



First Light

The Newsletter of the Cape Cod Astronomical Society



September, 2016 Vol. 27 No. 9

Did You Know [The Werner Schmidt Observatory](#) is featured on the "Trip Advisor" travel advisory site on the Web?

Check it out! Go to www.tripadvisor.com then click on "Things to Do" ; enter South Yarmouth MA, and scroll down a ways through the offerings and you will find:



Werner Schmidt Observatory
 #16 of 20 things to do in South Yarmouth
 5 reviews
 "Check the newsletter on the web si..." 05/20/2016
 "Wonderful!! A trip highlight!!" 08/16/2014

Observatories & Planetariums

"Wonderful!! A trip highlight!!"
 Reviewed August 16, 2014 via mobile

We were able to go on a Thursday night at 830 when they let the public visit and it could not have been better. The staff are volunteers who are extremely knowledgable and friendly. We were able to view Saturn, a huge nebula, the International Space Station, etc. etc. It is a little out of the way and the observatory...

My wife and I had a wonderful time visiting the Werner Schmidt Observatory and Cape Cod Astronomical Society during one of their recent Thursday evening star-gazing events. You can visit each Thursday. The first Thursday of the month they have a speaker in the Dennis-Yarmouth High School Library at 7:30pm followed by the star-gazing in the observatory if the weather...

...More on page 5...

Our Next Monthly Meeting: is Thursday, September 1st, at 7:30pm in the D-Y High School library. Jim Lynch, President of CCAS will present **LIGO Revisited**, a deeper look into the LIGO (Laser Interferometer Gravitational-Wave Observatory) facilities and the discoveries that have been accomplished and will be accomplished.

Reminder: The Summer Schedule of Every-Thursday Star Parties at The Schmidt Observatory has ended. Monthly "Quarter-Moon-Saturday" Star Parties begin on September 10th, 7:30-9:30pm. Public Welcome.

In this issue: Message from CCAS President / "Quarter-Moon" Star Parties Begin / Asteroid Occultations / Visits by Scouts / Neptune stars at night; Mercury stars at dawn / Autumnal Equinox / Tutorial on Astrophotography by Member Ron Hill/

Bright New Stars:

We are pleased to welcome Kim Christensen and Brian Glick of North Truro (summers) and New Rochelle to membership in CCAS. Kim and David will be with us only "in season" until they retire. Kim teaches Economics at Sarah Lawrence and Brian teaches Law at Fordham. They are hoping CCAS membership will help them to "rekindle a childhood love of astronomy".

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:

Message from Jim Lynch, new CCAS President:

After the presentation by our Guest Speaker Professor Antony Stark at our meeting on August 4th, Jim Lynch provided us an overview of some ideas he has put together looking to a stronger more effective Society as we move forward. Jim has collected the ideas from his presentation into a summary document which you can find beginning on page 5 of this issue of *First Light*

Thank you, Jim, for your first steps in helping us be "all that we can be."

CCAS Meetings:

Many thanks to HSCfA Professor **Antony A. Stark** for his presentation, **Cosmology with the South Pole Telescope**, at our August 4th meeting. Professor Stark updated us on new discoveries from the detection and analysis of faint features in the Cosmic Microwave Background.

Upcoming Meetings:

We are pleased to announce that Jim Lynch, President of CCAS will present **LIGO Revisited** at our meeting on September 1st.

Here is the abstract for Jim's presentation:

Right after the LIGO (Laser Interferometer Gravitational-Wave Observatory) project announced that it had unambiguously measured gravitational waves for the first time ever, then President of CCAS, Mike Hunter, gave a presentation to CCAS on the LIGO facility and its new discoveries. Since then, another detection has been announced, and a once "iffy" billion dollar NSF project has become the superstar performer of modern physics and astronomy. In my talk, I would like to extend and update the information Mike provided.

LIGO is a big project, and worthy of more than one talk this year! I will discuss LIGO's history, experimental

underpinnings, measurement aims, and recent accomplishments. As always, I will work to make the talk entertaining! Please note: To help us prepare for Jim's talk, we have found a most intelligible article on LIGO and its capabilities, "A Wrinkle in Space-time Confirms Einstein's Gravitation", at...

<http://astronomy.com/bonus/gravity?spMailingID=24700511&spUserID=MTE2MjkxNTUzMzU2S0&spJobID=741922086&spReportId=NzQxOTIyMDg2S0>

Thanks to Jim Lynch for recruiting another accomplished astrophysicist from HSCfA, Charles J. Lada, who will speak to us at our meeting on October 6th.

Dr. 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 sights 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.

Jim informs us that astrophysicist Chat Hull, on staff at HSCfA, will speak on **Radio Astronomy, Star Formation, and Magnetic Fields** at our meeting on November 3rd.

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).

Jim Lynch, CCAS President, assisted by Mike Hunter, Vice-President, is our present Program Chairman. Please contact Jim or Mike or info@ccas.ws if you have any leads on speakers for December 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:

The 2016-2017 dues cycle began on July 7th. Dues for most folks are \$30/year. Please pay your 2016-2017 dues this month if possible, even if you have been accustomed to making payment at other times of the year.

If you consider yourself an active member and are eligible to pay dues, please do so as soon as possible.

We need this money to pay our bills, pursue outreach, and support our Observatory! Please bring your check to the meeting or mail right away to: CCAS, 34 Ridgewood Rd. Orleans MA 02653. 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 August meeting are on our website; click on the "Minutes" button at www.ccas.ws or click on this link: <http://www.ccas.ws/minutes/ccasminutes080416.pdf>

From the Dome:

The Summer Schedule of Every-Thursday Star Parties at The Schmidt Observatory ended Thursday, August 25. The summer schedule will restart next June.

The "off-season" Schedule of once-per-month "Quarter-Moon-Saturday" Star Parties Begins Saturday, September 10th 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	September 10th
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 3rd

Bernie Young and Friends will try to observe one or More Asteroid Occultation of Stars during September:

Thanks, Bernie, for sending us this alert:

Two asteroid occultations are coming up in September. Asteroid (58) Concordia will occult a 12.5 magnitude star on Friday the 9th of September at 8:37 EDT. This will be a challenge, since the moon will only be 3 degrees away, but the 6.5 second occultation should allow integration without losing too much precision.

The next event involves (372) Palma occulting a 10.1 magnitude star on Tuesday the 13th at 11:11 EDT for 14.5 seconds. Seven of our colleagues living elsewhere have declared their attention to observe too, but we are nearest the centerline of the shadow. We anchor the eastern end of the observer list, which includes stations in Washington, Oregon, Minnesota, Illinois, Ontario, Pennsylvania, and Connecticut.

If the weather cooperates, I will open the WSO at 7:30 each of those evenings to begin tracking the asteroids. All are welcome to participate and observe. Call the WSO at 508-398-4765 after 7:30 if in doubt about the weather.

As I started writing this announcement, the calculations for a *third* occultation this month were revised, placing us outside the path of the shadow. There may be further changes....

Two Groups of Scouts Visited The Schmidt during August:

We are pleased to report that a group of Scouts visited The Schmidt on Friday, August 19th; a second contingent of Scouts visited on Thursday, August 25. Hopefully Joel or Bernie or another member of the Observatory Staff will send us a brief report and maybe even a photo! Good job, folks!

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.

September Observing:

Observing Resources:

Please see resources in the September issue of *Astronomy Magazine*, pp 36-43, and *Sky and Telescope*, pp 41-56, and Reference 5 for good guides to the sky.

There is a very special long article in the September issue of *Astronomy*: **100+ Years of Astronomical Discoveries** is covered in pages 21-35 and continuing in pages 44-67.

If you are new to Amateur Astronomy, and would enjoy an excellent tutorial on the history of our favorite science, do try to access a copy of this article!

Highlights in the Night Sky for September:

- Mag 8 **Neptune**, a binocular target if you search carefully, is at its peak for the year in September culminating on the 2nd when it reaches opposition (earth is directly between the planet and the sun). When a planet is at opposition, it rises pretty much at dusk, is overhead mid night, and sets near dawn. So you have all night to look. Best at its highest when at transit, 12:41am EDT, when it is at 40° altitude in the south.



This Finder chart from *Astronomy* points out our blue planet on September 2nd as sitting about 9/10ths of the way from

σ -Aquarius (middle right in the image) to λ -Aquarius (up and left of σ) on a line between the two mag 4 stars. Worth a try with binoculars; piece of cake with a telescope.

- Mercury** puts on one of its best predawn shows this year being at western elongation on September 28th. At 30 minutes before sunrise, it is 12° above the horizon at mag -.5. Can you see the tiny tiny waning 27.2 day-old crescent moon a bit above it?
- The **Autumnal Equinox** takes place on Thursday, September 22nd, at 10:21am EDT. On this day, all over the globe, the hours of daylight are almost exactly the same as the hours of dark ("equi-nox!")

Mooncusser's Almanac and Monthly Alert ¹			
SEPTEMBER 2016			
Object	SEPT 1 (EDT)	SEPT 15 (EDT)	SEPT 30 (EDT)
Sun	R 06:07 S: 19:14	06:21 18:50	06:37 18:24
Moon	R: 06:19 S: 19:15	17:56 04:55	06:09 18:18
Mercury (predawn)	R: 07:54 S: 19:36	06:02 18:24	05:05 17:50
Venus (evening)	R: 08:06 S: 20:11	08:39 19:53	09:15 19:36
Mars (evening)	R: 14:21 S: 23:12	14:05 22:50	13:48 22:34
Jupiter (close to sun)	R: 07:42 S: 20:01	07:02 19:12	06:19 18:21
Saturn (evening)	R: 13:44 S: 23:17	12:52 22:24	11:57 21:28
Uranus (evening)	R: 20:51 S: 10:01	19:55 09:04	18:55 08:02
Neptune (evening)	R 19:13 S 06:19	18:16 05:22	17:16 04:21
Pluto (most of nite)	R: 16:18 S: 01:44	15:22 00:48	14:23 23:49

Minima of Algol^{1,3} September:

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 two convenient evening occurrence of the Minima of Algol this month: Thursday, September 3rd, at 9:39pm, and Monday, September 26th, at 8:08pm.

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.

Moon Phases, September, 2016

New Moon, Thursday, September 1st, at 5:03am, EDT

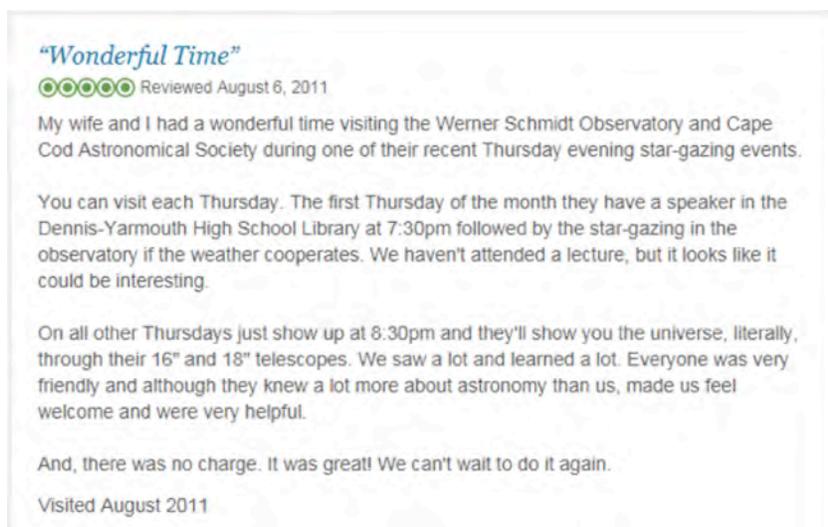
First QTR, Friday, September 9th, at 7:40am, EDT

Full Moon, Friday, September 16th, at 3:05pm, EDT

Last QTR, Friday, September 23rd, at 6:56am, EDT

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

More from TripAdvisor...obviously this has been going on for a while.



Some thoughts about CCAS from Jim Lynch, new Society President

At this point in time, I expect many of you know me from the CCAS meetings, and perhaps even voted for me for this year's President. However, I suspect many reading this article do *not* know me, and so I'd like to briefly introduce myself before turning to some thoughts about CCAS and its future. This text reflects points I made in a presentation at the CCAS meeting on August 4th. Power Point slides are available from me or info@ccas.ws .

As to my background, I am a physicist by training, with a Ph.D. (1978) in nuclear and particle physics from the University of Texas at Austin. I even took a few astronomy courses in grad school, so I'm not a total stranger to the theory side of astronomy (though it has come a huge way since 1978, and I'm enjoying catching up.)

Professionally, I have done ocean acoustics and acoustical oceanography for a career. I am a Senior Scientist at Woods Hole Oceanographic Institution (WHOI) and Editor-in-Chief of the *Journal of the Acoustical Society of America*, JASA), which are my "paying jobs." I will be retiring from WHOI as of January 1st, 2017; until then Mike Hunter will be covering some of the presidential duties for me as needed. (Thanks, Mike!) I have been an amateur astronomer pretty much my whole life. I like

astrophotography and am trying to gain some skills in spectroscopy as well.

I also have served in a few administrative positions (Department Chair, Editor, and Chief Scientist), so I think I can bring some admin skills to the table as CCAS's new President. That is why I agreed to run. And that brings me to what I most want to talk about - CCAS's future.

First, as a fairly new member (two years), let me say how impressed I am with what CCAS has accomplished through the years. The lectures, star parties, and education programs are all first rate, and a tribute to CCAS's members and officers. Any improvements I can help bring to CCAS will be built on a historically firm base. Also, please note that all of the points below are ideas and suggestions, and are intended to initiate discussion, and not be some sort of fixed roadmap or agenda.

Here are some "Issues to Address" from my presentation of August 4th:

The first item of note is that I have somewhat changed the meeting format for this year. Using a format I have seen work elsewhere, I have let our Guest Speaker be the lead speaker, followed by a brief break, and then our CCAS short technical talks and Society business. The Guest Speaker will (usually) be welcome to attend the Society part of the meeting, but often our speakers from outside like to get home sooner than later, and this format lets them do so.

The second item that I thought needed addressing was the *demographics of CCAS*. Plainly put, at present, it is an older demographic, and it would be nice to see more participation by younger people. (Nothing against the older demographic, by the way, spoken as a card-carrying member of it. Older, often retired, people tend to have a bit more spare time than younger people with career and family pressures.)

I think we need to work to attract more members of all ages, with some added emphasis on the younger people. To this end, I propose a Membership Committee. I would envision such a committee:

- 1) making a report to the membership on CCAS's demographics (spatial and age distributions) and total size of the membership (Peter Kurtz, Treasurer, maintains data on all active members.)
- 2) creating a report on how to recruit more active members,
- 3) assisting the Treasurer of CCAS in keeping a current membership list,
- 4) as an extension of the previous points, creating a second report that considers member retention via continual engagement in interesting activities (at meetings, at star parties, via education, via outreach, etc.), and,
- 5) creating one more report on Observatory Staff and key member backup possibilities.

This is a lot of work, but it also would allow members who are not staff or Officers a chance to engage in Society activities more actively. This effort may also be key to insuring a healthy future for the Society.

The third item is public communications. Specifically:

- 1) the CCAS web site needs upgrading, and
- 2) Peter Kurtz has been writing the newsletter, *First Light*, for more than a decade;
-- he is also our current webmaster (is designer, coder, etc. for both data updating and the structure of the site.)

After ten years writing the newsletter, Peter has expressed an interest in handing over the reins to a new person or persons in the not-too-distant future.

These are two major and important tasks, and we will need a few people to investigate opportunities for improvements. Thus I would propose a Web Site and Newsletter Committee to look into possibilities and report to the Society.

I recommend that we strengthen the website by having more than one person do all the work. A "Web Site" committee could, explore other sites, web designers, etc. and report back to the Society. Regarding the newsletter, I think it could be shortened, and a committee could explore ways to distribute the writing/editing chore and other improvements.

A fourth item to consider is Outreach and Advertising. Specifically, we should look into:

- 1) expansion possibilities (occasional star parties and lectures in towns further away from D-Y, where we have many members),
 - 2) better advertising for our functions and the Society (reviving the brochure, etc.), and
 - 3) look for possible external funding possibilities (beyond just dues) which would allow us to do more things, such as providing speaker transportation, getting students and young people to star parties, going to external events, etc.
- Again, an Outreach and Advertising committee tasked with looking at these issues and reporting to the Society might be a way to go.

A fifth item on the list (which is not endless, but is admittedly a bit long) is education. It would be nice to get a Society overview of current educational activities being pursued. It would also be good to see what other opportunities we could pursue

on Cape. An expanded list of astronomy related projects that could be pursued at all age levels would be of interest. Again, a committee could be tasked to look at these issues.

The sixth item on my list is a fairly simple one - increasing the frequency of CCAS officer meetings. The Foundation officers meet every third Wednesday at Werner Schmidt's house, but the CCAS officers do not meet formally. This should be changed, at least to a quarterly meeting.

The penultimate item on my list is Society/Foundation functions. The Society and Foundation functions merge at many points. A good example is star parties. The Society newsletter advertises star parties at the Observatory, the people hosting the star parties are all Society, part of them, Observatory; further, participation in star parties is mostly by Society members. Thus, at least looking at the possibility of combining the two legally separate entities should be done.

Toward that end, a small working group has been formed, and is looking at the issues related to insurance as well as joint Society /Foundation functions. The insurance issue, which is important to continuing operations, seems to be in order.

The last item is my suggestion for a Society retreat, where we can talk about these issues, followed by a small social occasion such as a pot-luck dinner and star party.

All of these are suggestions. People may or may not like them, they are subject to modification and change, and they may or may not be acted upon. That is the Society's decision. I just offer them in hopes of further improving an already active and vital CCAS.

Planet Astrophotography, by new CCAS Member, Ron Hill

Thanks to Ron Hill for sending us this tutorial on Astrophotography and sample photos.

Here follows two images of Saturn Ron Hill took using the 16" Schmidt-Cassegrain at The Schmidt Observatory followed by his discussion of techniques and equipment used. One image is "raw", the other is "after processing" as he describes.

Members and Friends: Please send us stories about your observing or astrophotography adventures. We can learn a lot from each other!



...before processing...



...after processing...

Equipment Used

ZWO ASI120MC Planetary imager
Laptop
Meade 16" ACT
Explore Scientific 2X Barlow

Software Used

Firecapture
AutoStakkert
Registax 6
Photoshop 5

Astrophotography of Deep Space Objects is a challenging part of our astronomy hobby. It tends to be a rabbit hole of gear, adapters and other gear. Planetary imaging on the other hand has become easier than it was in the past.

Today, to get great pictures of the planets requires a web cam or planet cam, a scope with a long focal length (SCT's are great for this), and a mount.

The webcam/planet imager takes hundreds of frames in a matter of minutes.

Stacking software finds the best frames and stacks them.

The mount can be either an AZ or EQ. My image below was taken on the 16" telescope at The Schmidt Observatory which tracks well on an alt/az mount.

Bernie Young, my wife Karen, and I got the 'scope on Saturn. Got it well centered with a crosshair eyepiece. At that point, I fired up Firecapture, software that directs the camcorder. Firecapture has default settings for each planet. There is a view screen on the software, which allows live viewing. I set it for Saturn, and adjusted the gain and frame rate until I could see the features on the planet. On Saturn, a good judge is the spilt between the rings. The focus will need to be adjusted to get a crisp image. On SCT 'scopes, there may be some image shift; adjust the 'scope as needed.

At this point, you hit the play button on Firecapture and it will start recording. It will create a video (AVI file) of the planet. On Saturn, many minutes of video can be taken since the rotation of the planet is so slow. On Jupiter, 5-60 seconds is recommended since the planet is spinning faster.

Once the video is done, a stacking step is used. Autostakkert is my preferred program.

Recommended settings.

- Image Stabilization: Planet
- Quality Estimator: Gradient
- Noise Robust: 4
- Stack: 50% of frames

Hit the analyze button, the analysis will take a few minutes to complete depending on your computer speed. Then hit stack. This should go quickly. A file will be created in the same directory as the video.

At this point, open RegiStax 6 and drag and drop the pic file into the program. You will be in the wavelet section. Adjust the wavelet settings to your liking. Wavelet is a powerful tool. It will really bring out the details in the planet.

Last step is Photoshop. The only things I do is create a duplicate layer, and run a high pass filter at a setting of 5 to 10. Then flatten the image. At this point, I use an unsharp mask to get the details out. Finally I use a despeckle noise filter to clean up the image.

That is a brief overview on how to make planet pictures. Below are links to the free software:

<http://www.autostakkert.com/>

<http://www.firecapture.de/>

<http://www.astronomie.be/registax/>

If members have questions, please contact me. I can save a lot of the learning curve.

Cape Cod Astronomical Society

President	Jim Lynch*	5083646192(cell)
Vice President	Mike Hunter	5083643370(cell)
Secretary	Gus Romano	7819294770
Treasurer	Peter Kurtz	5082550415
Observatory Director	Joel Burnett	5082217380
<i>First Light</i> Editor	Peter Kurtz	5082550415

info@CCAS.ws

Mailing Address: A. P. Kurtz, CCAS Treasurer, 34
Ridgewood Rd, Orleans MA 02653

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

Cape Cod Astronomical Foundation

Chairman Emeritus	Werner Schmidt	5083629301
Chairman	Mike Hunter	5083859846
Vice Chairman	Ed Swiniarski	5088965973
Director of R&D	Bernie Young	5083941960
Secretary	Joel Burnett	5082217380
Treasurer	Gus Romano	7819294770
Observatory Director	Joel Burnett	5082217380
Observatory Phone Line		5083984765

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), 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 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) Usually, we would cite here the web address for Astronomy Magazine's "The Sky This Month". For some reason, the September edition of "The Sky This Month" is not available online this month. Maybe next month, we'll be more fortunate.

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>