



THE STAR

THE NEWS LETTER OF THE
MOUNT CUBA ASTRONOMICAL GROUP
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OUR PROGRAMS ARE HELD THE SECOND TUESDAY OF EACH
MONTH AT 7:30 P.M. UNLESS INDICATED OTHERWISE
MOUNT CUBA ASTRONOMICAL OBSERVATORY
1610 HILLSDIE MILL ROAD
GREENVILLE DE.

FOR DIRECTIONS GO TO www.mountcuba.org
PLEASE SEND ALL PHOTOS AND ARTICLES TO
pestrattonmcag@gmail.com

DECEMBER'S MEETING
TUESDAY DECEMBER 10TH 7:30 p.m.

Agenda and Program

Dave Groski, MCAG
Greeting and Welcome. Introductions and Announcements.

Hank Bouchelle, MCAG and Univ. of Delaware
November Contest Winner Announced
What time is it in the Alapocas Quarry.

Program: The Moon as a Clock

MCAG December program describes a surprisingly easy way to determine the time, adding to our list of natural clocks. It is worth noting that for a generation, every 8th-grade student in the Colonial School District could, and every University of Delaware student taking PHYS139 can, determine the time using the Moon's appearance.

As a pretext to the meeting, please view the photos and description below.



Phenomena

Readily apparent to those on Earth's surface is the changing position of the Sun and Moon across the sky. Newspapers routinely report the rising and setting times of these objects. Sundials can report local time. Solar cells are engineered to capture as much sunlight as possible. The Moon figures large in the changing tides, and thus affects

ocean transport. A solar eclipse occurs on the rare occurrence of a perfect New Moon, while a Full Moon occurs on the occasion of a lunar eclipse. And it is a romantic object, too!

However, for those observing the Solar System from a distance the true motions of these objects are something else. Earth orbits the Sun, as does the Moon, but in combination with its own orbit around Earth.

Were we to bring Earth's rotation to a complete stop, its day and year would be of equal length, totaling the length of one Earth year. Any particular Earth resident would experience six months each of day and night. (The Moon presents a similar case, experiencing equally dividing day and night, to total the time required for one (synodic) orbit, about one "month.")

In the circumstance above, the Moon would *rise* in the *west*, move slowly across the sky, and set in the *east* about two weeks later. We do not usually observe the Moon's westward motion because it is overwhelmed and disguised by Earth's rotation. However, should a planet or relatively bright star appear near the Moon, over a period of time we can observe the Moon drifting closer and then away. A solar eclipse comes and goes as the Sun drifts westward to pass in front of the Moon, and then continue on.

A memorable experience is to observe a deep lunar eclipse with a telescope. Since the Moon has no atmosphere, stars wink out dramatically as the Moon drifts in front of them, and then emerge almost explosively from the opposite edge. Stars are so distant that they appear as geometric points. A star either shines, or it is winked off.

As the Moon appears to drift slowly but relentlessly to the west, it changes the angle between itself and the Sun. Each month, the Moon moves away from the Sun toward Full, and then toward the Sun, toward a New Moon. The angle between these objects determines precisely the Moon's phase. A quick glance at the Moon to determine its phase reveals exactly the angle between it and the Sun, even if the Sun is below the horizon!

The accompanying photographs (above) demonstrate the relationship between lunar phase and solar position. (They also reveal the angular distance to the Sun in each case.) Join us for the December 10th *Mt. Cuba Astronomy Group* meeting to learn how all of this fits together to make the Moon a timepiece!

NOVEMBER'S MEETING REVIEW

Hank gave a talk on the recent Hybrid Solar Eclipse. He explained just what must occur before an Eclipse of any sort can happen. His reference material was from the RASC Observers Handbook 2013. Hank gave the group a hand out with specific information on all that happened for this Eclipse to occur. Well done Hank. If you would like a copy, please email Hank. (email address above)

Our special guest speaker was Luisa Georgov. Luisa graduated from Glasgow High School and the University of Delaware. She is currently a real live travel agent for space flights. Yes, it is true. The possibility for the public to travel into space is not only near but it is about 1 year away.

Below is the SXC-001 space vehicle that will transport people from Earth to Space and back. The first ready to go craft is on schedule to roll off the assembly line by the middle of 2014. Flights to Space are scheduled begin in 2015.



SXC has allotted 100 seats for the first group of travelers. This group will be known as the Founding Astronauts. As of now, there are only a few seats left.

The requirements are you must be 18 or older. You will need to take a physical when you sign up as well as prior to your flight. It is recommended but not required, that you go through some training.

I'm sure all of you would like more information so Google SXC for a web site loaded with great information about the company and all you need to know about signing up. You may also sign up by contacting Luisa at LGTravel@verizon.net

If you would like to take a simulated ride into space, go to U-Tube and enter Justin Dowd. Select the following Metro Space Race/SXC Simulator Training: Justin Dowd. Since I was just a bit confused when I first viewed this video, I will offer a brief description of what you will see. There are four blocks in this video. In the upper left is Justin. To the right of Justin is the Desdemona which Justin is sitting in. The Desdemona simulates the G loads you experience during the flight. The lower left is a simulation of the SXC-001 as it takes you through the flight. To the right of that is the view you will get while on your flight.

Who is Justin Dowd? Justin won the contest SXC held for a free trip to space along with all the training SXC offers for a flight. I highly recommend you view the U-Tube video he produced to win the trip. Enter Justin Dowd in U-Tube and view the video

Einstein's Discovery about time (a chalk-imation animation)

That's what I said; it is a chalk-imation. Every thing you will see is done in chalk and Justin is the Artist. Only one word can describe it.....amazing.....

Justin is 4 months away from graduating from Northeastern University with a double major in Math and Physics.

MCAG PUBLIC OUTREACH:

SCHOOLS:

With the November issue of the STAR, I was able to reach out to 10 additional Science Teachers. All 10 teach at the Conrad Schools of Science. To date, we have received replies from 4 teachers. We are currently in the process of offering our assistance to them in the Astronomy phase of the Science Olympiad as well as arranging a trip to the Mount Cuba Astronomical Observatory. We also hope to present a lecture on Telescopes some time

this spring. Since I am a graduate of the old Conrad High School, you can only imagine how thrilled I am.

Jerry Hill at A. I. DuPont Middle School has informed us that he has been able to start an Astronomy Club. For now, the Club will center its activity on the Planetarium. He is currently in the planning and hopes to offer a program by 16th of January. We will keep all up to date. Great work Jerry.

We received the following too late for the November STAR. Hopefully it is not too late to get some students involved.

We hope to become more educated about this program. With our commitment to education, it would be a great thing if we could not only help teachers with content knowledge, learning activities, and support and make opportunities like these more accessible.

Year 28 of the DuPont Challenge—a national writing competition for middle and high school students—kicked off last week and will begin accepting entries November 15.

The DuPont Challenge calls on students in grades 7–12 from the United States, Canada, and U.S. territories to research, think critically, and write an essay that provides innovative ideas on the world's most pressing challenges, or demonstrates the application of science, technology, engineering and mathematics (STEM) to our daily lives.

This year, the Challenge encourages students to consider how science and innovation can be used to meet the needs of the 21st century for food, energy, and protection. Students should address one of the four following categories in a 700- to 1,000-word essay:

- Together, we can feed the world.
- Together, we can build a secure energy future.
- Together, we can protect people and the environment.
- Together, we can be innovative anywhere.

Students and sponsoring teacher prizes include savings bonds, teaching grants, exciting trips, and much more. The deadline for submissions is January 31, 2014. For more information, including official rules, entry forms, and details on awards, please visit the Challenge at www.thechallenge.dupont.com

An Invitation to Get Involved!

You, too, can be an elementary Student's Carl Sagan!!

On January 8, 2014 the Appoquinimink School District hosts a Space Night from 6:00 – 7:30 p.m. at Appoquinimink High School, in Middleton – a short drive for fourth and fifth grade students and their parents. Anyone with an interest in astronomy is invited to attend and share information, ideas or materials with students and their parents. The evening's format is a number of tables or stations around which the students and parents may circulate.

Individuals with binoculars or telescopes are particularly invited!! For more invitation, or to offer assistance --

Contact Hank Bouchelle at hbouchelle@live.com or 302-983-7830.

LIBRARIES:

Please don't forget the following dates. On January 17th Hank will be giving a lecture on the Constellations of Winter – Ancient Myths and Colors of Stars. He will give the talk at the Newark Free Library, 750 Library Ave. at 7:30 p.m. Hank will also give the same lecture on Wednesday January 29th at the Brandywine Library 1300 Foulk Rd. also at 7:30 p.m.

YOUR PHOTOS

In our last Newsletter, I was able to share one (1) photo that was taken by a member of the MCAG. That was a bit of a disappointment. I know that there are many more out there so please consider sharing your work with us. If you send them to me with a brief write up I will make sure you receive credit.

NEWS FROM THE WORLD OF ASTRONOMY:

Bizarre Asteroid with Six Tails Spotted



Most of you have likely heard or read about this Asteroid. However, I decided to do a short write up mainly due to the never before seen phenomenon. What we have here is Asteroid P/2013 P5. What makes this Asteroid so unusual is it has 6 tails. When you take a closer look you see that it is either turning or spinning out of control. For more, Google P/2013 P5 and read some really great articles. The theories behind this quite unusual Asteroid are very interesting. Hint, start with Wikipedia.

NEWS FROM NASA

MAVEN



I hope all of you were able to see the launch of NASA's latest adventure to view more of and learn more about our close friend Mars.

I was fortunate for I had the perfect spot on a hill. I saw the rockets rise out of a small bush at the end of our street.

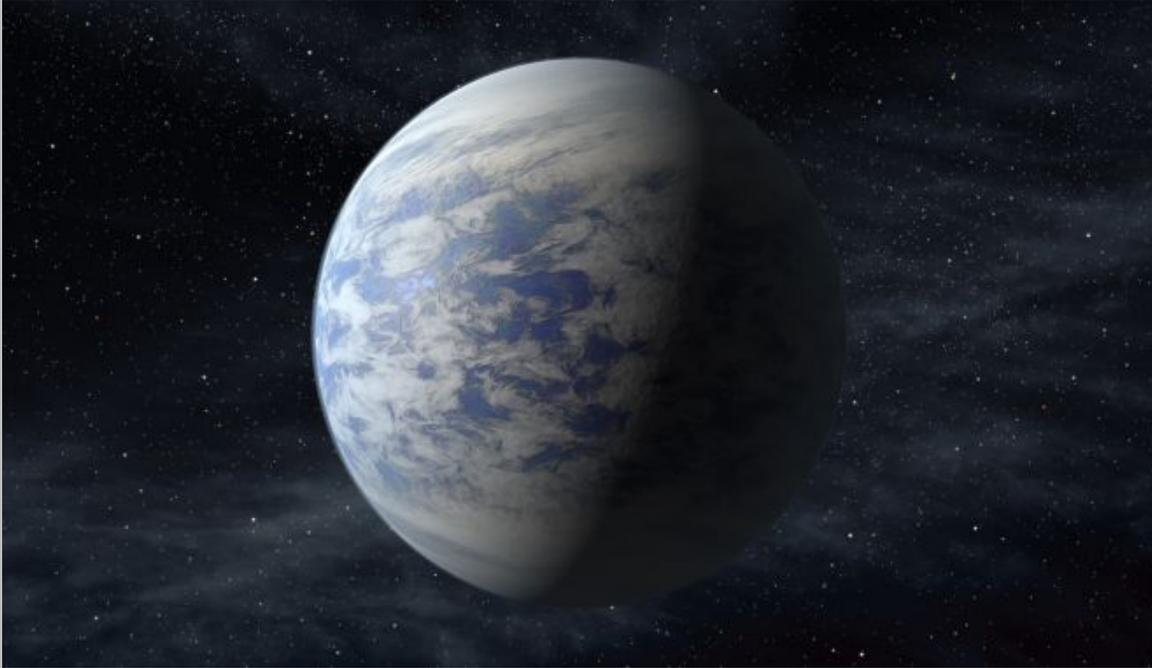
The main mission of Maven is to solve some mysteries of Mars. Billions of years ago, Mars was *potentially* a habitable planet with a thick atmosphere and large amounts of liquid water. But then something happened, and the Red Planet transitioned to the cold and dry world we know today. It's atmosphere is just 1 percent as dense as that of Earth. When MAVEN gets to Mars, it will go into an elliptical orbit which will bring it as close as 93 miles and as far away as 3,728 miles from the surface of Mars. Maven will also make a few "deep dips" coming within 77 miles of the Martian surface. NASA official informed us that by doing these dips, Maven will be able to sample the Red Planet's upper atmosphere and get a wider view of the entire planet as it moves away. Hopefully, we will find out where the atmosphere and water went.

ISON

It appears that ISON or at least a part of ISON has made it through its trip around the Sun. I guess I should say perhaps it made it. There is still a lot to question about just what it is we are now seeing. Some Astronomers are referring to what's left as a "rubble pile" which may quickly dissolve. I shall follow additional reports and get back to ISON's fate later.

EXOPLANETS

First in a series.



Looks a bit like planet Earth?

What we have here is an Artist version of a newly discovered planet.

Once upon a time, we humans thought we were alone in the vast cosmos of space.

However, Hollywood came to the rescue and informed us ET was here. Was that the way we found an answer to the most human of all questions? Are we alone? Of course not.....I hope.

It would be impossible to determine who the first human was to ponder the question. I do, however, believe that most of us have. Hopefully, the answer will soon arrive or at the very least, we will know that it has been determined that life may very well exist or may have existed on a specific planet other than ours.

Please consider the following:

Astronomers using NASA data have calculated that in the Milky Way Galaxy alone, there are at least 8.8 billion stars out of about 200 to 300 (estimated) billion stars in the Galaxy with Earth-size planets in the habitable temperature zone also referred to as the Goldilocks zone. A simple understanding of the habitable zone: Think of Earth's temperate zone. Now consider what is required to sustain life as we know it. Not too hot and not too cold. There are an estimated 8.8 billion Stars that have planets with the same or near the same habitable temperature zone as we on Earth.

We have been able to view approximately 42,000 stars a very small number when compared to 200 to 300 billion. Scientists have extrapolated that figure to the rest of the galaxy, and have calculated -- not estimated -- what percent of stars that are just like our

sun and may have planets similar to Earth: 22 percent, with a margin of error of plus or minus 8 percentage points. That comes out to about 1 in 5 stars are like our sun in size, color and age which have planets that are roughly Earth's size and are in the habitable zone where *life-crucial water can be a liquid.*

More to come in the January STAR

DECEMBER'S SKY

December 3 - New Moon. The Moon will be directly between the Earth and the Sun and will not be visible from Earth. This phase occurs at 00:22 UTC. This is the best time of the month to observe faint objects such as galaxies and star clusters because there is no moonlight to interfere.

December 13, 14 - Geminids Meteor Shower. The Geminids is the king of the meteor showers. It is considered by many to be the best shower in the heavens, producing up to 120 multicolored meteors per hour at its peak. The shower runs annually from December 7-17. It peaks this year on the night of the 13th and morning of the 14th. The waxing gibbous moon will block out some of the meteors this year, but the Geminids are so bright and numerous that it should still be a good show. Best viewing will be from a dark location after midnight. Meteors will radiate from the constellation Gemini, but can appear anywhere in the sky.

December 17 - Full Moon. The Moon will be directly opposite the Earth from the Sun and will be fully illuminated as seen from Earth. This full moon was known by early Native American tribes as the Full Cold Moon because this is the time of year when the cold winter air settles in and the nights become long and dark. This moon has also been known as the Moon Before Yule and the Full Long Nights Moon.

December 21 - December Solstice. The December solstice occurs at 17:11 UTC. The South Pole of the earth will be tilted toward the Sun, which will have reached its southernmost position in the sky and will be directly over the Tropic of Capricorn at 23.44 degrees south latitude. This is the first day of winter (winter solstice) in the Northern Hemisphere and the first day of summer (summer solstice) in the Southern Hemisphere.

WEB SITE OF THE MONTH

<http://astrobob.areavoices.com>

An excellent site that covers Astronomy as well as many related subjects. It is full of interesting articles and pictures for the beginner or amateur astronomer.

TELESCOPE WORKSHOP

The Workshop has completed the first mold for the Sun Dial Project. More detailed information and photos to follow>

PUBLIC NIGHTS AT MCAO

2-Dec-13 In search of Exoplanets Scott Jackson

16-Dec-13 When Giant Stars Collide Stan Owocki

Please be sure to make reservations by calling Mount Cuba, 302-654-6407. Leave a message and your call will be returned. All start times are 8:00 p.m.

UPCOMING ARTICLES FOR JANUARY STAR

Part two of Exoplanets.

What is Astrogeology?

More on SXC and the other companies involved in trips into Space.

EDITOR'S NOTE:

It is the goal of this Newsletter to first and foremost reach out to students, teachers and the general public. At the same time, we need to hold the interest of our members who have an intermediate or advance level of Astronomy and its related fields. I am open for any suggestions that will improve the type and level of the material covered in the STAR. You will notice that several articles end with a web site you can visit to learn more about the topic. I am a firm believer in the STAR being a newsletter that excites the interest of our readers. My hope is that the readers take the initiative and do some research on their own. We have the net so what could be more fun than to discover on your own additional information I did not include in an article.

Last but certainly, not least, I would like to thank my wife, Joan, for being the proof reader of the STAR. I write most of the articles but without Joan checking my grammar and misspelled words, (I can spell words that spell checker can't find) the STAR would not be what I intend it to be. Thanks Joan.

MCAG MISSION STATEMENT

The Mission of the Mt. Cuba Astronomy Group is to increase knowledge and expand awareness of the science of astronomy and related technologies.

To provide MCAG members and the general public with monthly educational programs in astronomy and astronomy-related topics

To engage in outreach to the public as well as MCAG members to provide engaging and informational activities of astronomical interest, including public lectures and observing.

To support a responsive, informative, and useful newsletter for its members and the general public.

To support educational institutions, including schools and their teachers, in their efforts to engage and inform their stakeholders in the area of astronomy, formally and informally, and as appropriate its relationship to mathematics.

To hold formal and informal courses, work-shops, and retreats that support its members' interests, and engage and inform the general public.

To offer publications and materials of astronomical interest to its members at a discount as they may be available, and to the general public when possible.

To develop and support affiliations with like-minded institutions.

If you know of anyone who is interested in Astronomy or someone who would like to learn more, please do not hesitate to extend an invitation to them to attend our meetings. If they have an interest in joining, our application is below.

Mt. Cuba Astronomy Group

Membership Form

The Mt. Cuba Astronomy Group is a tax-exempt organization dedicated to astronomy education and public outreach. Benefits of membership include:

- Monthly newsletter that includes details about the Group's activities and much astronomical information
- Monthly programs on subjects and topics of astronomical interest
- Free or discounted subscriptions to astronomy-related publications
- Free registration for MCAG workshops and classes
- Mention Mt. Cuba Astronomy Group and receive a 5% discount at Manor Books in New Castle (<http://www.yelp.com/biz/manor-used-books-New Castle>)



Mail to:

Ms. Carolyn Stankiewicz
1001 Woodstream Dr.
Wilmington, DE 19810

Name _____

Name(s) (children, if any, and age): _____

E-mail address: _____

Home address: _____

Phone (optional): _____

