



The Star

Newsletter of the
Mount Cuba Astronomy Group

Vol. 1 Num. 5 January 2013

Contact us at;

Dave Groski

david.m.groski@usa.dupont.com

Hank Bouchelle

hbouchelle@live.com

(302) 983-7830

Program Schedule:

Programs are at 7:30 at
Mt. Cuba Astronomical Observatory 1610 Hillside Mill
Road, Greenville, DE unless indicated otherwise.

Observing from a Comfortable Chair

Hank Bouchelle

January 8 Astronomy from the Pacific -

Greg Weaver, MCAO, will share photos and video in a talk on the eclipse that was visible from Australia / New Zealand and Carolyn Stankiewicz will be sharing details on her visit to Mauna Kea Observatory

First, I want to thank Dave Groski for sharing his remarks and his star atlases. It is always interesting to look back and learn about what has happened in the past, and how it relates to the present. I am also appreciative of the patience the meeting attendees exhibited during my impromptu discussion of eclipses. There are a number of facets to eclipses that somehow elude the mere geometry of these events.

February 12
Binoculars in Astronomy - Lynn King

March 12
Mapping the Sky

April 9
Stars and Constellations of Spring

April 18 (Thursday)- Tentative!
Joint Meeting,
MCAG and Univ. of DE. PHYS 139 class
Gore Hall, Univ. of DE, Newark Campus
Topic: *Light and Stars*

May 14
The Moon: Its Origin and Phases

June 11
Stars and Constellations of Summer

It is worth noting that 2013 is nearly a wash-out on the eclipse front. <http://eclipse.gsfc.nasa.gov/OH/OH2013.html>. An advantage of lunar eclipses is that they can be seen by nearly everyone on the proper side of Earth's surface, while solar eclipses, especially total solar eclipses, are visible only along a narrow path. 2013's lunar eclipses are all penumbral ("partial"). And the (semi-) total solar eclipse November 3, 2013, is visible only from Pacific Ocean and a slender path through Africa. See:

<http://eclipse.gsfc.nasa.gov/SEgoogle/SEgoogle2001/SE2012Nov13Tgoogle.html>.

Contributions to "The Star" may be sent to Ralph Denlinger denlinger108@zoominternet.net

While the observing weather was not perfect for our December meeting, the clouds were sufficiently thin to observe Jupiter's bands and three of its satellites. This led to a discussion of the fact that Jupiter's satellites reveal aspect rotation (see December's *STAR*, archived at the Mt. Cuba Astronomical Society website), and that were one to observe the Sun from Pluto, its apparent size would be about the same as Jupiter's observed from Earth!

And of course, what would a Christmas meeting be without cookies! And spiced walnuts! And soda! Speaking personally, I thoroughly enjoyed the casual but engaging conversations during our social time. It was quite nice, and I look forward to future occasions. It is such occasions that remind me how the MCAG came into existence.

Life and Death of a Comet

Contributed by Tom DeMott
(Adapted from *Astronomy Made Simple*, 1955)



Comet Hyakutake taken by Ralph Denlinger

A study of long-period comets indicates that at a distance of between 25,000 and 150,000 astronomical units from the sun, there is a "Comet Cloud" (Oort Cloud)

containing as many as a hundred billion individual comets. Due to perturbation of neighboring stars, some of these are occasionally injected into the domain of the solar system, beginning their stay in the solar system as long period comets, moving along greatly elongated ellipses.

During their stay in the solar system, both their orbit and their content may be greatly changed.

The orbit is affected during close approaches to one of the major planets. Such an encounter may change the comet's aphelion from thousands of astronomical units to a distance of tens of thousands of astronomical units from the sun; and the period from hundreds of years to tens of years.

A comet's content is changed each time it passes near the sun—part of its mass forming the tail, which eventually diffuses into space.

A comet may also split into two or more parts during a perihelion passage, or when passing close to one of the major planets. Heavy tides formed at such close passage are primarily responsible for the splitting.

Roche's limit indicates that a comet passing within 90 million miles of the sun, or 9 million miles from Jupiter, or 2 million miles from the Earth, should disintegrate as a result of the tides produced in it. The theoretical predictions are verified by observation. The 1947 XIV comet (the fourteenth comet in 1947) passed within 10 million miles of the sun and was split in two. Comet Shoemaker-Levy 9 ([formally designated](#) D/1993 F2) was a [comet](#) that broke apart and collided with [Jupiter](#) in July 1994, providing the first direct observation of an extraterrestrial collision of [Solar System](#) objects. Calculations showed that its unusual fragmented form was due to a previous closer approach to Jupiter in July 1992. At that time, the orbit of Shoemaker-Levy 9 passed within Jupiter's [Roche limit](#), and Jupiter's [tidal forces](#) had acted to pull the comet apart.

On October 1, 2013, comet C/2012 S1 (ISON) will swing by Mars, and then the Earth on December 26, 2013. Experts predict it

could become a rather spectacular sight in the night sky – but that's assuming it doesn't disintegrate before then. As witnessed by Comet Elenin last year, an apparition can break-up at any given time, particularly as it gets closer to the Sun.

Even if the comet does not split, its lifetime is limited to about a hundred perihelion passages. Towards the end, the comet has lost all the gases that could have been volatilized from it; the remaining debris continues along its normal orbit, colliding occasionally with the earth's atmosphere to produce meteoric showers.

New comets, however, are continuously being ejected from the gigantic Oort cloud to provide us with once in a lifetime unforgettably brilliant spectacles.

Phenomena

Jupiter's diameter is about 10 times Earth's. It is shrouded in clouds that are relatively reflective. This combination makes it appear as a relatively bright object in Earth's sky. In fact, it is among the brightest of celestial objects, in spite of the fact that it is about half a billion miles away. For most of this winter's evenings, Jupiter appears high in the east and south.

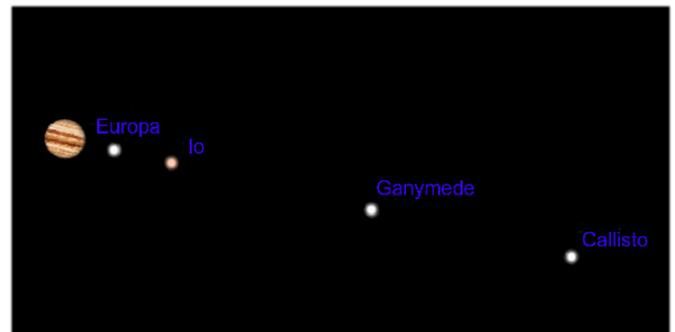
It is interesting that historical records refer to individuals who were not only able to discern Jupiter as a disk with the naked eye, but could also perceive one or two of its satellites!! In fact, four of these satellites would be visible to most of us, one of which is about the size of Mercury, were it not for the planet's glare. These four satellites are called **Galilean satellites** in honor of Galileo's systematic observation of them.

A mnemonic for remembering the order of the Galilean satellites according to their distance from the planet is, "I eat green cheese," for Io, Europa, Ganymede, and Callisto. These satellites variously appear along the line of Jupiter's equator. However, since they revolve around Jupiter at different speeds, they continually rearrange themselves

as viewed from Earth. In fact, sometimes one or more satellites pass behind the planet, obscuring them altogether. Likewise, the satellites can pass in front of Jupiter, casting their shadows on the face of the planet. In fact, Io can be seen to disappear behind Jupiter and reappear on the opposite side in the course of an evening!

Details of these motions helped Lewis and Clark map the Louisiana Purchase! And helped French astronomers determine the size of France!

Observing the movements of these satellites can be an interesting project, one that follows in Galileo's footsteps: As often as possible, use a telescope and sketch the arrangements of these satellites along with the date and time. Use as your measuring tool the apparent diameter of Jupiter. For example, if a satellite is four Jupiter diameters from the planet, its apparent distance is "four Jupiters." (With a little planning and thought, you can assemble a Jupiter satellite flip book!) Galileo referred to the objects as I, II, III, and IV. Their current names came later.



Jupiter and the moon 12/25/12 R. Denlinger

Lum's Pond State Park Event

A Public Program will be held from 6:30 - 8:00 PM, January 12. A thirty minute talk will be followed by an observation session. Contact Lauren Illiano at (302) 368-6989 for details !

Telescope Makers

The first gathering of the telescope making group was Friday December 21. Following is Dave Groski's summary. "We cleaned the tube assembly for an old Edmund 4.25 reflector that Hank wants to use for his out reach activities. We also cleaned and tested the optics. The primary mirror cleaned up very well after being covered by a thick layer of dust for many years. The mirror tested to be a perfect sphere so at this focal length it will give a very good 1/8 wave image. The next time we meet I look like to start restoring the mount. All it needs is some fresh paint.

Bob Stack brought up his 6" Maksutov which he had made from spare parts when he worked for OTI which made the famous Quantum series telescopes. I'm looking forward to looking thru it the next time we meet. I'll also bring a large optical flat so we can test the completed telescope by double pass autocollimations. Greg was nice enough to bring up an Edmund clock drive in hopes that we could use parts from it to replace the parts missing for the mount on the 4" Edmund. Unfortunately the parts won't work so Greg is going to call the person that donated the scope and see if we can locate the missing parts.

The next meeting will be sometime in Jan 2013

Out and About – Engaging Astronomy

There are a number of educational opportunities coming up, with something for everyone! Take note:

Ms. Carolyn Stankiewicz, Mt. Cuba Astronomy Group (MCAG) Membership Chair, hosts an informal introduction to astronomy course on Wednesday mornings (11:30 AM to 12:30, February 6 to early May) for the **Osher Lifelong Learning Academy** at the U. of DE

Wilcastle Campus. The course title is **New Topics in the Heavens**. You may contact the Osher Academy at 831-7600 or Carolyn at 302-475-2484 for more information. Register early and often!

The University of Delaware offers a one-credit *Star and Constellation Identification* (introduction to observational astronomy) course on Thursday evenings, 8:00 - 8:50 on its Newark Campus beginning in early February. **Dr. Hank Bouchelle, MCAG Co-Lead**, is the instructor. The course may be taken for continuing education credit or otherwise. The course requires no previous knowledge of astronomy or math, and investigates practical topics in astronomy and observing. For more information, go to: <http://primus.nss.udel.edu/CoursesSearch/courseInfo?&courseid=024865&offernum=1&term=2133&session=1§ion=010>. You may request a course syllabus at hbouchelle@live.com.

Mr. David Groski, MCAG Co-Lead, is organizing a telescope-making group. Those who know David, or know of him, cannot help but be impressed by his knowledge and skill, and the excellence of his work. More information may be had from Dave at: david.m.groski@usa.dupont.com.

As some of you already know, the **Mt. Cuba Astronomical Observatory** (MCAO) sponsors **Public Nights** on alternating Monday evenings at the Observatory. These are of general interest and open to the public. (It is wise to make a reservation - 302-654-6407). For more information, go to: mtcuba.org.

Of note to MCAG members are two Public Night programs: **The Sun from Pluto**, on January 28, demonstrates a surprisingly simple procedure to determine the Sun's appearance from the celebrated former planet. Bring a small calculator but no proficiency with math is necessary). On **April 22** the Public Night topic is **Comets and Meteor Showers**. It presents a brief discussion of the close relationship between comets and meteor showers, and meteor shower detail.

Starry Eyed Challenge



It all started with the Big Bang, which is predicted to have occurred approximately 13.7 billion years ago, leading to the expansion of the universe. After observing many galaxies, which astronomer proposed a law showing the relationship between the distance from the earth and the velocity at which each galaxy was moving away (recession velocity)?

Tycho Brahe

Subrahmanyan Chandrasekhar

Edwin Hubble

Giovanni Domenico Cassini

Answer 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): _____

Christopher Myers has sent us another fine star field. His details for the image are : Taken with a Nikon d7000, exposure was 26.6s, ASA 1000, f/3.5, focal length 18mm, taken Zion National Park, Utah, March 27, 2012 . A Venus and the Moon are setting behind a cliff to the west.

