



# First Light

The Newsletter of the Cape Cod Astronomical Society



**October, 2016** **Vol. 27 No. 10**

*A spectacular “naked-eye” viewing event coming this month:*



*(simulation on Sky Safari on iphone)*

After being “snuffed out” by the leading bright left edge of an 18 day-old waning gibbous moon very late at night on Wednesday, October 19<sup>th</sup>, you won’t need a telescope, or even binoculars, to see bright star **Aldebaran** peek out from behind the right-most dark edge of the right-to-left slowly moving moon. The moon will be surrounded by the many other bright stars of the Hyades asterism in Taurus, but mag 1 Aldebaran,  $\alpha$ -Tauri, the “eye of the bull”, the brightest in the asterism, will emerge from behind the dark side of the moon at about 2:56am.

Yes, that’s early, but the moon will be very high (64° altitude) in the southern sky, so even if you have trees, you should be able to see this wonderful event. *Just set the alarm for 2:40, get outside, and watch the reappearance at 2:56; then go back to bed! No pain, no gain!*

If you want to try to watch the *disappearance* of the star at 1:50am as the bright side “covers it”, (not easy to pinpoint since the moon is so bright) begin observing about 1:40. And yes, binoculars will enhance your experience.

*This is likely to be a best opportunity to view a “naked-eye” lunar occultation of a bright star in many years! Enjoy!*

**Our Next Monthly Meeting is Thursday, October 6th, at 7:30pm in the D-Y High School library.** HSCfA astrophysicist Charles J. Lada will present **The Search for Stellar Origins from Antiquity to the 21st Century**. Dr. Lada will show us how our understanding of objects in the night sky developed from antiquity through the present day.

**Reminder:** The Summer Schedule of Every-Thursday Star Parties at The Schmidt Observatory ended in August. **Monthly “Quarter-Moon-Saturday” Star Parties continue on October 8th, 7:30-9:30pm. Public Welcome.**

**In this issue:** “Naked-eye” Lunar Occultation / Bright New Star / Need Speakers for December and later / Uranus is the “star” Planet this Month- Try with Binoculars! /

## **Bright New Stars:**

We are pleased to welcome Ken Foote of Falmouth to membership in CCAS. Ken is a Senior Scientist at WHOI working in the general area of underwater sound. Ken says he has researched in this area covering the oceans from 55° South latitude all the way to 77° North... 11° above the Arctic Circle! Ken's interest in astronomy and astrophysics has been "curiosity driven" with only occasional observations, including a very special one: the March 7th total solar eclipse observed from Nantucket. Welcome to CCAS, Ken. We wish you many fulfilling new observations as your interest in astronomy grow.

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](mailto:info@ccas.ws)).

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

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## **CCAS News Items and Current Events:**

### **Message from Jim Lynch, new CCAS President:**

#### Speakers:

We have speakers for October and November, but currently are looking for one for December. If any CCAS member would like to speak in December, please contact either Jim Lynch or Mike Hunter. We also will continue to pursue outside speakers.

#### CCAS Directions:

In the last *First Light*, I suggested some possible changes and improvements we might make to CCAS as we move forward. The CCAS officers will meet for first discussions in this area before the October meeting. It is likely that we will try to organize committees to look into various topics. If you would be interested in serving on such committees, whose work will be mostly likely be done by conference calls and/or email, please let either Mike Hunter or Jim Lynch know at our upcoming meeting, or by email. This should be some interesting work, so we hope people will volunteer to help.

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### **CCAS Meetings:**

Many thanks to Jim Lynch for his presentation, **LIGO Revisited** at our meeting on September 1<sup>st</sup>. Following an earlier talk by Mike Hunter which highlighted LIGO technology and the first detection of gravitational waves, Jim provided information on a second important and confirmed detection of gravitational waves which further defines how a once "iffy" billion dollar NSF project has become the superstar performer of modern physics and astronomy. Jim's talk also summarized the history of LIGO and important personalities who contributed to making this technology possible, ...and

recently... successful.

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### **Upcoming Meetings:**

We are pleased to note we will have another visit by an accomplished astrophysicist from the Harvard Smithsonian Center for Astrophysics, for our meeting on October 6<sup>th</sup>.

#### **Charles J. Lada, will present The Search for Stellar Origins from Antiquity to the 21st Century.**

Since he obtained a PhD from Harvard in 1975, Dr. Lada has worked with radio and infrared telescopes on the ground and in space to investigate the origins of stars and planets. He was among the first astronomers to discover and study the Giant Molecular Clouds that are the birth sites for stars and planets, the molecular outflows and jets that drive early stellar evolution, and the gaseous disks that form planetary systems. Recently he has been investigating the role of star formation in driving the evolution of galaxies.

Here is the abstract for his talk:

Most of what we know about the origins of stars and planets, we have learned in the past quarter century. Yet the question of stellar origins is among the oldest in astronomy.

Why did it take so long, thousands of years, to understand the basic nature and origins of stars?

In this lecture I will review ideas and concepts about the nature of stars and stellar origins from the ancient Greeks to Newton and then to William Herschel who, in the eighteenth century, proposed a surprisingly modern picture of star formation.

I will discuss the "dark ages" of the nineteenth century when the infusion of new technology and physics set back research in this field for nearly a century. Finally I will describe the advances in physics and astronomy in the early twentieth century that led to the critical discovery of the true nature of the sun and the stars and set the stage for the renaissance in star formation research that began in mid- to late twentieth century and continues unabated today.

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Dr. Chat Hull, Jansky Fellow of the National Radio Astronomy Observatory, will speak to us on **Star Formation Through Radio Eyes** at our meeting on November 3<sup>rd</sup>. Like Dr. Lada, Dr. Hull is currently based at HSCfA in Cambridge. He is from a small town in upper New York State, and was a high school teacher for some years after graduating from UVA before jumping to graduate work in radio astronomy at Berkeley and now postdoc work in Cambridge.

Here is a short abstract for his talk:

How do stars form? How can we use radio waves to probe the origins of stars within their cold, dusty natal clouds? And how do magnetic fields affect the star-formation process? Come and find out how I use ALMA, a millimeter-wave radio telescope in the Atacama Desert in Northern Chile, to find answers to these questions. I will begin by discussing the basics of radio astronomy, radio telescopes, and star formation. I will then talk about the research I've been doing on

polarization and magnetic fields in forming stars, both as a graduate student at UC Berkeley and as a Jansky postdoctoral fellow at the Harvard-Smithsonian Center for Astrophysics.

**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).

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Jim Lynch, CCAS President, assisted by Mike Hunter, Vice-President, is our present Program Chairman. Please contact Jim or Mike or [info@ccas.ws](mailto:info@ccas.ws) if you have any leads on speakers for December and beyond. As Jim mentioned above, we are especially looking for speakers from the CCAS membership. 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!**

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**CCAS Dues:**

The 2016-2017 dues cycle began on *July 7<sup>th</sup>*. Dues for most folks are \$30/year. If you have not yet paid, please do so this month 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, pursue outreach, and support our Observatory! *Annual Dues payment is part of membership!* Please bring your check to the meeting or mail right away to: CCAS, 34 Ridgewood Rd. Orleans MA 02653. Thank you.

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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.

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The minutes of the September meeting are on our website; click on the “Minutes” button at [www.ccas.ws](http://www.ccas.ws) or click on this link:  
<http://www.ccas.ws/minutes/ccasminutes090116.pdf>

**From the Dome:**

**The “off-season” Schedule of once-per-month “Quarter-Moon-Saturday” Star Parties Continues Saturday, October 8<sup>th</sup> at 7:30pm at The Schmidt Observatory; Public Welcome.**

Want to know what a “Quarter-Moon-Saturday” Star Party is? Our website (“Star Parties and Activities Info” button) describes it this way:

From September thru June, we will have one regularly scheduled Star Party each month on the Saturday closest to the date of First Quarter Moon (about 7 days old); start time: 7:30pm End Time: 9:30pm. When the moon is near its First Quarter, the terminator (the line dividing light from dark) is favorable for viewing sunlight or shadow on the sides of craters. This time is also good for observing the dark side of the moon occult (cover) stars in the sky beyond it as it moves in its orbit.

The continuing schedule for “Quarter-Moon Saturday Star Parties” follows. *Public always welcome.*

Saturday	October 8th
Saturday	November 5th
Saturday	December 10th
Saturday	January 7th
Saturday	February 4th
Saturday	March 4th
Saturday	April 1st
Saturday	May 6th
Saturday	June 3 <sup>rd</sup>

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**October Observing:**

**Observing Resources:**

Please see resources in the October issue of *Astronomy Magazine*, pp 36-43, and *Sky and Telescope*, pp 41-56, for good guides to the sky.

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**Highlights in the Night Sky for October:**

- Last month, mag 8 **Neptune**, a binocular target, was our featured planet. This month Neptune’s “follower” (rises a bit short of an hour later than Neptune), **Uranus**, also a binocular target at mag 5.7, is the star of the show. If you have really good eyesight, the night is dark and clear, there is no moon, and you know where to look, you might even be able to pick out Uranus *without* optical aid. Uranus is at its peak for the year this month. As you can see in our “Mooncusser’s Almanac”, it is up most of the

night this month and is at opposition for this year on October 15<sup>th</sup>. That night, it transits at 12:28am, and sits nicely high in the sky much of the night, highest in our Cape Cod sky, 60° in altitude, at about 11pm EDT. Unfortunately, the 15<sup>th</sup> might not be the best night to look at Uranus since on the 15<sup>th</sup>, our moon is full and, not only is it very bright, but is very close to Uranus most of that night.



However, if not the 15<sup>th</sup>, *do* give Uranus a try several times this month. Learn exactly where it will be when you plan to look by studying a sky simulation program like Sky Safari (\$2.99 app for iPhone available at iTunes) and then, with your binoculars or small ‘scope, plan to star hop to it from a nearby bright star. In our October 10<sup>th</sup> example pictured above, the planet is just a bit below mag 2.8 star Algenib, the “home plate” star in the great square of Pegasus. You should have no trouble seeing it with binoculars if you can star hop from nearby bright stars.

**Minima of Algol<sup>1,3</sup>, October:**

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 are three convenient evening occurrence of the Minima of Algol this month: Friday, October 14<sup>th</sup>, at 1:00am, Sunday, October 16<sup>th</sup>, at 9:40pm, and Wednesday, October 19<sup>th</sup>, at 6:38pm (watch brightening after sunset.)

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.

Mooncusser’s Almanac and Monthly Alert <sup>1</sup> OCTOBER 2016			
Object	OCT 1 (EDT)	OCT 15 (EDT)	OCT 30 (EDT)
Sun	R 06:38 S: 18:22	06:53 17:59	07:12 17:36
Moon	R: 07:13 S: 18:50	17:49 06:14	07:55 18:24
Mercury (predawn)	R: 05:08 S: 17:49	06:08 17:46	07:26 17:42
Venus (evening)	R: 09:18 S: 19:35	09:52 19:26	10:29 19:27
Mars (evening)	R: 13:47 S: 22:33	13:30 22:23	13:08 22:17
Jupiter (predawn)	R: 06:16 S: 18:17	05:36 17:28	04:50 16:33
Saturn (evening)	R: 11:53 S: 21:24	11:04 20:33	10:08 19:35
Uranus (most of nite)	R: 18:50 S: 07:57	17:53 06:59	16:49 05:53
Neptune (most of nite)	R 17:12 S 04:17	16:16 03:20	15:12 02:16
Pluto (evening)	R: 14:19 S: 23:44	13:24 22:49	12:22 21:47

**Moon Phases, October, 2016**

First QTR, Sunday, October 9<sup>th</sup>, at 12:33am, EDT  
**Full Moon**, Sunday, October 16<sup>th</sup>, at 12:33am, EDT  
 Moon is also at perigee this day: **HIGH TIDES**  
 Last QTR, Saturday, October 22<sup>nd</sup>, at 3:14pm, EDT  
 New Moon, Sunday, October 30<sup>th</sup>, at 3:29pm, EDT

**Declination Tables for the Moon<sup>2</sup>** during this month. Please contact your editor for information or sources.

**NOTICE: NEW COPIES OF THE BROCHURE INTRODUCING CCAS AND ITS ACTIVITIES ARE AVAILABLE; INQUIRE AT [info@ccas.ws](mailto:info@ccas.ws) IF YOU WISH COPIES FOR DISTRIBUTION**

## Cape Cod Astronomical Society

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\* Mike Hunter will serve until Jim retires from WHOI later this year.

## Cape Cod Astronomical Foundation

Chairman Emeritus	Werner Schmidt	5083629301
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Secretary	Joel Burnett	5082217380
Treasurer	Gus Romano	7819294770
Observatory Director	Joel Burnett	5082217380
Observatory Phone Line		5083984765

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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.

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## **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), and 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 January2007/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  $\gamma$ Andromedae to Algol's west, mag 2.1, and  $\epsilon$ 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) 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>

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