



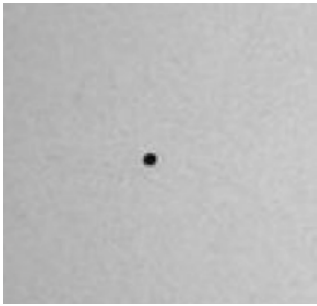
First Light

The Newsletter of the Cape Cod Astronomical Society



June, 2016 Vol. 27 No. 6

*Congratulations and thanks to Bernie and friends for hosting a **GREAT** Transit of Mercury showing on the morning/early afternoon of Monday, May 9th. Early on, patience was needed with the “in and out” clouds... but by about noon nearly anyone who came by could see Mercury on the sun without cloud competition: either a small ball on a gray background using our filtered 16” (image below) or equally good views using our Hydrogen alpha ‘telescope.*



The View from the 16” filtered ‘scope



Hank Ricci, Bernie Young, Mike Karaim and Werner Schmidt had clear skies to view the Transit

Our Next Monthly Meeting: is Thursday, June 2nd, at 7:30pm in the D-Y High School library. **Dr. Anastasia Fialkov**, an ITC Fellow (Institute for Theory and Computation) at HSCfA will speak to us on **the 21-cm line of neutral hydrogen**, a wavelength of light, which is observed from very early times. She will discuss the properties of these signals and what we can learn from them about the very early stages of the universe.

Reminder: The last 2016 winter season “Quarter-Moon-Saturday” Star Party (public welcome) is Saturday, June 11th at 8:30pm. The last 2016 “New-Moon-Saturday “work” evening for *Staff and CCAS Members only* will take place on June 4th at 8:30pm. [The Summer Schedule of Every-Thursday Star Parties at The Schmidt Observatory begins Thursday, June 23rd at 8:30pm.](#) Please see more information on these opportunities in schedules on page 3.

In this issue: The Transit of Mercury: Mission Accomplished! / CCAS Dues: old cycle, new cycle / 8th Grade Solar Observing / Girl Scout Star Party / Thursday-night Summer Star Parties Begin / Summer Solstice / “Astro-bits”.. take a look! / Jim Lynch’s Blurb on Upcoming Speakers /

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 might have new information for us (background, astro equipment preferred, interests, etc.) on yourself or someone else, please let us know (email info@ccas.ws).

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

CCAS News Items and Current Events:

CCAS Meetings:

Many thanks to Bernie Young, Research Director at the Schmidt Observatory, for his presentation at our meeting on May 5th introducing the upcoming **Transit of Mercury** and plans for observing and recording this phenomenon at the Schmidt (not to mention his preparations for and hosting the spectacular viewing on the day of the Transit, May 9th). Both the introductory presentation and the operation of the actual “daytime Star Party” were completely successful.

Upcoming Meetings:

Our next monthly meeting is Thursday, June 2nd, at 7:30pm in the D-Y High School library

The first of several staff members from the Harvard Smithsonian Center for Astrophysics lined up by Jim Lynch to speak at CCAS meetings will present on June 2nd.

Dr. Anastasia Fialkov, an ITC Fellow (Institute for Theory and Computation) at HSCfA is a theorist working with radioastronomy observers. She will speak to us on **the 21-cm line of neutral hydrogen**, a wavelength of light which can be observed from very early times. She will discuss the properties of these signals and what we can learn from them about the very early stages of the universe.

Professor Emeritus Larry Marschall of Gettysburg College, astronomer, teacher and always an excellent speaker, will speak to us at the July 7th meeting on new information about **Pluto** gleaned from data collected by NASA’s New Horizons mission. More information when available.

Finally, we are pleased to announce that HSCfA Professor **Antony A. Stark** will speak to us at the **August 4th** meeting. Professor Stark will speak on **Cosmology with the South Pole Telescope**. Here is his abstract:

The South Pole Telescope (SPT) is designed for observational cosmology, the detection of faint features in the Cosmic Microwave Background. After many years of preliminary work at the Amundsen-Scott South Pole Station, the South Pole Telescope became operational in 2007, and has been scanning the sky around the Galactic Poles ever since. Discoveries include detection of clusters of galaxies by the Sunyaev-Zel'dovich (SZ) effect, first detection of lensed galaxies in the early Universe, and measurement of features in

the Cosmic Microwave Background. We'll discuss how these results contribute to understanding the Big Bang and the formation of structure in the Universe.

This is a new chapter for us at CCAS following on the talk by HSCfA Post-Doc Colin Bischoff way back in August 2013 in which he introduced us to the work at the South Pole Station searching for B-mode radiation in the CMB. At that time, there was some evidence for B-mode radiation but the data was confounded some by interferences in the signals. We look forward to an update by Professor Stark.

Member Jim Lynch has had “bites” from other HSCfA staff members who responded to a flyer he created looking for speakers. The flyers were disseminated by Peter Williams, a postdoc there whom we first met when picking up some excellent telescope equipment donated by his family early in 2016. Jim will coordinate further scheduling of speakers from HSCfA. Please see Jim’s “flyer” advertising upcoming speakers on the last page (after references page) of this *First Light*.

Reminder:

Gus Romano (or his delegate) “hosts” a Dutch-treat dinner gathering for members and friends on each CCAS meeting night (before the meeting) at the South Yarmouth Hearth & Kettle restaurant at 5:45pm; (the meetings begin at 7:30 at D-Y.) The speaker for each meeting is always invited.

Please join the group to dine and talk about all things interesting, including astronomy! The H&K is at 1196 Rte 28, South Yarmouth, about a half mile west of the Station Avenue/Main Street intersection with Rt. 28 (traffic light).

Mike Hunter, CCAS President, is our Program Chairman. Please contact Mike or info@ccas.ws if you have any leads on speakers for September and beyond.

Members, PLEASE participate in the effort to recruit good speakers to present programs in astronomy and related sciences at our meetings.

Please let us know if you have any leads...

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

CCAS Dues:

Thanks to 48 CCAS members for “on-time” payment of dues during the 2015-2016 dues cycle. This is about half of members whose names we have retained (some maybe too long) on our rolls as “active” and expected to pay dues; (we also have 20 members *not* expected to pay dues: spouses, students, and “permanent” or honorary members.

If you consider yourself an active member and are eligible to pay dues, please do so early in the upcoming cycle.

The 2016-2017 dues cycle begins at our **July** meeting. Dues for most folks are \$30/year. Please pay your 2016-2017 dues in July or August if possible, even if you have been accustomed to making payment at other times of the year.

We need this money to pay our bills and support our Observatory! Please bring your check to the next meeting or mail right away to: CCAS, 34 Ridgewood Rd. Orleans MA 02653. We won't turn away a check at the June meeting for the upcoming cycle. Thank you.

The Cape Cod Astronomical Foundation is now participating in the AmazonSmile program (<http://www.smile.amazon.com>); please go to this Amazon login page and sign up. Going forward, 0.5% of the price of all your Amazon purchases will be donated to the Cape Cod Astronomical Foundation when you are a signed-up participant.

The minutes of the May meeting are on our website; click on the "Minutes" button at www.ccas.ws or click here <http://www.ccas.ws/minutes/ccasminutes050516.pdf>

From the Dome:

Solar Observing: Now becoming an annual event, viewing of the sun using both filtered and special wavelength telescopes at the Schmidt Observatory by Dennis-Yarmouth Elementary School students will take place the first week of June. Thirteen groups of 8th Graders each having about 18 students will spend about a half hour each viewing the sun.

April Girl Scouts from Eastham Middle School:



Our Observatory Staff was pleased to host an alert group of Girl Scouts from Eastham Middle School on April 29th. Pamela Anderson led the group. A fun time was had by all.

CCAS Members: Once again: There are many good things happening these days at The Schmidt. Please consider *involving yourself*. Contact Bernie or Joel directly if you can help or notify us at info@ccas.ws and we'll pass your interest along.

Star Parties and Member "Work" Evenings:

The last 2016 winter season "Quarter-Moon-Saturday" Star Party (*public welcome*) is Saturday, June 11th at 8:30pm. The last 2016 "New-Moon-Saturday" "work" evening for *Staff and CCAS Members only* will take place on June 4th at 8:30pm.

Please note: The Summer Schedule of Every-Thursday** Star Parties at The Schmidt Observatory begins Thursday, June 23rd, and ends on August 25th (*public always welcome!*) Starting time: 8:30pm; ending time: 10:30pm. (**Except on CCAS Meeting Nights which will be July 7th and August 4th.)

As always, "Private" group or individual observing sessions at the Werner Schmidt Observatory may be scheduled by contacting Observatory Director Joel Burnett at Joelburnett@comcast.net 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. Contact info@ccas.ws if you wish to borrow one.

June Observing:

Observing Resources:

Please see resources in the June issue of *Astronomy Magazine*, pp 38-43, and *Sky and Telescope*, pp 41-59, and Reference 5 for good guides to the sky. See *AM*, p41, *S&T*, pp 50-51 and reference 6 for positions of the moons of Jupiter and Saturn and special phenomena of the moons of Jupiter this month.

Highlights in the Night Sky for June:

- The parade of the "big three" planets across our evening sky, mentioned last month, continues in June: **Saturn**, rising here at 7pm on June 15th is preceded just a bit by **Mars**, rise time about 75 minutes earlier, which in turn is preceded by **Jupiter** which rises about six hours before Mars. So, at 9:30pm on the 15th, Saturn is at altitude 20° in the southeast, Mars is at altitude 26°, 18° west of Saturn, and Jupiter is beginning its gradual descent in the southwest at altitude 34°.
- **Saturn** is at opposition on June 2nd. It is even brighter than usual because the rings are highly tilted at this time: 26° from "level", near the largest tilt we ever see.
- Take the time this month to enjoy watching the movement of the moons of both Jupiter and Saturn. See the Observing Resources above for portraits of which moons will be where at any specific time.



This image, showing the sky about 5' wide, shows the positions of the moons of Saturn at 11:30pm on June 2nd. Distant giant Titan at lower left, hard to see dim Iapetus at top, and Dione, Rhea, Enceladus and Tethys clockwise around the planet.

- The summer solstice occurs at 6:34pm on Monday, June 20th. This marks the longest day in the year and the moment when the sun is as far north at sunrise and sunset and as high in the sky as it gets in the northern hemisphere all year. If you're a fan of cooler weather the turn of the sun more toward the south on this day promises that, yes, winter will come... eventually.

Mooncusser's Almanac and Monthly Alert¹
JUNE 2016

Object	JUNE 1 (EDT)	JUNE 15 (EDT)	JUNE 30 (EDT)
Sun	R 05:08 S: 20:09	05:05 20:17	05:10 20:19
Moon	R: 03:04 S: 15:53	15:38 02:38	02:22 15:59
Mercury (predawn)	R: 04:11 S: 17:58	03:58 18:26	04:33 19:47
Venus (in the sun)	R: 05:05 S: 20:00	05:15 20:28	05:38 20:47
Mars (evening)	R: 18:58 S: 04:23	17:45 03:13	16:39 02:07
Jupiter (evening)	R: 12:31 S: 01:31	11:42 00:39	10:52 23:43
Saturn (evening)	R: 20:00 S: 05:32	19:00 04:33	17:56 03:30
Uranus (predawn)	R: 02:51 S: 15:59	01:57 15:06	00:59 14:09
Neptune (predawn)	R: 01:17 S: 12:28	00:22 11:33	23:23 10:34
Pluto (all nite)	R: 22:26 S: 07:56	21:30 06:59	20:30 05:58

Moon Phases, June, 2016

New Moon, Saturday, June 4th, at 11:00pm EDT
Moon is at perigee on day before: HIGH TIDES
First QTR, Sunday, June 12th, at 4:10am, EDT
Full Moon, Monday, June 20th, at 7:02am EDT
Last QTR, Monday, June 27th at 2:19pm EDT

Minima of Algol^{1,3}, June:

Algol, a variable double star in Perseus, shines normally at mag 2.1 but once every 2.87 days dims to mag 3.4. The dimming is caused by the dimmer of two self-orbiting stars eclipsing the brighter as viewed from earth.

There is one convenient evening occurrence of the Minima of Algol this month: Thursday, June 9th, at 9:20pm.

Using binoculars or a small telescope, try to begin viewing two to three hours before the minima to watch the dimming (record magnitudes now and then by comparing Algol with neighboring constant magnitudes) and up to two to three hours after the minima to watch the brightening.

Declination Tables for the Moon² during this month. Please contact your editor for information or sources.

ASTROBITS (Editor's Picks)

In preparation to writing *First Light* each month, your editor peruses the latest issued of *Astronomy* and *Sky & Telescope* and various websites looking for items of interest or value.

Nearly always, we find at least one and often several items of interest.

Here's the best for June:

• **Quasars Near and Far:**

Want to see the blazing core of an early galaxy putting out light billions of times brighter than our sun... and caused by gas falling into a supermassive black hole? Although variable, the quasar 3C 273, at its brightest, is mag 11.7, about the magnitude of Saturn's moon Enceladus; at its faintest, it's mag 13.2 (a bit brighter than Pluto at opposition); either way, we can see this phenomenon using either of our biggest telescopes at The Schmidt.

Look for it about 2.5° southeast of the mag 5 star 16 Vir, high in the sky in Virgo during June. It's 2.5 billion light years away and is the brightest and nearest Quasar we see. (For more information, please see the article by James O'Meara in June's *Astronomy*, p 18; he also

talks about a very very distant quasar, PG1634 +706.)

- **“Dust, Hippos, and an Occasional Shooting Star”:**

There’s a delightful cartoon on page 18 of June’s *Astronomy*, p18, showing hippopotami falling from the sky!... to make two points important for amateur astronomers to think about:

1. “An average of 60 tons of meteoritic dust falls to Earth each day; equal to the weight of 40 hippos.”... and,
2. Sometimes the dust can contain particles large enough to become sporadic *meteors*.

So... on *any* clear night you might see one of the bigger hippos falling from the sky... a stray *not* associated with any specific meteor shower.

- **Supporting Library Lending Telescopes Programs:**

The Schmidt Observatory has many telescopes to lend out, maybe sell, maybe lease. What about the idea of providing a telescope(s) to a local library and supporting a program there to lend it out to patrons? The New Hampshire Astronomical Society has figured out how to do this at multiple libraries. For success, it can’t be just any telescope; work to make it “goof-proof” might be advised, and it’s a good idea

to have one Society member devoted to each “Library Telescope” for maintenance and maybe a little coaching now and then. See how it’s done in the article by Glenn Chaple, June *Astronomy*, p 14.)

- **All About Telescopes:**

Are you a “new” amateur astronomer thinking about borrowing or buying a your own personal telescope? While we may be seeing the blurring of lines between teaching and marketing, *Astronomy* magazine has collaborated with Celestron to put together a very readable and informative article available on the web which in 15 pdf pages, “How To Buy Your First Telescope”, provides tutorial information on “all things telescope”. Check out this link:

<http://www.astronomy.com/-/media/Files/PDF/Buying Your First Telescope.pdf>

NOTICE: NEW COPIES OF THE BROCHURE INTRODUCING CCAS AND ITS ACTIVITIES ARE AVAILABLE; INQUIRE AT info@ccas.ws IF YOU WISH COPIES

Masthead and References on Next Page; Jim Lynch’s Blurb on Upcoming Speakers on Last Page

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Cape Cod Astronomical Foundation

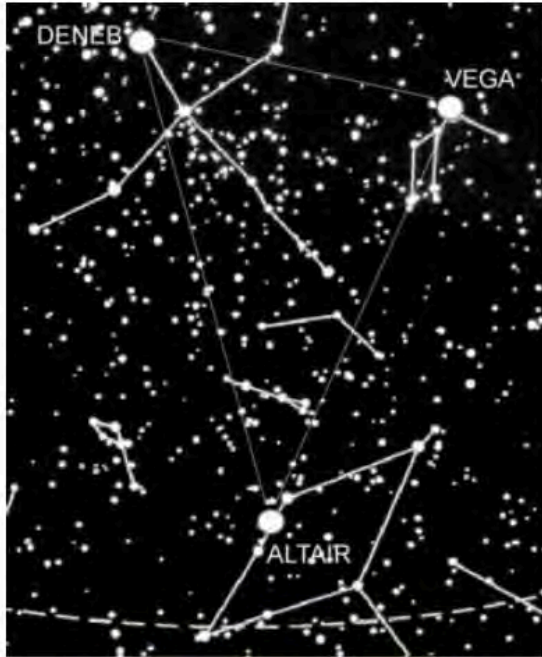
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The **Cape Cod Astronomical Society** meets at 7:30 pm on the first Thursday of every month in the library of the Dennis Yarmouth Regional High School in Yarmouth, Massachusetts. Meetings are open to the public. Membership dues are \$30 for adults, \$15 for students in two year colleges and part year residents, and no charge for spouses or for students in K12 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 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 January 2007/January 2008 *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.
S&T's reliable calculator for Minima of Algol dates and times can be found at:
<http://www.skyandtelescope.com/observing/celestial-objects-to-watch/the-minima-of-algol/>
[If you are not a registered user yet of *Sky and Telescope* online, going to this website will result in arriving at a screen asking you to become a registered user. No need to be a subscriber to either the print or online editions of the magazine. For future access to the S&T website, you will be prompted to enter your user ID and password.]
- 5) Here is the web address for Astronomy Magazine's "The Sky This Month" online for June:
<http://www.astronomy.com/magazine/sky-this-month/2016/04/saturn-at-its-best>
- 6) S&T's interactive Java utility for showing the positions of **Jupiter's main moons** for any date and time:
<http://www.skyandtelescope.com/observing/objects/planets/3307071.html>
for **Saturn's moons**: <http://www.skyandtelescope.com/observing/objects/planets/3308506.html>

See and Hear The Stars of Summer!



The "Summer Triangle"

- This summer, some of the best and brightest stars of astronomy can be seen and heard at Dennis-Yarmouth HS. Come to the library at 730 PM on the first Thursday of the month to see and hear them! Plenty of free parking is available.
- June 2nd - [Dr. Anastasia Fialkov](#) of the Harvard Smithsonian Center for Astrophysics speaks on "The Missing Pages of Cosmic History". She will discuss how we can learn about the early universe, the first stars, and much more by using radio telescope observations of the famous 21-cm line of neutral hydrogen.
- This is a free lecture for the general public, as well as astronomy buffs.
- For D-Y HS layout information and driving directions, see the Cape Cod Astronomical Society website at www.ccas.ws (Click "Old website.")