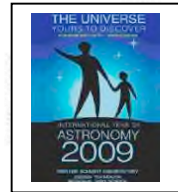




First Light

The Newsletter of the Cape Cod Astronomical Society



September, 2009 Vol.20 No. 9

- [All Members](#): please update your dues!
- **Next Monthly Meeting**: is Thursday, September 3rd at the DY Library. Program notes below.
- **Public Star Parties**: The Summer Wednesday Star Parties having ended August 26, “Fall Tuesdays” Star Parties will take place **every TUESDAY**, at 8:00pm at the Schmidt for all of September and possibly beyond. The Observatory Staff has decided on a **TUESDAY** schedule at least for September because Tuesdays work best for the Observatory Staff. So Star Parties are scheduled on the 1st, 8th, 15th, 22nd, and 29th of September, weather permitting. Check the main page of our website after 6pm to find out about cancellations when the weather looks poor. Please note the starting time is 8:00pm, not 8:30pm EDT for September.
- **Feature Story This Month**: Three of Jupiter’s Moons Disappear at CCAS Star Party!

Bright New Stars:

We welcome Lee Bystock of South Yarmouth to CCAS. Lee hasn’t been to a meeting yet but he did meet up with Ed Swiniarski at the “mostly cloudy” Star Party at The Schmidt on August 5th. Their discussion and Lee’s interest “to become familiar with observation equipment and techniques” resulted in Lee’s applying for membership. Lee is full time on Cape. He has “BARSKA® 7~21 x 40mm” zoom binoculars which we hope he will bring to an upcoming Star Party.”

We like to welcome new members to our Society in this section of First Light each month. If you are a new star 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 ARTICLE FOR PUBLICATION IN FIRST LIGHT.

CCAS Events

Thanks to Betsy Young for her informative presentation August 6th covering the life of astronomer Maria Mitchell. Betsy reviewed Mitchell’s journey from being a comet hunter on Nantucket to becoming the first Director of the Observatory at Vassar College. In 1847, Maria, aged 29, discovered a comet from the rooftop of her home in Nantucket. She was an abolitionist, a suffragette, and

cofounder of the American Association for the Advancement of Women.

We are pleased to announce that Charlie Burke, a former member of CCAS back in the ‘80’s has rejoined us and volunteered to take on the post of Secretary of our club. Charlie was voted into office at our August meeting and provided his first minutes which are available on our website; click on on the “Minutes” button at www.ccas.ws or go to <http://www.ccas.ws/minutes/ccasminutes080609.html>.

Thank you Charlie.

Charlie is back from a defection to the United States where he was a member of a Metro West Astronomy Club. Now he and his wife are full time Cape Codders . Charlie has already helped us at summer star parties

Other Minutes Highlights:

Tom Leach, President, has had name tags made for all members. Upon entering each meeting, please stop at the table near the meeting group to pick up your name tag and check off your name on the Member’s attendance sheet also on the table. Anyone needing a name tag, please contact Tom.

Mike Hunter and Werner Schmidt reviewed the project to mount our 4” TeleVue scope on a new Losmandy equatorial mount and dedicate that ‘scope to digital astro imaging.

Tom Leach presented part of his first message to members all of which is printed below under "Executive Corner."

Many thanks to Tom Leach, Program Chairman, and those persons who have agreed to speak, for the following outstanding speakers' program for the upcoming months:

On September 3rd, former CCAS president Gary Derman will talk about Einstein's telescope and its use in the search for the Dark Matter and Dark Energy that occupy 95% of the universe. Discarded as not practical by Einstein when he first suggested it, the phenomenon has already been used to find new planets and to see objects too distant for even the Hubble telescope alone. Amateurs and professionals alike will use it for the new astronomy of the 21st century.

On October 1st, Robert Brookhart will speak on aspects of missile tower development during the space race in the 1960's. John Kennedy said "We choose to go to the moon not because it is easy but because it is hard." As a structural steel detailer Brookhart worked in California on plans and drawings that led to the Apollo moon shot tower(s) at Cape Canaveral including requisite escape plans for astronaut safety. His work in steel design also got him involved in the Atlas missile silo program.

Executive Corner

Thanks again to Charlie Burke for volunteering for and accepting the role of Secretary. Welcome aboard, Charlie!

From our President:

Being elected as V.P. last year was a great honor. Now being asked at our recent election to lead this group humbles me beyond words. And it has given me a great challenge.

When Jon Greenberg and Mike Hunter first approached me with the possibility of running for President, I raised my eyebrows with some skepticism; I am a relative novice in our field and had joined quite recently only to learn more about astronomy.

I've come to know and respect our past President and Observatory Director and to greatly admire them both. I wasn't sure I could live up to the high standards they've set and needed a year under my belt to watch how this club functions. It was my great fortune that Gary Derman with the support of his wife Helen, was willing to take on the role of President in 2008. Gary is one of the most creative people I know and truly seems to know a great deal about everything in our club and hobby, and has continually shown me how effective can be diplomacy.

As we talked it over, they convinced me that I was up for the challenge and could be a good leader for our club. So I eventually accepted their proposal knowing that I will have great support from them and Peter Kurtz our new Treasurer, and newsletter editor. Now having Paul Cezanne (the astronomer not the painter) at my back as Vice President, we have someone who is a rock star and brings considerable expertise to his position, having served as an active member and leader in other astronomy clubs. A tip of the cap to you both.

The new leadership team has been discussing multiple ideas and agendas by mainly by email so far. We need to restructure some of our committees and come up with a new plan to help streamline our workflow. The calendar for the year needs to be reviewed. Plans possibly beyond a special Saturday Star Party for the fall National Astronomy Day, Saturday, October 24, must be made. New ideas for our website are underway—and that's just scratching the surface.

Gary Derman had a vision for the future of the club. To be honest with you, I don't have one of my own—at least not yet. The plans and ideas that Gary laid out last year still ring true for me. The idea of the club being ours—to make it whatever we want it to be—still resonates with me, and it's my honor to try to keep the Astronomy Club slewing forward. With the help of some very dedicated friends last year, we were able to help lead some effective events. I think we should continue to perfect this mission, and our Society must do everything in its power to keep rolling.

I ask you to get involved. Speak out. Make your voice heard. This Cape Cod Astronomical Society is yours, mine, and ours—let's continue shaping it into something amazing for all of us.

As Tom mentioned, the new Executive Board has been exchanging ideas by email and phone on a continuous basis and will soon formally convene by conference call. Anyone wishing to offer an item to the agenda, please contact Tom, Paul, Peter or Charlie.

All Members please update your dues!

Please be reminded that the 2009-2010 dues were due end of June. As of August 22, 15 of our membership renewed their dues this cycle; 27 members have not yet updated. Of these, 15 paid dues last year in the period October to December. Those that can, please try to get on the summer-summer cycle.

Please bring your check or cash to a meeting and give to Peter Kurtz or mail to the Society address: CCAS PO Box 297 Harwich Port MA 02646. Thank you. .

From the Dome

The box score for our Wednesday summer star parties as of press time is clouds- 9.5, "clear skies-" 3.5. About the 0.5's: Ed Swiniarski, optimistic to the end, met under clouds with one visitor on 8/5 and the two had such a good time that the visitor (See Bright New Stars) has joined the club. 7/29 and 8/12 were cloud-outs, but we did have a very special night with about 25 visitors featuring the disappearing moons of Jupiter and other wonders on 8/19. See the Feature Story beginning on page 4.

Our Meade 16" scope sits on a very sturdy pedestal and is always parked facing North. So it knows where it is and how to move accurately up and down and around. Given this, Mike Hunter thought he might try a new alignment procedure for the 16" that does NOT involve finding the "Home" position and testing azimuthal and altitudinal motions each time the scope is aligned. Such a procedure could result in faster alignments with smaller system error. Mike proved out the simplified and streamlined alignment procedure ("Two Star Alignment") vs the old more complex "Automatic Alignment" procedure in midmonth with good success. Peter and Greg also found it quick and successful at our Star Party on 8/19. The new procedure indeed is faster and minimizes internal system error.

Work on the 18" tracking and GoTo systems continues. The scope did very successful "Push-To's" at our 8/19 Star Party.

Wonder of wonders! The floors of the Schmidt Observatory were cleaned and resurfaced during August. Come see our beautiful clean floors!

Reminders:

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.

Foundation News...

The Losmandy G-11 equatorial mount detailed in this space last month has been received. Details for mounting our Televue 4" refractor on the Losmandy, lining the system out for digital astro-imaging, and preparing a pad outside the Dome for its operation are all under study at this time.

Reminder:

CCAS has both 8" and 14" Dobsonian telescopes for loan to members. Currently, Tom Leach is using the 14" for outreach in Harwich. If you wish to borrow one of these 'scopes, contact info@ccas.ws

September Observing:

Our feature story beginning on page 4 on our actual observations of Jupiter *having only 3 Galilean moons* at the CCAS Star Party on August 19th retells a special observing experience. With luck, we will have seen it again like that at the Star Party scheduled for August 27.

An even more unusual event will take place the night of September 2-3. While it will not be happening on the night of a regularly scheduled CCAS Star Party, a bit after midnight on that night, *NONE of Jupiter's main moons will be visible!* Please see page 6 for more information.

During September, mag 5.7 **Uranus** pairing with the mag 7.6 asteroid **Juno** form a pair of pairs with, about 30° to the east, bright (mag -2.7) **Jupiter** pairing with blue mag 7.8 **Neptune**. This west-to-east quartet provides continuous good observing transiting about 31° above the horizon as they pass by one-by-one each evening. If you observe during September, be sure to take in each of these easy to see opportunities. Since both Neptune and Uranus are close to opposition, (August 17th and September 17th respectively,) there will not be a better season for these two for quite some time. Both should be easy *binocular targets*. See reference 4 for finder charts.

We have equinox, approximately 12 hours of daylight and 12 hours of night on September 22nd. The sun's angle at noon is half way down to its low position at winter solstice at 5:39 pm on that date after which sunrise and sunset will begin to take place south of east and south of west respectively. Prior to equinox, the sun was rising and setting to the north of east and west.

Of academic interest: at dusk on September 4th, **Saturn's rings** will be dead edge on; i.e., not visible. They have been close to edge on most of the recent Saturn season. Unfortunately, this full edge on apparition will not be visible to most of us since Saturn is buried in sun glow.

Don't forget to go out about 4:30am one morning soon, and take your baseline reading on the brightness of the very slowly eclipsing variable star **ϵ -Aurigae**. A reading now will capture the brightness before it begins its several months'-long dimming. See the story in last month's First Light.

Early Autumn is the best time in our hemisphere to see the **zodiacal light** before dawn. While you are up taking your brightness measure on ϵ -Aurigae, you might see the z light on and above the horizon in the east. Begin looking 2 hours before sunrise especially the two weeks beginning with September 16th..

Mercury lives in the sun at September's beginning (inferior conjunction on September 20th) but will be visible before

sunrise very late in the month.

Periodic magnitude 9.4 Comet 22P/Kopff is conveniently placed in Aquarius for evening viewing with a good telescope. It moves at a moderate clip toward the west in that constellation from end August through September 18 when it begins to slow while making a retrograde turn.

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 and the information or sources will be provided.

Moon Phases, September, 2009

Full Moon Friday, Sept 4th at 12:03pm EDT
Last QTR Friday, Sept 11th at 10:16pm EDT
New Moon Friday, Sept 18th at 2:44pm EDT
First QTR Saturday, Sept 26th at 12:50am EDT

Mooncusser's Almanac and Monthly Alert¹ By Peter Kurtz SEPTEMBER, 2009

Object	Sep 01 (EDT)	Sep 15 (EDT)	Sep 30 (EDT)
Sun	R 06:07 S: 19:14	06:21 18:50	06:36 18:24
Moon	R: 17:33 S: 03:20	02:43 16:53	16:27 03:13
Mercury (eve then am)	R: 08:23 S: 19:54	07:17 18:51	05:16 17:48
Venus (predawn)	R: 03:21 S: 17:48	03:52 17:43	04:26 17:32
Mars (predawn)	R: 00:40 S: 15:51	00:24 15:32	00:06 15:06
Jupiter (evening)	R: 18:22 S: 04:32	17:23 03:30	16:21 02:25
Saturn (eve then am)	R:07:14 S: 19:54	06:28 19:03	05:38 18:08
Uranus (evening)	R: 19:46 S: 07:35	18:50 06:37	17:50 05:35
Neptune (evening)	R: 18:31 S: 04:59	17:35 04:02	16:35 03:01
Pluto (evening)	R: 15:02 S: 00:57	14:07 00:01	13:09 23:02

Feature Article: A Very Special "Catch" at a CCAS Star Party!

The section "August Observing" in last month's First Light gave notice of multiple evenings in August when most interesting movements of the Galilean Moons of Jupiter, Io, Europa, Ganymede, and Callisto, might be observed. Of course any night Jupiter is up the positions of the moons and the movement of the faster moving moons is always of interest. But on certain nights, a very special show can be observed in just a few hours.

One such special night was our Star Party on Wednesday, August 19th. At one point in the evening, most of us there had the opportunity to see Jupiter flanked by only ONE moon: Callisto. Where were the others?

A few hours before that Star Party, your editor looked up the forecast for the Galilean moons on S&T's Jupiter and Moons website.⁵ This table from that reference shows that a very special sequence of events would take place during prime viewing time.

Movements of Note of the Galilean Moons, August 19, 2009

6:12 EDT	22:12 UT, Ganymede begins transit.	9:48 EDT	01:48 UT, Ganymede ends transit
6:44 EDT	22:44 UT, Ganymede's shadow first shows.	10:22 EDT	02:22 UT, Europa ends transit.
7:23 EDT	23:32 UT, Europa begins transit.	10:22 EDT	02:22 UT, Ganymede's shadow ends.
7:46 EDT	23:46 UT, Europa's shadow first shows.	10:38 EDT	02:38 UT, Europa's shadow ends.
8:16 EDT	00:16 UT, Io enters occultation behind Jupiter.	10:42 EDT	02:42 UT, Io reappears behind Jupiter.

If correct, this forecast implies that between 8:16pm EDT and 9:48pm EDT, *three of Jupiter's four main moons will have disappeared!*

And a special observing experience we had indeed. Because this experience was so unique, it is worth the retelling here in the hope it might stimulate people to check out the schedules for Jupiter and moons any clear night they might be thinking about observing and for sure any night CCAS has a Star Party scheduled when Jupiter will be up.

The panels below, taken from a second simulator available on the web⁷ show the unfolding of events. These images are true images as one would see through high power binoculars. In actuality *the views we actually had* through our two very excellent telescopes, the Meade 16" and the Obsession 18" Dob, were very close in appearance to what is shown in these simulation panels but in the telescopes all images and motions were left-to-right mirror images of what you see below. In the panels below, C, E, G, and I show the positions of Callisto, Europa, Ganymede, and Io respectively; dark circles show moon shadows on the planet. The first three panels show events that took place before we began observing at about 8:30pm EDT.

Note that because of the brightness of Jupiter most of us could not see the moons themselves when in front of the planet; (these simulations show the positions of both the moons and shadows); *we could* see the moons when not superimposed on the planet on either side and we *could* see the shadows of both moons (some could only see the larger shadow of Ganymede) as they moved across. The shadows we saw were smaller than the black smudges in the simulation panels below. These panels show Jupiter itself and distances to moons almost exactly as they looked in our scopes. But the shadow of Ganymede on this scale was a very small dot and the shadow of Europa, a dot smaller than that.

I. This panel sets the stage. 5pm EDT. Callisto will remain essentially non moving in the time frame of our observations. Ganymede will soon (6:12) move left-to-right beginning transit to be followed by Europa. Io will move back counterclockwise to become lost behind Jupiter and its shadow.



II. 6:20 pm EDT. Ganymede begins transit at 6:12



III, 8:16 pm EDT. Both Ganymede and then Europa and their shadows are all on Jupiter and are transiting left-to-right. Io is just disappearing behind the planet.



WE BEGAN OBSERVING AT ABOUT 8:20 AND DID SEE EVENTS AS SHOWN IN THE NEXT 3 PANELS. EXCEPT FOR THE FACT OF MIRROR IMAGING, AND THE FACT THAT OUR SHADOWS WERE "DOTS", THESE SIMULATION IMAGES ARE VERY SIMILAR IN SIZE AND DETAIL TO WHAT WE ACTUALLY OBSERVED

IV. 8:20pm EDT. Io has gone behind. We observed the G and E "dot" shadows moving across the planet as shown here and in the next two panels until about 9:45pm when the moons began to pass beyond transit. In this situation, if you had looked at Jupiter with a telescope less capable than our 16" or 18" and could not see the shadows, you would have "observed" that *three of Jupiter's moons had completely disappeared!*)



V. Remember, we can only see the shadows of the transiting moons, not the moons themselves. An hour later, 9:20pm EDT. Ganymede soon to begin its reappearance. Io still behind. Both shadows still visible.



VI. 10:20pm EDT. Our last observation. Io still behind. Both Ganymede (farthest right) and Europa close behind form a tiny chain on the right side of the planet. A keen-eyed observer might still see the last shadow on the edge.



VII. 10:42pm EDT. As we were shutting down the Observatory Io was reappearing from behind Jupiter. All is now well in the universe: Jupiter has 4 Galilean moons again!



Observing the positions of Jupiter's moons with the excellent equipment we have at The Schmidt is always rewarding. When we can watch moons *disappear* and *make shadows* which *move* during our hour or two of observing on a given night is uniquely rewarding.

How often do disappearances and dramatic motions like this take place during the Jupiter evening season in our summer/fall months; i.e., from 9pm to 11pm beginning about July 15th; as early as 7pm through 11pm toward end October? Take a look at the table available on the web from Sky and Telescope. ⁷ For 2009, at least one of disappearance, reappearance, or shadow transit take place in prime viewing time from 8 through 11pm on *10 of the 31 nights in August; 11 of the 30 nights in September, and 16 of the 31 nights of October!* Look at the reference, find the events that interest you on a given Star Party night, come on out to the Schmidt Observatory, and enjoy moons disappearing, reappearing, and making shadows moving across Jupiter! If you can't make it to the Schmidt, take your own or a neighbor's 'scope or binoculars, and see how many moons you can see and what they are doing over an hour or so.

When you have one pattern, it is not unusual to see it again in fairly close succession. We saw "only Callisto" for a period at our Star Party on Wednesday, August 19. Well, a week later, on Wednesday, August 26, the "only Callisto" phenomenon will be visible again from 10:00pm EDT until 12:36am EDT. Hopefully it will have been clear for our Star Party scheduled that night.

JUPITER MOON ALERTS FOR THE FUTURE:

If you don't mind observing later in the evening, for a while after midnight, on the night of September 2nd/3rd, ALL the main moons of Jupiter will disappear! Not just three like we lost on 8/19... but all four!

It will be ten years before the next time all four are "hidden". Here's a primer to how it will happen beginning the night of September 2nd: Callisto will move behind Jupiter at 7:19pm EDT. Io moves behind at 11:43pm EDT. At that time, Europa and Ganymede are poised to disappear by passing in front; all four will be "gone" by 12:43am EDT. Check out the details using the tools at references 5, 6, and 7, and, weather permitting, watch at least until all have disappeared. Io should peek back at 2:29am.

Astro Trivia Question: Do you Know Why Jupiter's largest moons are called the "Galilean" Moons?

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.

**A Project Idea?
A Photo?
A Piece of Club History?
A Short Profile on Yourself, New or Old Members!?**

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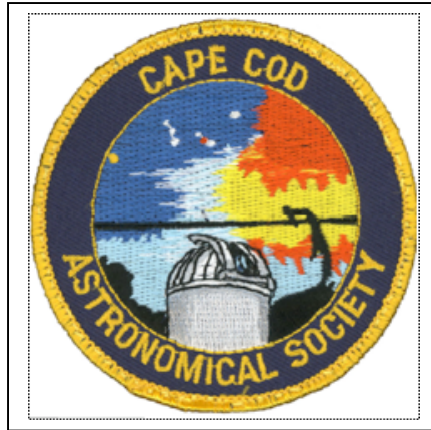
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The **Cape Cod Astronomical Society** meets at 7:30 pm on the first Thursday of every month in the library of the Dennis-Yarmouth Regional High School in Yarmouth, Massachusetts. Meetings are open to the public. Membership dues are \$30 for adults, \$15 for students in two year colleges and part year residents, and no charge for spouses or for students in K-12 schools.



Reference Information:

- 1) Information for The Mooncussers Almanac and Monthly Observing Alerts was extracted from Sky Events, Astronomy Magazine Online (Astronomy.com), Stargazing.net's Planet Rise/Transit/Set calculator (<http://www.stargazing.net/mas/planet2.htm>), *Astronomy Magazine*, *Sky & Telescope Magazine*, *Sky and Telescope Skywatch 2007*, and other sources. The *Observer's Handbook, 2007 and 2008*, published by The Royal Astronomical Society of Canada is also an important reference, particularly for information on lunar libration and declination and the minima of Algol.
- 2) Information on how Libration and Declination Maxima and Minima can make visible parts of the moon normally hidden was reviewed in the December-January 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) On Uranus, Neptune, and Juno: see the September issue of Sky and Telescope: story with charts beginning page 55.
- 5) <http://www.skyandtelescope.com/observing/objects/javascript/jupiter#> This reference also provides simulation images "truer to life" than the images in reference 6 but we used images from reference 6 for this presentation because the moon shadow positions are more easily seen in the images from 6 and show up better when printed.
- 6) "Javascript Jupiter" <http://www.shallowsky.com/jupiter/> Thanks to Bernie Young and Paul Cezanne for finding this tool for us. This simulator shows shadow positions easier to see than reference 5 but the images from 5 show images truer to life; i.e, it is really hard to see the shadows. Now and then the Shallowsky reference will make an error on positioning of Callisto. Reference 5, the Sky & Telescope simulator is thus more robust.
- 7) <http://media.skyandtelescope.com/documents/JphenTab09.pdf>