stars for every 1 massive star.

standard assumptions that we’ve had—that the brightest stars tell you about the whole population—don’t seem to work, at least not in a constant way,” says Gerhard R. Meurer who led the study as a research scientist at Johns Hopkins University, Baltimore, MD. (Meurer is now at the University of Western Australia.)

Meurer says that the discrepancy could be as high as a factor of four.

In other words, the total mass of small stars in some galaxies could be four times greater than astronomers thought. Take that, Shaq!

The study relied on data from Galaxy Evolution Explorer to sense UV radiation from the smaller stars in distant galaxies, and data from telescopes at the Cerro Tololo Inter-American Observatory to sense the “H-alpha” (red light) signature of larger stars. Results apply mainly to galaxies where stars are newly forming, cautions Meurer.

“I think this is one of the more important results to come out of the Galaxy Evolution Explorer mission,” he says. Indeed, astronomers might never count stars the same way again. Find out about some of the other important discoveries of the Galaxy Evolution Explorer at <http://www.galex.caltech.edu/>. For an easy-to-understand answer for kids to “How many solar systems are in our galaxy?” go to The Space Place at: <http://tiny.cc/I2KMa>

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

MISCELLANEOUS

Skyward**by Brad Dunn***(continued from page 1)*

the planetarium and show off how much we know (or don't know) about the sky at night. [Ed.: Bring your short-focus binoculars to see all those deep-sky objects!] Until then, don't forget the StarWatches on April's Saturday nights and the upcoming Astronomy Day on May 7th. Clear skies!

Happy Birthday**by Robin Byrne***(continued from page 4)*

By September of 1994, the solar panels were degrading to the point that Magellan had very little time left. That gave NASA enough time for one last experiment. The solar panels were rotated so that they were perpendicular to the direction of motion, and the spacecraft was lowered into an orbit that skirted the upper atmosphere of Venus. This "windmill experiment" allowed the solar panels to drag through the atmosphere while the spacecraft's engines compensated for the torque. The amount of engine use allowed scientists to determine atmospheric density at the highest altitudes. Then, on October 11 of the same year, one last command was sent to lower the orbit even further. Magellan would, over the next two days, slowly descend and disintegrate in Venus' dense atmosphere.

Among the discoveries about Venus made by Magellan, was a

better determination of the age of Venus' surface. Due to the lack of many craters, it is now widely thought that the surface of Venus cannot be older than 500 million years, which may sound old, but is considered "young" from a geologic standpoint. This means that Venus experienced extensive volcanic activity during that time. Whether Venus is still volcanically active, however, is unknown, since no volcanic eruptions were imaged. However, it was found that its surface is peppered with millions of volcanoes. The images show no evidence for water being on the surface during Venus' cooler past, and no indication of Venus having plate tectonics, either. So much for Venus being Earth's "sister planet."

Right now, Venus is visible in the East during the predawn hours. If you're up early enough, take a gander at our nearest neighbor, marvel at its beauty, and remember the Magellan spacecraft, which taught us so much about this, formerly, elusive planet.

References:

Magellan Summary Sheet
<http://www2.jpl.nasa.gov/magellan/fact1.html>

Magellan (spacecraft) -

Wikipedia

[http://en.wikipedia.org/wiki/Magellan_\(spacecraft\)](http://en.wikipedia.org/wiki/Magellan_(spacecraft))

Challenges of Magellan
Spacecraft eHow.com By Carlos Mano

http://www.ehow.com/list_7296320_challenges-magellan-spacecraft.html

Regular Contributors**BRAD DUNN**

Brad is the current chair of the club and a member since 2007. During the day, he runs Dunn Professional Billing and Dunn Construction.

BOB SMITH

Bob is a founding member of BMAC, since 1980. He has also served as chair many times over the years. He currently works at Pioneer Industrial Sales.

TERRY ALFORD

Terry is also a founding member since 1980 and has been chair many times, as well. He has worked as an astronomy lab instructor at ETSU since 2001 and is also the sole proprietor of Celestial Woodworks.

ROBIN BYRNE

Robin has been writing the science history column since 1992 and was chair in 1997. She is an Associate Professor of Astronomy & Physics at Northeast State Community College (NSCC).

ADAM THANZ

Adam has been the Editor for almost all of the years since 1992. He is the Planetarium Director at Bays Mountain Park as well as an astronomy adjunct for NSCC.

Scope for Sale

I have a Coulter Odyssey 13.1 in. F/4.5 telescope for sale. It has been well taken care of and as far as I know it is in good condition. I also have several eyepieces with it in addition to a viewfinder and a Telrad finder.

Cell: 423-742-0019.

woofer@chartertn.net

Thanks!

Lynn Davis

Astronomy Day - May 7, 2011

Bays Mountain Park & Planetarium



Schedule of Events

Join the Bays Mountain Astronomy Club in celebration of

The International Day of Astronomy!

Learn about the science and hobby of astronomy.

Perfect fun for the entire family!

All non-planetarium astronomy-related activities are free on May 7th!
Planetarium tickets are \$4 per person.

Highlights: Paul Lewis, Director of UT Knoxville's Space Science Outreach and Solar System Ambassador for NASA, will report on current missions orbiting planets in our Solar System. Bays Mountain Astronomy Club members will also be providing a number of fascinating presentations. Learn about telescopes and more! The club will also be hosting daytime viewing of the sun and nighttime viewing of Saturn, the moon, and much more!

Contact Info: 423-229-9447; www.baysmountain.com

Afternoon Events: 12 p.m. - 4:30 p.m.

Displays (free!): 12 p.m. - 4:30 p.m., *Discovery Theater*. See many displays featuring all sorts of astronomical topics.

"Where Are We?" with Brad Dunn (free!): 1:30 p.m., *Discovery Theater*. Learn all about where we are in the universe. Find your place in space!

Solar Viewing (free!): 2 p.m. - 4 p.m., *Observatory*. Thrill at viewing different layers of the sun up close and in great detail. Safely see sunspots and prominences. Weather dependent.

Solar System Walk with Robin Byrne (free!): 2:30 p.m., *Observatory Grounds (only if not raining)*. This fun outdoor excursion shows just how large the Solar System really is. Learn about the planets and their diversity with this cool activity for the whole family.

"Meteorites: Rocks from Space" with Gerald Fleenor (free!): 3:30 p.m., *Discovery Theater*. Learn about these visitors from afar and how we have learned about our Solar System from them. Examples will be shown.

Evening Events: 7 p.m. - 10 p.m.

"Around the Planets We Go" with Paul Lewis (free!): 7 p.m. - 8 p.m., *Amphitheater (Planetarium if raining)*. Let's take a look at the current missions orbiting planets of our Solar System. Messenger is the latest entry into the quest for knowledge of our planetary partners. We will also visit Venus, Mars, Saturn and our own Moon.

Nighttime Viewing (free!): 8:30 p.m. - 10 p.m., *Observatory*. Spectacular views of celestial delights await you. Savor a wonderful view of Saturn's rings, be awe-struck by the distance to galaxies, and feel like you're flying low over the moon with the Bays Mountain Astronomy Club's telescopes. These views and more will be seen at our Observatory. A live presentation about what is up in the night sky will take place in the Planetarium if the weather does not cooperate.

The Bays Mountain Astronomy Club



Find out more at our website:

www.baysmountain.com

Edited by Adam Thanz:

thanz@ci.kingsport.tn.us

Dues:

The Bays Mountain Astronomy Club requires annual dues for membership. It covers 12 months and is renewable at any time.

Rates:

\$12 /person/year

\$4 /additional family member

If you are a Park Association member, a 50% reduction in fees is applied.

Calendar

Special Events

May 7 Astronomy Day! The event starts at noon, so please show up by 11:45 to set up.

July 30 BMAC annual picnic. Natural Tunnel, VA at the gazebo. Bring a dish/snack to share and a chair.

SunWatch

Every Sat. & Sun., 3 - 3:30 p.m.,

Mar. - Oct., weather permitting.

BMACers are always welcome to help.

StarWatch

8:30 p.m.: Apr. 23, & 30

BMACers need to arrive 30 min. early to set up.

BMAC Meetings

7 p.m., Planetarium Theater

May 6 "Planetary Visions" will be shown along with getting ready for Astronomy Day and then possible observing.

7 p.m., Discovery Theater

June 3 Topic TBA.

Apple logo Made on a Mac!

Bays Mountain Astronomy Club
853 Bays Mountain Park Road
Kingsport, TN 37660