First Light

The Newsletter of the Cape Cod Astronomical Society

August, 2011 **Vol.22 No. 8**

Editorial

The Milky Way…Well, not Quite!

What's Wrong With this Picture? Is that oblique blue column the glow from an arriving alien ship? Or some special blue aurora? Maybe some special magnetic phenomenon caused by a distant supernova?

Nope. In this spectacular and revealing recent photo, nature is spoiled by, as he puts it, an "insanely bright and unshielded spotlight at Brooks Park in Harwich Center"; taken at his home in Harwich Center by Chris Cook.[4]

How can we educate ourselves and the public that how this kind of thing destroys not only natural beauty but at the same time wastes a lot of electricity??

Next Monthly Meeting: is Thursday, August 4th at 7:30pm in the D-Y Library. CCAS former President Gary Derman will present: **Mirror Grinding, Configuring and Testing an 8" Telescope.** (Please see the moving banner and the "tail of the rocket" on our website's home page for more information on future speakers and topics.)

In this issue: Lunar Occultation Coming / CCAS Elections / Last Chance for Saturn / Gallileo Missed It! / Pairs of Fuzzballs / Vesta at its Best / Salute to the Shuttle Program

Bright New Stars:

We like to profile new members in 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*.

Thanks to Mike Hunter for his "From the Dome" report and to Bernie Young for his invitation to watch the moon occult a star.

CCAS and Related Events:

Weather permitting, there will be a special Star Party at the Werner Schmidt Observatory on August 10th to view the occultation of a bright (mag 2.9) triple star system in northern Sagittarius by the dark edge of a twelve day old waxing moon. Don't miss the chance to see this Prime Time observing event as it takes place and also learn about some of the new video-capture research techniques that will be in use that night at the WSO. Please see the story beginning on page 5.

Many thanks to Gary Derman for his instructive and entertaining presentation on how to build a Dobsonian reflector telescope "from scratch." Well, not really from scratch: you buy the mirror blank and grinding materials and instructions and maybe the spider diagonal mirror and eyepiece and focuser… but the rest can be done with drain pipe pieces and plywood. The main event is the grinding of the mirror and while requiring hours (80) and patience (lots), and, literally, "elbow grease". Gary made it clear that this can be fun and most satisfying. Anyone interested in doing this himself (or even better, with a child or grandchild) should contact Gary for startup tips and more.

At our meeting on August 4th, Ed Ting will discuss **Making Use of a Webcam in Astrophotography, What You May Not Know**. Ed publishes one of the most comprehensive telescope review websites on the internet. Inside, you'll find reviews of over 100 telescopes, eyepiece reviews, a beginner's advice column, feature articles, and lots more! His telescope review website has become a very popular resource for amateur astronomers interested in upgrading equipment and for the novice looking to buy his first scope.

Thanks again to Tom Leach, who continues to put together great programs of speakers for our meetings.

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 July meeting are on our website; click on the "Minutes" button at www.ccas.ws or go to http://www.ccas.ws/minutes/ccasminutes070711.pdf

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SPECIAL NOTICE!!!!
2011-2012 Dues were Due July 1, 2011

Members: Please plan to make your payment either by bringing to the July meeting or mailing directly to CCAS at PO Box 207 Harwich Port MA 02646.
Thank you.
And Thank You to the many members who already have made payment.

Executive Corner

The following candidates were nominated and elected by acclamation for the Executive Board of the Cape Cod Astronomical Society for the 2011-1012 year:

President:	Tom Leach
Vice President	Mike Hunter
Secretary	Charles Burke
Treasurer	Peter Kurtz

It was also time to (re) elect a (new) member of the Cape Cod Astronomical Foundation Board of Trustees. Pio Petrocchi was nominated for the expired position and re-elected by acclamation.

Thank you, gentlemen, for your willingness to serve.

From the Dome…

… from Mike Hunter

Summer Thursday Star Parties are in full swing: July's first three events saw 15 to 20 guests and three or four staff each. That includes the fog-out on 7/21. You couldn't see above the tree tops but folks toured the Dome and chewed the fat. It's amazing to see the little kids' eyes pop when you open the dome shutters and run it around for a lap or two.

As noted elsewhere in this First Light, under Bernie Young's leadership, planning for and observing/recording occultations is becoming a significant activity at the Dome. Occultations are neat in their own right but are producing their biggest impact by driving growth in skills and knowledge of equipment and procedures in our staff. Come

participate in the event scheduled for August 10th if you'd like to see first hand what fun this can be.

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

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August Observing:

Mooncusser's Almanac and Monthly Alert[1]
By Peter Kurtz
August 2011

Object	August 1 (EDT)	August 15 (EDT)	August 31 (EDT)
Sun	R: 05:35 S: 19:59	05:49 19:41	06:05 19:16
Moon	R: 08:03 S: 20:42	20:04 07:57	09:24 20:14
Mercury (eve/dawn)	R: 07:36 S: 20:40	06:13 19:23	04:37 18:27
Venus (dawn/sun)	R: 05:12 S: 19:50	05:46 19:46	06:25 19:32
Mars (late nite)	R: 02:19 S: 17:32	02:05 17:17	01:51 16:55
Jupiter (late eve)	R: 23:36 S: 13:21	22:44 12:30	21:42 11:29
Saturn (evening)	R: 10:56 S: 22:43	10:07 21:51	09:12 20:51
Uranus (late eve)	R: 22:10 S: 10:25	21:15 09:28	20:10 08:22
Neptune (evening)	R: 20:50 S: 07:30	19:53 06:33	18:49 05:28
Pluto (evening)	R: 17:30 S: 03:16	16:34 02:20	15:30 01:15

Resources: Please see the August issues of *Astronomy Magazine*, pp 36-43, and/or *Sky and Telescope*, pp 43-49, for good overviews of sky highlights for August. Please also see reference 5 for the web address for *Astronomy*'s online edition of "The Sky this Month" for August.

Losing Venus and Saturn, gaining Jupiter, and enjoying our most distant planets:

After so many months, **Venus** has gone to live with the sun.. But, at some time most nights in August, you can view the other six planets.

Early August is "last chance" for evening viewing of **Saturn** this season: on August 1, the ringed planet lies some 20° high in the west-southwest an hour after the sun sets. That altitude dips to just 5° by month's end. As always, when you view Saturn, try to locate as many of its main moons as possible, and, if you can (next season?), check an hour or so later to see if and how the inner moons have moved. Please see reference 5a for Resources on **Saturn's moons**.

Pluto (mag 14) is well up when the Sun sets this August. **Neptune** (mag 7.8), then brighter **Uranus** (mag 5.8) join it later in the evening in this month's night skies. Each will arrive higher than 25º altitude in the southeast on August 1 at Cape Cod as follows, earlier as the month proceeds: on August 1, **Pluto** is 26º altitude at sunset; **Neptune** will reach 25º just after 10:30pm; **Uranus** will reach 25º at 11:24pm.

Neptune is at opposition and shows its brightest this season on August 22.

Last month we noted that **Neptune** was located in its orbit on July 12-13 at the same position it was at one 165-year orbit ago when it was first discovered. Neptune moves pretty slowly. So if you view Neptune this month, you will have seen it "very very close" to where it was in orbit when discovered; i.e., just east of Capricorn.

Did you know that Galileo looked at Neptune on two different dates and missed discovering it as a planet? **Do you know why he missed its "wandering" motion in the sky?** See page 4 for the answer.

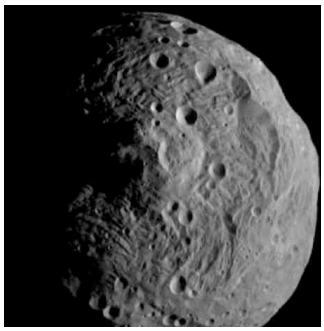
Jupiter rises after 1am on August 1for Cape Codders. By the end of the month, it will rise at 11:29. We could say that Prime Time evening viewing of Jupiter begins mid-September this year. We look forward to "evening" Jupiter and its moons (resources: reference 5a). If you cannot wait, stay up after midnight this month and get a preview!

Showers, Comets/Clusters, and Asteroid Special Events:

The **Perseid meteor shower** peaks August 13… with a full moon. Might be best to wait until next year. But anytime you are out observing 8/5-8/18, don't be surprised if you see a streak or two, particularly looking away from the moon.

Last month we mentioned the arriving of **Comet C/2009 P1 (Garradd)** at mag 8 low in the late evening sky in Pegasus, but promised it would get brighter, possibly better than mag 6 this winter, and better and better placed in the sky over a good part of the coming twelve months. While it will not gain its most spectacular status solo until the winter, we find two special viewing opportunities in August by virtue of **how it pairs with star clusters**. On August 1 and 2, it lies less than 1° from the bright globular cluster **M15** in western Pegasus. When viewed through binoculars under a dark sky, the pair will look like mismatched cotton balls. A good scope will show individual stars in the globular and a chance to see the comet's short and narrow tail. Late in the month, don't miss another Garradd/globular pairing, this time on August 26. That night the comet nearly occults **M71** in Sagitta.

During August, our 2nd largest asteroid (after Ceres), **Vesta,** will shine brightly in two ways:



First Photo of Vesta by the Orbiting Dawn Spacecraft, July 18, 2011[5b]

1. Reaching opposition on August 5th, Vesta will glow at mag 5.6 (easily naked-eye visible with the moon only 6 days old on that date.) Come to a CCAS star party during August and view it about 10pm in Capricorn with either binoculars or our big Dob scope. It should be at altitude 14º by 10pm most of the month. Finder charts: Ref 5c.
2. NASA's Dawn spacecraft entered orbit of Vesta on July 16th and returned this first photo of the big rock on July 18. More photos and summaries of evolving scientific data on the asteroid should flood the popular press well through August; good news to divert our attention from the demise of the shuttle program. When you are using a telescope to view the asterioid, see if you can see the spacecraft!

Moon Phases, August, 2011

First QTR Saturday, August 6th , at 7:08am EDT
Full Moon Saturday, August 13th , at 2:57pm EDT
Last QTR Sunday, August 21st , at 5:54pm EDT
New Moon Sunday, August 28th , at 11:04pm EDT

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.

Galileo Saw Neptune and Drew a Sketch of Its Position. Why Isn't He the Discoverer of this Planet?

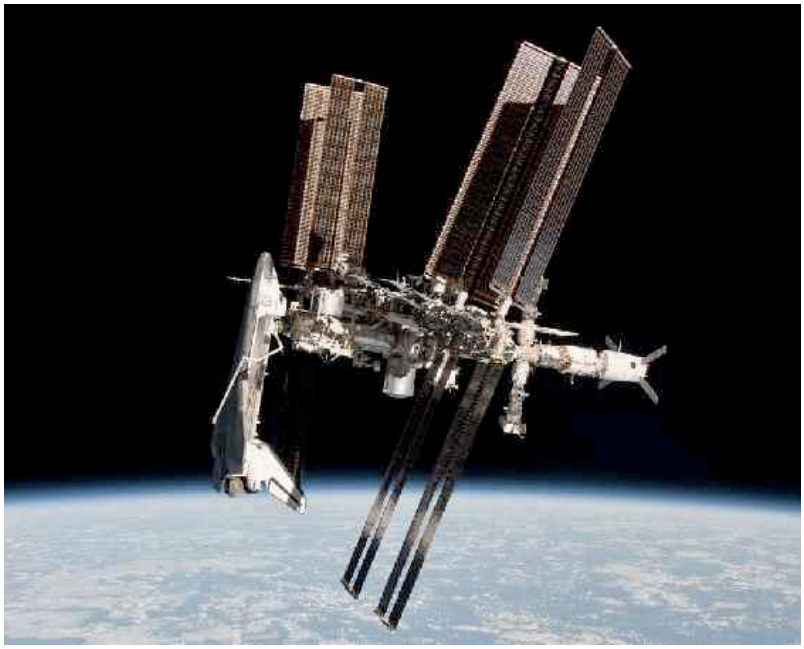
As seen from Earth, all the planets appear to periodically switch direction as they cross the sky. Though all stars and planets appear to move from east to west on a nightly basis in response to the rotation of Earth, the outer planets generally drift slowly eastward relative to the stars. This motion is normal for the planets, and so is considered direct motion. However, since Earth completes its orbit in a shorter period of time than the planets outside its orbit, we periodically overtake them, like a faster car on a multi-lane highway. When this occurs, the planet we are passing will first appear to stop its eastward drift, and then drift back toward the west. Then, as Earth swings past the planet in its orbit, it appears to resume its normal motion west to east. Inner planets Venus and Mercury appear to move in retrograde in a similar mechanism, but as they can never be in opposition to the Sun as seen from Earth, their retrograde cycles are tied to their lower conjunctions with the Sun. Asteroids and Kuiper Belt Objects (including Pluto) also exhibit apparent retrogradation.

Interestingly, **Galileo's** drawings show that he first observed Neptune on December 28, 1612, and again on January 27, 1613. On both occasions, Galileo mistook Neptune for a fixed star when it appeared very close—in conjunction—to Jupiter in the night sky, hence, he is not credited with Neptune's discovery as a planet. During the period of his first observation in December 1612, Neptune was stationary in the sky because it had just turned retrograde that very day. This apparent backward motion is created when the orbit of the Earth takes it past an outer planet. Since Neptune was only beginning its yearly retrograde cycle, the motion of the planet was far too slight to be detected with Galileo's small telescope. *[Editor: Galileo had many accomplishments but, in this chapter, he was a victim of bad luck!]* from Wikipedia: http://en.wikipedia.org/wiki/Apparent_retrograde_motion

Last Glimpses of a Spectacular 30 Year Accomplishment

By Peter Kurtz

First Light Salutes the thirty year Shuttle Program with these Three Era-ending Photos:



Shuttle docked at ISS, taken by a departing Soyuz[6a]

…after final Undock[6b]

…and gliding to runway at Canaveral, dawn, July 21,2011[6c]

Invitation to a "Special Event" CCAS Star Party, Wednesday, August 10

Thanks to Bernie Young for this invitation to all CCAS members and Friends:

<u>Occultation of mag 2.9 Star π-Sagitarii , 10:22pm</u>

A conjunction of the moon with the magnitude 2.9 star π-Sagittarii (Albaldah) will occur at 10:22 local time on Wednesday August 10th (2:24 UTC August 11). This results in an occultation of the star, causing it to disappear behind the dark side of the waxing gibbous moon. It will reappear at 11:32 local time. This star is sufficiently bright that most people can see it with the

naked eye, although the presence of the moon will make the event more spectacular if binoculars or a small telescope are used to view the disappearance. The reappearance from the bright limb of the moon will be difficult to see even with a telescope.

This is a particularly interesting astronomical event because π-Sagittarii is actually a triple, with one component 0.09 arcseconds separation, just about at the limit of resolution for our 16" telescope and video camera. There is a research interest in acquiring video records of the occultation to enhance the understanding of this complex star system.

This event calls for a special star party. We have four telescopes we can share to view the approach. This means we need several observatory staff members to run the various scopes. Or just come to enjoy the spectacle and the bustle of activity we expect to have preparing video recording systems, etc.

[Notes added by *First Light* Editor]
Thanks to Professor Jim Kaler, Professor Emeritus of Astronomy at the University of Illinois, who provided information on π-Sagittarii. Information on Professor Kaler can be found at his website and information on π-Sagittarii can both be found at reference 7a. Bernie has also been developing information on occultations using a computer program called Occult 4. Please see reference 7b.

Every star is different in ways most people have never heard or thought about or have long since forgotten. An occultation provides a stimulus to focus on one given star in some detail. π-Sagittarii is a very interesting star. Consider all the interesting points in the following profile by Professor Kaler:

ALBALDAH (π-Sagittarii):

Among the brighter stars of Sagittarius is one that does not belong to the main figure, but floats above it to the north of the ecliptic, helping the celestial Archer to span the solar path. Albaldah, to which Bayer assigned the Greek letter "Pi," is, however, the third magnitude (2.89) luminary of the small asterism "the Teaspoon," which goes along with Sagittarius's lower-down and larger famed "Teapot." Though the proper name is not standard in the recognized literature, it is still of ancient lineage. Arabian star lore established 28 "manzils," or "daily stations," or "mansions" for the Moon in its path along the ecliptic. Number 21, "Albaldah" or "Al Baldah," gave its name to the star we now call "Pi Sagittarii," and refers to "the City," in fact taken commonly as referring to Makkah, or Mecca. Albaldah is an impressive class F (F2) "bright giant" 440 light years away that shines with the light of almost exactly 1000 Suns from a white 6500 Kelvin surface. These characteristics conspire to reveal a mass of five times that of the Sun and an age of 95 million years from the time it began life as a class B4 hydrogen-fusing dwarf. Pi Sagittarii has now shut down its core hydrogen fusion and is in transition with a dead helium core into becoming a classic bright helium- fusing "red giant." Most interestingly, on a graph of stellar luminosity against temperature, the star is on the "blue edge" of the "Cepheid instability strip," the zone where stars like Delta Cephei, Eta Aquilae, and Zeta Geminorum (Mekbuda) lose their sense of equilibrium and pulsate and change their brightnesses like well-oiled clocks. Albaldah should become one of their number in about 1.5 million years. Two very close companions accompany the star, one at a separation of 0.09 seconds of arc, the other a 6th magnitude star at 0.4 seconds. Nothing else is known about them. From its brightness, the outer one, at least 54 Astronomical Units away from Pi proper, is a class B9 star. The inner one, at least 13 AU out, most likely is as well, but who knows. Given the close-in clumping of the stars, as well as the lack of three-dimensional positioning, orbital periods are near-impossible to guess, but would be at least 15 years for the inner, and over a century for the outer.

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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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 2011*, and other sources. The *Observer's Handbook, 2010 and 2011,* 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 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) Email from Chris Cook: local photographer and member of CCAS to Tom Leach. Find out more about Chris and his photography at Chris Cook Photography, www.cookphoto.com and his blog: http://www.chriscookphotography.blogspot.com Go to http://www.darksky.org/ to find out more about how to fight light pollution.

5) Here is the web address for Astronomy Magazine's online "The Sky This Month" online for August: http://www.astronomy.com/en/News-Observing/Sky%20this%20Month/2011/06/Neptune%20glows%20at%20its%20brightest.aspx

5a) Resources: if you don't have "Gas Giants", the iPod app for modeling the positions of Saturn's and Jupiter's moons at any date and time, positions for the moons of Jupiter for any date and time in August are given in graphic diagrams in the August issue of *S&T* (p 47.) and *Astronomy* (p 37). Or go to the following web addresses to access *S&T*'s Java Utility for showing the positions of Saturn's http://www.skyandtelescope.com/observing/objects/javascript/3308506.html and/or Jupiter's http://www.skyandtelescope.com/observing/objects/planets/3307071.html main moons for any date and time.

5b) Photo of Vesta by Orbiting Dawn Spacecraft: http://science.nasa.gov/science-news/science-at-nasa/2011/18jul_dawn4/

5c) Finder Chart for Vesta: See the August issue of *Astronomy*, p43 or reference 5 above.

6a) Docked at the ISS: http://www.nasa.gov/mission_pages/station/multimedia/gallery/iss027e036710.html This photo is actually of Endeavor on the penultimate shuttle mission. Photo taken by Expedition 27 crew member Paolo Nespoli from the Soyuz TMA-20 following its undocking prior to return to earth on May 23, 2011 (US date.)
6b) Final Separation: http://www.nasa.gov/mission_pages/shuttle/shuttlemissions/sts135/multimedia/gallery/fd12atlantis.html
6c) Shuttle Landing: http://www.universetoday.com/87655/ghostly-landing-of-atlantis-closes-americas-space-shuttle-era/

7a) Jim Kaler's Web Page: http://stars.astro.illinois.edu/ His portrait on π-Sagittarii: http://stars.astro.illinois.edu/sow/albaldah.html Professor Kaler operates two main websites, Skylights, which provides weekly information on the sights of the sky, and Stars, which features the "Star of the Week." Check with Bernie to find out what part of his info on the upcoming occultation came from Professor Kaler and what part he (Bernie) developed himself using the occultation-predicting computer program Occult 4
7b) Occult 4: http://www.lunar-occultations.com/iota/occult4.htm