Night Times

LAKE COUNTY ASTRONOMICAL SOCIETY

January 2007

Our first **LCAS** meeting in 2007 will take place on **Friday, January 19th**. As usual the business meeting will start at 7:30 p.m. followed by an astronomy program by member **Stacy Greenhill.** Stacy will share some highlights of her trip to the **Stone Observatory in India**. Hope to see you there!

No business meeting report this month due to the annual *LCAS Holiday Pizza Party*.

We had about 37 folks at this year's party. In addition to great food, spirits and lively conversation, Mike Dziedzic provided some poetic entertainment with the reading of that LCAS Christmas classic, "Twas the Night Before the Geminids". Leon Choin and Greg Lutes contributed some astronomy trivia, and Travis Whitlow provided some astronomy humor.

Photos of the event (courtesy Richard Eveleth) may be found at **http://tinyurl.com/ylsvlu**

Somewhere Warmer…

Astronomy is a year round hobby, but astronomical events don't wait for clear skies and warm nights. So it's bundle up and bear it, OR find somewhere 'warmer'.

Here are some opportunities to get away and find warmer and probably clearer skies.

Deep South Texas Stargaze held at the Escondido Ranch, west of Freer, Texas. Jan 17th – 21st, 2007
http://www.kingsvilleastronomicalsociety.org/DSTS2007.htm

Cedar Key Star Party 2007 Cedar Key Florida
Feb. 11th – 17th, 2007
http://www.upstateastro.org/stars/cedarkey.html

Winter Star Party 2007 Florida Keys.
February 12th – 18th, 2007
http://www.scas.org/wsp.htm

7th Annual Kisatchie Star Party Baton Rouge, LA.
March 14th – 18th, 2007
http://www.bro.lsu.edu/bras/kisatchie.html

2007 Texas Star Party near Fort Davis, Texas
May 13th – 20th, 2007
http://www.texasstarparty.org/

NightTimes is the monthly publication of the Lake County Astronomical Society. **Meetings** of the LCAS are held at 7:30 PM on the third Friday of every month at the visitor center of the Volo Bog State Natural Area, 28478 W. Brandenburg Road, Ingleside, Illinois. Following an astronomy program open to the public, visitors are invited to view the moon, planets and stars through members' telescopes, weather permitting. Club contacts and phone numbers are listed on the third page. LCAS is a 501(c)(3) not-for profit organization chartered to promote the interest and participation in astronomy.

Thoughts from…

Matt Lowry

More Than Just Stargazing

Well, another semester of my astronomy class at the College of Lake County is finally at an end. Any honest high school or college instructor will tell you that while they may enjoy teaching their subject, they also cannot wait for that inevitable end to the crazy schedule, maddening last minute preparations, and the less-than-pleasant chore of grading papers.

However, when it is all said and done, I must say that after being away from the classroom and lab for only a few days, I get the itch to return. There's just something special about teaching astronomy.

Why is it that so many people sign up for an astronomy class? Such classes tend to be popular, attracting many different kinds of student, varying by age, ethnicity, technical & scientific background, and education level. There is obviously something appealing about the topic of astronomy that draws so many who know next to nothing into these classes. I suspect this is the same kind of attraction that draws the curious to monthly LCAS meetings.

Of course, when the uninitiated come to an astronomy class or meeting for the very first time, many of them come with a lot of astronomical "baggage", my affectionate term for misconceptions.

Some come in the door thinking they are taking an "astrology" course (my personal favorite misconception); some actually believe that the Sun travels around the Earth; others cannot conceive of a universe older than the Biblical 6000 years; many actually think that a "shooting star" is a star falling from the sky; and many are just interested in looking at stuff through a telescope without any initial desire for deeper understanding. All students, in one way or another, come into astronomy class with such intellectual "baggage", and I view it part of my job to release these students of this burden so that they may develop a deeper appreciation of our universe.

No matter what fanciful notions a student brings with them on that first day, it is my profound hope that my students leave on the last day with some sense of how vast our universe is in both time & space. I want them to understand that, quite literally, they are part of a continuum of existence from the primordial big bang 13.7 billion years ago until the present day. It's my hope that they can gaze up at the stars with awestruck wonder knowing that the atoms that make up their bodies were generated in the death throes of titanic stars ages ago halfway across the cosmos. I want them to lose themselves in the knowledge that there are more stars in the sky than there are grains of sand upon all of the beaches of Earth, and that it's likely that ours isn't the only such terrestrial planet.

I want my students to understand that when they learn the facts, the view of our universe, and our small place within it, as revealed by science is more wonderful than any fantasy ever dreamed up in any story or myth. I want them to know that once you understand more about what is really going on "out there", the view through the telescope is never again the same.

Ad Astra - Matt Lowry

Counterweight Formula

Jack Kramer

On a German equatorial mount, how large a counterweight will you need for a given size telescope?

The formula is:

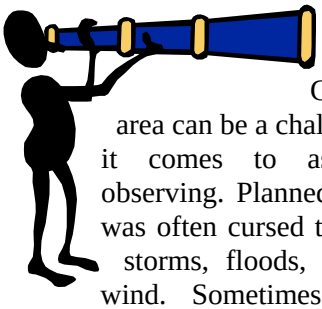
(Scope weight) x (scope-to-mount distance) ÷ (c/w-to-temount distance) = c/w weight

Let's assume the scope weighs 13 pounds and the center of the tube is 4" from the GEM mount head. We'll also assume that the counterweight will be 12" from the GEM head. Plugging numbers into the equation, we get:

(13x4) ÷ 12 = 4.3 pounds

You can use a heavier or lighter counter-weight if you slide it up or down the declination shaft. Decreasing its distance from the center of the mount (that is, the RA axis pivot) will roughly double the weight needed to balance things.

Sharing Observations



The skies above the Chicagoland area can be a challenge when it comes to astronomical observing. Planned observing was often cursed this year by storms, floods, clouds and wind. Sometimes you just have to take what the skies give you, and be ready when and where they offer it up.

This last month the offerings were perhaps few, but they were certainly rich and varied. You didn't need a telescope to enjoy many of the highlights from the sky this month. With the cold clear skies, even the full moon looks crisp and clear, causing many to pause and enjoy the sight.

For those who may have been unable to catch much of the sky this month, here are some observations reported by a variety of LCAS members. Please send me your observations, or share them on the club Yahoo! site. This way we can all enjoy and learn about the sky, even if we are not always able to be there in person.

Planetary Triple Play – Many LCAS members were able to catch Mars, Mercury and Jupiter in the early morning of December 10th, in close proximity to each other. Jeff Wojnicki, John Smith and Linda Aschenbrenner were using 10x50 binoculars. Joe Shuster reported observing the triple plus Beta Scorpii with 15x70 binoculars on a tripod.

Pleiades Occultation – On December 3rd Leon Choin observed the occultation of multiple stars in the Pleiades by the moon.

Geminids – Pete Kasper, Dirk Leahy, Jim Westgate and Dave Wagner all reported meteor sighting from 12 per hour to 24 per hour during the Geminid meteor shower around Dec 13th (with no competing moon and despite local light pollution). Jim saw a particularly bright 'fireball' in the early morning hours.

Sunspot 930 – Jack Kramer reported on new activity surrounding sunspot 930 embedded in a bright and complex facular region. Jack observed the sunspot with a PST at 60x with surprising midday clarity. Jack passed on the expectation of a possible aurora, and that prediction was certainly correct!

Aurora – Word of the aurora sighting went out on the Yahoo! site on December 14th. Many members reported on and photographed the auroral activity. You can see some great photos at the club Yahoo! site.

Monthly Quote:

"Light is the messenger of the stars and it's been said that we are star stuff that's taken destiny into its own hands." Charles Ross, mathematician and artist

Club Contacts

President:	Tom Mathieson
Vice-President:	John Smith
Publicity:	Travis Whitlow
Secretary:	Didi Witnik
Treasurer:	Jim McCullough
Membership:	Leon Choin
Librarian:	Jim McCullough
Programs:	Mike Dziedzic
Observing:	Mike Dziedzic (847) 546-1808
Telescope Curator:	Jim Westgate
Webmaster:	Michael Purcell Keith Smolinksi
Editor:	Dave Wagner

Send any club inquiries to:
contact@lcas-astronomy.org

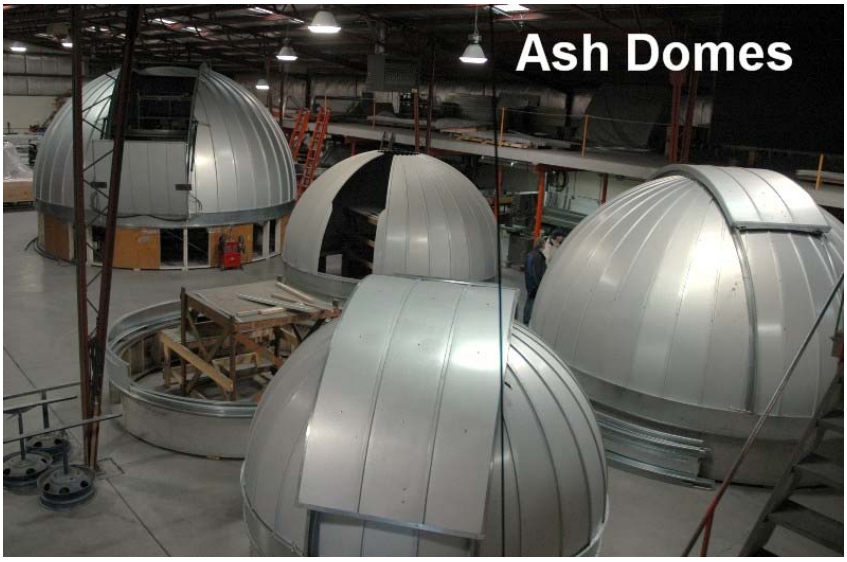
Send any newsletter inquiries to:
editor@lcas-astronomy.org

Visit our website for more contact info- www.lcas-astronomy.org

Visit to Ash Dome

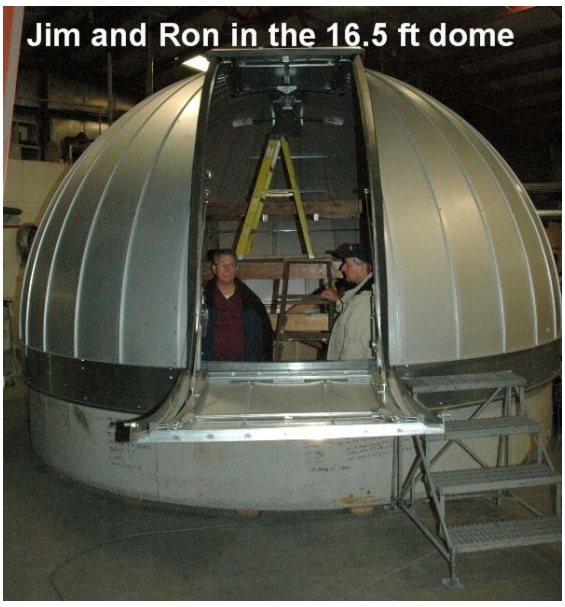
By Ron Stanley

Since the club has decided on building a domed observatory and one of the nation's largest builders of observatory domes happens to be located in the southwest suburbs of Chicago, a few club members thought a visit would be in order. On December 9, Dirk Leahy, Jim McCullough, Dave Wagner and myself took a trip down to Ash Domes in Plainfield, Illinois.



For a bit of history, Ash Dome has been building observatory domes for over 40 years. Of the domes I observed while investigating observatory designs almost all were made by Ash, the oldest being the domes installed in the 1960's, at the Racine Astronomical Society in Union Grove, Wisconsin. These domes, some of the first produced by Ash, are still operating with little problem today.

On Saturday Dec. 9, we were met at Ash Dome by Rich Olsen the current owner and son of the founder. In his manufacturing facility were 4 domes that were nearing completion and fully operational. In their manufacturing process they fabricate almost all the parts of the dome, except hardware, within their facility and then fully assemble and test the domes before taking them apart and packing them for shipping. On the day of our visit we were able to inspect and operate a range of 10', 14', 16.5' and 20.5' domes. I think we all agreed that the sight of the 20.5-foot dome was quite impressive!



Rich showed us the motorized control functions of the domes, such as opening the shutters and dome rotation. There is a change in the design of the domes going from 16.5 foot and smaller to 18.5 foot and larger in diameter. The larger size requires a more robust structural design along with hydraulic controls for the shutter operation in the larger domes compared to a cable and pulley system in the smaller domes. This is important to the club, as we had been planning on the 18.5-foot dome for the Lake Sky Observatory. However, there is a significant cost increase going from the 16.5 foot to the 18.5-foot dome. The 16.5-foot dome in the configuration we would need costs $23,800 while the 18.5 foot in the same configuration costs $39,760. Therefore, after taking measurements, the design committee is trying to determine whether the 16.5-foot dome could accommodate the Lake Sky Telescope.

After showing us the operational features of the various domes, Rich took us through the manufacturing process. Starting with the rolled galvanized steel, he showed us the machines that cut and stamped the panels that make up the dome and shutter assemblies. He also took us through the machine shop where the various support and mounting members are fabricated. Finally, he took us through the warehouse area where prefabricated dome pieces are stored.

After the tour we met in his office and he gave us contact information for customers who had purchased domes in the size ranges in which we are interested. The dome could be ready from 90-120 days after the order is placed and he also told us that they could deliver the dome unassembled to our site and help us with assembly.

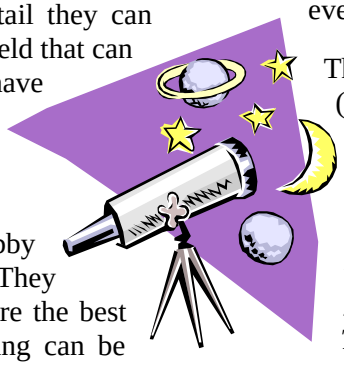
I think I can speak for all the club members present that day when I say that we were all impressed with the quality and attention to detail we saw at Ash Dome, and that the club should feel secure with the purchase of one.

(Editor: See more Ash Dome photos at the club Yahoo! site)

The Perfect Telescope

Roberta Garza

There isn't "SUCH A THING" the experts can tell you, and I tend to agree. I've seen many kinds of scopes in the star parties I've visited over the years, from the top of the line Ritchey-Chretien, to the Maktsutov, and Schmitt-Cassegrain, and finally to the raggedy waste-wood home made ones. Every telescope concept is made for a particular task. For example: The Cassegrain systems are better suited for astrophotography, although you can image with just about any telescope. The refractors are best for planetary observing due to the detail they can resolve, but they may suffer from a narrow field that can frustrate your efforts to see deep. Then you have the reflectors; which can give a wide aperture, perfect for deep sky observing and fair resolution.



I've noticed that many people new to the hobby are skeptical about home made telescopes. They probably think that the factory made ones are the best because they are made "by experts". Nothing can be further from the truth!

Unless you pay top dollar for a premier telescope, you're going to have some trouble with the production versions. There always seems to be some problem with these, which will require your expertise, or some research to get it fixed.

In one of my trips to ASTROFEST, I saw a 6" Newtonian with a tube made out of reeds, and a 10" refractor with a pier like base made of 4x4's which looked liked they were picked from the dump after being there for weeks (you have to wonder how much effort it would take to carry it!). Another scope was made as a tripod with the primary at the bottom of one of the legs and the secondary on top. This concept is called YOLO. And then there are the trischiefspeiglers made out of 3 mirrors. There was a 12" one at ASTROFEST 8 years ago. The owner told me it took him 5 years to build it. He even ground the mirrors himself!

THE OPTICS - In my book IT DOESN'T MATTER how a telescope looks, what matters is... THE OPTICS! And here is where the home made ones excel. There are so many mirror grinders out there who make exquisite mirrors that no factory can match. No matter what kind of system you choose, you will get MORE for your money acquiring a Newtonian or better yet, a Dobsonian.

I have made everything in my Dobsonian telescopes. In the past few years I have leaned over to buy factory made primary and secondary mirror holders. The same goes for focusers. One of my sources is University Optics (www.universityoptics.com). Unless you are a machinist you cannot make these parts as accurately as the factory ones.

BUILD IT YOURSELF - Now, if you decide to build your own Dobsonian, you can save some money and better yet, make it to your own specs. The best thermal materials are wood and cardboard (Sonotube for scopes under 10"). For anything over 10", it is best to make it with trusses. You'll have to start with the primary mirror, and then build everything else around it.

There used to be a monthly magazine years ago (*The Starry Messenger*) where you could find all kinds of used mirrors, but nowadays it seems that you can only buy used items at star parties. Newport Glass (www.Newportglass.com) offers fairly good mirrors for a good price. You can get the prime ones like Pegasus, Nova, Galaxy and Zambuto's as advertised in *Astronomy* and *Sky & Telescope* magazines.

Materials to build your scope are available in just about every hardware store. Should you have a table saw or a router, Menards in Mundelein has got 1/2" and 3/4" thick white pine wood 4'x8' panels with one smooth side. Ace Hardware has aluminum pipes you could build trusses with. There are plenty of sliders everywhere and all kinds of Formica material, but I can assure you NOTHING beats the pads made of virgin Teflon sliding on Ebony Star Formica. Piper Plastics (Rt.45 with Peterson Rd. Mundelein) makes all kinds of plastics and Teflon. Home Depot sells pieces of Ebony Star Formica measuring 90"x30" (you'll have to buy the whole sheet!).

Don't have fancy tools? You can get Baltic Birch, Cherry wood and other exotic woods at Owl Harwood Lumber Co. They can cut any piece for a small cost accurate to 1/32nd of an inch.

I prefer screws over nails to fasten the wood on my telescopes. The same goes for my preference for using a varnish spray, but you can use any other kind of paint (although I'd advise you to use the spray kind: it's faster and smoother!).

RESOURCES - To build anything under 10" you can find a guide on Richard Berry's "How to Build a Telescope" book. Anything from 12.5" to 30" you can build it with the guidance of David Kriege's "The Dobsonian Telescope" book

In the end, if you want to avoid all this trouble, you can even get a telescope kit from www.Astrosystems.biz, where at least you could have the fun of assembling it yourself.

HAVE FUN! - Making mistakes is all part of building a scope. Once you have one built, try it in the field. You'll be surprised on how many issues you can detect and then get them fixed or transformed.

I can provide sketches via the Internet to SERIOUS INQUIRERS. All you'd have to do is contact editor@lcas-astronomy.org to get the message to me.

I say: *If I can do it, anyone else can too!* To make it all work may require a lot of patience and frustration. If you're armed with the first, you will prevail.

Lunar Challenge:
Catena Davy

Jack Kramer

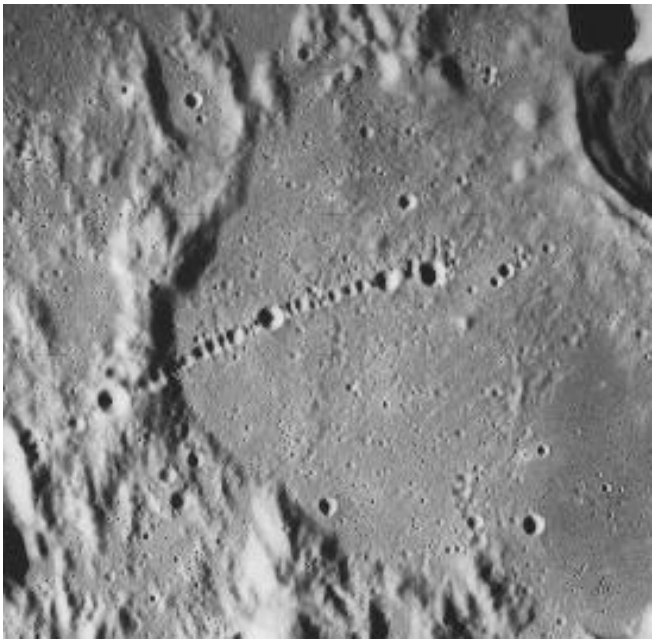
If we happen to observe small lunar craters all stretched out in a row, it makes us wonder what might have caused this. There are a variety of possibilities.

- Some are endogenic, meaning they originated from activity within the Moon itself. Examples of this type include those that lie within rills, suggesting they were caused by subsidence or volcanism.
- Secondary crater chains on the Moon are common. Such chains are generally radial to a large crater, occur near other such chains, and have raised rims with "chevron" imprints between craters that point back to the primary. Clearly, they were formed from debris thrown out of the large crater upon impact. We also find craterlets distributed in a haphazard line around some large craters, such as Copernicus.
- Several crater chains on the Moon and elsewhere in the Solar System don't seem to fit either of the two previous scenarios. The mystery was solved in 1993 with the discovery of Comet Shoemaker-Levy 9. As you recall, it was not a single comet, but a chain of twenty-one comet fragments created a year earlier when Jupiter's gravity tore apart the original comet. SL-9 crashed into Jupiter in 1994, and we can visualize that if Jupiter had a solid surface, a chain of craters would probably have resulted from any particles of SL-9 that survived passage through the atmosphere. In fact, such crater chains have been found on Jupiter's Moons Callisto and Ganymede.

We now know that fragmented comets are not unusual. Sunlight alone can shatter their fragile nuclei. The breakup of Comet Schwasmann-Wachmann 3 is a recent example. And there's evidence that many asteroids are really aggregates of dust and rock barely held together by a slight bit of gravity. If these things were to hit a terrestrial object, they'd likely make chains of craters. If you haven't already guessed, the word "catena" is a Latin term adopted by the International Astronomical Union to signify a chain of small craters.

In 1994, Jay Melosh and Ewen Whitaker announced their finding of two crater chains on the Moon, neither of which appears endogenic or secondary to a larger impact. One fairly large chain is near the crater Abulfeda and the other lies near Davy. The Davy crater chain is particularly interesting because it's an almost perfect line of twenty-three pockmarks each only a few miles in diameter. This is significant because it proves that multiple-impact events and resulting crater chains have indeed occurred in our Earth-Moon system.

This chain of craterlets doesn't actually lie within Davy, but in the larger, highly eroded crater basin with Davy at the (lunar) west edge. This basin is referred-to as "Davy Y". The image below from the Lunar Orbiter spacecraft clearly shows the chain stretching across Davy Y and up onto the walls of the basin (part of the crater Davy is seen at the upper right edge of the image).

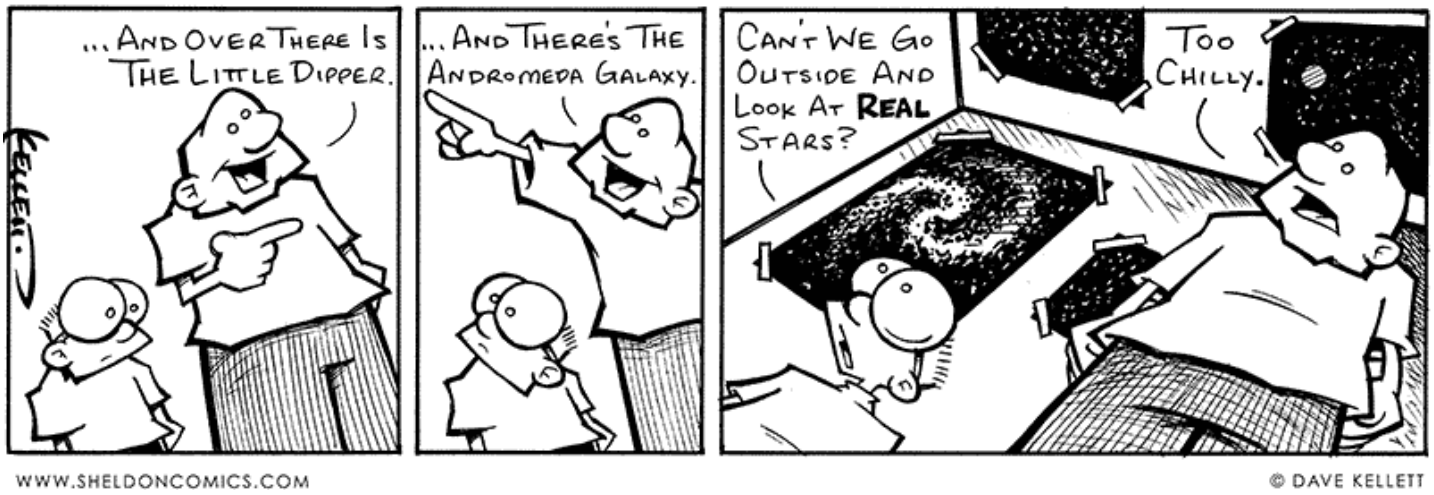


To help in locating the site, on the following page is an image of the area that I took through a 4-inch refractor. It shows Davy in relation to the large ruined crater Ptolemaeus and the famous "Straight Wall".

The crater chain doesn't show up in the above picture, but you might be able to see a faint light-colored line stretching across Davy Y. This follows the line of craterlets, so at first I thought it might be lunar surface material ("regolith") scattered as the pieces of space debris impacted the Moon. Checking a number of lunar atlases, the light line shows up in wide-field images, but not close-ups. That suggests it's more likely to be sunlight brightening the rims of the craterlets; an inability to resolve individual craters may cause the reflected points of light to knit together into what looks like a continuous line. This seems to be confirmed by close inspection of Clementine Mission imagery. Its visibility also may depend on the angle at which sunlight strikes it. In my 6-inch refractor, the smaller craters appeared to reflect a lot of sunlight, making them visible sometimes as mere points of light.

Observing the Davy crater chain will test the quality of your telescope optics. This is one of those features that calls for high magnification. Bear in mind that even the largest of these craterlets is only a few miles wide. The best time to view is when the Moon is around 8 days old (just past first quarter) with strong shadows. The Straight Wall is a good indicator – if you can see it as a black line, then there is sufficient shadowing to see at least the largest craters of the Davy chain. But I've clearly seen the entire chain in the 6-inch refractor at 300x when the Moon was nearly 11 days old. The larger craterlets in the chain appear to be pretty deep, so shadows linger for quite awhile. The resolution of a large telescope is helpful, but not required so long as the optical quality is good. Many years ago I tried with an 80mm refractor, but could only detect a light-colored line where the crater chain lies. More recently I caught sight of the three largest craterlets on the floor of Davy Y using the 4-inch refractor at a little over 200x. They were at the edge of resolution, becoming apparent off and on as seeing conditions fluctuated. The craters superimposed on the wall of Davy Y were visible in the 6-inch, but not in the 4-inch.

The Moon fascinates people at public star parties, though we amateurs often regard it as a bit of a nuisance. But I find that challenges such as the Davy chain prod me to spend more quality time with our Moon.



Did Newton Invent the Newtonian?

Jack Kramer

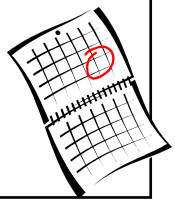
We all know that the Newtonian telescope is named after Sir Isaac Newton. But did he really invent it? Well, yes and no. He can be credited with the Newtonian design, but not the reflector concept. In the annals of mirror-based systems, it was the Scottish astronomer and mathematician James Gregory who invented the reflecting telescope. His design, published in a book called *Optica Promota* in 1663, used a parabolic primary mirror and concave ellipsoidal secondary that redirected the light back through a hole in the primary. Though many telescopes of Gregorian design eventually were built, James Gregory himself never actually made one. At the same time, Isaac Newton was working on his own reflecting telescope and in 1668 achieved the notoriety of building the first working reflector telescope. Its design was essentially the same as what we today think of as a "Newtonian". He did it entirely on his own, even making some of the tools used. With an aperture of 1-inch and a tube length of 6-inches, it magnified 30 times. Newton later built an improved reflector with an aperture of nearly 2-inches. In 1672 he made the 6-inch telescope that is commonly illustrated as his. (A reproduction of it is shown here.)

Newton's study of light convinced him that refracting telescopes of that day were flawed, since they were subject to color interference. But his spherical primary mirrors produced their own aberrations, so the Newtonian design was not embraced by the astronomical community for about another hundred years. The most serious drawback to reflector telescopes of the time was the type of material available with which to make the mirrors. James Gregory's concept of using a parabolic primary mirror was sound. But Newton's design provided a larger field of view and ultimately supplanted the Gregorian in popularity. The rest is history.

January 2007 LCAS Almanac

Prepared By: Bruce Bahde

Jan 1	Giuseppe Piazzi discovers Ceres (asteroid), 1801
Jan 2	Luna 1, first craft to leave Earth's gravity, 1959
Jan 3	***Full moon***. Quadrantid meteor shower peaks. Mars rover lands on Mars 2004.
Jan 4	Jupiter 5 degrees north of Antares, 11 P.M. EST. Quadrantid meteors
Jan 6	Moon passes 0.9 degrees north of Saturn, 1 P.M. EST. Moon passes 1.2 degrees north of Regulas, midnight EST.
Jan 7	Mercury in superior conjunction. Galileo discovers Europa, and Calisto, moons of Jupiter
Jan 10	*Moon at apogee*
Jan 11	***Last quarter moon***. Spica 1.1 degrees north of moon, 3 P.M. EST. William Herschel discovers Titania and Oberon, moons of Uranus, 1787
Jan 13	Galileo discovers Ganymede, moon of Jupiter 1610
Jan 14	Huygens lands on Titan, 2005
Jan 15	Moon passes 0.5 degrees south of Antares, 8 A.M. EST Moon passes 6 degrees south of Jupiter (noon EST).
Jan 16	Moon passes 5 degrees south of Mars, 9 P.M. EST
Jan 18	***New moon***. Venus passes 1.4 degrees south of Neptune, 8 A.M. EST
Jan 19	**LCAS Meeting 7:30 Volo Bog**
Jan 20	Moon passes 2 degrees south of Neptune, 1 PM EST.
Jan 22	*Moon at perigee*. Moon passes 0.4 degrees north of Uranus, 1 A.M. EST.
Jan 24	Voyager 2 flies past Uranus, 1986.
Jan 25	***First quarter moon***
Jan 28	Johannes Hevelius born, 1611
Jan 31	Explorer 1 launched, 1958



Another Quote: **"**We have your satellite. If you want it back send 20 billion in Martian money. No funny business or you will never see it again." (Seen on a hall wall at NASA's Jet Propulsion Labs)