



First Light

The Newsletter of the Cape Cod Astronomical Society



September, 2010

Vol.21 No. 9

What We Thought in Antiquity:

*I know that I am mortal by nature,
and ephemeral
But when I trace at my pleasure the windings to and fro
of the heavenly bodies,
I no longer touch earth with my feet:
I stand in the presence of Zeus himself
and take my fill of ambrosia, food of the gods.*

... from an epigraph to Ptolemy's great work, Almagest, 2nd century AD.

These lines are found in a wonderful book, *The Planets*, by Dava Sobel. Please see notes on her book on page 5 of this issue of First Light.

- **Next Monthly Meeting:** is Thursday, September 2nd at the DY Library. Werner Schmidt Observatory Director **Dr. Mike Hunter** will discuss building and use of innovative personal observatories. More program notes below. (Please see the moving banner and the tail of the rocket on our website's home page for upcoming speakers and topics.)
- **Dues:** If you haven't paid your 2010-2011 dues by September 1, you are two months late. Please bring to next meeting or see the address on page 3. We need your participation! Thanks to all who are up-to-date.
- Thursday Summer **Star Parties** open to all members and the public ended on August 26th. Star Parties open to the public are scheduled on Thursdays: Sept.9, Sept. 30, Oct. 14, and Oct. 28, all at 8pm. Possible cancellations: if you see clouds on the afternoon of a scheduled Star Party or expect a cloudy evening, please call the observatory after 7:15 at 508-398-4765. No answer after 8 rings suggests cancellation because of clouds.

Contact info@ccas.ws or Mike Hunter, Observatory Director, if you wish to set up a special Star Party for your group during the winter or spring months. MEMBERS, particularly newly joined: we would like to provide you an opportunity to observe. If you would like to schedule an evening at The Schmidt, contact us and we will try to schedule something for you soon.

Bright New Stars:

Please welcome **Tim Barker** of Needham to the Society. Tim is Professor of Astronomy at Wheaton College and we are very pleased to now be able to count him as one of our membership. We were privileged to have Tim speak to us in June of 2009: "Visual Astrophysics," a wonderful introduction to planetary nebulae and the techniques used in their study. In addition, Tim is the

person who recently donated a 32" Obsession Dobsonian telescope to the Harwich School System (story in the June, 2010 issue of *First Light*.) For more info on Tim please see: <http://wheatoncollege.edu/faculty/timothybarker.html> Welcome to CCAS, Tim; we hope to see you at many CCAS meetings and Star Parties and hope you will be able to make a second presentation at one of our meetings in the near future.

For several summers now, a gentleman by the name of **Anolrew Sipos** from Quebec has participated in one or more of our meetings. This year he proposed to “pay dues” and decided \$20 was a reasonable amount to cover once-a-year attendance over several years. Thank you, Anolrew, for your generosity and we hope to see you often.

We are very pleased to announce that Jim Mitchell, a science teacher at D-Y High School, joined CCAS at our meeting on August 5th. Jim will be teaching an Earth and Space course at D-Y this year and spoke for a few minutes at our meeting to introduce himself and his upcoming course. Jim has good ideas and aspirations for better involvement of CCAS members with D-Y programs and better involvement of himself and his students with activities in our Society and our Observatory. Your editor has asked Jim to write up more about himself and his program for *First Light*. Hopefully we can provide further information next month.

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).

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

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

CCAS Events

The schedule for **Star Parties** open to the public may be found in page 1 and also in the “Green Box” on the homepage of the CCAS website. Do come out and enjoy the night sky. See the Section “**September Observing**” below for an overview of what awaits you.

Many thanks to CCAS president, and CCAS program chairman **Tom Leach** for his most instructive presentation on the structure, physics, and dynamics of the Sun at our August meeting. Tom explained the kinds of observations and measurements we can make on the Sun, how that data informs us about structure and phenomena deep in our star, and reviewed some of the effects of Sun phenomena on us here on Earth. An especially effective presentation was made possible by Tom’s interweaving images and videos from the web, each of which addressed a given topic or phenomenon.

Especially amusing was his clip from an old 50’s educational TV show clip, called “Our Mr Sun.” You can view this clip at the following website:

<http://video.google.com/videoplay?docid=-297681774672439227#> Thanks, Tom, for a most informative and entertaining presentation.

At our meeting on September 2nd, Werner Schmidt Observatory Director **Dr. Mike Hunter** will discuss building and use of innovative personal observatories. Needing an alternative to repeatedly setting up one’s small or medium sized telescope on a nightly basis has prompted amateur astronomers to find ways of protecting equipment short of building a major observatory structure. A permanent dome or equivalent can be cost prohibitive, or too demanding of space. A major structure also may be prohibited by zoning regulations or at the very least require a building permit. Mike will provide examples of the many approaches a growing number of amateur astronomers have taken to protect their telescopes from the elements alternative to the building of a major structure.

ARE WE ALONE? On October 7th, Dr. Jon Greenberg will discuss the Search for extraterrestrial intelligence, a topic that presents many questions: Is there intelligent life elsewhere in the universe? Is there intelligent life on earth? What are the odds of finding intelligent life elsewhere? What is the (in)famous Drake equation? How is the search being conducted? What would happen if we received an authentic modulated signal from an extraterrestrial source? Should we answer it? Dr. Greenberg is a past president of CCAS and has a personal Observatory on a rooftop deck of his home in Eastham.

COSMIC CONVERSATIONS. On November 4th, Stephan Martin will give us an opportunity to see the recent solar eclipse in the southeastern Pacific as he and fellow astronomy tourists saw it in July. Stephan is an astronomer, educator, and writer, who has taught astronomy and physics at colleges and educational centers across the U.S. for over twenty years. He led a trip in July to see the complete solar eclipse in the path of the Moon’s umbral shadow as it crossed the South Pacific Ocean where it made landfalls only at Mangaia (Cook Islands), Easter Island (Isla de Pascua) and several isolated atolls. He is author of a new book “Cosmic Conversations” a collection of interviews with scientists, spiritual teachers, indigenous peoples, and cultural “creatives” that explores and expands our ideas about the nature of the universe and our role in it.

Thanks again to Tom Leach, who continues to put together great programs now set up through the end of the year. If you wish to look ahead beyond the November program, go to our website and look at the gray box in the middle of the rocket; there you will see our “CCAS Lecture Series”: profiles on speakers and topics from now through the end of the year.

Members, **PLEASE** participate in the effort to recruit good 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 August meeting prepared by Charlie Burke, our Secretary, should be on our website; click on the "Minutes" button at www.ccas.ws or go to <http://www.ccas.ws/minutes/ccasminutes080510.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.

2010-2011 Dues *were* Due June 30, 2010

Members: Please plan to make your payment either by bringing to the September meeting or mailing directly to CCAS at PO Box 207 Harwich Port MA 02646.

Thank you.

Foundation News...

Thanks to Werner Schmidt for sending us the following report:

The team of Bernie Young and Jim Carlson is making good progress on the Imaging Project: working out mechanics and procedures for making good astroimages using our SBIG CCD camera on telescopes mounted on our new Losmandy mount. All the indications are that the Losmandy mount used with our present Televue 4" refractor are capable of excellent results. There are however still many areas to be explored; the project is complex.

The possibility of adding a shed to house the equipment is being pursued. Bernie made an excellent drawing of a proposed shed, showing the location and construction.

This has been submitted to the DY Maintenance Dept. for their consideration. If indeed we wish to go ahead with this, the unknowns are cost, possible need for a building permit, and determination of who would do the actual construction.

It now appears we may have to purchase sophisticated ancillary equipment such as a motorized focusing unit, and new Bisque software; this in addition to our plan to buy a 8" Ritchie Cretien Astrograph as an alternative to the 4".

We could use more manpower for this project as the normal weather variability and people availability pose a limiting factor. Anyone interested in joining Bernie and Jim in pursuit of this project would be welcome -just let us know.

From the Dome

...from Mike Hunter, Director of the Observatory

My lawn reminds me of the Sonoran Desert and the years I lived in Tucson. Except that the desert was a bit greener. At least the hours mowing the lawn have fallen way down; which is a good thing because the number of clear nights is way up.

The annual D-Y High School Academic Leadership Institute visit to The Schmidt on July 27th saw 23 incoming freshmen, 2 D-Y staff, and 4 drop-by public guests join our 4 staff members for a great program. Even the very bright, nearly full moon didn't dampen spirits. The students stayed well beyond their scheduled end time and had to be moved out by the D-Y staff.

Two days later, the 7/29 star party drew 19 guests and 2 staff members.

While we had a weather cancellation on 8/12, we had a most successful evening 8/19: 11 guests, 1 CCAS member, and 6 staff. Al Mutter, a "friend" of the Society we see now and then, brought his own Celestron Go To asking for pointers on set up; we didn't get it aligned but did get some nice views on his scope as well as our own equipment. The waxing gibbous moon tended to washout dim fuzzies but showed some real interesting terminator objects. Two of them looked like telephone poles, probably relatively straight arcs of crater rims just barely illuminated. Great views of Jupiter and its moons and a good look at Neptune using the well-behaving 16" Meade.

Finally, the summer star parties are extended on a twice per month basis into September and October. Please see the schedule on page 1.

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. Robert Tobin has the 8". If you wish to borrow one of these 'scopes, contact info@ccas.ws

September Observing:

The AUTUMNAL EQUINOX takes place September 22nd at 11:09pm. From then, nights are longer than days until next spring.

PLANETS:

THIS MONTH **JUPITER IS AS CLOSE, BRIGHT, AND AS LARGE AS IT WILL BE UNTIL THE COMPLETION OF ITS NEXT 12 YEAR ORBIT... AND YOU CAN ENJOY IT FREE OF CHARGE ALL NIGHT EVERY NIGHT!**

- While **Jupiter** season really began in August, with opposition taking place on 9/21, September is "as good as it gets." **Jupiter** is big and bold all month achieving a 12 year maximum diameter, 50", on that date. This "best for many seasons" event takes place now because opposition occurs in a year in which Jupiter achieves perihelion.

As you might expect, astronomy magazines had a lot to write about on Jupiter, its surface features, and its moons this month. A sampling:

In the September issue of *Astronomy Magazine*:

"Jupiter Rules the Night" (p 36):

- Best Jupiter in 50 years;
- "Not since 1963 has the giant planet appeared so big and bright;"
- Since it is at opposition, it remains visible the entire night;
- Binocular target, mag 6 **Uranus**, shadows Jupiter within 2^o all month;

"The King of Planets Reigns in September"(p 50):

- Since the planet rotates once in about ten hours, you can watch surface features move hour-to-hour all night;
- Use color filters to bring out details otherwise hard to see.

How close is Uranus? Its opposition takes place within five hours of that of Jupiter on the 21st; that

night they are separated by only 0.8°. Take a look with binoculars or with a wide-field telescope eyepiece to see both in the same field.

- As always, Jupiter season invites us to watch the Galilean moons night-to-night and hour-to-hour. Position charts for Jupiter's main moons are published in the September issues of *Astronomy Magazine* (p37) and *Sky and Telescope* (p47); further, on page 57 of the *S&T* you can find a wonderful chart to guide you to "special" moon events; e.g., timings for disappearance of moons behind the planet and their reappearance, timings for eclipsing of moons by Jupiter's shadow, transit across the face of the planet, and transits of a moon's shadows across the face. See also reference 6 for an all-season dynamic model of the moment-to-moment positions of Jupiter's main moons.
- Like to watch the Great Red Spot move? With Jupiter so close and big, this is the time to watch. A table noting times at which the great red spot moves across the central meridian of the planet every day in September is printed on page 58 of September's *S&T*.
- In the neighborhood: Find blue **Neptune**, mag8, running ahead of the Jupiter/Uranus pair on the ecliptic by about 25° (1.5 hours).
- **Venus** reaches maximum brightness this season on September 23: since it "off to one side" of the sun as viewed from earth, it is a "quarter" Venus or less most of the month. Venus and our own moon will appear as a pair of *Cheshire Cat Grins* only 0.3° apart on the evening of September 11: at 7pm, 3 minutes after sunset, the pair of 20%-lit crescents will sit 12° above the horizon. Very much a viewing and photo opportunity.

THE MOON:

When East is West:

On a fairly regular basis, libration², the "wobbling" of the moon's axis, gives us a special look at features normally out of our view or on the edge of the face of the moon we normally see. This month, maximum western libration on 9/30 exposes the edges of Mare Orientale, a large "sea" on the extreme western edge of our view. Beginning with full moon on September 23rd, see the rings edging the sea in profile; over the next few days, the sea turns more toward you revealing a bit of the sea floor.

How is it that a mare existing on the extreme west limb of the moon is named Mare Orientale, literally, the sea of the east? The answer: At the time the sea was named

about 1906, it was located on what by convention then was considered the eastern side of the Moon, hence the Latin name for "Eastern Sea". In 1961, however, the International Astronomical Union adopted the astronautic convention for East and West on the Moon and thus the "left" limb became the western edge.

A COMET FOR BINOCULARS (OR NAKED EYE?)

Comet 103P/Hartley is approaching (see chart 1 below), might be visible (mag 8?) with binoculars by end September and might be naked eye by mid October.

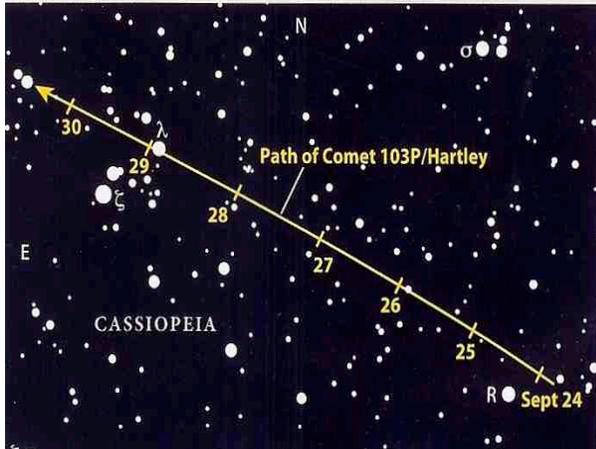


Chart 1. Comet 103P end September (Astronomy Magazine, Sept 2010, page 42).

Start looking below Cassiopeia toward the end of September. 103P is expected to brighten quickly to as much as mag 4 by mid October. Chart 2 (Reference 8) shows its expected track from October 19 until well into 2011. The time of main interest (expected mag 8 to 5 and back) will be October 1 thru the beginning of 2011. See Reference 8 for much more information.



Chart 2. Comet 103P after 10/19 (See reference 8)

OTHER SUMMER TARGETS

Please see the overview on "Summer Observing Targets

for Small Telescopes" in last month's *First Light* for a great list of summer favorite clusters, nebulae, etc. (Source: reference 9.)

Mooncusser's Almanac and Monthly Alert¹

By Peter Kurtz
September 2010

Object	Sept. 1 (DST)	Sept. 15 (DST)	Sept. 31 (DST)
Sun	R 06:07 S 19:14	06:21 18:50	06:36 18:24
Moon	R: 22:52 S: 14:04	14:35 23:29	22:42 13:47
Mercury (close to sun)	R: 06:32 S: 19:00	04:56 18:08	05:31 18:04
Venus (early eve)	R: 10:04 S: 20:41	10:08 20:04	09:52 19:14
Mars (early eve)	R: 09:42 S: 20:50	09:34 20:16	09:28 19:43
Jupiter (late eve)	R: 20:03 S: 08:02	19:04 06:58	18:00 05:49
Saturn (early eve)	R: 08:11 S: 20:20	07:24 19:29	06:35 18:34
Uranus (late eve)	R: 19:56 S: 07:56	18:59 06:58	17:59 05:56
Neptune (even ing)	R: 18:38 S: 05:11	17:42 04:14	16:42 03:13
Pluto (evening)	R: 15:14 S: 01:03	14:19 00:08	13:20 23:09

Once again, all of us have access to excellent summaries of interesting sky objects to be seen in the upcoming month in the print editions of both *Astronomy Magazine* and *Sky & Telescope*. The websites for both magazines 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. Look also on the CCAS website for other good observing guides.

Moon Phases, September, 2010

- Last QTR Wednesday, Sept 1st at 1:22pm DST
- New Moon Wednesday, Sept 8th at 6:30am DST
- [High Tides Sept 7-8 (perigee: 12am 9/8)]
- First QTR Wednesday, Sept 15th at 1:15am DST
- Full Moon Thursday, Sept 23rd at 5:17am DST
- Last QTR Thursday, Sept 30th at 11:52pm DST

Astro Question of the Month:

The Astro Question of the Month and its answer are embedded in our discussion of the moon given on pages 4 and 5.

What We Thought “in Antiquity”:

We will soon continue our series of insights into the perspective which star guides more than 100 years old give us on our hobby; excerpts from the *The Friendly Stars* by Martha Evans (available online, see reference 12) in future issues of *First Light* will continue next month.

But I wish to use the quote you see on the first page of this *First Light* to draw your attention to a remarkable book. This quote is from an epigraph to Ptolemy’s *Almagest* (2nd century AD) and is just one of many such gems from antiquity found in the wonderful little book, *The Planet,s*, by Dana Sobel (c 2005, Viking Penguin.) Sobel takes this epigraph, appearing on page 32 of her book, from a translation of *Almagest* by G. J. Toomer, Princeton U. Press, 1998.

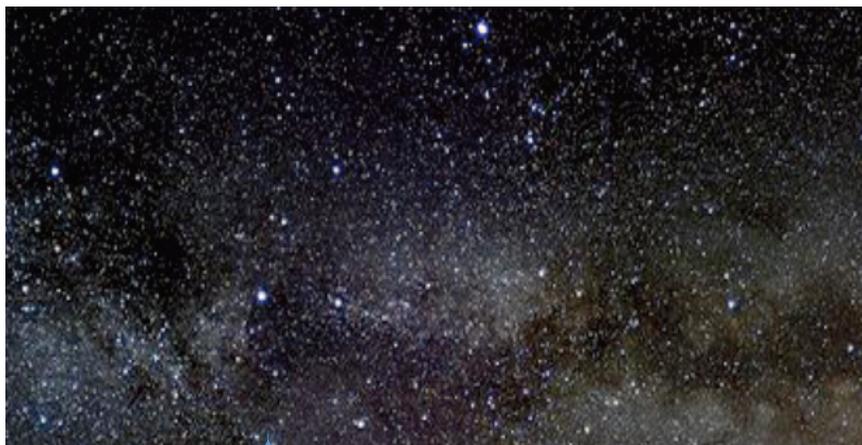
Dana Sobel is author of the *New York Times* bestsellers *Longitude* and *Galileo’s Daughter*, along with *The Planets*, all “must” reads for anyone interested in the history of astronomy. *The Planets* continues to demonstrate Sobel’s uncanny ability to merge many perspectives including the religious, mythological, and rigorously scientific, among others, in illuminating a subject. This is somewhat unique in a time when it is so popular to set such perspectives against one another. Sobel merges such diverse perspectives to make the whole greater than the parts in this lyrical but accurate portrait of the sun and the solar system.

The Swan Flies In a Big Black Cloud

...an observing experience... by Peter Kurtz

Early in August, your editor and his wife had an opportunity to visit with his brother and sister-in-law at Chazy, NY on the shore of Lake Champlain. After a wonderful dinner, this visit provided an opportunity to lie back and look at the sky in a big field having essentially full horizons in all directions. August 7th was a night that was still, crystal clear, and, save amazing starlight, very dark.

Overhead, the swan, Cygnus, was flying south down the Milky Way. She was almost hard to pick out because the background stars of our galaxy were so many and so bright. But the spectacular “seeing” this night made easily apparent something I had never recognized so clearly before: the Cygnus Rift. The Cygnus Rift is a dark patch or patches between us and the edge stars



of our galaxy, that obscures many of those edge stars from our view. This image (from reference 10) shows the Cygnus rift almost exactly as we saw it that dark night on the shore of Lake Champlain. In this image, the swan flies from left to right, the left

arrow points to Deneb, the tail, while the right arrow points to Albireo, the head. All three bright stars of the “summer triangle” are evident: Deneb in the swan, Vega, at the top, and Altair at the bottom right. Now the dark cloud of the Cygnus Rift starts just below the upper “wing” star; from there it runs down to between Deneb and the star marking the heart of the swan to a point below Deneb and above and to the left of the lower wing star; thence south under Albireo and all the way to the right side of this photo: a kind of dark question mark lying on its side with the hook pointed up on the left behind the wing of the swan.

The Cygnus Rift is a vast interstellar dust cloud existing between lobes of the spiral arms of the Milky Way. Where it is thick, it blocks light from Milky Way stars and other stuff from reaching us.

We are lucky that the Cygnus Rift does not block out Deneb or other main stars in Cygnus or the other key stars of the Summer Triangle; the rift is in front of other stars in the plane of the galaxy but not those we so much enjoy seeing.

It turns out the rift is about 300 LY from earth. Distances to the main stars in Cygnus go all over the map so some are way farther away (but not behind) relative to the dust rift. Deneb, the tail, α -Cyg, is 3200LY away; Sadr, γ -Cyg (the middle star of the wing), is 1500LY; Albireo, the head, β -Cyg, is closer, 390 LY; the upper wing star, δ -Cyg, is only 171 LY; and, finally, the lower wing star, Gienah, or ϵ -Cyg, is only 72.1 LY.

It is curious that the brightest star in the constellation (always the α star) in this case, Deneb, 1.33 magnitude (with a faint companion, 11.73) is the farthest away. It must be very luminous. A subject for another day. The other stars I mentioned are magnitudes as follows: Sadr, the middle star of the wing, 2.23 (also VERY far away); ϵ -Cyg, the lower wing star in the image, 2.49; δ -Cyg, the upper wing star, 2.91 (and a faint companion at 7.91); and finally, my favorite, Albireo, the beautiful blue and white double β star, is mag 3.07 with its companion 5.07.

Readers, take a look with binoculars or your small scope on the next calm, clear, and dark night. After you see the rift (naked eye or in binoculars) see if you can split the blue and gold double, Albireo. And, while you’re looking at the swan, try to see the North American Nebula. It is some 2° by 1° in size and is a big blob to the naked eye about 7 o’clock below Deneb and to the left of the left end of the rift dark patch. Before you try to find it, the information in reference 11 will give you a good idea what you are looking for. I think seeing the dark patch (the Gulf of Mexico) is the key to convincing yourself that you can see the shape of North America (including Florida) and Central America.

Resources for Education and Demonstrations

- Check out the article on p44 of September’s *Astronomy Magazine* for a “**Letter to Galileo**” describing for the great man what astronomers have been doing over the last 400 years!
- Visit the website of the **Astronomical Society of the Pacific** for a veritable treasure-trove of resources for outreach and teaching key concepts in astronomy. [<http://www.astrosociety.org/education.html>]

Examples:

International Year of Astronomy (2009) Discovery Guides The ASP and NASA have collaborated to create monthly guides highlighting a different theme and object in the sky for each month of 2009. The IYA Discovery Guides contain an article, finder chart for the featured object, a hands-on activity that brings the theme of the month as well as links to additional activities related to the topic. Most activities include a short pertinent video that can be downloaded.

A Sampling of Hands-On Astronomy Activities from the ASP Jump into hands-on astronomy with these classroom tested activities from a variety of ASP programs

Surfing the Solar System Surf the web to find the answers to a fun solar system puzzle for the whole family.

Good Astronomy Activities on the Web Navigate the tangled web of activities on the internet with this annotated list, organized by subject.

Night Sky Network Astronomy Activities & Resources

- Some of you may remember the short article in the May 2010 issue of *First Light* on **Galaxy Zoo**, an opportunity for ordinary people to participate in precising and classifying new galaxies from images from the Sloan Digital Sky Survey. A much more elaborate overview of Galaxy Zoo appears as a Feature Article in the September issue of Astronomy Magazine, page 30. Read the article and see if you might wish to become a Zooite.

Got Any Local Photos Showing Light Pollution or “Good” Lighting?

Reminder: Please think about the opportunity to take photos documenting light pollution or “good” lighting as requested in last month’s story “Local astronomers Aim to Limit Light Pollution”. Tom Leach, our President, is working on a video portrait on the local light pollution situation⁷. Once again, Tom requests that *All interested persons send him photos which might be useful in this video story; again, local photos of GOOD light situations and, more importantly, BAD light situations. Please notify Tom directly if you have photos or let us know at info@ccas.ws*. Thank you.

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

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Observatory Director	Michael Hunter	508-385-9846
Observatory		508-398-4765

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.

References and Notes for this issue:

- 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 minima 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 December2007-January2008 *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) *Astronomy Magazine's* online The Sky This Month online feature; you can access this month and past months; <http://www.astronomy.com/asy/default.aspx?c=ss&id=84>
- 5) Current week's *Sky and Telescope* "Sky at a Glance" <http://www.skyandtelescope.com/observing/ataglance>
- 6) ALL DATES AND TIMES UTILITY FOR JUPITER'S MOONS: <http://www.skyandtelescope.com/observing/objects/planets/3307071.html>
- 7) Tom Leach's draft video on light pollution: <http://www.youtube.com/watch?v=AkwLyD1YKzM>
- 8) References for Comet 103P/Hartley: i) Astronomy Magazine, September 2010, page 42; ii) Seiichi Yoshida's Comet Pages: Orbital elements, finder charts, magnitude expectations: <http://www.aerith.net/comet/catalog/0103P/2010.html> ;
- 9) "Bakich: Summer Targets for Small Telescopes" http://www.astronomy.com/asy/default.aspx?c=a&id=8381&utm_source=SilverpopMailing&utm_medium=email&utm_campaign=ASY_SUB_100611_final&utm_content=
- 10) [http://en.wikipedia.org/wiki/Great_Rift_\(astronomy\)](http://en.wikipedia.org/wiki/Great_Rift_(astronomy)); (image): http://en.wikipedia.org/wiki/File:Milkyway_Swan_Panorama.jpg;
- 11) http://en.wikipedia.org/wiki/North_America_Nebula
- 12) *The Friendly Stars* available for perusal online: http://books.google.com/books?id=fY4XAAAAYAAJ&printsec=frontcover&dq=The+Friendly+Stars&hl=en&ei=_VsjTMztD4P_8AbOm7STBQ&sa=X&oi=book_result&ct=result&resnum=1&ved=0CCgQ6AEwAA-v=onepage&q&f=false