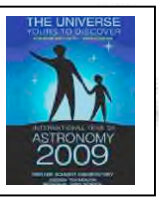
First Light

The Newsletter of the Cape Cod Astronomical Society



December, 2009 **Vol.20 No. 12**

- **Next Monthly Meeting:** is Thursday, December 3rd at the DY Library. Program notes below. If we are blessed with a clear night, and interest is sufficient, observing from the Schmidt will follow the meeting.
- Regularly scheduled weekly Star Parties open to the public will resume in June. Now and then **Star Parties** are scheduled for special groups. If you would like an evening at the Schmidt for yourself or your group, please contact Mike Hunter or let us know at info@ccas.ws Sometimes, when "special group" events are scheduled, the organizers may opt to invite the general membership. When that occurs, an email will be sent to members and "friends" of the Society a day or two in advance.
- **Feature Stories This Month:**
  - "Citizen Sky" How you can estimate the magnitude of a variable star and report it to a worldwide data collection and reporting process.
  - Our president's log on an evening with the Leonids.

Bright New Stars:

We welcome Marvin and Judith Gullotta to membership in the Society. If your Editor has the story correct, Marvin and Judith participated in at least two of our late fall star parties one of which actually had some good seeing. Marvin and Judith, thanks for joining and look forward to seeing you at many more observing sessions and meetings.

First Light would like to recognize two groups who participated in very successful Star Parties at The Schmidt on October 29th and November 17th. Both groups were students from CCCC with faculty members Richard Schwartz and Jay O'Leary. We recognize them as Bright New Stars for many reasons: for sure because they brought nearly clear skies to a scheduled event at the Dome twice in succession, unheard of in recent history; also because they were groups both very active and interested who asked great questions and made helpful comments. Thanks, people, for two great observing and sharing sessions!

We like to welcome new members to our Society in this section of First Light each month. If you are a new member and have not yet been so recognized, or have new information for us (background, astro equipment preferred, interests, etc.) on yourself or someone else, please let us know (email info@ccas.ws).

Many thanks to contributors to this issue: Tom Leach, and Mike Hunter.

PLEASE CONSIDER SUBMITTING AN ITEM OR ARTICLE FOR PUBLICATION IN FIRST LIGHT.

If you are a regular contributor, thank you very much!

CCAS Events

Many thanks to Ryan Mann for his entertaining and informative talk on personal experiences in the science of Dendrochronology, the study of annual growth rings in trees. In 2008, Ryan spent several months at sites along Waquoit Bay on Cape Cod collecting data on and coring various tree species in the area and cataloging results. The presentation included many excellent pictures and informative slides and Ryan supplemented these by providing opportunity for hands-on examination of coring equipment, tree slices (cross sections) and cores. He also provided intriguing examples of the kinds of information on weather and geologic history that can be learned from core samples and the spacing of annual rings in cedar trees found in the Waquoit Bay area.

Our program chairman, Tom Leach, has outdone himself putting together great programs for our monthly meetings from now well into the middle of 2010. If you like to look ahead, go to our website and look at the gray box just below the base of the rocket; there you will see what has become our "Speaker's Bureau": profiles on speakers and topics from now through May 6th.

Extracts for programs for our December and January meetings follow:

On December 1st, Dr. Alburt Rosenberg will talk about Atmospheric Optical Effects. Rainbows, mirages, auroras, the twinkling of stars, and even the blue color of the sky are all considered atmospheric optical effects. These visual events in the sky occur when light bounces off or is bent by solid particles, liquid droplets, and other materials present in the atmosphere. Dr. Rosenburg, Harvard, BA, Univ. of Florida, MS, U of Penn, PhD, taught concepts and theories in physical science at RPI, Penn, and UMASS. He even taught "Astronomy 101" at the University of Alabama one year because "all the astronomy faculty members were off at observatories!"

On January 7th, Michael Renzi will give a talk entitled "Reflections of an Aspiring Astronomer". A former CCAS member, Mr. Renzi resides in Lakeville, Mass where he operates a roll-off roof observatory under dark skies. He has built and maintained many telescopes. Equipment Mike uses for astro-imaging includes a Schmidt-Cassegrain telescope and a Losmandy Titan mount. Trenzi's favorite quote: "The amateur astronomer has access at all times to the original objects of his study; the masterworks of the heavens belong to him as much as to the great observatories of the world. And there is no privilege like that of being allowed to stand in the presence of the original." - Robert Burnham [Burnham's Celestial Handbook, Vol 1.]

Members, ***PLEASE*** participate in the effort to recruit speakers to present programs in astronomy and related sciences at our meetings. Please send any ideas or contact information to Tom Leach, our President and Program Chairman. For sure he will follow up.

Or, even better, volunteer to give a talk yourself!

The minutes of our November meeting prepared by Charlie Burke, our Secretary, are on our website; click on on the "Minutes" button at www.ccas.ws or go to http://www.ccas.ws/minutes/ccasminutes110509.pdf

Executive Corner

The Executive Board exchanges ideas by email and phone on a continuous basis and now and then formally convenes by conference call. Anyone wishing to offer an item to the agenda, please contact Tom, Paul, Peter or Charlie.

All Members please update your dues!

As was true in October, we made excellent progress in dues participation in November: five more members brought their dues up-to-date. Now 35 of 60 "members on the rolls" are up to date. Of the 25 remaining delinquent, possibly 11 should be classified "inactive", so we stand at 35 of 49 active members: good progress!

One of our members not yet up-to-date is an officer of the Society! That has GOT to change! If you (or any other member) forgot again, please send your payment in this month either by bringing to a meeting or mailing directly to CCAS at PO Box 297 Harwich Port MA 02646. Thank you. .

From the Dome

Please see the short story on "Bright New Stars" on page one about two, count 'em, two, successful star parties for student groups in this reporting period: some 30 guests over two nights and mostly clear skies at both events!

In addition, Mike Hunter and Gail Smith hosted a successful "indoors at the Dome" session for 10 Girl Scouts and their leaders on a cloudy November 12th. They enjoyed seeing how telescopes work and asked many questions. The big hit was watching/hearing the shutters of the dome open and the dome taking one turn around the track. "That was cool!"

Please see the announcement concerning Star Parties at the top of page 1.

The Observatory Staff meets once a month at The Schmidt to plan events, tune equipment, and share/learn skills in operating our various telescopes and astro-imaging equipment. The following persons are presently members of the staff: Mike Hunter, Matt Jones, Peter Kurtz, Tom Leach, Greg McCauliff, Gail Smith, Ed Swiniarski, and Bernie Young.

As always, "Private" group or individual observing sessions at the Werner Schmidt Observatory may be scheduled by contacting observatory Director Mike Hunter at mamhunter@yahoo.com **or sending an email to** info@ccas.ws

Our Society exists to promote observing! Promote this objective by asking for time at the Dome!

CCAS has both 8" and 14" Dobsonian telescopes for loan to members. Currently, Tom Leach is using the 14" for outreach in Harwich. If you wish to borrow one of these 'scopes, contact info@ccas.ws

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December Observing:

Mooncusser's Almanac and Monthly Alert[1]
By Peter Kurtz
DECEMBER, 2009
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Object	Dec 1 (EST)	Dec 15 (EST)	Dec 31 (EST)
Sun	R 06:48 S: 16:11	07:01 16:11	07:07 16:20
Moon	R: 15:25 S: 06:39	06:39 15:19	16:15 07:22
Mercury (evening)	R: 08:07 S: 16:56	08:35 17:31	07:34 17:07
Venus (predawn)	R: 05:58 S: 15:40	06:30 15:45	06:59 16:05
Mars (evening)	R: 21:10 S: 11:31	20:23 10:44	19:15 09:43
Jupiter (evening)	R: 11:25 S: 21:39	10:36 20:56	09:40 20:08
Saturn (predawn)	R: 01:05 S: 13:18	00:14 12:25	23:14 11:23
Uranus (evening)	R: 12:41 S: 00:22	11:46 23:27	10:43 22:26
Neptune (evening)	R: 11:30 S: 21:55	10:35 21:01	09:33 20:00
Pluto (early eve)	R: 08:11 S: 18:02	07:18 17:09	06:17 16:08

*Once again, NOW is **the best time or year** for leisurely early evening observing: it isn't hot; it isn' t (too) cold; and, the sun sets well before 5pm! Orion is high enough in the sky to allow a peek at The Nebula starting at 6pm (rise time on December 15th.)*

*Get out early NOW and take in **Jupiter** and the antics of its moons before the season for the giant planet ends as it moves closer and closer to the sun; as you can see above, end December Jupiter sets still some four hours after the sun; but by end January, the differential will be only 90 minutes. As you also can see from the chart above, **Neptune** is "with Jupiter"in this respect this season with **Uranus** just two hours behind. In fact, if you have good binoculars or a good telescope with an eyepiece that can give some breadth of field, see Jupiter and Neptune at the same time: on the evening of December 19th, the mag 8 small blue ball of Neptune will stand just 0.6º above bright Jupiter*

Top 10 winter Milky Way "fuzzies" coming up:

Many of these will not be so fuzzy in a good telescope! From the most invitational writeup by Michael Bakitch beginning p 46 in the December issue of Astronomy magazine:

- M37, a premier open cluster in Auriga;
- M45, the Pleiades;
- M1, the Crab Nebula in Taurus;
- the open cluster M35 in Gemini with its companion NGC 2158;
- M42, the Orion nebula;
- the Rosette nebula, NGC 2237-9 in Monoceros; the small open cluster NGC2244 shines in front of the Rosette;
- the Christmas Tree open cluster, NGC2264, also in Mon;
- open cluster M41 in Canis Major;
- open cluster NGC2362 also in Canis containing at center, τ-canis majoris, a 4th magnitude triple star; and finally,
- open cluster M46 in Puppis.

All of us have access to excellent monthly summaries of things of interest in the sky in the upcoming month in the print editions of both Astronomy Magazine and Sky & Telscope. The websites of both magazine also offer a wealth of information on "what's in the sky this month";[4,5] both outfits also offer weekly or monthly email newsletters to help you keep abreast of what's happening. There are also many good web links on the CCAS website .

Given this wealth of readily available information on monthly observing opportunities, one might judge that it is unnecessary, even maybe superfluous for First Light to comment in this area each month.

Would you like more or less information in this area in First Light each month? Please let us know.

The Highlights for December:

- **Winter solstice**: 12:47pm, Monday, December 21.
- **Geminid Meteor shower** peaks: this year: ideal circumstances: this usually best of all winter meteor showers peaks at midnight on Sunday, December 13th; three days before New Moon. The radiant will be well up in our east by 9pm. Unlike the Leonids of November, which are "good" only near peak, the Geminid event produces reasonable numbers of meteors not just hours but days on either side of peak. At peak this year, during prime time in the late evening, you might see as many as 120 meteors/hour!

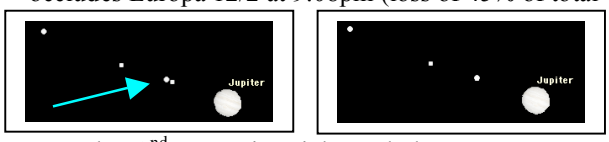
The Planets:

- **Mercury** makes possibly the best evening appearances of the year this month: 5º high at 30 minutes after sunset on 12/9; 8º high at 30 minutes after sunset on 12/18, date of greatest eastern elongation (20º from sun). While it has more of its face toward us on the 9th

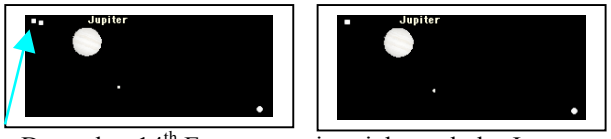
(mag 0.5, 81% illuminated,) it becomes more interesting in a telescope on the 18th (mag 0.44, a 60% illuminated "quarter" planet).

- **Photo op**: 12/18, 30minutes after sunset (4:30pm): blazing (mag -2) Jupiter poses above a 5% crescent moon slice above half illuminated but bright (mag 0.5) Mercury.
- Reference is often made in this space to positions of **Jupiter's Galilean moons** and now and then transits, shadows, and hidings behind the planet (see p 47 of the December issue of Sky and Telescope; in particular, find details for the double shadow transit on Jupiter occurring at prime time on Cape Cod at 8:34pm on Sunday, December 20th.)

Something unusual comes up, however, this month, which deserves special mention. Right now, with the plane of the orbits of Jupiter's moons very close to edge-on to us, twice this month **one moon passes *in front of* a sister moon** visible at prime hour viewing: Io occludes Europa 12/2 at 9:08pm (loss of 45% of total



December 2nd Io moving right occludes Europa
8:48pm 9:08pm



December 14th Europa moving right occludes Io
(Calisto is far left out of pictures)
7:06pm 7:36pm

light) and Europa returns the favor on 12/14 at 7:26pm (loss of 23% of total light.) Both occlusions take only about ten minutes so be ready ahead of time. Don't miss either event; Good binoculars are all you will need!

Update on NASA's Crash of LCROSS on the Moon:

In October we summarized the expectation for October 9th: a spectacular crash of a rocket and later an observer satellite into the moon to spray up debris which would show the presence of water in the Moon's southern highlands.

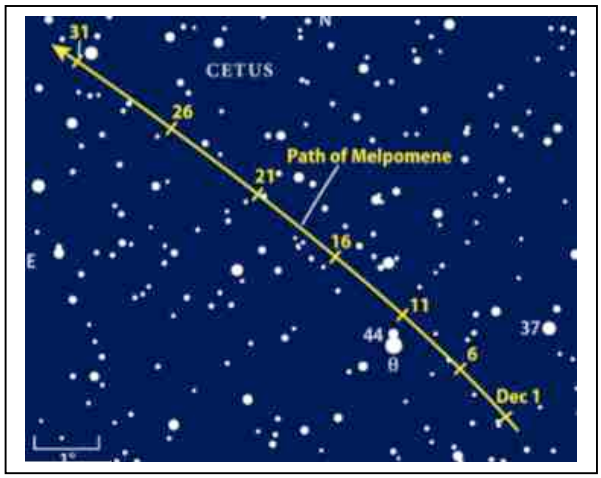
Last month we overviewed the fizzle of the televised public showing of the event. The crash took place in front of our eyes; there was nothing to see. A public hype fiasco.

But now the good news: we noted in this space last month that following the broadcast, NASA officials downplayed the unseen debris plume, instead celebrating and looking forward to analyzing the high-quality spectroscopic data the LCROSS satellite did capture and return before its demise.

Well some of that analysis has been completed with positive results: data released by NASA on 11/15 indicates the LCROSS crash did kick up water from the south polar region of the moon.[6] Keep track of evolving information which might tell us whether that water is of sufficient quantity to be pertinent to manned missions to the moon or not. Consult http://lcross.arc.nasa.gov/ on a regular basis to find out.

An Asteroid, not a Tragedy… but a Lot of Fun:

Last month in this space we introduced the opportunity to observe the 8.6 magnitude asteroid Melpomene. We pointed out that this asteroid is named for the Greek muse of tragedy. Indeed, Melpomene has proved anything but tragic for your Editor. We observed Melpomene on two occasions using our 16" scope at The Schmidt since last month's story was written: on October 29th and again on November 16th . In the next issue of First Light, we will report on our experience, how we found the asteroid, and how we "proved" we were looking at a moving object both nights.



Melpomene hangs around in the evening sky in Cetus through December. Hopefully many of us will have a chance to enjoy seeing the asteroid again. Beginning in January, it begins to dim substantially and we will not see it as bright as it is now until the year 2016.

Moon Phases, December, 2009

Full Moon	Wednesday, Dec. 2nd	at 2:30am EST
Last QTR	Tuesday, Dec. 8th	at 7:13am EST
New Moon	Wednesday, Dec. 16th	at 7:02am EST
First QTR	Thursday, Dec. 24th	at 5:36pmEST
Full Moon	Thursday, Dec. 31st	at 12:13pm EST

"Blue Moon"

Anyone having an interest in monthly **Libration and Declination Tables for the Moon**[2] or **Dates and Times for the Minima of Algol**[1,3] during this month please contact your editor and the information or sources will be provided.

A PORTION OF THIS PAGE IS INTENTIONALLY LEFT BLANK TO REMIND ALL MEMBERS THAT THERE IS ALWAYS PLENTY OF ROOM IN FIRST LIGHT FOR YOUR CONTRIBUTIONS.

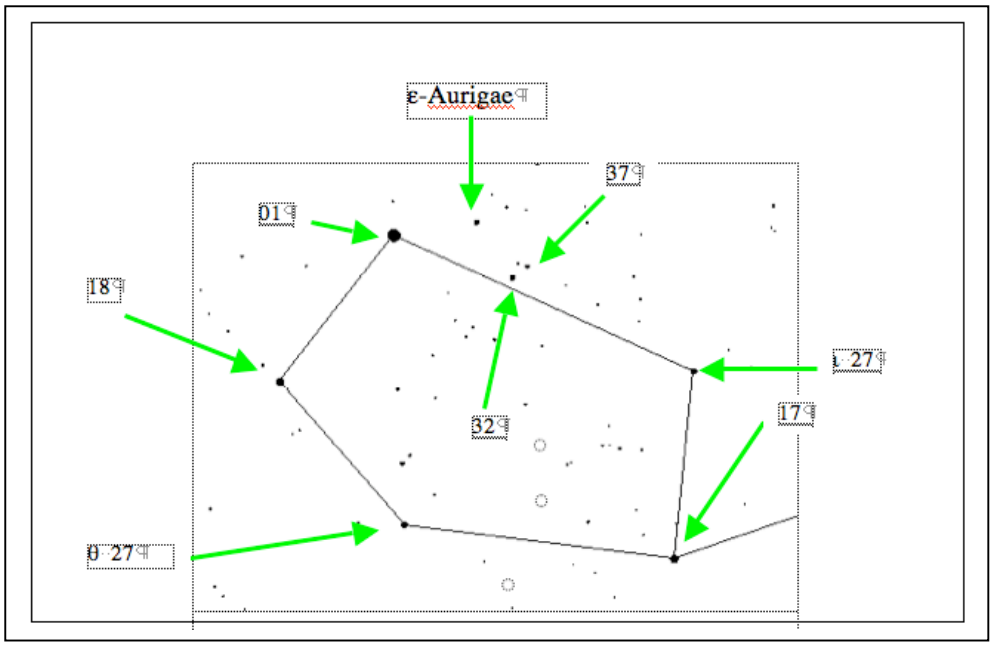
Feature Articles:

"Citizen Sky": Experiences Making and Reporting Observations on the Dimming of epsilon Aurigae from September through January and beyond

. . . By Peter Kurtz

In August we reported in First Light on the coming opportunity to observe and report on changes in the brightness of ε-Aurigae as it undergoes its once every 27 years dimming and then later brightening phenomenon. Reprising: An article by Glenn Chaple in the August issue of Astronomy Magazine (p 15) invites observers to begin regular observation of **ε-Aurigae**, a very slowly dimming variable star. Like the well known Algol which runs through its bright/dim cycle every three *days*, ε-Aurigae completes one cycle from magnitude 3.0 to magnitude 3.8 or so and back over two *years* and then waits 25 years until the next dimming cycle! The most interesting times in this cycle are changes in apparent brightness as the dimming begins and ends, a process that takes about two years.

In an earlier cycle in the mid 1980's, the dimming process took place over about six months, the star stayed dim for nearly a year, and brightening took place over another six months. The next dimming cycle after the one that starts this August won't occur until 2036… so for sure, don't miss this one! Will this event mirror the 80's event?



E-Aurigae and comparator stars ."37" means magnitude 3.7 etc.

ε-Aurigae is easy to find, clockwise and above the ring from Capella. There are many stars of static magnitude from 2.0 to 3.8 in the neighborhood that can be used as comparators when making observations on brightness.

A website called "Citizen Sky" has been created for teaching how simple it is to make and record estimates of magnitude at various times and from various places and providing an opportunity to record your observations[7], particularly during the dimming period from August through January. The Citizen Sky website is a stepchild of AAVSO, the American Association of Variable Star Observers, and is fully supported by AAVSO. So this is not some fly-by-night operation either in practice or importance. No one really knows "what" comes in front of ε-Aurigae every 27 years taking about three months to dim it and then several months later to move away and allow full brightness. One of the objectives of the worldwide observing this time around is to try and define the nature of the "eclipsing" object.

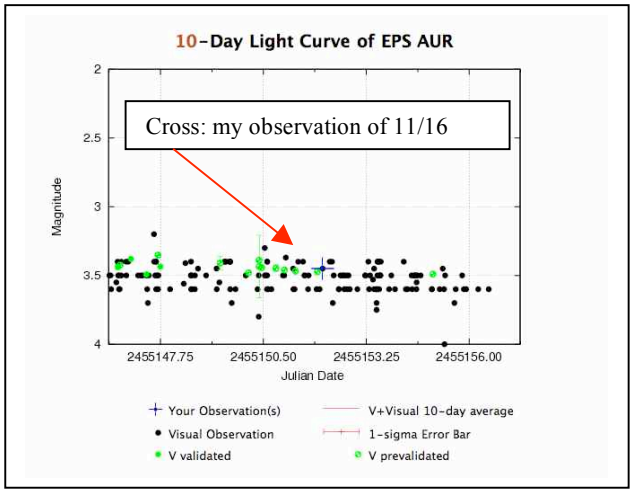
I have made and reported two observations estimating the brightness of ε-Aurigae , one in September, and one just recently on 16 November and would like to profile this experience here in the hope readers might be inspired to take their own observations and join the worldwide magnitude vs time recording effort.

The website provides a downloadable one page star chart showing the relative positions of ε-Aurigae and nearby comparator stars. My own edition of this chart is shown on the previous page.

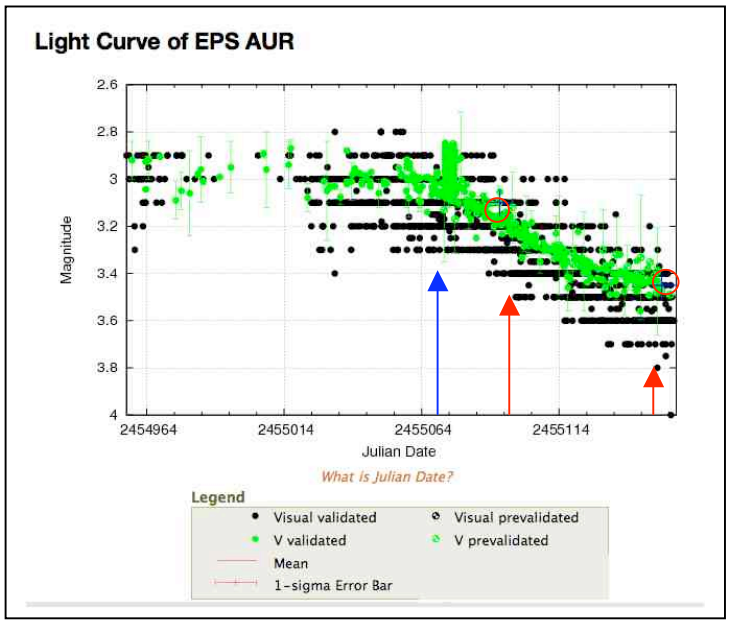
On the very clear morning of September 18th at 4:35am EDT, I stood out on my front porch and studied ε-Aurigae and pertinent comparators (see chart on previous page) with 8x35 binoculars for about ten minutes. I decided that ε-Aurigae that morning was dimmer than the two "27" comparators available (ι- and θ- Aurigae) but brighter than the "32" comparator, η- Aurigae. (Coincidentally,the three stars ε-Aurigae, the "32" comparator: η- Aurigae, and the "37" comparator: ζ-Aurigae, are known collectively as "The Kids", most appropriate given that Auriga is a charioteer often depicted as a "shepherd".) So, interpolating between magnitudes 3.2 and 2.7 and adding a little subjective judgment, I recorded the magnitude estimate for ε-Aurigae as 3.0 for early morning on September 18th. Not very complicated. Not very sophisticated. I accessed the Citizen Sky recording website, entered date, time, quality of seeing, and magnitude estimate 3.0. (I told it my location when registering as a participant.) I then examined my estimate plotted with many others (see charts below.)

After a lot of procrastination, I went out again on the evening of November 16th at 9pm EDT (much more convenient than 4:30am now that Auriga is so conveniently placed in the eastern evening sky) and, using comparators η- ("32") and ζ-("37") recorded the magnitude estimate for ε-Aurigae for that date, time and place as 3.45. The entry was made at the website.

So how do my two observations compare with other visual observations collected at the website?



10 day observations around my observation of November 16. Left hand scale, top to bottom is 4.0, 3.5, 3.0, 2.5, 2.0 Green dots are "validated" observations



'Light Curve of EPS AUR": vertical axis: mag 4.0 to mag 2.0; horizontal axis: Julian Date 2454964 (May 12, 2009) to 2455154 (November 18, 2009). My points noted in red circles.

I was happy to see that my observations sat very close to the other "validated" points (green dots.) It is clear that the expected dimming began about the time predicted on/about Julian date 2455072, i.e., August 28, 2009 (blue arrow.) Will the dimming continue or do we see the beginning of a leveling out? We'll let you know next month.

What good is a scatterplot of points that has so much subjective bias and observing error? Enough subjective points subjected to statistical analysis will yield a curve having high utility because the subjective biases and error in general are random and should cancel out. The scientist in me says the citizen observations will tend to be "dimmer"than they should be during this period because folks want to see they noticed the dimming for sure. I think that is why you see a higher population of black points below the green than above. Nevertheless, subjected to good statistical reduction, a high population of these kinds of data will yield a light curve having scientic utility. Finally, although not shown here, there are professionals and amateurs measuring day to day not with their eyes but with calibrated digital light brightness measuring tools. At the end of the day, those points should run down the center of the green pattern. We'll see.

Join the effort. Get the Comparator Star Chart from Citizen Sky, take your own observations, report them and see them on the plots. (The points submitted by each participant are shown in online charts as crosses corresponding to the id code for the submitter.)

More on this in January or February.

A Report on Observing the Leonids from Harwich

…Thanks to Tom Leach for sending us this report on his experiences observing the Leonids on November 17th.

METEOR SHOWER
- LEONIDS 11/17/09 SEEN BY TOM LEACH, HARWICH, MA
41° 43' 17.15" N
70° 00' 50.4" W

TIME	POSITION	DIRECTION OF TRAVEL	SPREAD	COMMENT
1:40:40	Below Perseus	west	5°	Barn Burner
1:51:18	below Taurus	South	7°	
1:56	near Sirius	East to West	12°	
1:59:20	Pleiades	South	6°	
2:07	Bellatrix	west	4°	
2:08:45	Lepus	South	6°	
2:11:53	Eridanus	south-west	6°	
2:13:15	below Orion	south west	6°	A meteor criss-cross
2:25:50	Cetus	west	8°	
2:35:00	Leo	heading east	small	

Coming Next Month:

- A report on making observations of the asteroid Melpomene.
- In a month or so, Neptune will pass out of our night sky. Did you know when Galileo was discovering key things about the sky in 1609-10, he missed Neptune? A good story. We had promised to visit it this month. We'll try again for the January issue.
- January 2010 marks the beginning of the year in which Galileo published *Nuncius Sidereus* announcing his observations on the solar system, the moon, the moons of Jupiter, and other then new phenomena. We promised a story in this issue to celebrate his book and some interesting aspects of his observations on the moons of Jupiter. Even though the Internatioinal Year of Astronomy, 2009, ends this month, we will also try to find room for this story next month.

Cape Cod Astronomical Society

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The **Cape Cod Astronomical Society** meets at 7:30 pm on the first Thursday of every month in the library of the Dennis-Yarmouth Regional High School in Yarmouth, Massachusetts. Meetings are open to the public. Membership dues are $30 for adults, $15 for students in two year colleges and part year residents, and no charge for spouses or for students in K-12 schools.

Reference Information:

1) Information for The Mooncussers Almanac and Monthly Observing Alerts was extracted from Sky Events, Astronomy Magazine Online (Astronomy.com), Stargazing.net's Planet Rise/Transit/Set calculator (http://www.stargazing.net/mas/planet2.htm), *Astronomy Magazine*, *Sky & Telescope Magazine*, *Sky and Telescope Skywatch 2007*, and other sources. The *Observer's Handbook, 2007 and 2008,* published by The Royal Astronomical Society of Canada is also an important reference, particularly for information on lunar libration and declination and the mimima of Algol.

2) Information on how Libration and Declination Maxima and Minima can make visible parts of the moon normally hidden was reviewed in the December-January First Light. Quick recap: Max Long brings to view extra right side; Min Long, extra left side; Max Lat, extra north side; Min Lat, extra south side. Max Dec puts it high in our sky during its transit; Min Dec puts it low.

3) Algol is an eclipsing variable star in Perseus which has its brighter component eclipsed or covered by its companion once every 2.87 earth days. When the dimmer component is not eclipsing the brighter, Algol appears typically about magnitude 2.1; when eclipsed, magnitude 3.3 The minima usually lasts about two hours with two hours on either side to bring it back to mag 2.1. Good comparison stars are γ-Andromedae to Algol's west, mag 2.1, and ε-Persei to its east, mag 2.9.

4) http://www.astronomy.com/asy/default.aspx?c=ss&id=84

5) http://www.skyandtelescope.com/observing/ataglance

6) http://www.nasa.gov/mission_pages/LCROSS/main/prelim_water_results.html

7) http://www.citizensky.org/content/how-submit-data