



First Light

The Newsletter of the Cape Cod Astronomical Society



November, 2010

Vol.21 No. 11

What We Thought in Antiquity

...(this month, in honor of our current comet Hartley, a poem from the 19th century):

I am like a slip of comet

...by Gerard Manley Hopkins

*I am like a slip of comet,
Scarce worth discovery, in some corner seen
Bridging the slender difference of two stars,
Come out of space, or suddenly engender'd
By heady elements, for no man knows;
But when she sights the sun she grows and sizes
And spins her skirts out, while her central star
Shakes its cocooning mists; and so she comes
To fields of light; millions of travelling rays*

*Pierce her; she hangs upon the flame-cased sun,
And sucks the light as full as Gideons's fleece:
But then her tether calls her; she falls off,
And as she dwindles shreds her smock of gold
Between the sistering planets, till she comes
To single Saturn, last and solitary;
And then she goes out into the cavernous dark.
So I go out: my little sweet is done:
I have drawn heat from this contagious sun:
To not ungentle death now forth I run.*

[Please see notes and source for this poem on page 6 of this issue of First Light]

- **Next Monthly Meeting:** is Thursday, November 4th at the D-Y Library. Stephan Martin will give an overview of some of the major events in cosmic history up to the present, as well as some of the observational evidence for and significance of these events. More program notes below. (Please see the moving banner and the “tail of the rocket” on our website’s home page for upcoming speakers and topics.)
- **Dues:** If you haven’t paid your 2010-2011 dues by November 1, you are four months late. Please bring to next meeting or see the address on page 3. We need your participation! Thanks to all who are up-to-date.
- The last scheduled Star Party for this season took place in October. Contact info@ccas.ws or Mike Hunter, Observatory Director, if you wish to set up a special Star Party for your group during the winter or spring months. MEMBERS, particularly newly joined: we would like to provide you an opportunity to observe. If you would like to spend an evening at The Schmidt, contact us and we will try to schedule.
- Please see the two special “Notices” on page 6 of this issue: a telescope for sale and an opportunity to learn how to do astrophotography using CCD equipment.
- Thanks to Bernie Young, we had an excellent “first experience” with a lunar occultation of a bright star last Thursday, October 19. Be sure to read the feature story in this issue of First Light.
- Daylight Savings Time ends at 2am, Sunday, November 7th.

Bright New Stars:

We are happy to welcome David Rego to membership in CCAS. David joined at our October meeting. David, if you would be willing, please send a note letting us know a little bit about you and your background and how you became interested in Astronomy. Welcome!

We like to welcome new members to our Society in this section of *First Light* each month. If you are a new member and have not yet been so recognized, or have new information for us (background, astro equipment preferred, interests, etc.) on yourself or someone else, please let us know (email info@ccas.ws).

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

If you are a regular contributor, thank you very much!

Thanks to Jon Greenberg for alerting us to the Helvetia asteroid stamp; see page 7.

CCAS Events

Many thanks to CCAS past president and long term local astronomy teacher Jon Greenberg for helping us learn and think about “**Are We Alone?**” (or not?). Jon’s informative and provocative presentation accomplished, we are sure, his somewhat diabolical objective: he left one group of listeners fully convinced ET intelligence must exist out there, another group fully convinced there might be life but not necessarily intelligent, and a third group agreeing ETI might exist but, because of the vast distances in space and time involved, being very divided on the question of whether conversation between them and us will likely ever take place. Thank you, Jon. It will be interesting to see how the adventure progresses.

Cosmic Conversations At the CCAS meeting on November 4th, Stephan Martin will give an overview of some of the major events in cosmic history up to the present, as well as some of the observational evidence for these events. Where did the universe come from? Where are we going? What happened between the beginning and now? We won’t answer these questions definitively by any means, but we’ll have plenty of thought for a rich discussion. Mr. Martin is currently Assistant Professor of Astronomy at Bristol Community College in Fall River, and his research focus is extragalactic studies of dark matter. He is also author of the new book “Cosmic Conversations” a collection of interviews with scientists, spiritual teachers, indigenous peoples, and cultural “creatives” that explores and expands our ideas about the nature of the universe and our role in it.

Opto-mechanical Systems of High Acuity: At our meeting on December 2nd, Randall Moore, ME will tell us about the engineering problems of large space telescopes and why we put telescopes in space. Randall, a Director of Industrial Relations, Northeastern University College of Engineering, has held many positions in his 40 year career in the Aerospace Industry including the following: Director of Engineering with Senior Aerospace, Principal Systems Engineer at The Smithsonian’s Astrophysical Observatory, and Chief Mechanical Engineer, Itek Optical Systems. Besides his work directly with Adaptive Optics, other programs that he has been involved with directly include The Viking Mars Lander, Airborne Reconnaissance Sensors for aircraft and orbiting applications, the Chandra Orbiting X-Ray Observatory and the Hubble and Spitzer telescopes.

Ice Core Research in the Arctic: Dr. Chester C. Languay knows ice can tell you a lot about the Earth and a lot about other planets and their moons that we will visit in the next millennium. At our meeting on January 6th, Dr. Languay will tell us a lot about ice and everything that falls within it. In 1956, Languay's team was the first to successfully drill an ice core down 400 meters. By 1966 they had perfected drilling a quality ice core to one mile deep through bedrock at Camp Century in the Arctic. This sample sheds light on 100,000 years of the earth's history. For eight more years Languay visited the Arctic as an ice geologist.

Celestial Landscape Photography: At our meeting on February 3rd, Paul Blackmore, staff photographer for The Cape Cod Times, will present a program on Celestial Landscape Photography. Paul is a young, dynamic prize-winning photographer who teaches photography in a way a novice can easily understand. He is a self-taught photographer who has won many New England Press Association awards as well as awards from the New England Associated Press News Executives Association. Paul works as a photojournalist, but has a passion for landscape photography and nightscapes. In addition to teaching, he runs a wedding photography business. He is a board member and one of the founders of the Photographic Society of Cape Cod.

Thanks again to Tom Leach, who continues to put together great programs now set up well into next year. You can study profiles of additional upcoming speakers and topics by going to our website. Look at the gray box in the middle of the rocket where you will find information under “CCAS Lecture Series”.

Members, **PLEASE** participate in the effort to recruit good speakers to present programs in astronomy and related sciences at our meetings. Please send any ideas or contact information to Tom Leach, our President and

Program Chairman. For sure he will follow up.

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

The minutes of our October meeting prepared by Charlie Burke, our Secretary, should now be posted on our website; click on the “Minutes” button at www.ccas.ws or go to <http://www.ccas.ws/minutes/ccasminutes100710.pdf>

Technical difficulties: if the minutes are not yet available, please wait until November 6th; they should be posted no later than the 6th.

Executive Corner

Members of The Executive Board exchange ideas by email and phone on a continuous basis and now and then formally convene by conference call. Anyone wishing to offer an item to the agenda, please contact Tom, Paul, Peter or Charlie.

2010-2011 Dues were Due June 30, 2010

Members: Please plan to make your payment either by bringing to the September meeting or mailing directly to CCAS at PO Box 207 Harwich Port MA 02646.

Thank you.

From the Foundation... and Dome...

Please see the Feature Article on page 7 for an two views of our experience observing a lunar occultation on October 19th; great progress has indeed been made on our imaging and video system capabilities!

As always, “Private” group or individual observing sessions at the Werner Schmidt Observatory may be scheduled by contacting observatory Director Mike Hunter at mamhunter@yahoo.com or sending an email to info@ccas.ws

Our Society exists to promote observing! Help us promote this objective by asking for time at the Dome!

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

October Observing:

THE PLANETS and their MOONS:

STUDY JUPITER WHILE IT IS STILL CLOSE TO EARTH AND HIGH IN THE SKY!

Jupiter and its moons continue to star in the evening sky and will do so all the way through March, 2011. However, if you want to study the bands and “Great Red Spot”, or see if you can “find” the southern equatorial band which for more than a year has “disappeared”, *do so this month*. On November 1, the planet at apparent diameter 46.9” is only 6% smaller than the maximum size it reached at opposition in September. By month’s end, as the earth on an inner track begins to leave Jupiter “behind”, it will shrink to 42.7”, a 10% loss in size. Another important factor making *now* the time for careful study is that Jupiter is high in the sky at convenient evening viewing times: Nov 1: transit at 9:36pm DST; Nov 30: transit at 6:41pm EST. High altitude means better “seeing”.

[Note: The Great Red Spot moves around Jupiter once approximately every 10 hours. Please see Reference 5a for Sky and Telescope’s Utility for tracking the GRS by time and date.]

As always, observing Jupiter offers more than just study of the surface features. Jupiter is currently in *retrograde* motion, the apparent motion of the planet as we view it of moving a bit west against background stars from night to night. We see it that way for short periods now and then when the earth reaches particular positions on its orbit vs. Jupiter (or the other outer planets) making it appear to move east to west night-to-night against background stars instead of the more general “normal” apparent motion of west-to-east. Jupiter began its current retrograde motion in July. It ends November 19th.

See if you can see the change by noting the planet’s position against background stars beginning about November 15th; note how it slows in its east-to-west motion vs. the background stars approaching the 19th, and then watch it begin to move in its regular motion to the east night-to-night through the next few days.

SPECIAL EVENTS IN MOTIONS OF THE JOVIAN MOONS THIS MONTH:

Special thanks to Martin Ratcliffe and Alister Ling of the staff of *Astronomy Magazine’s* online feature, [The Sky This Month](#) for November, for the following clear and enticing prose on *special performances* of Jupiter’s moons this month; taken directly from:

<http://www.astronomy.com/asy/default.aspx?c=a&id=10247>

COMING OUT OF SHADOW:

The current geometry of the Sun, Earth, and Jupiter means that a moon exiting Jupiter's shadow does so on the planet's eastern side (to the right when viewed through an inverting telescope). During such an eclipse, a moon goes from invisibility to full brightness in just a few minutes. The night of **November 15/16** provides two excellent examples: **Io** pops out of Jupiter's shadow at 12:05 a.m. EST; **Europa** follows 53 minutes later. These times mark the middle of the events, so start viewing a bit earlier.

An even more spectacular dual eclipse/reappearance occurs the evening of **November 1**, when **Io** and **Europa** pop into view just a few arcseconds apart. **Io** reappears first, at 9:14 p.m. EDT. Less than 30 minutes later, at 9:40 p.m. EDT, the drama intensifies when **Europa** appears 4" to **Io**'s northeast. Keep watch for the next hour as the two moons close to within 2" of each other.

MAKING A PASSING SHADOW ON THE PLANET:

When either **Io**, **Europa**, or **Ganymede** passes in front of Jupiter, backyard observers can witness the moon's disk crossing the planet followed by the moon's shadow. (The dark shadow always stands out better against the light-colored cloud tops of Jupiter's atmosphere than does the "bright-on-bright" passage of the moon itself.) For North American viewers, one of the best such events occurs **November 7/8**. **Io** begins to transit Jupiter's disk at 9:38 p.m. EST; 64 minutes later **beginning at 10:42, the moon's dark shadow follows**. Both the disk and the shadow take about 135 minutes to cross Jupiter's girth.

North Americans can expect repeat performances from **Io November 14/15** (disk transit begins at 11:28 p.m. EST; **shadow transit at 12:38 a.m. EST**) and **November 23** (disk transit begins at 7:47 p.m. EST; **shadow transit at 9:03 p.m. EST**). The best-timed **Europa** transit is **November 24** starting at 5:52 p.m. EST with the **shadow following at 8:22 p.m. EST**. Because **Europa** orbits farther from Jupiter than **Io**, the transits take a little longer (about 25 minutes more) to complete.

URANUS AND NEPTUNE:

As in October, this month magnitude 5.8 **Uranus** lies along nearly the same line of sight as Jupiter, about 3° northeast. The more distant planet remains an easy binocular object all month; if you have a really dark sky, you might be able to see Neptune without optical aid. With at least a mid-sized scope, you can verify the blue-green disk appearance of the 3.6" target.

Neptune glows fainter than Uranus and lies significantly farther west, so it shows up best a little earlier in the evening relative to the two inner planets. You will need at least binoculars to see mag 7.9 Neptune and a good telescope to identify the blue disc shape of the distant planet.

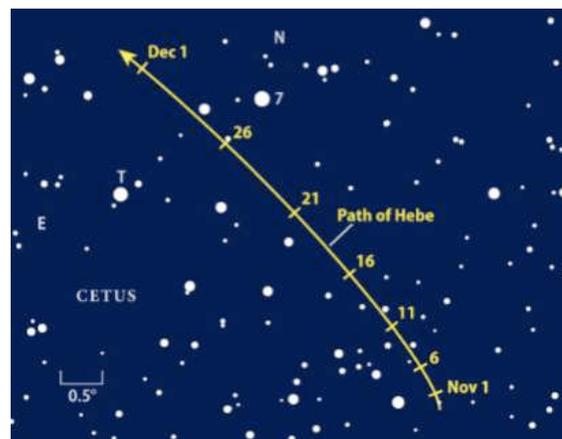
Like Jupiter, Uranus has been in retrograde motion for many months now. It comes nearly to a stop by end November and will resume normal motion on December 6th. Neptune's retrograde motion, also evident for many past months, ends November 7th.

Resources for Jupiter and its moons for October:

- Position charts for Jupiter's main moons are published in the November issues of *Astronomy Magazine* (p37) and *Sky and Telescope* (p47);
- A Chart for timing of "special" Jupiter moon events is published on page 58 of the *S&T*. See also reference 6 for an all-season dynamic model of the moment-to-moment positions of Jupiter's main moons and time, any date.

COMETS AND ASTEROIDS:

ASTEROID HEBE 6:

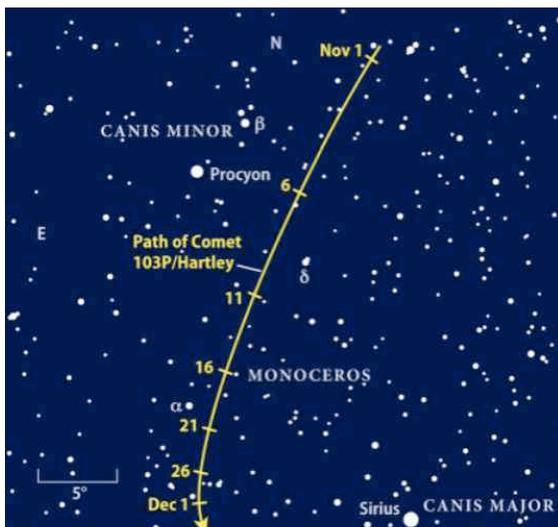


Just below Jupiter and Uranus, mag 8 asteroid **Hebe**, 6th largest asteroid at 120miles across, will move slowly

toward the northeast during November closer and closer to the main stars of the constellation Cetus. At month's beginning, Hebe is 23° southeast of Jupiter near 6th magnitude star SAO166066 and at month's end is a bit northeast of 4.5 mag variable star AE Ceti (7-Ceti). If you think you have found Hebe, make a sketch of its position against neighboring star images and check the next evening to be sure it has moved. See reference 8.

UPDATE ON COMET HARTLEY:

Comet 103P/Hartley 2 is having a most impressive pass this year. If you haven't seen it yet, give it a good try. It should be visible (mag 4.5 on Oct 24) without optical aid in November and should show at least one or maybe two



(from Astronomy Magazine Online, reference 8)

tails (the dust tail was edge-on to us in October) in a good telescope as the month progresses. Unfortunately, as the month moves along, the comet moves farther and farther southeast so that one needs to look late at night or predawn to see it much above the horizon.

OTHER OBSERVING TARGETS:

MIRA NEAR MAXIMUM RIGHT NOW:

Mira, omega-Ceti, is a pulsating variable star (magnitude range: 10 to 2) which is reaching a maximum as we write. Mira takes about 11 months (332 days) to rise from its most dim 10 magnitude to maxima near 3 or 2. On October 18, it had reached *mag* 2.8 and is expected to continue brightening for the next several weeks.

So this could be a record setting cycle. Mira is in the neck of Cetus, the whale, and is favorably positioned for evening viewing in November and December. Take a look; a good comparator star right now is Menkar, the 2.4 magnitude brightest star in the whale's head just east

of where the neck joins the head. Is Mira brighter than Menkar?

Take a look at least once a week for a while and note Mira's brightness vs. Menkar's. If it starts to dim appreciably, likely sometime early in 2011, you'll need a comparator star chart containing stars dimmer than Menkar. You can print such a comparator chart by going to the AAVSO comparator chart plotter at <http://www.aavso.org/vsp> and asking for "Mira".

The resultant plot will keep you busy for some time; it has comparators from mag 3.5 all the way down to 7.2 and then 9.0, sufficient to track Mira all the way back to its minima near mag 10 way into 2011.

Mira at maximum is the brightest periodic variable star in the sky that for part of its cycle is not visible to the naked eye. Mira rises from minima to maxima fairly quickly: usually about 110 days. We are at the end of that cycle now. Return to minima from maxima is much more leisurely, taking two thirds of the cycle.

Interested in why Mira, a periodic variable, changes brightness? For a start, check out the paper by Reid and Goldston at reference 9.

Mooncusser's Almanac and Monthly Alert¹ By Peter Kurtz November 2010			
Object	Nov. 1 (DST)	Nov. 15 (EST)	Nov. 30 (EST)
Sun	R 07:13 S 17:35	06:30 16:20	06:47 16:11
Moon	R: 02:20 S: 14:47	13:08 01:08	01:36 12:48
Mercury (evening)	R: 08:07 S: 17:57	08:03 17:04	08:38 17:24
Venus (dawn)	R: 06:54 S: 16:52	04:23 15:01	03:31 14:22
Mars (early evening)	R: 09:18 S: 18:43	08:14 17:24	08:08 17:09
Jupiter (evening)	R: 15:46 S: 03:26	13:50 01:29	12:51 00:31
Saturn (late nite)	R: 04:48 S: 16:37	03:00 14:45	02:08 13:49
Uranus (evening)	R: 15:50 S: 03:44	13:54 01:47	12:54 00:47
Neptune (evening)	R: 14:34 S: 01:05	12:39 23:09	11:40 22:11
Pluto (early evening)	R: 11:17 S: 21:04	09:23 19:10	08:26 18:13

Finally, all of us have access to excellent summaries of

interesting sky objects to be seen in the upcoming month in the print editions of both *Astronomy Magazine* and *Sky & Telescope*. The websites for both magazines also offer a wealth of information on “what’s in the sky this month”.^{4,5} Both outfits also offer weekly or monthly email newsletters to help you keep abreast of what’s happening. Look also on the CCAS website for other good observing guides.

Anyone having an interest in monthly **Libration and Declination Tables for the Moon**² or **Dates and Times**

for the **Minima of Algol**^{1,3} during this month please contact your editor for information or sources.

Moon Phases, November, 2010

New Moon	Saturday, Nov 6 th at 12:52am DST
First QTR	Saturday, Nov 13 th at 11:38am EST
Full Moon	Sunday, Nov 21 st at 12:27pm EST
Last QTR	Sunday, Nov 28 th at 3:36pm EST

NOTICES:

The following requests for posting were received by First Light during October:

Maria Mitchell Photometry School

The following invitation was sent to us by Gary Walker, a former CCAS member, now working at the Maria Mitchell Observatory on Nantucket. You can reach Gary at bailyhill@aol.com.

Here at Maria Mitchell Observatory in Nantucket, Mass, we have a unique opportunity in the winter to host several volunteers and teach them how to do CCD observing in exchange for housing. There is no charge. You will observe each clear night on either the 24 inch RC or the 17 inch Planewave, each fitted with a professional grade CCD camera and photometric filters. There is opportunity to focus on a project and write a poster paper, or an AAVSO paper if you wish, but it’s not mandatory. The housing is dorm style; you may have a roommate. The schedule is flexible and those living in the Cape/Boston area may travel back regularly if they wish. You will have plenty of downtime to learn to reduce CCD data, and explore the island of Nantucket. You don't need a car, as everything here is pretty much walking distance. Nantucket has very dark skies, registering only 21.4 mags⁷ on typical nights. The main obstacle to observing is the fog which rolls in now and then.

Anyone having an interest or questions, please email me. You do not need any prior CCD experience to participate. Opportunity starts anytime between October and May.

[Some of you may have already seen this telescope opportunity on a CCAS Yahoo site posting:]

10” Celestron Newtonian for Sale by CCAS Member Joe Chretien:

I have a 1 year old 10" Celestron Newtonian (OTA only) for sale including the original focuser and a Moonlite low profile dual speed focuser. Asking \$550 firm with the Moonlite (\$265 item); \$450 without. I want to get a different scope; this is too big for me and my mount. I hope to get an Orion 8-inch f/4 Newtonian Astrograph Reflector instead. So this has to go first. Please contact "Joseph" Joe@austinhealey.net

What We Thought “in Antiquity”:

Dr. David Levy, the comet hunter, a regular contributor to *Astronomy Magazine*, began his career writing a Master’s Thesis “The Starlight Night” on aspects of the connection between the night sky and English literature (See the article in *AM*, September 2010, p 16.) Dr. Levy notes in this article that his Master’s thesis advisor, Dr. Norman MacKenzie, inspired Levy’s long time interest in the *connection between the night sky and English literature* by introducing Levy to the wonderful Gerard Manley Hopkins poem given on page 1. In that article, Dr. Levy also notes that two weeks before Hopkins penned his verse, the Comet Tempel-Respighi had passed between two bright stars α -Aurigae and β -Tuari; Levy concludes this is the event that must have inspired the poem. Please see reference 10 for an online source for this poem. In honor of our best comet this year: Hartley 2.

We return to excerpts from *The Friendly Stars* next month. Then again, maybe we'll find something else for our front page. If you have something "literary" and "astro" and not too modern, please sent it to us at info@ccas.ws Thank you.

Of General Interest:

Asteroid Discovery Featured on Stamp That Glows in the Dark!

Thanks to Jon Greenberg for bringing the following item to our attention:



On May 8, 2009, Switzerland issued a stamp honoring the discovery of an asteroid by one Markus Griesser of the Eschenberg Observatory at Winterthur, Switzerland. Griesser was successful in securing permission from the IAU to name the asteroid in 2006, and he named it *Helvetia* in honor of his country and his observatory. Helvetia is asteroid 113390 and it and its orbit with others in the solar system are featured on the stamp as shown at left. Helvetia (the asteroid, only a bit smaller than the country!) is about three kilometers in diameter with a heliocentric orbital radius of about 344 million kilometers. The orbit sits between Mars and Jupiter as shown on the stamp; once cycle takes 3.5 years. The position of the asteroid shown on the stamp is as it was on the date of issue. (from <http://www.post.ch/philatelie/en/ph-lupe-2009-2.pdf>)

The Helvetia Stamp: the orbit lines and planets
glow in the dark!

Astro Questions of the Month:

Why do some members of CCAS only very rarely, if at all, come out to Star Parties or special events like the Star Occultation event of October 19th?

What can we do to encourage more members to come out?

[If you have either answer, please send to info@ccas.ws and we will pick up on this next month.]

**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**

Feature Article:

The October 19th Lunar Occultation of kappa-Piscium

Part 1

REPORT ON THE TIMING THE LUNAR OCCULTATION OF KAPPA PISCIUM, OCTOBER 19, 2010, 21:10:46 EDT

...by **Bernie Young**

A beautiful 50°F evening, not a breath of wind, and just two hours to setup the equipment for a research project that none of us had ever done before. Having enough good equipment helps, along with some redundancy when things go wrong, and enough expertise to get the job done. Result: a most satisfying evening.

Our staff for this event: Gail Smith, Peter Kurtz, Greg McCauliff, Werner Schmidt, Ed Swiniarski, and myself converge on the WSO beginning at the usual 7:00 pm. (Mike Hunter and Stan Rivers came on board later as did six guests.) We roll out the G11 Losmandy mount, slide on the 4" Televue scope, string the extension chords, plug in power supplies, setup the work table for a TV/VCR, drag out a box with star diagonal, eyepieces, and video camera and try to find and locate the stars for calibration. Pegasus is prominent on a moonless night, but today it was too close to the waxing gibbous moon to provide alignment stars. Add the glow of the lights at the football field, and I missed Alpheratz. By the time it was evident that the alignment had to be restarted, we were still an hour from the occultation...no problem. Second time around, Capella was up and got us off to a good start, then Alpheratz, and finally Merkab was right on, so forget the usual 5 star align and go find our target star, kappa Piscium.

There it was, right on the TV, but with the moon still quite far out-of-field, its light reflected off the inside of the dew shield and probably the optical tube too. We could still make out the star in the glow of the reflections, and after a while when the moon came more directly into view, the glow disappeared, contrast improved, and the craters on the edge of the disc appeared, advancing toward our target.

I thought we were looking at the earthshine, but after replaying the tape, it was evident we were seeing the luminous edge of the terminator on our gibbous moon.* With that image in hand, we used Ed's digitally tuned radio to get the Canadian time signals from CHU. The cable I used successfully at home to connect the line out of the receiver to the audio in of the TV/VCR was picking up noise sufficient to overwhelm the signal. Operational Plan B was to hold a microphone to the radio. This gives a weak input, but clean enough to produce an audio track for timing.

We still had a half-hour to wait. As the moon progressed, it looked like our star was going to get swallowed by the jaws of a huge crater.** Then in a few seconds, it was gone. Confirmation came down from the crowd in the dome looking through the 16". We didn't want to wait for the emergence. We felt the full chip image of the moon might overwhelm it, so entertained ourselves for the next hour or so trying our imaging system with other targets.

Polaris is a challenge with a polar axis mount; we didn't hit it, so went on to Capella to make sure our alignment was still good. We did an additional align on Capella, and went looking for the Andromeda Galaxy. It could be seen, but not with the video camera. We need some more experience with dark fuzzies and video cameras. So on to my favorite celestial mechanics subject: Jupiter and the Galilean moons. A couple of minutes of taping here and on to nearby Uranus for some more taping. OK, a good evening's work.

Next time let's try a small audio amplifier, and maybe one of our other video cameras. I already have a tray for the mount dolly to carry most of the equipment. Also, use a personal camera to record the event.

Come to the November meeting, see a video of the occultation, hear the time signals, see Jupiter and the moons, and Uranus. Hear a scientific explanation of why we do this crazy exercise anyway. We hope you will enjoy the video.

*, **: Please see next page.

Footnotes to Bernie's report added by First Light Editor while writing "Part 2"

*At occultation, the moon was 91.5% illuminated, very bright with only 8.5% of the near-side surface area dark beyond the terminator and aimed at the star. See the simulation images in the supplemental story below. It was clear to both folks observing visually using the 16" and Bernie's group that, because of all the light and glow, no one could "see" the dark edge of the moon advancing against the star; just the advance of the terminator toward the star. The best indicator for how far ahead of the terminator the dark edge actually existed during our view was observing the distance from terminator to star just before it winked out.

** Folks using the 16" saw a "huge mountain" rather than a crater aiming at the star, almost as if to "eat" it. Study of simulations of the event and some study of moon features reviewed below support the hypothesis that Bernie's "crater" and the 16" folks' "mountain" were both optical aberrations caused by a lunar prominence at the terminator. See Part 2 below for more information.

Part 2

NOTES ON VISUAL OBSERVING OF THE LUNAR OCCULTATION OF KAPPA PISCUM, USING THE 16" MEADE SCHMIDT-CAS IN THE OBSERVATORY DOME.

[...WITH COMPUTER SIMULATIONS AND IMAGES OF MOON FEATURES TO ILLUSTRATE WHAT WE THINK WE SAW]

...by Peter Kurtz

Our warm up to the occultation event started with looking up the event in tables in the 2010 edition of the Observer's Handbook of the Royal Astronomical Society of Canada, a wonderful source of information on astro events for any given year. The RASC 2010 handbook indicated our event should take place taking place at 9:10.37pm DST on the 19th so we knew to be "ready" anytime after 9:05pm. Our next preparatory step was to simulate the event using Sky Safari software on an ipod. Sky Safari predicted occultation at just before 09:11pm, in good agreement with the RASC prediction. Here are images from Sky Safari that



Simulation for 3 minutes before occultation expected at....



Simulation for October 19, 09:10:37 pm DST

gave us an idea of what to expect in the eyepiece of the 16" scope on the 19th.

Bernie's communication to us after the event records the observed time for wink-out of the star at 09:10:46pm DST. So the Sky Safari simulations and RASC Handbook predictions were remarkably well confirmed. This turns out to be a lot of fun!

OK. How do these simulation images relate to what we saw with the 16" Meade? We were using a 20mm Nagler eyepiece on the Meade which corresponds to a magnification of 203x and a field diameter of about 32° or 0.6 moon width, about like the image at left above. As noted earlier, we could not see the horizon or dark edge at all (even though you can see it in the images above because of the artificial "blue" color of the background.) All we could see was the brightly lit territory this side of the terminator including some of the prominent features along the edge of the terminator. As noted in the footnotes above, we only knew where the dark "edge" was when it snuffed out the star.

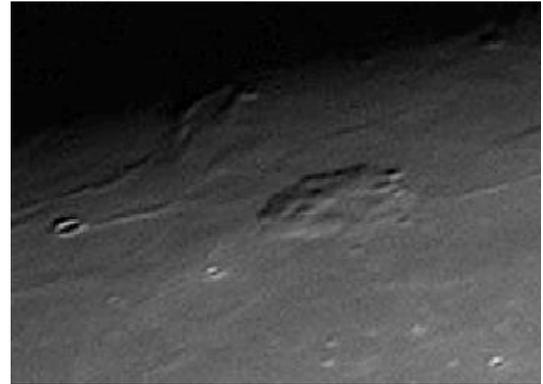
Now our "footnotes" above also talk about a prominence that in the 16" appeared as a "huge mountain" and in Bernie's setup,

looked like “crater” “aiming” at the star before occultation. Both must be some kind of optical phenomena caused by something. If you look at the simulation images above, you can see a prominence of some kind right on the terminator “aimed” at the position where the dark edge of the moon will wink-out the star. It is clearest in the left hand image but you can see it in both. What is that?

We have access to a very good moon mapping and modeling program, Moon Globe, also on our ipod. Using Moon Globe, we flew around the area of the moon seen in the Sky Safari images above and have concluded that the only moon object that our “mountain” could be is a 70km wide, 1000m tall prominence of volcanic domes called Mons Rumker at moon coordinates 40.8N 58.1W. To find out more about Mons Rumker, check out our reference 12. Mons Rumker is the only big prominence existing



Mons Rumker from “Astrosketch, ref. 12...



... and another image from outcastsoft, ref 12

in the northwestern region of the Oceanum Procellarum west of the Jura Mountains for at least 10° in any direction. We conclude that Mons Rumker had to be the object causing the optical images of a “mountain” seen by the 16” group and the “notch” or “crater” seen by the Televue group.

So a star is winked out by the dark edge of the moon. What’s so exciting about that? We all know that the moon moves around the earth. It moves about 12° to the east night-to-night. You can see that by just looking one day after another. But when you see that 12° change, you can *infer* but not actually *see* the movement.

Watching the instantaneous extinguishing of the star as it occurs in real time allows one to actually see the moon moving. This actual seeing of the moon’s motion is very exciting indeed.

Come out the next time we do this and see if the event doesn’t *move* you.

If you would like information on either of our ipod apps, Sky Safari or Moon Globe, please contact your First Light editor.

Got Any Local Photos Showing Light Pollution or “Good” Lighting?

Reminder: Please think about the opportunity to take photos documenting light pollution or “good” lighting as requested in last month’s story “Local astronomers Aim to Limit Light Pollution”. Tom Leach, our President, is working on a video portrait on the local light pollution situation⁷. Once again, Tom requests that *All interested persons send him photos which might be useful in this video story; again, local photos of GOOD light situations and, more importantly, BAD light situations. Please notify Tom directly if you have photos or let us know at info@ccas.ws.* Thank you.

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

References and Notes for this issue:

1) Information for The Mooncussers Almanac and Monthly Observing Alerts was extracted from Sky Events, Astronomy Magazine Online (Astronomy.com), Stargazing.net's Planet Rise/Transit/Set calculator (<http://www.stargazing.net/mas/planet2.htm>), *Astronomy Magazine*, *Sky & Telescope Magazine*, *Sky and Telescope Skywatch 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 December2007-January2008 *First Light*. Quick recap: Max Long brings to view extra right side; Min Long, extra left side; Max Lat, extra north side; Min Lat, extra south side. Max Dec puts it high in our sky during its transit; Min Dec puts it low.

3) Algol is an eclipsing variable star in Perseus which has its brighter component eclipsed or covered by its companion once every 2.87 earth days. When the dimmer component is not eclipsing the brighter, Algol appears typically about magnitude 2.1; when eclipsed, magnitude 3.3 The minima usually lasts about two hours with two hours on either side to bring it back to mag 2.1. Good comparison stars are γ -Andromedae to Algol's west, mag 2.1, and ϵ -Persei to its east, mag 2.9.

4) *Astronomy Magazine's* online The Sky This Month online feature; you can access this month and past months; <http://www.astronomy.com/asy/default.aspx?c=ss&id=84>

5) Current week's *Sky and Telescope* "Sky at a Glance" <http://www.skyandtelescope.com/observing/ata glance>

5a) http://www.skyandtelescope.com/observing/objects/planets/Transit_Times_of_Jupiters_Red_Spot.html

6) ALL DATES AND TIMES UTILITY FOR JUPITER'S MOONS:
<http://www.skyandtelescope.com/observing/objects/planets/3307071.html>

7) Tom Leach's draft video on light pollution: <http://www.youtube.com/watch?v=AkwLyD1YKzM>

8) Astronomy Magazine online's The Sky This Month:
<http://www.astronomy.com/asy/default.aspx?c=a&id=10247> See Reference 9 in the October *FL* for more on Comet Hartley.

9) Variability of Mira: <http://iopscience.iop.org/0004-637X/568/2/931/15504.text.html>

10) http://www.firstscience.com/home/poems-and-quotes/poems/i-am-like-a-slip-of-comet_871.html

11) *The Friendly Stars* available for perusal online:
http://books.google.com/books?id=fY4XAAAAAYAAJ&printsec=frontcover&dq=The+Friendly+Stars&hl=en&ei=VsjTMztD4P_8AbQm7STBQ&sa=X&oi=book_result&ct=result&resnum=1&ved=0CCgQ6AEwAA-v=onepage&q&f=false

12) http://en.wikipedia.org/wiki/Mons_Rumker; Astronomy Sketch of the Day: <http://www.asod.info/?p=1256>; and from outcastsoft/Astroimages: http://www.outcastsoft.com/AstroImages/MonsRumker_20100127_MJA.jpg