



First Light

The Newsletter of the Cape Cod Astronomical Society



October, 2010

Vol.21 No. 10

What We Thought in Antiquity

...(this month, the quote is “modern” but the sentiment is timeless):

*Many have an interest in astronomy... but few cultivate their passion for the stars.
Some think astronomy is too hard... others are swept up by day-to-day commitments...
...always waiting for the “right time” to learn more about the night sky.
The basics of astronomy are not difficult...
...to learn about the lives and deaths of stars,
...how to use a telescope,
...and the place of astronomy in our history and culture.
Build your knowledge and appreciation of astronomy one small step at a time.
When you look into the sky on a clear dark night...
...you challenge your intellect and imagination,
...appreciate nature in its ultimate form.
...you tap into a source of peace, contemplation, and endless wonder.
And you gain perspective on your own life...
... and free yourself, for a time, from its day-to-day worries and constraints.*

As Carl Sagan once said, “*Somewhere, something incredible is waiting to be known.*”

Taken from the introduction to the online “One Minute Astronomer” by Brian Ventruo⁸

-
- **Next Monthly Meeting:** is Thursday, October 7th at the DY Library. Dr. Jon Greenberg, for years a teacher of Astronomy for Beginners in our community and former CCAS President, will discuss the Search for Extraterrestrial Intelligence. 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 October 1, you are three 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.
 - **Fall Star Parties** continue at 8:30pm on these Thursdays: Sept. 30, Oct. 14, and Oct 28. [If you see clouds on the afternoon of a scheduled star party or expect a cloudy evening, please call the observatory after 8:00 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:

CCAS hosted about 20 DYHS students at The Schmidt Observatory on Wednesday, September 15. Following on an invitation from Jim Mitchell, Earth and Space course teacher and recently joined CCAS member, Peter Kurtz and Bernie Young assisted by Marie Kurtz “taught” a daytime class session introducing the students to CCAS, the Observatory, our main equipment, and, the night sky. Pictures of “our favorite things in the sky” were followed by an introduction to asteroid tracking and “Citizen Sky”: variable star observing with naked eye or binoculars. We were set up to view the sun through binoculars and one telescope fitted with sun filters but that was nixed by clouds. Next time! We had lively discussion on many topics and look forward to future interactions between CCAS non-student members and Jim and his students in the future. If you would like to get involved in teaching (a) special topic(s) or working with students in special class projects, please let us know at info@CCAS.ws or let Peter know at meeting. Jim is completing a signup sheet for new Student Members of CCAS. Welcome to all these bright new stars.

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!

Many thanks to Bernie Young and Tom Leach for their contributions to our Feature Articles section this month: Bernie, for his overview of the work being done to mature our Astro-imaging capabilities and Tom for sending in some amazingly good images of Jupiter taken from his home observatory [Jupiter is now as close to earth as it has been for 50 years or will be until 2022.]

CCAS Events

Many thanks to Observatory Director Mike Hunter for his tutorial on simple and economical ways you can securely mount your telescope “in place” at home and protect it from the elements... all helping to minimize startup time for each observing session. Mike provided a gamut of techniques for covering your scope ranging from a pricey and elaborate black plastic bag with bungee to an elegant “Lean Back” plastic shed he found at <http://www.carpephoton.com>.

Mike focused for some time on a simple and inexpensive but fully functional telescope box shelter he built at home. Ease of set up and repeatability were stressed as major considerations when designing any mount and cover system. Also, moisture management and precautions in the area of electrical wiring were discussed.

ARE WE ALONE? On October 7th, Dr. Jon Greenberg, for years a teacher of Astronomy for Beginners in our community and former CCAS President, 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 has a personal observatory on a rooftop deck on 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.

OPTO-MECHANICAL DESIGN OF HIGH ACUITY SYSTEMS will be presented by Randy Moore on December 2nd.

Paul Blackmore will present **CELESTIAL LANDSCAPE PHOTOGRAPHY** on January 6th.

Dr. Chester C. Languay will present **ICE CORE RESEARCH IN THE ARCTIC** on February 3rd. More information on these upcoming presentations will be posted here when it becomes available.

Thanks again to Tom Leach, who continues to put together great programs now set up into next year. You can study profiles of upcoming speakers and topics by going to our website; look at the gray box in the middle of the rocket; there you will find information under “CCAS Lecture Series.

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 September meeting prepared by Charlie Burke, our Secretary, are on our website; click on the "Minutes" button at www.ccas.ws or go to <http://www.ccas.ws/minutes/ccasminutes090210.pdf>

Executive Corner

Members of The Executive Board exchange ideas by email and phone on a continuous basis and now and then formally convene 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.

From the Foundation... and Dome...

Please see the Feature Article by Bernie Young on page 5 for an update on progress on lining out our new imaging system.

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!
Help us 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

October Observing:

PLANETS:

To paraphrase what we said last month:

FOR OBSERVERS, LAST MONTH, **JUPITER WAS CLOSER, BRIGHTER, AND LARGER THAN IT HAS BEEN FOR 47 YEARS!**

THIS MONTH, OCTOBER, IT IS STILL BETTER THAN 98% AS CLOSE AS IT WAS LAST MONTH!

IT WILL BE 12 YEARS UNTIL JUPITER IS AS CLOSE AS IT IS THIS MONTH!

YOU CAN ENJOY IT, AND ITS MOONS, FREE OF CHARGE ALL NIGHT EVERY NIGHT!

DON'T MISS YOUR BIG CHANCE!

If you have any doubt about what a great opportunity this is, take a look on page 7 at the images Tom Leach got with a \$30 webcam from his rooftop observatory on September 21.

Resources for Jupiter and its moons for October:

- Position charts for Jupiter's main moons are published in the October issues of *Astronomy Magazine* (p37) and *Sky and Telescope* (p47);
- A Chart for timing of "special" Jupiter moon events is published on page 58 of the *S&T*. See also reference 6 for an all-season dynamic model of the moment-to-moment positions of Jupiter's main moons and time, any date.

Mag 5.7 **Uranus** continues very close to Jupiter this month separated by only 3° by end October. Once again, take a look with binoculars or a finder scope, or with a wide-field telescope eyepiece on your main scope to see both in the same field.

In the neighborhood again: find blue **Neptune**, mag 8, running ahead of the Jupiter/Uranus pair on the ecliptic by about 25° (1.5 hours).

Finally, **Venus** sets with the sun at midmonth, so if you want to see it at its thinnest crescent before becoming lost in the sun (to reappear soon as a "morning" star) look early in October.

THE MOON:

When is the last time you saw the "Man in the Moon"? Do you know how to show it to a child? See page 8.

COMETS AND ASTEROIDS:

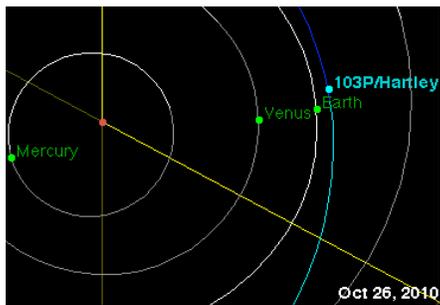
Don't forget to start looking for or look again at **Comet 103P/Hartley 2** (Please see reference items 9i-9iii.) We introduced this comet with references and finder charts in last month's *First Light*. Hartley is unique in several respects: it will be very bright this visit, expected to get to at least mag 5, possibly mag 4 in late October; it is moving very fast. When a comet moves fast, it usually means it is passing very close to earth; indeed only 11 million miles away from earth on October 20, it will be as close as any comet in the last few centuries. Finally, Hartley is now a regular periodic comet. How is that it is periodic but the first time anyone saw it was Hartley in 1986? The answer involves Jupiter; see the story in reference 9iii.

Finally, would you like to play with an online utility that will show you where Hartley is in its orbit next to earth in its orbit at any date...?

Go to the JPL Small Body Browser and Orbit Simulator found at: <http://ssd.jpl.nasa.gov/sbdb.cgi>, and enter "103P" in the search box. The program returns orbital elements and other information. Click on the words "Orbit Diagram" in gray just under "103P/Hartley 2" and the program returns its interactive orbit utility for our comet. This works for most asteroids and comets.

You can tilt the orbits, move them around, and zoom in and out. Most importantly you can click on fast forward or reverse to watch the bodies move from day-to-day or use a one-day-at-a-time motion button. The program shows distance between the comet and earth each day as the two bodies change positions in their orbits.

Using these capabilities you can "find" the date when the comet is closest to earth as shown here in a clip for October 26. On this day it will be 0.111au from earth or 1.03 million miles away. Will the comet be its brightest at this closest approach?



When you first see the comet, it may be only mag 7. Check the simulator to see where it is that day and how far away it is. Then later in the month, repeat the research when it is brighter. Can you correlate the brightness levels you record from time to time with the distances you can read from the JPL simulator? Enjoy!

Moonscuser's Almanac and Monthly Alert¹ By Peter Kurtz [October 2010](#)

Object	Oct. 1 (DST)	Oct. 15 (DST)	Oct. 31 (DST)
Sun	R 06:37 S 18:22	06:53 17:59	07:11 17:36
Moon	R: 23:42 S: 14:30	14:25 00:18	01:04 14:15
Mercury (morn>evc)	R: 05:35 S: 18:04	06:47 18:01	08:02 17:57
Venus (eve>in sun)	R: 09:50 S: 19:10	08:54 18:11	07:02 16:56
Mars (early eve)	R: 09:28 S: 19:41	09:23 19:13	09:18 18:45
Jupiter (all nite)	R: 17:56 S: 05:44	16:57 04:41	15:51 03:31
Saturn (in sun)	R: 06:31 S: 18:30	05:45 17:39	04:51 16:41
Uranus (all nite)	R: 17:55 S: 05:52	16:59 04:54	15:54 03:48
Neptune (evening)	R: 16:38 S: 03:09	15:42 02:13	14:39 01:09
Pluto (evening)	R: 13:16 S: 23:05	12:22 22:10	11:21 21:08

OTHER OBSERVING TARGETS:

NEW LIST OF 10 BEST FALL TARGETS FOR SMALL TELESCOPES AND BINOCULARS:

Several members have expressed enjoyment using *Astronomy* magazine Senior Editor Michael E. Bakich's earlier online article *Summer Observing Targets for Small Telescopes and Binoculars*. Well here we point you to Bakich's favorites for autumn:

- 1) the Andromeda Galaxy, M31,
- 2) the globular cluster M15 in Pegasus,
- 3) the Owl (open) Cluster, NGC 457,
- 4) the Helix Nebula, NGC 7293 in Aquarius,
- 5) the Double Cluster in Perseus; (two adjacent open clusters, NGC 899 and NGC 884),
- 6) μ -Cephei, Hershel's Garnet Star; see especially Bakich's comments on what makes it vary in intensity and how best to see the red colors,
- 7) M2, the beautiful globular cluster in Aquarius,
- 8) M33, the Pinwheel Galaxy,
- 9) the Blue Snowball planetary nebula in Andromeda, NGC7662,
- 10) the magnificent Pleiades, M45, in Taurus.

Bakich's video and transcript are both especially helpful because of the many suggestions he makes on approaches to take in finding and examining each of these targets. Please see reference 10; if you cannot access the video/transcript (not a subscriber to *Astronomy Magazine*), contact your editor to see a copy of the transcript.

Orionids

The Orionid meteor shower peaks before dawn on October 21. The radiant rises about 10pm on the 20th.

Finally, 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.

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 for information or sources.

Moon Phases, October, 2010

Last QTR	Thursday, Sept 30 th at 11:52pm DST
New Moon	Thursday, Oct 7 th at 2:44pm DST
First QTR	Thursday, Oct 14 th at 5:27pm DST
Full Moon	Friday, Oct 22 nd at 9:36pm DST
Last QTR	Saturday, Oct 30 th at 8:46am DST

Astro Question of the Month:

This from Bernie Young:

The Autumnal Equinox took place on September 22nd. As a member of the Cape Cod Astronomical Society, how would you define the Autumnal Equinox to someone if you were asked to explain it?

[Members, please email your best answer to info@ccas.ws and we will pick up on this next month.]

What We Thought "in Antiquity":

The thoughts given on page 1 this month, current rather than ancient notions on "why look at the sky?", are from Brian Ventrudo, creator and publisher of the "One Minute Astronomer". Please see the story on page 8.

We return to excerpts from *The Friendly Stars*¹¹ next month.

Special News Clip:

John Dobson greatly stimulated the wide use of simple and economical large aperture Newtonian reflector scopes when he invented a simple plywood mount, showed you can make a good big scope with a simple cardboard tube, and promulgated "home" creation of reflector mirrors beginning in the middle 1960's. Our beautiful Obsession 18" Dob is a grandchild of John Dobson's ideas. Dobson turned 95 on September 14th. See the story at:

<http://www.skyandtelescope.com/community/skyblog/newsblog/102434024.html>

Feature Article:

The Cape Cod Astronomical Society Imaging Project

By Bernie Young
Member, CC Astronomical Foundation Board

A year ago we took a major step to improve our astrophotography capabilities by acquiring a Losmandy G-11 German equatorial mount with a Gemini servo controller. This report is a means of letting you know where the imaging project stands and where it might go, and to stimulate ideas as to what we might do in the future.

The 16" Meade is our sophisticated "light bucket" for offering optical viewing satisfying a variety of interests. But besides accessibility limited by the stairs in the dome, it presents technical problems for astrophotography common to all fork-mounted Schmidt-Cassegrain instruments. It requires coordinated control of two tracking servos, and a de-rotator so the camera rotates along the arc celestial objects follow through the sky. The primary mirror of a SCT moves a bit on focusing, and often makes excursions on its own at inopportune times. The SCT is not well matched to a flat CCD camera chip. The quality photo images needed for deep sky observations, astronomical metrology, metric variable star observations, and presentation of images to a wider audience is restricted. Time exposures are limited to about one minute before point sources of light begin to appear as streaks.

The G-11 mount is a popular mount for those wanting to take astronomical imaging to the next level. If perfectly aligned, it need only track about the right ascension axis. Small telescopes with optics optimized for the flat field of a camera are economical. If there is a down side to a smaller scope on a G-11, it is that the flexibility and options offered are so numerous that it takes time to find the best path for our needs. We are methodically picking our path through those options.

The first fruits of nearly a year's efforts came recently and accidentally with the splitting of Polaris' companion which I had never seen in an optical telescope. "Dark fuzzies" never impressed me because there wasn't much to see but the camera is far more sensitive than the eye.

A typical August session began with a roll out to the concrete pad. We mechanically align the dolly on the pad with wood compression blocks and refine the alignment by looking through a polar scope mounted in the right ascension axle. This picks Polaris up even before you can see Arcturus, a much brighter evening star in this season, and accounts for the 45' offset of Polaris from the pole. After synchronizing on a first bright star, we often hit the next targets center in the cross hairs of the 12.5mm reticle eyepiece. We make 5 alignment observations and then cross the meridian to get data to correct for backlash in the servos. After each alignment, we record data on the tracking errors. In a good alignment session these numbers stabilize at a few arc minutes after aligning on three or four stars.

We then mount the camera. Focusing is a trial and error process of adjusting the focuser and observing the image. The camera software controls the imaging, and reports on the quality of the focus. A caliper gets us near the optimum focus, saving time. By 9:00pm we begin imaging.

We can offer views deeper in the sky, or with better resolution than you have seen in previous visits to the observatory. As we become more sophisticated, we will be adding software and hardware. If we succeed in obtaining internet access at the observatory, we can offer images to anyone having online access in real time. If you have interest in a particular celestial object, or would like to develop a particular technique, we soon should be able to offer that capability in a manner similar to any research facility. Like professional astronomers, we mostly sit inside behind a computer, but everyone can watch what we're doing.

Some high quality images require much processing of digital data after the observing session. Those who might want to apply imaging software to data gathered at the observatory can work at home at their leisure.

Anyone interested in astronomical imaging is welcome to join us. For those who would like to read about the equipment, I have posted the manuals on the CCAS Yahoo Group site.

Jupiter News:

1) A Jupiter Impact Discovered while imaging by a Japanese Astronomer

2) CCAS Member Perfecting Imaging of Jupiter from Home Observatory



Tachikawa's photo of Impact on Jupiter



Tom Leach's webcam experiment with Jupiter

1) [Left Image] On August 20, 2010, at 18:22 Universal Time, Japanese amateur Masayuki Tachikawa recorded a brief flash on Jupiter (upper right of center) using a 6-inch (150-mm) f/7.3 refractor and a webcam. North is up; the Great Red Spot is distinct below center, and Ganymede is at lower right. The impact event, *as it happened*, shows as the small white blip on the upper orange band a bit right of center. Please see reference 12; this image is a clip from his video which shows the appearance and very quick disappearance of the flash caused by an impacting object.

2) [Right Image] On September 21, there was no impact event, but the sky was very clear and Tom Leach created this image of Jupiter by stacking images taken using the 10" telescope and 1.3 mp Phillips Toucan webcam at his rooftop observatory in East Harwich, MA. Nice job, Tom!

Wait until we all see what we can do with the new CCAS imaging setup described above in Bernie Young's Feature Article!!!

“Resources; including Resources for Beginners”

“THE SUN”:

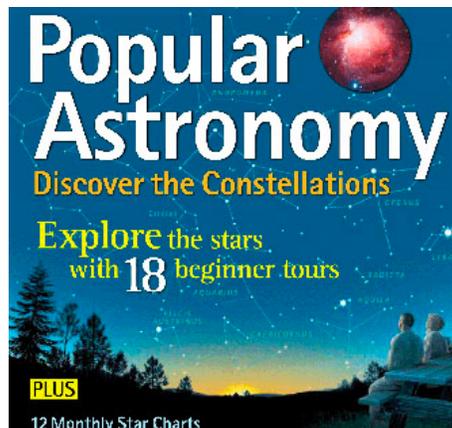
Astronomy Online has a new and excellent video (transcript also available) on the characteristics of our home star and the methods scientists are using to study it... a most appropriate complement to Tom Leach's presentation at our August meeting. You can view this sun video at reference 13. If you are not a subscriber to *Astronomy Magazine*, your editor can send you a copy of the transcript.

... FOR BEGINNERS:

SPECIAL ISSUE:

Sky and Telescope is publishing a slim special issue containing information on the Constellations along with a skymap very appropriate for beginners. See reference 14 for more information.

This single issue is available from S&T's online store (reference 14b) for \$6.99 if you cannot find it on a magazine rack.



... FOR BEGINNERS...(and also the rest of us):

THE ONE MINUTE ASTRONOMER:



On page 1 of this issue, we have printed excerpts from Brian Ventrudo’s introduction to his online/email feature “The One Minute Astronomer”. OMA is a once or twice a week online posting on a topic of interest to astronomers and sky gazers. A key virtue of OMA is that you receive an email with a *very* brief mention of the topic du jour so you can pass it by or not; again, only one or two per week. Here is an example:

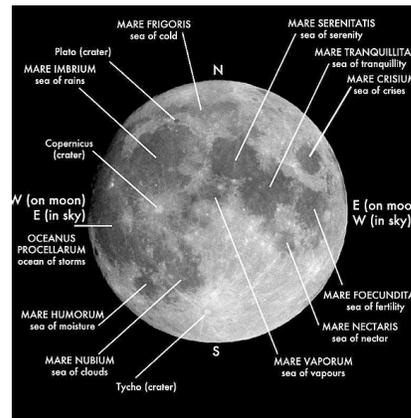
Email, September 17:

“Dear Client,

Wander over the next few nights to see the waxing gibbous Moon move towards full on September 23. With your unaided eye, you'll see the dark patches of the lunar *maria* and lighter areas of the lunar highlands, the oldest part of the Moon's surface left over from the days of its formation. And don't forget to look for the famous "Man in the Moon"...

[Click here to read more...](#)“

When you click on the “Click here to read more...” you go to the story about the moon: including the “Man” picture, (when was the last time you thought about that?), a note on 9/18 being International Observe the Moon night, and notes on phases in the next week or so. This article, clearly oriented to beginners, talks about maria and lunar highlands, provides a really wonderful "starter" map shown here, and promises moon study articles to come.



See reference 15 for “About”, and “Current Postings”; click on “Subscribe”/“Email” if you wish to start your own access; you will receive an email about once a week which will provide you the web address for the latest short “One Minute Astronomer” article.

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

Cape Cod Astronomical Society

President	Tom Leach	508-237-9291
Vice President	Paul Cezanne	508-487-1456
Secretary	Charles Burke	508-394-9128
Treasurer	Peter Kurtz	508-255-0415
Observatory Director	Michael Hunter	508-385-9846
<i>First Light</i> Editor	Peter Kurtz	508-255-0415

Mailing Address: PO Box 207 Harwich Port MA 02646

Cape Cod Astronomical Foundation

Chairman	Werner Schmidt	508-362-9301
Vice Chairman	Michael Hunter	508-385-9846
Director R&D	Bernie Young	508-394-1960
Secretary	Ed Swiniarski	508-896-5973
Treasurer	Pio Petrocchi	508-362-1213
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, *f* 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/ata glance>
- 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) See page 8 for an introduction to the online resource, "One Minute Astronomer". Brian Ventrudo is the creator and publisher of the "One-Minute Astronomer" <http://www.oneminuteastronomer.com/>
- 9) 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> ; iii) see also the interesting history of this comet found in: <http://www.skyandtelescope.com/observing/home/102632669.html>
- 10) "Bakich: Autumn Targets for Small Telescopes" http://www.astronomy.com/asy/default.aspx?c=a&id=8507&utm_source=SilverpopMailing&utm_medium=email&utm_campaign=ASY_NEWS_SUB_100910_final&utm_content=
- 11) *The Friendly Stars* available for perusal online: http://books.google.com/books?id=fY4XAAAAYAAJ&printsec=frontcover&dq=The+Friendly+Stars&hl=en&ei=VsjTMztD4P_8AbQm7STBQ&sa=X&oi=book_result&ct=result&resnum=1&ved=0CCgQ6AEwAA-v=onepage&q&f=false
- 12) Masayuki Tachikawa records impact on Jupiter: <http://www.planetary.org/blog/article/00002631/>
- 13) an introduction to the sun: http://www.astronomy.com/asy/default.aspx?c=a&id=10159&utm_source=SilverpopMailing&utm_medium=email&utm_campaign=ASY_NEWS_SUB_100910_final&utm_content=
- 14) <http://www.skyandtelescope.com/community/skyblog/observingblog/102004888.html>; b) Online store: <http://www.shopatsky.com/product/Popular-Astronomy-Discover-the-Constellations/new-arrivals>
- 15) "About" <http://www.oneminuteastronomer.com/about/> "Current Postings" <http://www.oneminuteastronomer.com>