



First Light

The Newsletter of the Cape Cod Astronomical Society



December, 2010

Vol.21 No. 12

What We Thought in Antiquity

For the ancients, one or more unusually bright star events would signal some impending important event. If you were a senior astrologer toward the end of 1 BC, would these events, all verifiable with any good planetarium program, have made you wonder, anticipate, or worry... or even decide to take a trip?

- Lots of things were happening in the heavens, and people like the excitement.
- In 7 BC, Jupiter and Saturn had *triple* conjunctions in “the house” of Pisces. This is a very rare event. For the two greatest planets to have, not just one, but three conjunctions (within one year) in the house of the new age was indicative of GREAT CHANGE about to take place. From time to time, Venus and Mercury also dropped in.
- By the spring of 6 BC, Mars had joined the party, adding more weight to the degree of changes to come. Astrologers all over the known world were looking for something BIG to happen.



NGC 1435

- 8/01/3 BC: Jupiter rose in the east, *en te anatole*, “in the first rays of the dawn.”
- 9/12/3 BC: A first Jupiter and Regulus occulting conjunction: rising in the east and visible from 0230 until just before sunrise.
- 2/18/2 BC: Second Jupiter and Regulus conjunction: visible with full Moon from 1900 until 0530
- 5/7/2 BC: Third Jupiter and Regulus conjunction: visible after sunset, until 2400.
- 6/17/2 BC: Jupiter and Venus spectacular conjunction in Leo.
- 8/27/2 BC: Jupiter, Venus, Mars and Mercury conjunction in the east, just before dawn in Virgo. This places the Sun also in Virgo. Two days later the Moon joined the party.
- 10/13/2 BC: Jupiter and Venus have a close conjunction in Virgo and Jupiter moves westward in relation to the Sun and other planets.
- 12/15/2 BC: Jupiter reaches its furthest point westward, no longer moving against the background stars, and appears to stand still for almost a month. Just before dawn, is on the meridian due south of Jerusalem, in line with Bethlehem.

[Reference: see page 6.]

Seasons Greetings! Merry Christmas! Happy Holidays! Happy Hanukkah!

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- **Next Monthly Meeting:** is Thursday, December 2nd at the D-Y Library. Randall Moore, ME will tell us about the engineering problems of large space telescopes and why we put telescopes in space. More notes on Randall 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 December 1, you are five 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.
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Bright New Stars:

We are happy to welcome Nora Glass to membership in CCAS. Nora joined last month. Nora is a nurse educator with a background in IT working for Cape Cod Healthcare. She grew up in Bourne and recently returned to the Cape to work and live. She owns “basic binoculars” and enjoys looking up into a dark sky filled with stars and other goodies. She hopes CCAS can help her learn astronomy. Her brother-in-law has a large Dobsonian scope and needs help with that. Sounds like a great place for her to start. Let us know how we can help, Nora. And Welcome!

Welcome also to new member Jim Whitehill who joined at our November meeting. Jim, if you would be willing, please send a note to info@ccas.ws letting us know a little bit about you and your background and how you became interested in Astronomy.

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!

Many thanks to Bernie Young for putting his video of last month’s moon - star occultation (see below) on Youtube and for this month’s feature article updating us on progress with the imaging capabilities at the Schmidt Observatory.

CCAS Events

A Helping Hand... Thanks to Gary Derman for his outreach to help a neighbor get acquainted with his telescope. A request came in for help at info@ccas.ws. Because the request came from an Eastham resident, we asked Gary, also an Eastman resident, if he might help. It turns out that both “student” and “teacher” are neighbors in Eastham and a good collaboration took place. We hope our “student” decides to join us soon at an upcoming CCAS meeting or Star Party.

Video of Occultation: Please check out the videotape at this web address; taken during the occultation of kappa-Piscium by the dark edge of the moon, 10/19/10 by Bernie Young.

http://www.youtube.com/watch?v=y8oD_7j1cOk

The full story on this occultation was reported in last month’s *First Light*

Helpful hints: In Bernie’s video, the star is winked out by the dark edge of the advancing moon at five beeps (seconds) after the balloon “kappa Piscium” disappears. The star is not that easy to see but if you look carefully, the balloon shows you where it is. Keep in mind that the dark edge of the moon, which will “extinguish” the star, is a good deal to the right of the terminator in this view.

Many thanks to Stephan Martin for his clear and fascinating overview of the sequence of events which took place in the first instants of the beginning of the Big Bang. Steve made the unimaginable intelligible and interesting. One of the best presentations we have had. For more on Steve and his book, *Cosmic Conversations*, please go to <http://cosmicconversations.org/default.aspx>

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. Langway 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. Langway will tell us a lot about ice and everything that falls within it. In 1956, Langway'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 Langway 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 November meeting prepared by Charlie Burke, our Secretary, are on our website; click on the "Minutes" button at www.ccas.ws or go to <http://www.ccas.ws/minutes/ccasminutes110410.pdf>

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 by Bernie Young on page 5 for an update on progress with our new imaging system.

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

December Observing:

More details on all the events mentioned in the following, and others, can be found in the December issues of *Astronomy* and/or *Sky and Telescope* magazines or online at reference 4.

Special Events:

- **Total eclipse of the moon**, December 21: For Cape Cod, partial eclipse (umbra moving into the moon) begins at 01:32 EST, totality starts at 02:40, totality ends at 03:53, and umbral partial coverage ends at 05:01. This particular eclipse is as high in the sky as it could get for us since it takes place when the ecliptic is very high at night only 15 hours before the...
- **Winter Solstice**, December 21, 18:38 EST.
- The **Geminid Meteor Shower** peaks the night of December 13-14. That night the radiant near the star Castor is overhead about 2am. We have especially favorable conditions this year with a half moon setting just after midnight. Further, earlier in the evening the moon is far in the west as Castor rises in the east. Meteor occurrence rates for this shower remain high for at least a day on either side of the peak, so watch for the Geminids any time of night beginning December 12 and continuing through the 14th.

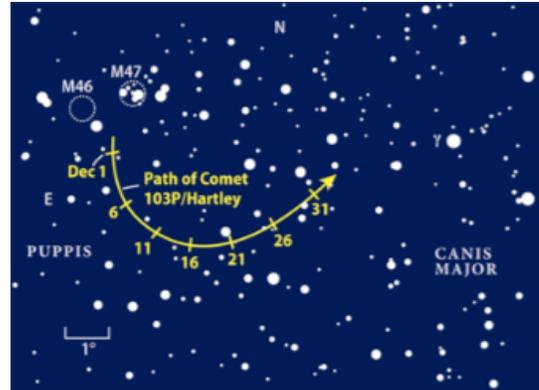
Planets:

- **Neptune** season is waning; the blue planet, magnitude 7.9, is still conveniently placed for evening viewing but setting near 10pm at month's beginning and near 8pm at month's end, it is beginning to get low in the sky at prime viewing times.
- You still have until about midnight each evening to study **Jupiter, its moons, and Uranus**. Note from the rise and set times in our Mooncusser's Almanac table below that Jupiter and Uranus are almost on top of each other this month: separated by less than 3° all month. Uranus is magnitude 5.9; see if you can see it near Jupiter with binoculars.
- For Cape Codders, the shadow of Europa begins a **transit of Jupiter** at 20:08 EST on December 26.
- A few days later, you will find that **Jupiter has "gained a new moon"**. Beginning the evening of December 28th (15' separation,) with closest approach December 30th (4' separation) and "ending" on January (17' separation,) Jupiter passes the 5.5 magnitude star 20-Piscium. If you study the Galilean moons during this time period, you will for sure find a "fifth moon" added, albeit out of the moons' plane. *On December 30th only Io is closer to the planet than the star!*
- **Predawn spectacles:** While only a 24% lit crescent, beautiful predawn "star" **Venus** reaches peak brilliance in early December when it shines at magnitude -4.9, 25 times brighter

than Sirius. Passing crescent moons offer two **special photo ops** this month: the 13% lit moon rises almost simultaneously with and only a bit to the right of Venus at 3:34am on December 2nd; at month's end; at 3:45am on the 31st, a 16% lit moon rises 15 minutes after and below Venus.

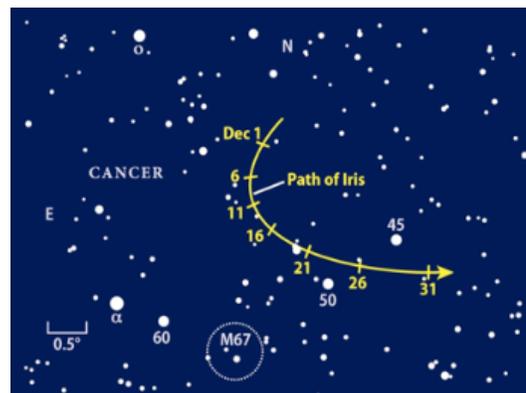
Comets and Asteroids:

- **"Comet of the Year":** 6th magnitude **Comet 103P/Hartley** was closest to the sun in late October. But is well placed in the evening sky in December. 103P will describe a semicircle in the sky just a bit left of bright Sirius. Look



early in the month when the moon is out of the way. Two tails about a fuzzy head should be visible. See *Astronomy* magazine, p 42 or reference 4 for more viewing hints.

- Two events have taken place which make **asteroid Iris** a premier Cape Cod viewing target for December: the asteroid has moved into Cancer, a bit to the left of Jupiter, nicely placed in the evening sky, and Cancer moves



higher each night as the month progresses. Iris, magnitude 8.4, is especially interesting to follow this month because it traces a semicircle within a degree or so above and to the right of the open star cluster, M67. Iris is the fifth

largest main asteroid (140mi in diameter) and the fourth brightest. On December 13, Iris forms a tight pair with a star of similar brightness. And on the 20th, you can see the asteroid pulling away from an unequal pair of brighter stars.

Resources for Jupiter and its moons for *December*:

- Position charts for Jupiter’s main moons are published in the December issues of *Astronomy Magazine* (p37) and *Sky and Telescope* (p47);
- A Chart for timing of “special” Jupiter moon events is published on page 64 of the December *S&T*. See also reference 5 for an all-season dynamic model of the moment-to-moment positions of Jupiter’s main moons and time, any date.

Moon Phases, December, 2010	
New Moon	Sunday, Dec 5 th at 12:36pm EST
First QTR	Monday, Dec 13 th at 8:59am EST
Full Moon	Tuesday, Dec 21 st at 3:13am EST
Last QTR	Monday, Dec 31 st at 11:00am EST

Anyone having an interest in monthly Libration and Declination Tables for the Moon² or Dates and Times for the Minima of Algol^{1,3} during this month please contact your editor for information or sources.

Mooncusser’s Almanac and Monthly Alert¹ By Peter Kurtz December 2010			
Object	Dec. 1 (EST)	Dec. 15 (EST)	Dec. 31 (EST)
Sun	R: 06:48 S: 16:11	07:01 16:11	07:07 16:20
Moon	R: 02:48 S: 13:20	12:22 01:56	04:04 13:15
Mercury (eve then dawn)	R: 08:39 S: 17:25	07:39 16:53	05:28 15:04
Venus (predawn)	R: 03:28 S: 14:20	03:14 13:55	03:20 13:35
Mars (early evening)	R: 08:07 S: 17:08	07:59 16:59	07:44 16:54
Jupiter (evening)	R: 12:47 S: 00:27	11:53 23:37	10:54 22:43
Saturn (predawn)	R: 02:05 S: 13:45	01:15 12:53	00:16 11:52
Uranus (evening??)	R: 12:50 S: 00:43	11:55 23:48	10:53 22:46
Neptune (early evening)	R: 11:36 S: 22:07	10:42 21:13	09:40 20:12
Pluto (early evening)	R: 08:22 S: 18:09	07:29 17:16	06:28 16:15

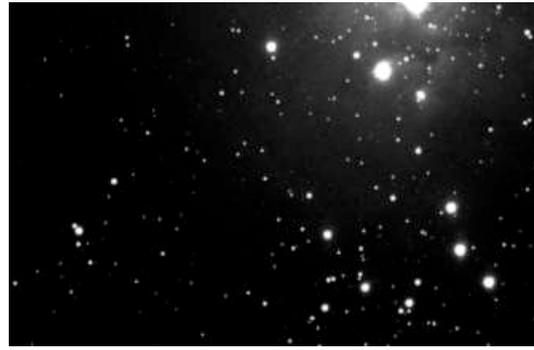
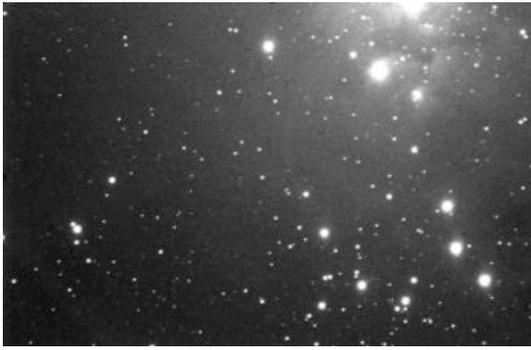
Feature Article:

First Photos from Imaging Project

The task we were given was to develop enough expertise with the “Track and Accumulate” feature that we could document it and train other staff members to carry on. We are close to attaining that objective.

Track and Accumulate is a procedure patented by Santa Barbara Instruments Group (SBIG, the camera manufacturer) for capturing images. It is incorporated in their CCDOps software package. Track and Accumulate is a simple entry level technique for the aspiring astrophotographer. The idea is to select one star in the field of view. A series of short exposures is taken and each is aligned on the selected star. The total exposure time is equivalent to a longer exposure, but the errors from imprecise alignment or tracking that often result in streaked images is avoided. The resulting image can then be processed later.

Indeed, alignment isn’t necessary at all, as we found out accidentally when I kicked the dolly and moved the mount. Frustrated, and not willing to realign the mount, we attached the camera to the telescope to see what we could get. We pointed the telescope at the star-forming region in Orion, focused the camera, and setup to automatically take a series of six 30 second images. The raw result taken by Gail Smith and me on November 12, 2010 is shown on the left below; the field of view is approximately 0.9 x 0.6 degrees. This approximates a three minute exposure which would have been streaked had we not used the Track and Accumulate technique.



The raw images requires post processing. Someone who may not want to come out on a cold winter's eve but wants to participate may work with an image like this at home using astrophotography software or even the more common programs like Photoshop.

I carried both bmp and jpeg files for this image to my home laptop on a flashdisk, each file about 1.5 Mb. There I edited it with some software that came with a printer I bought 11 years ago to produce the image shown on the right above.

This is a good area of the sky to show the capabilities we have. It includes faint stars, faint nebulosity, brighter stars, and brighter nebulosity.

A manual has been prepared describing how to connect the camera to the computer, focus it, capture an image, and shutdown the camera. Anyone interested in participating in this project please let us know by sending an email to info@ccas.ws

Bernie Young
2010 11 19

What We Thought “in Antiquity”:

The “ancient” star events and photo given on page 1 this month are taken directly from an online blog from one Frances Drake at reference <http://frances-writes.blogspot.com/2008/12/christmas-astronomy.html>

We return to excerpts from *The Friendly Stars*¹¹ next month.

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.

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

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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: [http://www.astronomy.com/en/News-Observing/Sky this Month/2010/10/Venus blazes before dawn.aspx](http://www.astronomy.com/en/News-Observing/Sky%20this%20Month/2010/10/Venus%20blazes%20before%20dawn.aspx)

5) ALL DATES AND TIMES UTILITY FOR JUPITER'S MOONS:
<http://www.skyandtelescope.com/observing/objects/planets/3307071.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_8AbOm7STBO&sa=X&oi=book_result&ct=result&resnum=1&ved=0CCgO6AEwAA-v=onepage&q&f=false

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