



# *First Light*

The Newsletter of the Cape Cod Astronomical Society



February, 2012

Vol.23 No.2



*Do you know this part of the sky? Can you identify some of the objects?*

Please check out the annotated version of this shot on page 5 to see how well you did.

This is a very special astrophoto. What makes it special is that it is not “just an” astrophoto; rather it is “part of an” astrophoto that covers the entire night sky. Nick Risinger, creator of the 360° photo and author of an article about the Photopic Sky Survey in the February issue of *Sky & Telescope* (p70) provides this quote from John Dobson as one of his inspirations for the work. More information on the Photopic Sky Survey on page 5.

*“If you find yourself at sea in a small unlighted boat alone in the darkness of a cloudless night,  
and if you gaze into the darkness of the space between the stars,  
then keep wide awake,  
and if your mind is full of wonder and your heart is full of peace,  
There is a chance that you will understand.”*

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**Next Monthly Meeting:** is Thursday, February 2nd at 7:30pm in the D-Y Library. Air Force Lt. Col. Shawn Smith will present a talk on the “PAVE PAWS” radar at the Massachusetts Military Reservation and its use in tracking missiles, satellites and other space objects. Public welcome. Please join us.

**Reminder:** “Dark Saturday” Star Party at the Schmidt, 7:30pm, Saturday, February 18th ; members and public welcome!

**In this issue:** Support for The Schmidt / Anthropic Principle / Six Planets / Near-earth Asteroid / Photopic Sky Survey / Winter Binocular Targets / Lens Grinding Kit

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## **Bright New Stars:**

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 have new information for us (background, astro equipment preferred, interests, etc.) on yourself or someone else, please let us know (email [info@ccas.ws](mailto:info@ccas.ws)).

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

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

### **Support for The Schmidt Observatory (CCAF):**

Last month we reported on the start of an "end of year" campaign asking for donations to the Cape Cod Astronomical Foundation (CCAF) from CCAS members and "Friends of CCAS" to support needed equipment purchases at The Schmidt.

We are very pleased to report that as of January 22, \$540 has been contributed and forwarded to CCAF. Thanks to Edward Gaulin, David Goehringer, Jon Greenberg, Mike Hunter, Peter Kurtz, Stan Rivers, Peter Rothstein, Gail Smith, and Werner Schmidt for significant contributions.

CCAF also extends once again its thanks to the general membership of the Society for approving a block donation of \$1000 last year from CCAS funds. "Your dues at work!"

Members and friends: please try to attend events at The Dome soon, and often, in 2012. You can expect to enjoy new capabilities that your generosity has made possible.

We are hoping that equipment, education, and outreach capabilities at The Schmidt can continue to with the help of further contributions from Society Members and Friends.

### **CCAS Meetings:**

Many thanks to Rick Paulus and Julie Guibord for their presentation, **Discovering Planet Earth: Hiking the Pacific Crest Trail** at our meeting on January 5<sup>th</sup>. This was a rare opportunity for society members to follow the 2,650 mile hike Julie and Rick took along the Pacific Crest Trail. They began their long walk through the wilderness at the U.S. - Mexico border in early May and after four months, six climatic regions and countless mountain ascents, finished their trek in the Cascade Range of Washington State at the Canadian border. They admit their adventure is not for the faint of heart, with a requirement of pushing more than 20 miles per day in rough

terrain in order to complete the trail before autumn. This was a most interesting talk on the extremes of environment on planet earth and the planning and management required to succeed at such a challenge. Please see the meeting minutes online for more information.

Don't miss the Lt. Col. Shawn Smith's talk, **The Use of Phased Array Antenna Technology to Track Earth Orbiting Satellites and Other Objects** at our meeting on February 2nd. Lieutenant Colonel Smith is Commander of the 6th Space Warning Squadron at Cape Cod Air Force Station on the Massachusetts Military Reservation. Part of a four site PAVE PAWS (Phased Array Warning System) net, the squadron is responsible for detecting sea-launched ballistic missiles fired from submarines in the Atlantic Ocean and intercontinental ballistic missiles. Its secondary mission is tracking Earth-orbiting objects such as the International Space Station, the Space Shuttle, any object that deviates from its known orbit, or any new orbiting objects. Typically, the 6 SWS performs approximately 2,600 satellite tracks totaling about 9,100 observations daily. This unit has protected the East Coast of the United States from sea and land strikes by enemy missiles and more for more than thirty years. Please join us to learn the whole story.

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And, once more, thanks to Tom Leach who continues to put together great programs of speakers for our meetings.

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 Program Chairman. For sure he will follow up.

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

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## **Minutes**

The minutes of our January meeting are on our website; click on the "Minutes" button at [www.ccas.ws](http://www.ccas.ws) or go to <http://www.ccas.ws/minutes/ccasminutes010512.pdf>

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## **From the Dome...**

...by Mike Hunter

Please see earlier story on Donations to CCAF.

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**"Dark Saturday" Star Parties** at The Schmidt; 7:30pm:

Feb 18 Apr 21 Mar24 May 19

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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](mailto:mamhunter@yahoo.com) or sending an email to [info@ccas.ws](mailto: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](mailto:info@ccas.ws)

### Astronomy Question of the Month:

What is the Anthropic Principle? We might not be here if this principle were not in operation in the universe. See page 6 for the answer. A most interesting and controversial idea!

### February Observing:

#### Observing Highlights for February, 2012 at Cape Cod:

Please consult the February Issues of *Sky and Telescope* (pp 42-49), *Astronomy Magazine* (pp 36-53), and *Astronomy Magazine Online* (See Ref 5) for more information on these highlight topics and others.

#### Planet Highlights:

#### Six planets grace the nighttime sky during February;

Consult our *Mooncusser's Almanac* for rise, transit, and set times.

Here are the highlights:

- Little **Mercury** enters the evening stage after February 15<sup>th</sup>. Like Venus, it gets as high in the sky as it can during the second half of the month, compliments of the steep ecliptic (see below): by the end of the month, it is at altitude 10° half an hour after sunset. Also, by the end of the month...
- **Mercury** it the lowest step on a ladder of *five of the six planets* visible in February. Look at dusk on the 2<sup>9th</sup>: above **Mercury** find **Uranus** (you'll need a telescope), then **Venus**, then **Jupiter** (10°) above Venus, and

finally a half moon near Aldebaran in Taurus. Number five? Turn to the east and you'll find **Mars** rising at the other horizon. Only **Saturn** is absent from this early evening show and it comes onstage near midnight.

- **Saturn** season begins in earnest in February; the planet rises at 11:16pm on Feb 1, 9:23pm at month's end. Take a preview of the big show that starts next month.
- **Mars** rises about 8pm on Feb 1<sup>st</sup> and earlier each day as the month proceeds. Mars is at opposition on March 3<sup>rd</sup> and as close to earth as it will get this year two days later. Start observing *now* and enjoy the next two months. Mars begins the month at apparent size 11.8” approaching the max it will reach in early March. Look for the **north polar cap**; it should be easy to see because Mar's axis is tipped toward earth at this time. It is late spring on March so you may be able to observe the shrinking of the cap if you look now and then over the next several weeks.
- **Venus** points to **Uranus**<sup>4</sup> during February: As Venus moves higher in the sky night-to-night between Feb 7<sup>th</sup> and Feb 11<sup>th</sup>, the two are separated by less than 3°. This makes this period ideal for using Venus (mag -4) to find Uranus (mag 6) with binoculars or telescope during the period. The closest encounter, however, occurs the night of February 9<sup>th</sup> when the two approach *within 0.3°* of one another. Try binoculars or a telescope at low power. A polarizing filter may aid the effort to attenuate Venus' brilliance. Venus climbs as high as it does in our evening sky in February (almost 40° above the horizon at sunset) because this is the season when the ecliptic is highest above and, at its “ends”, most vertical to the horizon.
- **Jupiter** and its moons continue to entertain in February. However, with a setting time at 10:14pm at month's end, fans need to pay attention before the big planet exits the scene for a while.
- Don't miss a passage of Jupiter's Moon **Europa** and its **shadow** across the face of the planet, a special event for Jupiter's moons on February 22.

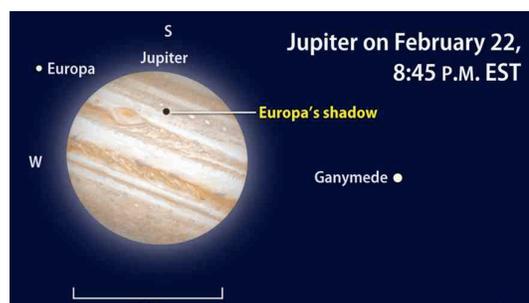


Image inverted and mirrored from true; Here Europa's Shadow is moving (right) east to (left) west after the moon has moved west of the planet.

As shown above, Europa has already transited Jupiter as night falls in the eastern half of North America. As the moon leaves Jupiter's western limb (or edge), its shadow appears on the eastern limb at 7:40pm EST. The shadow

takes more than 2 hours to cross Jupiter's face, disappearing at 10:02 pm EST.

**Resources for Jupiter and its moons:** if you don't have *Gas Giants*, the iPod/iPad app for moons of Saturn and Jupiter discussed in the April, 2011 *First Light*, please see the February *S&T*, p 47; February's *Astronomy*, p 37, or the interactive resource online at reference 6 for positions of Jupiter's moons for any date and time. A chart of special eclipses, occultations, and shadow transits is given in the February *S&T*, p53; times for transits of Jupiter's Great Red Spot are also given on that page.

<b>Mooncusser's Almanac and Monthly Alert<sup>1</sup></b> <b>By Peter Kurtz</b> <b>February 2012</b>			
Object	Feb. 1 (EST)	Feb. 15 (EST)	Feb. 29 (EST)
<b>Sun</b>	R: 06:52 S: 16:55	06:36 17:13	06:15 17:30
<b>Moon</b>	R: 11:28 S: 02:17	02:05 11:21	10:09 01:02
<b>Mercury (evening)</b>	R: 06:52 S: 16:29	07:02 17:44	06:52 18:58
<b>Venus (evening)</b>	R: 08:38 S: 20:18	08:16 20:48	07:53 21:17
<b>Mars (late eve)</b>	R: 20:06 S: 09:00	18:56 07:59	17:35 06:53
<b>Jupiter (evening)</b>	R: 10:13 S: 23:43	09:22 22:57	08:33 22:14
<b>Saturn (late night)</b>	R: 23:16 S: 10:19	22:20 09:24	21:23 08:28
<b>Uranus (evening)</b>	R: 08:58 S: 21:06	08:04 20:14	07:11 19:22
<b>Neptune (early eve)</b>	R: 07:43 S: 18:23	06:49 17:31	05:55 16:38
<b>Pluto (dawn)</b>	R: 04:38 S: 14:21	03:44 13:28	02:51 12:34

**Two minima of Algol occur in Prime Time** for Cape Codders in February: at 10:50pm on Feb 11<sup>th</sup>, and 7:40pm on Feb 14<sup>th</sup>, Valentines Day. Begin observing 3hours before or peek now and then the 3 hours after the minima to watch the dimming and brightening.

**Special Opportunity; Special Challenge: Visitation by Eros, a Near Earth asteroid that moves perceptively in less than 30 minutes, and changes brightness fourfold every 2 hours.**<sup>7</sup>

Mag 9 Eros is only a little asteroid, potato-shaped, 21 miles long and 7 miles wide. But here are several reasons why some clear night between now and March 1<sup>st</sup> you might want to take two or three looks over the space of an hour or two:

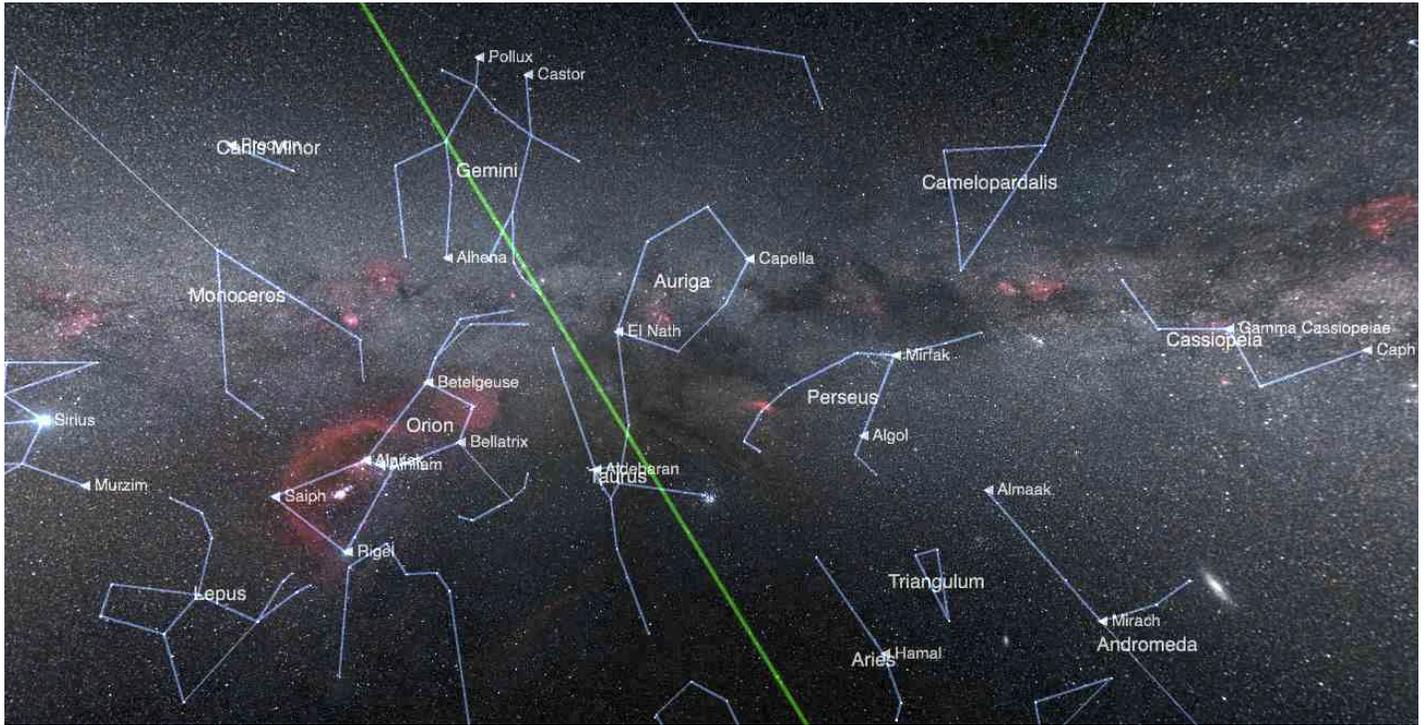
- At its closest on January 31, Eros will pass only 16 million miles from earth, pretty close for a solar system object.
- Eros is the second largest of more than 7500 near-earth asteroids; and the only NEA bright enough for easy observation.
- The last time Eros passed this close to us was in 1975. The next equivalent visit takes place in 2056.
- Eros will be nicely placed for observation in Cape Cod's evening sky as follows beginning January 25. Below Regulus in Leo, it passes by beta-Sextans, then crosses Hydra moving almost to Antlia by mid March. Because it is not that high above the horizon during this period, observing after 10pm each night is best since altitude is higher then. It sits right at about 21° altitude at 10 pm for most of the period.
- If you find it and can check in a few times over about 90 minutes, you should be able to see it has moved against the background stars (*moves 2.5"/minute!* for most of this period) and you should be able to see changes in brightness as it rotates once every five hours.

<b>Moon Phases, February, 2012</b>	
<b>Full Moon</b>	Tuesday, February 7 <sup>th</sup> , at 4:54pm EST
<b>Last QTR</b>	Tuesday, February 14 <sup>th</sup> , at 12:04pm EST
<b>New Moon</b>	Tuesday, February 21 <sup>st</sup> , at 5:35pm EST
<b>First QTR</b>	Wednesday, February 29 <sup>th</sup> , at 8:21pm EST

Anyone having an interest in monthly **Libration and Declination Tables for the Moon<sup>2</sup>** or **Dates and Times for the Minima of Algol<sup>1,3</sup>** during this month please contact your editor for information or sources.

## Feature Story:

*Here's the "key" to the photo on Page 1.  
How well did you do?*



*And here's the "rest of the story":*

There is a wonderful story in February's *Sky & Telescope* magazine, "For All the Night's Stars" by Nick Risinger. Nick and his father travelled more than 60,000 miles to take more than 37,400 individual photos of the night sky from both hemispheres and arrange them into an amazing composite of the 360° night sky you can browse yourself at <http://skysurvey.org>.\*

As Nick writes in the *S&T* article, "As I figured it, only two kinds of astronomical photos were possible – ones that covered *part* of the sky and ones that covered *all of it*." Shots taken from the northern hemisphere were taken from clear sky corners of the western US while those taken from the southern hemisphere were taken from cold clear desert areas in South Africa near the South African Astronomical Observatory. *Do* read the *S&T* article to learn technical details on equipment and software used to build the composite photo.

\*But, most importantly, *Do* visit the composite photo online. Once there, click on the box "Interactive 360°" and prepare for the opportunity to take a self-guided tour left, right, up, down, zoom in, zoom out... to anywhere in the entire night sky. To facilitate your understanding as to where you are, what you are looking at, and maybe where you want to go or zoom, now and then click on the "i" button: key constellation lines and names of main stars and sky objects will superimpose on your location in the photo. Turning the "info" off when moving around is a good idea if you want to do fast "slewing".

You can't really appreciate the depth of the experience you can have "exploring" this unique picture of our universe if you don't "play" a little bit. With the "i" button off, try just sitting on the "move left" button and imagine you are sitting on a stool on the north pole and watching the universe spin around you left to right. Enjoy!

The home page on Risinger's website also reprises some of the information that appeared in the *S&T* story: how the Photopic Sky Survey was done and key equipment and software listings.

## **Astronomy Question of the Month:**

What is the Anthropic Principle? We might not be here if this principle were not in operation in the universe. See page 6 for the answer. A most interesting and controversial idea!

The anthropic principle states that if the universe and its laws were different than they are, mankind (and any other intelligent life) wouldn't be here to think about it. Some statements of the anthropic principle include the idea that the universe and its laws are as they are to accomplish the purpose of making human life possible. The Anthropic Principle has some basis in scientific fact. For example, scientists have calculated that if the physical laws in our universe were just a tiny bit different, we (or any other intelligent life) could not exist. If the force that holds atomic nuclei together were just a few percent stronger, the hydrogen atoms created after the Big Bang would have fused into helium atoms, and no hydrogen would remain. No hydrogen means no water, no organic molecules, and no life.

Please take the time to visit the online website of "The One Minute Astronomer" to learn more about the Anthropic Principle: <http://www.oneminuteastronomer.com/5146/anthropic-principle/>

The "One Minute Astronomer" is a website created and maintained by astronomer Brian Ventrudo. Check out other articles at the site. One can sign up to have periodic email alerts to new articles sent to your mailbox.

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## **OBSERVING RESOURCES:**

### **Winter Targets for Binoculars:**

This information is extracted from the article in February's *Astronomy*, p 46 and a companion piece online.<sup>8</sup>

A target list for binoculars has two virtues, it lets us see some forest where normally we would be directed only to trees, and reminds us about neighbors to "old favorites" we already know how to find in the sky. Here's a selection; please see the original articles for more information:

- The Pirate Moon Cluster, NGC 1647, is a bright diamond-shaped open cluster 4° north of the Hyades at the head of Taurus.
- NGC 2244, one of the brightest non-Messier open clusters in the sky between Betelgeuse and Procyon is a tiny rectangle. Can you see the surrounding haze of the Rosette Nebula?
- Find open clusters M46 and M47 east of Sirius; M47 is a "baby Pleiades"; in binoculars, M46, on the other hand, is a broad haze of faint suns. Can you spot the planetary nebula NGC 2438 on the northeast quadrant of M46?
- The online story highlights these old favorites: Pleiades, Hyades, Orion Nebula (Yes... it is a different kind of treat at low power!) and these less well know objects:
- NGC 2264, one of the brightest open clusters in the winter sky. Can you see the shape of a Christmas Tree? Can you see nebulosity surrounding the cluster?
- And whenever you are freewheeling the sky with binoculars, don't miss checking in on these three open clusters in Auriga: M 38, a little left of center of Auriga at this time of year... (can you see the "starfish" shape?); to the east, M36... (can you see a pinwheel?); and finally, just a bit east of the "pentagon", the dim M37 (best with a magnification greater than 12x.)

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## **Any Interest in a Free Lens Grinding Kit?**

Member Larry Brookhart sent an email to [info@ccas.ws](mailto:info@ccas.ws) offering a lens grinding kit-- tools for making reflector telescope mirrors by grinding glass "blanks" with various grits. Anyone interested, please contact CCAS at [info@ccas.ws](mailto:info@ccas.ws) and your request will be forwarded to Larry. Thank you.

## Cape Cod Astronomical Society

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Treasurer	Peter Kurtz	508-255-0415
Observatory Director	Michael Hunter	508-385-9846
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[info@CCAS.ws](mailto:info@CCAS.ws)

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Chairman	Werner Schmidt	508-362-9301
Vice Chairman	Michael Hunter	508-385-9846
Director R&D	Bernie Young	508-394-1960
Secretary	Ed Swiniarski	508-896-5973
Treasurer	Pio Petrocchi	508-362-1213
Observatory Director	Michael Hunter	508-385-9846
Observatory		508-398-4765

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.

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### References and Notes for this issue:

- 1) Information for The Mooncussers Almanac and Monthly Observing Alerts was extracted from Sky Events, Astronomy Magazine Online (Astronomy.com), 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 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  $\gamma$ -Andromedae to Algol's west, mag 2.1, and  $\epsilon$ -Persei to its east, mag 2.9.
  - 4) <http://media.skyandtelescope.com/documents/Uranus-Neptune-2011.pdf>
  - 5) Here is the web address for Astronomy Magazine's online "The Sky This Month" online for February: [http://www.astronomy.com/en/News-Observing/Sky this Month/2011/11/Venus hits the spotlight.aspx](http://www.astronomy.com/en/News-Observing/Sky%20this%20Month/2011/11/Venus%20hits%20the%20spotlight.aspx)
  - 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>
  - 7) For more information and excellent finder charts for Eros, please see stories in February's *Astronomy* (p 48) and *S&T* (p52)
  - 8) Winter Targets for Binoculars (online version) [http://www.astronomy.com/Web Extras/2011/12/10 top winter binocular treats.aspx](http://www.astronomy.com/Web%20Extras/2011/12/10%20top%20winter%20binocular%20treats.aspx)
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**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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