Star Gazer News

Astronomy News for Bluewater Stargazers
Vol 7 No. 7 July 2013

July 2013 Contents

Canada's 15th Dark Sky Preserve
The BOEC and BAS was officially proclaimed Canada's 15th Dark Sky Preserve on May 11, 2013. RASC representative Dan Taylor presented the certificate to Deb Diebel and Brett Tatton at the finale to the official program in the century-old barn. Let's hope the preserve lasts as long as the barn has already. Image by Don Sankey

In a cooperative initiative
to conserve the natural dark sky as a part of our heritage

The Bluewater Outdoor Education Centre
And the
Bluewater Astronomical Society
in partnership with
The Royal Astronomical Society of Canada

Hereby designate

The Bluewater Outdoor Education Centre Dark Sky Preserve

Together we recognize that natural darkness is an ecological resource in need of protection and are committed to responsible lighting practices that preserve the beauty and wonder of the dark sky above these parks.

This designation is given by the RASC and reaffirmed at the BOEC. It builds on efforts of both parties - encouraging cooperation and commitment to preserve the environment.

with the signing of this document

this 11th day of May, 2013

at the Bluewater Outdoor Education Centre

DEBORAH DIEBEL, Site Manager
Bluewater Outdoor Education Centre

BRETT TATTON, President
Bluewater Astronomical Society

GLENN HAWLEY, President
The Royal Astronomical Society of Canada

May 11, 2013 BAS Volunteers
The group shown here is most of the BAS volunteers that came to the BOEC reunion to help out with the festivities. [missing are Ross and Ang B. and Dave S.] The unfamiliar face third from left is Dan Taylor, from the RASC Light Pollution Abatement Committee who presented the official certificate to Deb Diebel BOEC site manager and to Brett Tatton BAS president at the time the original application was accepted (Nov 2012).
Photo by Elizabeth Braden.

A Thank You from Deb Diebel: BAS exec sent a bouquet of flowers to Deb to thank her for all the work she did in organizing the 40th Reunion. Here is her reply:
Hi [BAS],
Please extend my gratitude to your club for the beautiful flowers delivered to me on Wednesday. They were completely unnecessary, and entirely APPRECIATED! They are in my dining room where they make me smile every day. It was such a kind gesture, Thank-you!
Have a great weekend! (Let's hope for an asteroid sighting or two!)
***Deborah Diebel** Site Manager Bluewater OEC*

BAS Executive 2013-2015

President:	Aaron Top	aarontop@hotmail.com
Vice-President:	John Hlynialuk	stargazer@wightman.ca
Secretary:	Lorraine Rodgers	lrodgers@bmts.com
Treasurer:	Cheryl Dawson	cheryl.dawson@bell.net
Past-President:	Brett Tatton	bretttatton@gmail.com
Membership:	David Skelton	dskel@golden.net
Public Outreach:	TBA	

BAS Events for July 2013

Jul 3 Wed **BAS meeting** at **ES Fox** Observatory, 7 pm Speaker: **Aaron Top - "True Colours of the Universe".** Bring a lawn chair.
Jul 5 Fri **Public viewing** Grey Roots Museum parking lot 9 pm Saturn and Venus, clusters, nebula and galaxies. Backup July 6 at ES Fox Obs. (NM-3)
Jul 6 Sat **BAS viewing @Fox** Realm of Galaxies in Virgo. Backup night is the Dark Sky Weekend July 12 to 14 at BPNP. (NM-2)
Jul 12 -14 Fri-Sun **Dark Sky Weekend** at Bruce Peninsula National Park. Pre-registration by BAS members and guests required. Contact Joan S. (andromeda@gto.net) or John H. (stargazer@wightman.ca) (FQ-3)
July 22 Mon **Mars and Jupiter** close approach in dawn sky, less than 1° apart (fainter Mercury also nearby) (FM)
Jul 28 Sun **S. delta Aquarid meteors** Viewing at ES Fox Observatory 20/h at maximum and unfortunately, Moon (LQ-1)
Jul 29 - Aug 2 Astronomy Kids Day Camp for kids from 8 to 13 years of age, registration form on BAS website. Pre-register **by July 12, 2013**.
Jul 30 Tue **Summer Public Stargazing** (1st of 5) Bruce Power Learning Centre (3092 Bruce Rd 13) 7:30 pm followed by star gazing weather permitting. Bring bug spray. Dress warmly!
Fees apply: (proceeds to support astronomy education in Bluewater)
$15/adult ($5 refunded if the weather does not allow observing)
Family price $30 (2 adults + children 18 and under ($10 refund if no observing)

From the "Top": by Aaron Top pres. BAS

Hello Stargazers...

Happy Summer Solstice to you all and I wish everyone clear skies and awesome viewing. I hope that by the end of the summer you will all have some awesome memories of sights that you have seen. I will be away on holidays :) and have a list of various objects I would like to observe and photograph throughout the next 2 months. There have already been a few events that I have missed and I will now have to wait a while, even years, for a repeat of some. Some will never occur again in my lifetime, but this is what keeps astronomy forever interesting. I still have only witnessed one total solar eclipse (when I was 6 or 7 years old) and I long for another one. I can hardly wait for the day the moons shadow again graces itself upon me.

Anyway, until then, I will expect the unexpected. A good example of this is the noctilucent cloud display I saw from the Manitoulin Star Party last year. I have only seen these once and hope to see them again in the near future!
[There was also the June 1 auroral display that sneaked up on us. I am glad both Aaron and Steve were awake for that one and had their cameras handy! -ed]

New BAS executive for 2013 to 2015 is:

President: Aaron Top
Vice-President: John Hlynialuk
Secretary: Lorraine Rodgers
Treasurer: Cheryl Dawson
Past-President: Brett Tatton
Past-Past President: Dan Gieruszak
Membership Chair: Dave Skelton
Welcome to the new members on exec and Thank You to those who served in the past!

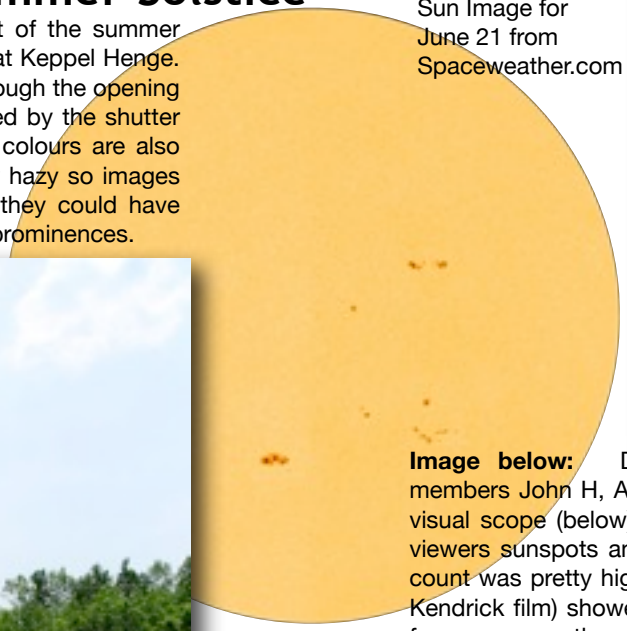
Smile and Wave: Cassini to take our picture July 19, 5:27 pm EDT

Earthlings, for the first time, will have advance notice of when an interplanetary probe is snapping an image of them. The date is July 19 at 5:27 pm EDT.

Cassini will be taking a series of exposures over a 15 minute interval that will show the Earth through Saturn's rings. This is a repeat of a famous image taken a few years ago, but this time we know when it will happen and you can get out and wave. See pg 14 below and read more at:
http://saturn.jpl.nasa.gov/news/waveatsaturn/

BAS Celebrates Summer Solstice

Once again BAS celebrated the start of the summer season with solar viewing and tai chi at Keppel Henge. **Image top right:** Sunlight streams through the opening in the analemma disk-an effect created by the shutter in the camera not the disk. Spectral colours are also camera-induced. The sky was slightly hazy so images in our scopes were not as crisp as they could have been, but there were several obvious prominences.

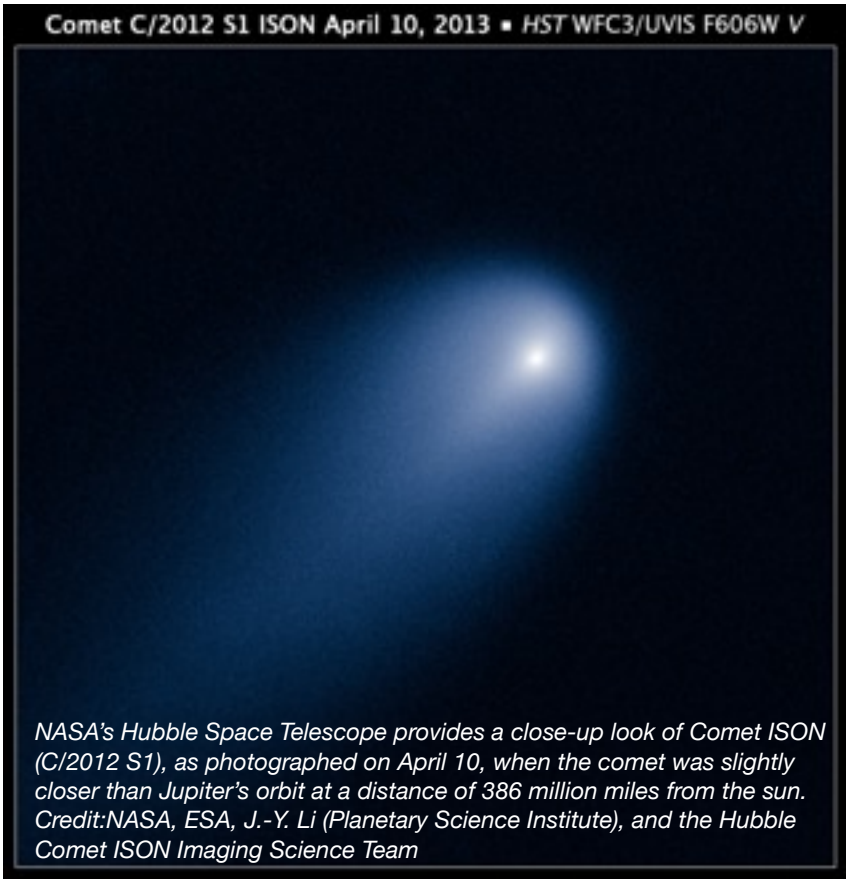


Sun Image for June 21 from Spaceweather.com

Image below: Dave S. comments on sunspots. BAS members John H, Aaron Top and Steve I. deployed a regular visual scope (below) and two H-alpha solar scopes to show viewers sunspots and prominences on the sun. The sunspot count was pretty high and even the visual filter (a homemade Kendrick film) showed dozens of sunspots. The official count from spaceweather.com was 135!

One of the ongoing projects that was completed recently by Steve Irvine and Bill Loney, was the Analemma Pattern Project. The image shown here was taken at 1:20 DST -the key moment on this year's summer solstice day. Note that the shadow of the ring just circles the peg at the top of the concrete apron. Each of the small dots in the oval-shaped pattern radiating from the peg is the location of a peg that was hammered into the earth during the course of the several years it took to complete the analemma pattern on the ground. Ceramic pieces colour coded to the seasons are embedded in the concrete in this utilitarian as well as artistic creation. This has become my favourite piece at Keppel Henge and is a wonderful example of how art connects us to Nature as well as an example of the very creative imaginations at work on the site. Bravo! Steve and Bill!

The T'ai chi group at Keppel Henge included visitors from Collingwood, Meaford, Owen Sound, Wasaga Beach, Thornbury, Sauble Beach, Southampton, Chatsworth, Big Bay, and even the suburbs of Dornoch! This event has become a tradition and the weather has not let the group down. Keppel Henge has become the place to do tai chi on the summer solstice.



NASA's Hubble Space Telescope provides a close-up look of Comet ISON (C/2012 S1), as photographed on April 10, when the comet was slightly closer than Jupiter's orbit at a distance of 386 million miles from the sun. Credit:NASA, ESA, J.-Y. Li (Planetary Science Institute), and the Hubble Comet ISON Imaging Science Team

Comet ISON preview

A live (photographic) view of Comet ISON is now available at **http://theskylive.com/ison-tracker.** Watch it as it brightens!

This NASA Hubble Space Telescope image of Comet (C/2012 S1) ISON (left) was made on April 10, when the comet was slightly closer than Jupiter's orbit at a distance of 618 million km from the Sun (630 million km from Earth).

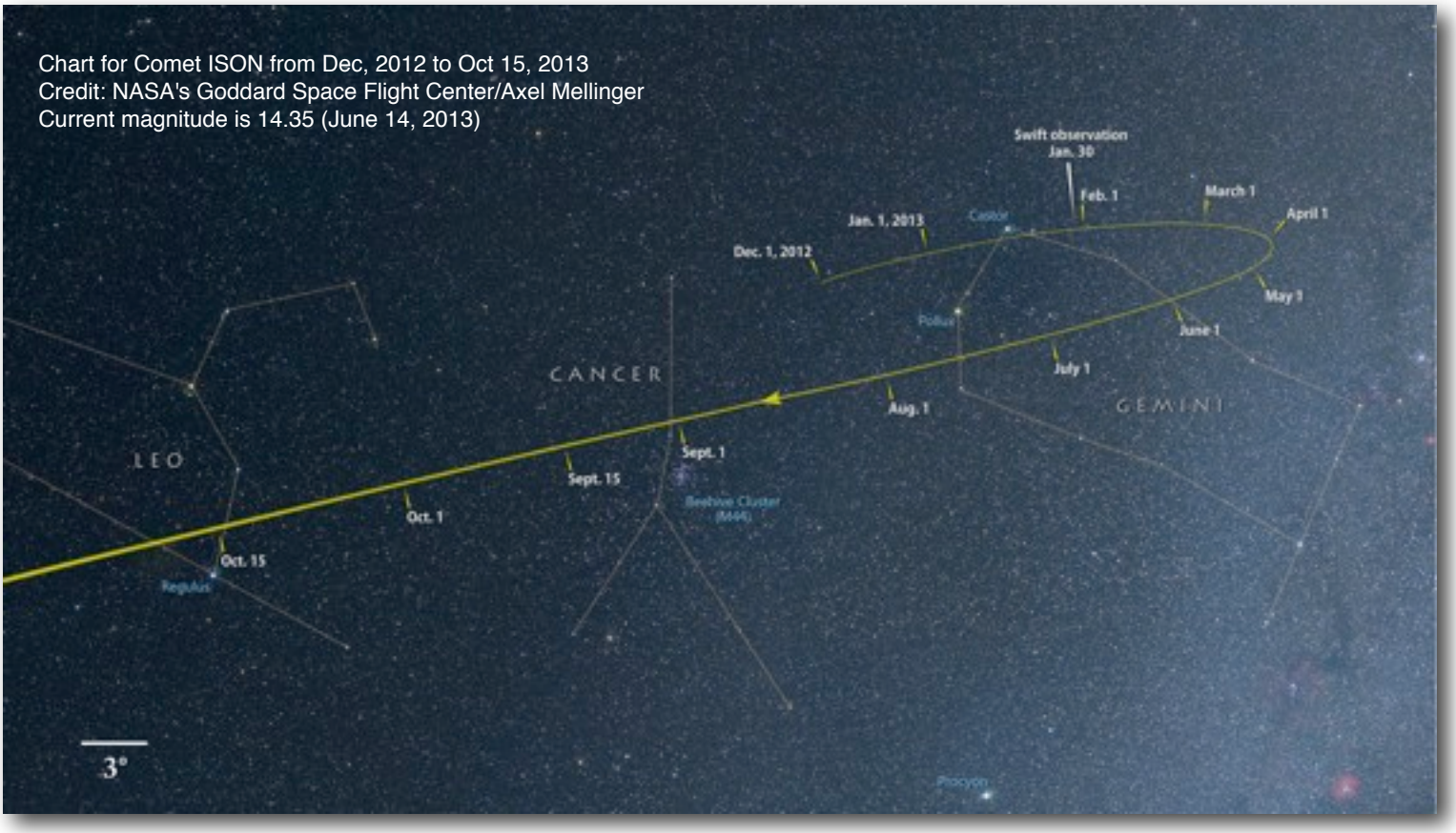
Even at that great distance the comet is already active as sunlight warms the surface and causes frozen volatiles to sublimate. A detailed analysis of the dust coma surrounding the solid, icy nucleus reveals a strong, jet blasting dust particles off the sunward-facing side of the comet's nucleus.

Preliminary measurements from the Hubble images suggest that the nucleus of ISON is no larger than three or four miles across. This is remarkably small considering the high level of activity observed in the comet so far, said researchers. Astronomers are using these images to measure the activity level of this comet and constrain the size of the nucleus, in order to predict the comet's activity when it skims 1,100,000 km above the sun's roiling surface on November 28.

The comet's dusty coma, or head of the comet, is approximately 4,960 km across, or 1.2 times the width of Australia. A dust tail extends more than 91,200 miles, far beyond Hubble's field of view.

More careful analysis is currently underway to improve these measurements and to predict the possible outcome of the sungrazing perihelion passage of this comet.
This image was taken in visible light. The blue false color was added to bring out details in the comet structure.

ISON stands for International Scientific Optical Network, a group of observatories in ten countries who have organized to detect, monitor, and track objects in space. ISON is managed by the Keldysh Institute of Applied Mathematics, part of the Russian Academy of Sciences.



Most Detailed Observations Ever of the Ring Nebula

ESA/Hubble press release 23 May 2013

Play the movie at:
http://www.spacetelescope.org/videos/heic1310a/

The NASA/ESA Hubble Space Telescope has produced the most detailed observations ever of the Ring Nebula (Messier 57). This image reveals intricate structure only hinted at in previous observations, and has allowed scientists to construct a model of the nebula in 3D — showing the true shape of this striking object.

Formed by a star throwing off its outer layers as it runs out of fuel, the Ring Nebula is an archetypal planetary nebula [1]. It is both relatively close to Earth and fairly bright, and so was first recorded in the late 18th century. As is common with astronomical objects, its precise distance is not known, but it is thought to lie just over 2000 light-years from Earth.

From Earth's perspective, the nebula looks roughly elliptical. However, astronomers have combined ground-based data with new observations using the NASA/ESA Hubble Space Telescope to observe the nebula again, hunting for clues about its structure, evolution, physical conditions and motion.

It turns out that the nebula is shaped like a distorted doughnut. We are gazing almost directly down one of the poles of this structure, with a brightly coloured barrel of material stretching away from us. Although the centre of this doughnut may look empty, it is actually full of lower density material that stretches both towards and away from us, creating a shape similar to a rugby ball slotted into the doughnut's central gap.

The brightest part of this nebula is what we see as the colourful main ring. This is composed of gas thrown off by a dying star at the centre of the nebula. This star is on its way to becoming a white dwarf — a very small, dense, and hot body that is the final evolutionary stage for a star like the Sun.

The Ring Nebula is one of the most notable objects in our skies. It was discovered in 1779 by astronomer Antoine Darquier de Pellepoix, and also observed later that same month by Charles Messier, and added to the Messier Catalogue. Both astronomers stumbled upon the nebula when trying to follow the path of a comet through the constellation of Lyra, passing very close to the Ring Nebula [2].

Notes

[1] Planetary nebulae take their name from their roughly circular appearance through low-magnification telescopes. The phenomenon has nothing to do with planets.

[2] Messier 57 was not the only object to be discovered during the tracking of this comet, named C/1779 A1. Messier and other astronomers added a handful of other nebulae to the catalogue during this observing period — Messiers 56, 58, 59, 60, and 61.

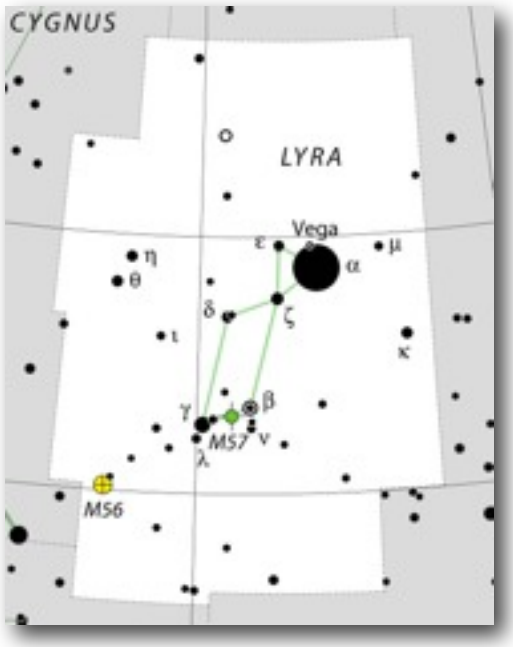


Image credit: NASA, ESA, and C. Robert O'Dell.

After the crowds leave, the dark skies are there for BAS stargazers to enjoy. Bruce Peninsula National Park is an official Dark Sky Preserve -one of the largest in Canada. Image by J. Hlynialuk at the 2012 Dark Sky Weekend (part of a MW rising movie).

Join BAS for a DARK SKY WEEKEND c/o BPNP

Group Campsite 3 is reserved for BAS campers for the weekend of July12/13/14. So bring your telescope to share with the public on Friday and Saturday night (weather permitting). Note that the fee is waived on the basis that BAS members take shifts manning displays in the Visitor Centre on Saturday and allow the public to view through their telescopes Friday and Saturday night for a few hours. **Pre-register with Joan Skelton (andromeda@gto.net) by July 4, 2013 to reserve your camp spot.**

DARK SKY Weekend with the BLUEWATER ASTRONOMICAL SOCIETY
Bruce Peninsula National Park
Friday July 12 – Saturday July 13

Friday July 12		
10pm	**Night Sky Viewing** (with telescopes)	**Trailhead Parking Lot**
	Night Sky Viewing (green laser star show)	**Singing Sands**
Saturday July 13	**Visitor Centre Lobby**	
10am – 3pm	**Astronomy Information Displays** manned by BAS Members	
10am – 3pm	**Children's Hands-on Activity Table**	Leader Joan Skelton
Presentations	**Visitor Centre Theatre**	**Presenter**
10:30 – 11am	"The Colour of the Universe"	Aaron Top
11:30 – 12pm	"Northern Lights – Can't Miss 'Em"	John Hlynialuk
1:30 – 2pm	"The Colour of the Universe"	Aaron Top
2:30 – 3pm	"Losing the Dark (Light Pollution)"	John Hlynialuk
10pm	**Night Sky Viewing** (with telescopes)	**Trailhead Parking Lot**
Sunday July 14	**No Activities**	

Bring your favourite bug repellent and refreshments. Samples above.

Use a Canadian Aurora Service *by* Robert Atkinson BAS member

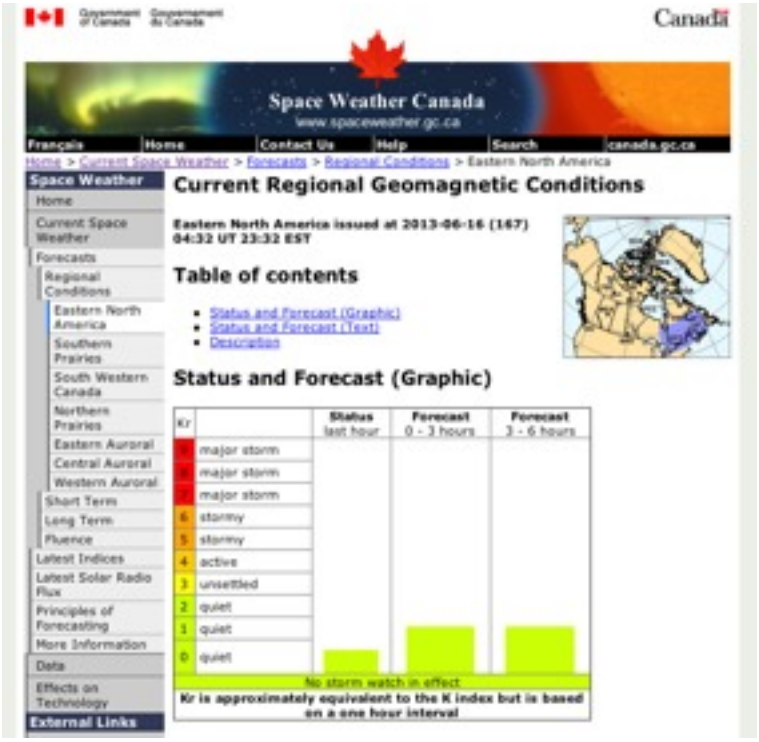
RED alert, RED alert! Those famous words were uttered in Star Trek warning that something is about to happen. But in our case those words are warning us of a possible awesome aurora display.

On the BAS website for quite sometime there is a link to the American Space Weather site. On the left hand side, halfway down you will find the graphical display titled "Current Auroral Oval" showing aurora activity for the Northern hemisphere plus the strength as indicated by the Kp number.

In contrast to this, and in my opinion a much simpler and easier to understand predictor of aurora outbreak, is the new link to the Canadian version called Space Weather Canada. Have a look at this link (www.spaceweather.gc.ca). [From the Home page, select “Current Space Weather” and on the page that appears, under “Regional Conditions” select your region -Eastern North America for most of us. If you are in a different part of Canada the region you pick will be highlighted in blue on the small map of Canada on the page that appears next. -ed]

Select your region which is "Eastern North America" for most of our members and you will be presented with the current geomagnetic conditions. They will be displayed in a three column graph. Columns are Status last hour, Forecast 0 to 3 hours, and Forecast 3 - 6 hours. For my area which is 42 degrees latitude, there are two important conditions to be met that almost certainly guarantee aurora will be visible. The first condition is the forecast of a Kr value (level of activity) of 7-9 which is RED. The second condition is the horizontal bar on the bottom of graph will read **"major storm watch in effect"** and will be coloured purple. I have confirmed aurora visibility in my area at least two times when the conditions above were met. The important thing to note is the higher the Kr value the higher the likelihood of aurora.

So there you have it, with solar maximum probably peaking by summers end, you can monitor the graph. When you see RED on that graph remember those famous words from the Star Trek series and get outside and look to the heavens. Its your best chance of seeing those green and red softly floating curtains in space called the 'Northern Lights'.



Malcolm Park got some great images of the Oct 24/11 aurora that sprang up with rather little notice. His shots testify to being prepared to go at a moment’s notice. He writes: “I got my Spaceweather alert when the K Index hit 5. Initially, the aurora was visible as a a green band from 8 to 9 pm, then it flared red with vertex moving from the north until it was right overhead between 9 and 9:45 pm EDT. The most amazing aurora of my life! Thanks for Spaceweather phone!!” Nikon D3s at 14mm, ISO 1600, 3 s exp at F/2.8. Image below is a 4 shot composite.

One Small Step for (a) Man, One Giant Leap for Mankind

Apollo 11 Commander, Neil Armstrong, July 20th, 1969

"I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the Moon and returning him safely to the Earth."

President John F Kennedy
May 25th, 1961

"*We choose to go to the Moon. We choose to go to the Moon in this decade, and do other things, not because they are easy, but because they are hard; because that goal will serve to organize and measure the best of our energies and skills ..*"

President John F Kennedy
Houston's Rice University Address

What a wonderful speech! I had just finished reading, in its entirety, President Kennedy's address to a huge crowd (35,000) at Houston's Rice University on September 12th, 1962. This speech, more than any other, set the rationale for the USA to embark on a grand endeavor of space exploration. The whole speech is riveting, eloquent, and inspiring. Listen to his remarkable challenge for his country (from the same speech):

"*If I were to say, my fellow citizens, that we will send to the Moon, 240,000 miles away from the control station in Houston, a giant rocket, more than 300 ft tall, the length of this football field, made of new metal alloys, some of which have not been invented, capable of standing heat and stresses several times more than have ever been experienced, fitted together with a precision better than the finest watch, carrying all equipment needed for propulsion, guidance, control, communications, food and survival, on an untried mission, to an unknown celestial body and then return safely to earth ... to do this, and do it right, and to do it before this decade is out, then we must be BOLD !"*

Paula and I remember this event like it was yesterday. From July 19th until July 22nd we were visiting relatives in St. John's, Nfld, and the whole family stayed up late to watch the landing. Even Premier Joey Smallwood declared a Provincial Holiday to commemorate this historic event. It is estimated that ¼ of the entire population of the Earth watched the landing. What an exciting time for a science teacher and astronomy buffs! I even have the front page of Toronto's Globe and Mail framed in the lecture room of our Quetican Observatory.

There have been many books published over the years highlighting the Apollo astronauts and Mission Controllers. I probably have most of them in my library. Recently I have purchased two wonderful books on the history of the Apollo Program and they both complement each other. Kennedy's speech is included in the fascinating book, entitled, ***Footprints in the Dust***, *The Epic Voyages of Apollo*, edited by Colin Burgess, and published by the University of Nebraska Press. Each Apollo mission, from the 1969's Apollo 11 landing, through to the final 1975 Apollo Soyuz mission are recounted in their own chapters.

The book draws on extensive interviews with the Mission Control personnel, Apollo astronauts, and a supporting cast of engineers/ scientists. Right from the first chapter, entitled "The Whole World Was Watching" I found the book riveting and, once I began reading it, I couldn't put it down. Listen to Walter Cronkite speaking about the Apollo 11 landing in his autobiography, "**A Reporter's Life**":

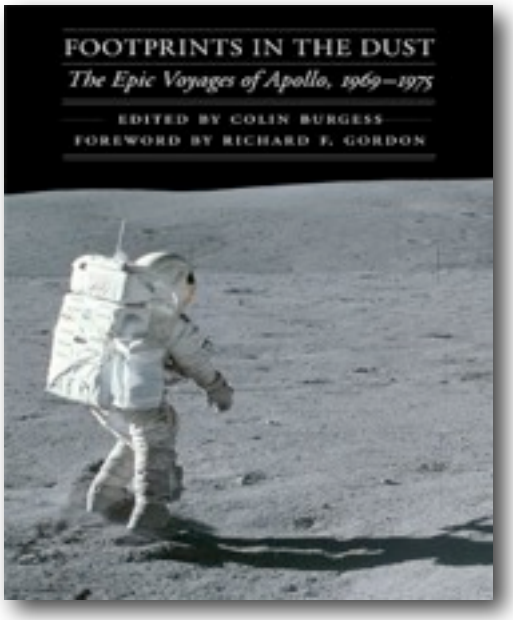
" To see Neil Armstrong, 240,000 miles out there, as he took that giant step for mankind onto the Moon's surface was a thrill beyond all other thrills of that flight. When Neil emerged from the Eagle I almost regained my composure, which I had lost completely when the Eagle had settled onto the Moon's surface. I had just as long as NASA to prepare for that moment, and yet, when it came, I was speechless".

The second book, entitled, ***Apollo, The Epic Journey to the Moon*** was written by Davis West Reynolds, and published in 2013 by Zenith Press. This book follows the entire Apollo Program, from its inception, through its engineering and technological innovations, until the last lunar landing. The photos and illustrations of the Cape Launch Complex, the Vehicle Assembly Building, the Saturn V rocket, the Lunar Module, and the Lunar Rover were fascinating. The maps, photographs, and text for each Apollo Lunar Mission transport the reader to the Moon's surface at each of the Apollo landing sites.

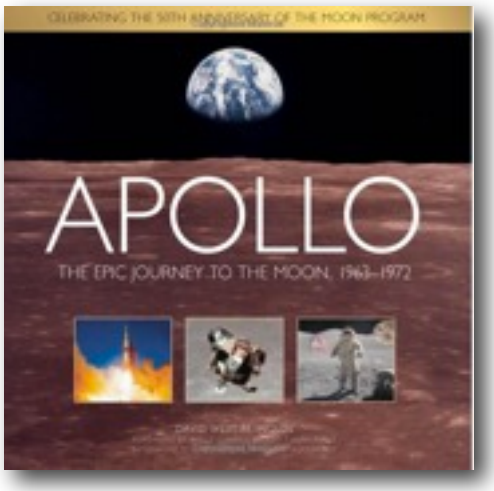
This summer marks the 44th anniversary of the Apollo 11 Moon landing. With the advantage of 44 years of hindsight, we can now address the real significance of the Apollo program. For sure, President Kennedy's 1961 challenge to his nation to set a goal of landing a man on the Moon and returning him safely to the Earth was superbly achieved! But, there is a deeper meaning to the Apollo Program than simply bringing back Moon rocks for scientific analysis. Listen to the sentiment expressed by Apollo 15 astronaut, David Scott, on the significance Apollo Program:

"The Moon itself is colorless, except for shades of grey and black. You have a world with a black sky and no atmosphere. I have a better appreciation for the Earth and its environment, because, when you look back at it and see it, you realize it is the only place in the Universe that we know of where humans can live. You know, we have to take care of it. The significance of the Apollo Program was not so much putting a foot on the Moon, but putting an eye on Earth."

These two books are highly recommended for good summer reading.



Footprints in the Dust, *The Epic Voyages of Apollo* ($35), 1969-1975 (ISBN #978-0-8032-2665-4), edited by Colin Burgess, published by the University of Nebraska Press.



Apollo, *The Epic Journey to the Moon* ($44), 1963-1972 (ISBN # 978-0-7603-4452-1), written by Davis West Reynolds, and published in 2013 by Zenith Press.

Goodbye Comet Lemmon? not quite yet...

Image right shows a lucky catch at 3:27 am June 4. While imaging Comet Lemmon that morning, a tumbling piece of satellite debris came through the field of view. The majority of the "flashing lights" in orbit (with the exception of Iridium satellites) are spent rocket boosters, pieces of nosecone fairings, and even a toolbag from the ISS that floated out of reach. That item eventually re-entered the atmosphere and burned up.

The comet on June 4 was heading northwards (generally left in the image) towards the star σ-Andromedae (brightest star centre left). It misses it by about 0.3° on June 5. The path of Lemmon (see June SGN pg. 3) took it to within 5° of M31 from June 10 to 12. Comet PanSTARRS got to about half that distance Apr 4.

The comet has no tail visible in this image (and I tried to bring one out in Photoshop -no luck). The coma was still a beautiful green and nucleus was not very star-like. This made it hard to estimate the brightness, but it is brighter than 8th magnitude putting it pretty much according to prediction.

Canon 60Da image 30 s exp. ISO 2000. Prime focus on TV NP 101, 540 mm at f5.4.

Lorraine R. roused herself to hunt for Lemmon the same morning and sent this report:
I finally had the opportunity to search for Comet Lemmon this morning and was successful. The sky was already brightening at 4 am. I located it at 4:10 am. The sky was too bright later when I tried to look for M31 in the same region. I noted that the comet had a bright nucleus but no tail was visible to me. I used my 8" Dob with a 14mm eyepiece. In general, it was a bit disappointing after watching PanSTARRS so many times. But the success of the hunt was encouraging.
I finished the morning with a view or the waning crescent moon with obvious earthshine.
Lorraine [And then she went to work!!!-ed]

Surprise Northern Lights!

While some slept June 1 (me included), two BAS photographers were out taking aurora images. This display was a bit of a surprise as the alerts that went out earlier were not indicating major activity. Though it was cloudy earlier in the evening of May 31, it cleared up just in time for the display.

Image above taken by Steve Irvine who lives near Big Bay. He emailed: "I was actually turning in for the night, and just happened to take a quick glance at an iPod app called Aurora Forecast, and saw that the readings were off the scale. I went outside intending to take a few test shots, and came back in 2 1/2 hours later!" Canon 50D images through the 24 mm end of a 24-105 mm zoom at f/4, ISO 1600, exp = 20 s. Steve regularly updates his images at his website: http://www.steveirvine.com/astro

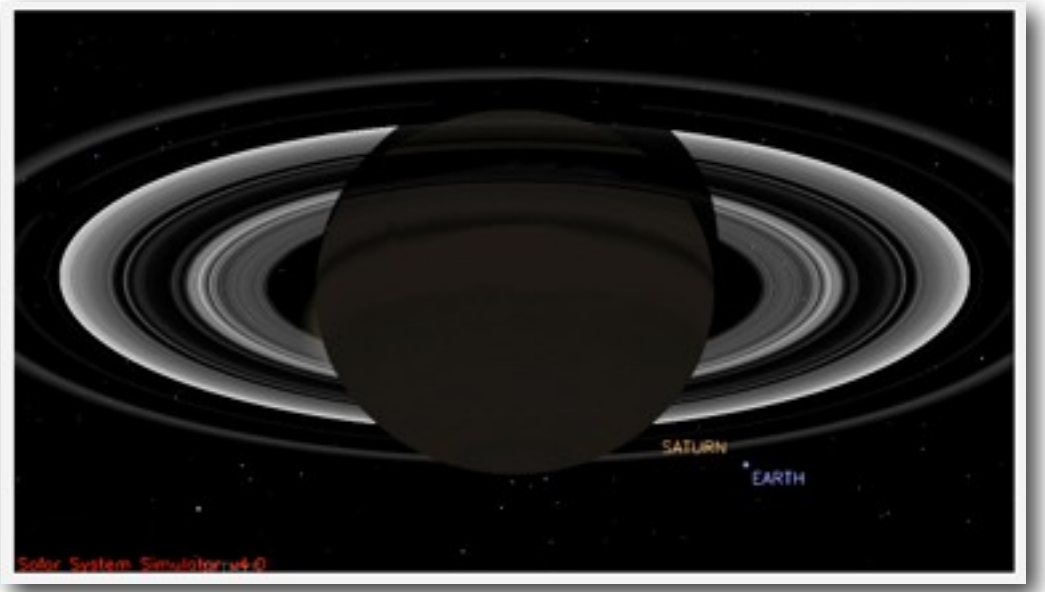
*Fisheye image right is the work of Aaron Top who emailed: "*The most amazing thing I have ever seen ever WOW WOW WOW!"

Zbyg was very proud of the smaller version of the camera shown here (4" diam by 10" long). Yes, the camera container is plumbing pipe! The transparent acrylic dome is still covered with protective tape.

UWO technician, Zbyszek Krzeminski arrived Tuesday June 4, with the ASGARD all-sky camera, computer, GPS unit, power supplies and assorted cables. The work day to dig the trench and build the pier was June 8.

A hard-working crew showed up June 8 to dig the trench and build the pier for the new ASGARD camera station. Once the 100 ft of cable was laid out and we determined the length of trench, the fun part started. Digging the trench through the typical stony till of the drumlin that the Fox is built on brought up a good crop of pebbles, cobbles, and boulders, i.e, a good cross section of glacial till. The last 5 ft near the observatory which was backfilled with rocky rubble during construction was even more interesting. The able workers who did the job were (image right) Frank Williams, Brett Tatton, Peter Thor, Eric Ingard, Aaron Top and John (glad my name is not Polish) Hlynialuk. Thanks, guys! Very much appreciated! [Camera (image right) was installed Jun 10 -ed]

Cassini to Image Earth From Deep Space July 19, 5:27 pm



Simulated view from Saturn showing position of Earth at time of image. Credit: NASA

June 19, 2013: On July 19, 2013, NASA's Cassini spacecraft will photograph Saturn and its entire ring system during a total eclipse of the sun. Cassini has done this twice before during its previous 9 years in orbit, but this time will be different.

"This time, the images to be collected will capture, in natural color, a glimpse of our own planet next to Saturn and its rings on a day that will be the first time Earthlings know in advance their picture will be taken from a billion miles away," says Carolyn Porco, Cassini imaging team lead at the Space Science Institute in Boulder, Colorado.

Earth will appear as a small, pale blue dot between the rings of Saturn. The entire system is too big for Cassini to capture in a single snapshot, so the spacecraft will create a mosaic, or multi-image portrait.


N. America faces the camera on picture day. Credit: NASA

Cassini will start obtaining the Earth part of the mosaic at 2:27 p.m. PDT (5:27 p.m. EDT or 21:27 UTC) and end about 15 minutes later, all while Saturn is eclipsing the sun from Cassini's point of view. The spacecraft's unique vantage point in Saturn's shadow will provide a special scientific opportunity to look at the planet's rings. At the time of the photo, North America and part of the Atlantic Ocean will be in sunlight.

"While Earth will be only about a pixel in size from Cassini's vantage point 1.44 billion kilometers away, the team is looking forward to giving the world a chance to see what their home looks like from Saturn," says Linda Spilker, Cassini project scientist at NASA's Jet Propulsion Laboratory in Pasadena, Calif. "We hope you'll join us in waving at Saturn from Earth, so we can commemorate this special opportunity."

Unlike two previous Cassini eclipse mosaics of the Saturn system in 2006, which captured Earth, and another in 2012, the July 19 image will be the first to capture the Saturn system with Earth in natural color, as human eyes would see it. It also will be the first to capture Earth and its moon with Cassini's highest-resolution camera. The probe's position will allow it to turn its cameras in the direction of the sun, where Earth will be, without damaging the spacecraft's sensitive detectors.

This will be the first time Earthlings have had advance notice that their picture will be taken from interplanetary distances. To participate, click here .

"Ever since we caught sight of the Earth among the rings of Saturn in September 2006 in a mosaic that has become one of Cassini's most beloved images, I have wanted to do it all over again, only better," says Porco. "This time, I wanted to turn the entire event into an opportunity for everyone around the globe to savor the uniqueness of our planet and the preciousness of the life on it."

Porco and her imaging team associates examined Cassini's planned flight path for the remainder of its Saturn mission in search of a time when Earth would not be obstructed by Saturn or its rings. Working with other Cassini team members, they found the July 19 opportunity would permit the spacecraft to spend time in Saturn's shadow to duplicate the views from earlier in the mission to collect both visible and infrared imagery of the planet and its ring system.

This latest image will continue a NASA legacy of space-based images of our fragile home, including the 1968 "Earthrise" image taken by the Apollo 8 moon mission from about 240,000 miles (380,000 kilometers) away and the 1990 "Pale Blue Dot" image taken by

Voyager 1 from about 4 billion miles (6 billion kilometers) away.

July 19th, concludes Porco, "will be a day for people all over the globe to celebrate together the extraordinary achievements that have made such interplanetary photo sessions possible. And it will be a day to celebrate life on the Pale Blue Dot."

To learn more about the public outreach activities associated with the taking of the image, visit: http://saturn.jpl.nasa.gov/waveatsaturn .

Credits:
Production editor: Dr. Tony Phillips | Credit: Science@NASA

Canes Venatici (CVe)

α Canum Venaticorum - Cor Caroli Y Canum Venaticorum - La Superba

This constellation is fairly difficult to identify as it consists of only two stars, the brightest (Cor Caroli) having a magnitude of only 2.8. Its two brightest stars are almost parallel with the last two stars in the handle of the Big Dipper and lie about 12° to the southwest. Cor Caroli forms one corner of the "Diamond of Virgo," a perfect diamond in the heavens formed by joining the stars Cor Caroli, Arcturus in Bootes, Spica in Virgo and Denebola in Leo.
15 Canum Venaticorum, a double star, can be separated with steadily held fieldglasses. Observe also the variable star La Superba, a beautiful flashing dark red star.

DOUBLE STARS

	Mag.	Sep (s)	Location	Remarks
α	3.2-5.7	20	125439	Pale Yellow·Lilac; easy in 2"
2	5.8-8.0	12	121441	Orange-Blue; fine contrast.
Σ1615	6.0-8.2	27	121233	Yellow-Ashen.
Σ1645	7.0-7.5	10	122645	Fine pair.

MESSIER OBJECTS

	Mag	Location	Remarks
M3	6.3	134029	Globular Cluster. 40,000 LY away; very unusual. 1/7 of the 1,000 stars in M3 are variable, all having a period of half a day.
M51	8.1	132847	Spiral Galaxy. The famous "Whirlpool Galaxy", seen exactly broadside-on.
M 63	9.5	131442	Spiral Galaxy. aka "The Sunflower Galaxy"
M 94	7.9	124941	Spiral Galaxy. aka "Cat's Eye Galaxy"
M 106	8.6	12174	Spiral Galaxy.

Other Objects of Interest in Canes Venatici

NGC 5005 - Spiral Galaxy, magnitude 9.6, location 130937.
R Canum Venaticorum - Long period (328 days) variable, max. magnitude 7.7. Location 134740.
V Canum Venaticorum - Long period (192 days) variable, max. magnitude 6.8. location 131746.
Y Canum Venaticorum - "La Superba," a variable star of the 5th magnitude and brilliant red colour. Location 134246.

Coma Berenices (CBe)

Coma Berenices is a open cluster of 5th and 6th magnitude stars about 15° southwest of Canes Venatici. It should be observed on a clear and moonless night; with fieldglasses, between 20 and 30 stars can be seen, clearly suggesting the shape of a head of flowing hair. The brightest star in this group, β Comae Berenices, has a magnitude of 4.3 and lies about 8° to the west of the main group of the cluster (see chart). Many spiral galaxies lie in this constellation.

DOUBLE STARS

	Mag.	Sep (s)	Location	Remarks
2	6.0·7.5	4	120222	
12	4.8·8.0	66	122026	
17	5.4·6.7	145	122626	White-Lilac
24	4.7-6.2	20	123319	Orange-Blue; beautiful contrast
3	5.2-7.4 -9.0	1-29	125121	Lilac-Blue; triple
Σ1678	6.8-7.5	33	124315	

Coma Berenices (CBe) (cont'd)

MESSIER OBJECTS

	Mag	Location	Remarks
M 53	7.6	131018	Globular Cluster. [60 000 LY]
M 64	8.8	125422	Spiral Galaxy. Large and bright."Blackeye" Galaxy 20 Million LY away
M 85	9.3	122318	Spiral Galaxy.
M 88	10.2	123015	Spiral Galaxy.
M 91	10.7	124114	Probably a comet. [Nope!y NGC 4548- ed]
M 98	10.7	121115	Spiral Galaxy.
M 99	10.1	121615	Spiral Galaxy. Large and bright.
M 100	10.6	122016	Spiral Galaxy.

[Note: The last six listed above are very near the border to the constellation Virgo and form part of the famous Virgo Cluster. None of these CBe galaxies are part of Markarian's Chain but are located just above it. -ed]

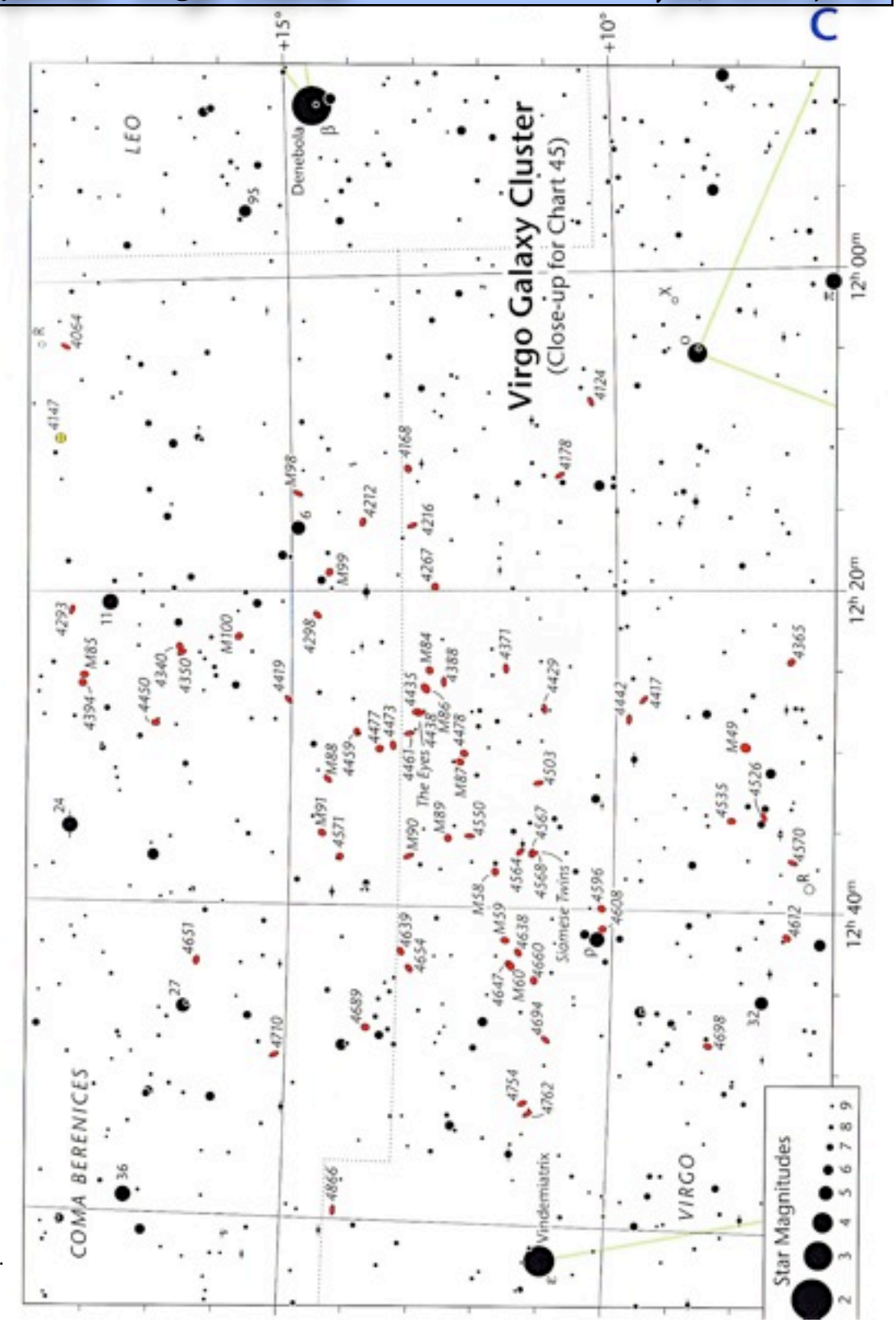
Other Objects of Interest in Coma Berenices

NGC 4559 - Spiral Galaxy seen edge-on. Location 123428.
NGC 4565 - Spiral Galaxy. Mag. 11.0. Location 123426. 31 MLY. [a beautiful edge-on spiral with prominent dust lane. -ed]

The **Virgo Cluster** chart here is a copy of the detailed map provided in the appendix of the Pocket Sky, -an enlargement of the Virgo/Coma Berenices region of chart 45 in that atlas. Markarian's Chain runs from M84 to NGC 4477 in the centre of the cluster and includes the two galaxies labelled "The Eyes".

The Virgo Cluster contains upwards to 2000 galaxies and in the brightest 160, (see Atlas of the Universe, www.atlasoftheuniverse.com)there are only 19 ellipticals. The view through the telescope, however, shows a preponderance of "ellipticals" and only a few spiral types. The answer is that there are a large number of S0 galaxies (the rounded spirals with no obvious arms) which masquerade as ellipticals in telescopic views. Of the top 160 galaxies, 40 are S0 and many more are Sa spirals with tightly wound spiral arms which look a lot like ellipticals as well.

There are 19 Messier objects in the cluster: 11 galaxies, in Virgo and 7 galaxies and one globular cluster, M53 on the Coma side. M64 in Coma is the Blackeye Galaxy and M104 on the border of Corvus is the Sombrero Galaxy, -both are worth a look. Another favourite is NGC 4565 in Coma near the star γ-Com. This is a beautiful edge-on spiral with a prominent dust lane. The chart at right does not show the location of any of these interesting objects. Check your other atlases for these.



Messier Objects in CBe

M 53	7.6	Globular Cluster. [60000 LY]
M 64	8.8	Spiral Galaxy.."Blackeye" 20 Million LY away
M 85	9.3	Spiral Galaxy.
M 88	10.2	Spiral Galaxy.
M 91	10.7	[actually NGC 4548- ed]
M 98	10.7	Spiral Galaxy.
M 99	10.1	Spiral Galaxy. Large, bright.
M 100	10.6	Spiral Galaxy.

Messier Objects in Virgo

M 49	8.6	Elliptical.
M 58	9.2	Spiral
M 59	9.6	Elliptical
M 60	8.9	Elliptical
M 61	10.1	Spiral
M 84	9.3	Elliptical
M 86	9.7	Elliptical
M 87	9.2	Elliptical
M 89	9.5	Elliptical
M 90	10.0	Spiral
M 104	8.0	Spiral

[The Sombrero Galaxy]

The **Virgo Cluster** is at approx. 53.8 ± 0.3 Mly in the constellation Virgo and Coma Berenices. With 1300 (and possibly up to 2000) member galaxies, the cluster is the heart of the larger Virgo Supercluster, of which the Local Group is an outlying member. It is estimated that its mass is 1.2 x 10^{15} solar masses out to 8° of the cluster's center or a radius of about 7.3 Mly. Many of the brighter galaxies, including the giant elliptical M 87, were discovered in the late 1770s and early 1780s by Charles Messier where he described them as "nebulae without stars". Their true nature was not recognized until the 1920s.

The cluster subtends a maximum arc of approximately 8° centered in Virgo; many are visible with a small telescope. The cluster is a fairly heterogeneous mixture of spirals and ellipticals. As of 2004, it is believed that the spirals of the cluster are distributed in an oblong prolate filament, approximately 4 times as long as wide, stretching along the line of sight from the Milky Way. The elliptical galaxies are more centrally concentrated than the spiral galaxies.

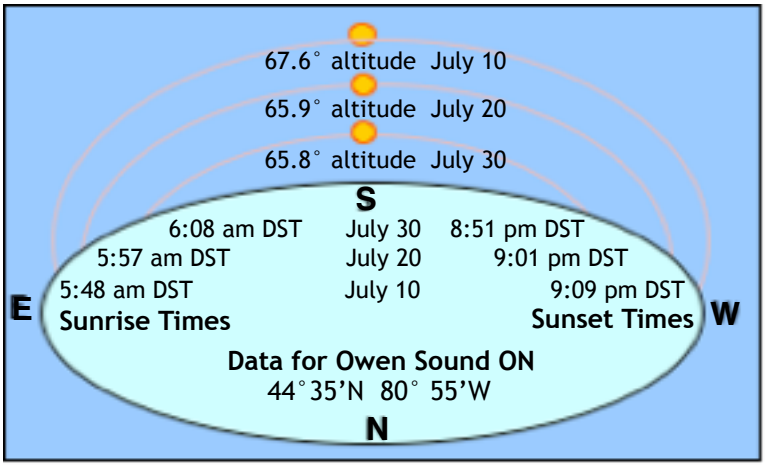
July 2 **Pluto at opposition (mag 14.0) in Sagittarius**
July 3 **Venus in M34 (Beehive) Venus sets 10:44 DST**
July 5 **Jupiter 1.1°S of M35 (difficult due to sunlight)**
July 6 Mars 4° N of Moon; Moon at apogee (406 490 km)
July 8 **New Moon rises locally at 6:29 am DST**
July 10 Venus 7° N of Moon
July 15 First Quarter Moon rises at 12:24 pm DST
July 16 Spica 0.3°S of Moon, occultation (not vis. here)
Mars 0.4° S of M35;
July 17 Saturn 3° N of Moon
July 19 Cassini spacecraft to take Earth's picture
5:27 pm DST (Go out, Smile and wave!)
July 21 Moon at perigee (358 400 km) Large tides
July 22 Venus 1.2° N of Regulus (min. sep. 1.25°)
Mars 0.8° N of Jupiter;
FM (Thunder Moon) rises 7:55 DST
July 28 S. δ Aquarid meteors peak (11 pm) 20/h moon = 56%
July 29 Last Quarter Moon rises at 12:27 pm DST
July 30 **Mercury greatest elongation W (20°)**

BAS Events

Jul 3 BAS meeting at **ES Fox** Observatory, 7 pm Speaker: **Aaron Top "True Colours of the Universe".** Bring a lawn chair.
Jul 5 Public viewing Grey Roots Museum parking lot 9 pm Saturn and galaxies. Backup July 6 Fox Obs.
Jul 6 BAS viewing @Fox Realm of Galaxies in Virgo. Backup night is the Dark Sky Weekend July 12 to 14 at BPNP. (NM-2)
Jul 12 -14 Dark Sky Weekend at Bruce Peninsula National Park. Preregistration by BAS members required. Contact Joan S.
July 22 Mars and Jupiter close approach in dawn, less than 1°
Jul 28 S. delta Aquarid meteors Viewing at ES Fox, rate = 20/h
Jul 29 - Aug 2 Astronomy Kids Day Camp forms on BAS website. Pre-register **by July 12, 2013.**
Jul 30 Summer Public Stargazing (1st of 5) Star talk 7:30 pm followed by star gazing weather permitting. Bring bug spray. Dress warmly!
Fees apply: $15/adult ($5 refunded if no observing) Family price $30 (2 adults + children 18 and under ($10 refund if no observing)

Planets

MERCURY, stays close to the sun for the first two weeks of July but by month end appears in the morning sky. It is part of a planet trio with Mars and Jupiter in the last week of July. **VENUS**, (-3.9), is a bright Evening Star near the Beehive July 3/4, and about 1.25° from Regulus on July 22. **MARS** (1.6) is a dawn planet and appears 10° from Jupiter July 1 but that shrinks to less than a degree by July 22. **JUPITER**, (-1.9) is good in the last half of July as it is carried higher in the sky by the stellar motion. Mars makes a quick dash past Jupiter (minimum separation 47 min July 22 and by month end Jupiter and Mars are 4 degrees apart. Note Mercury just below the pair in the last two weeks of July. **SATURN**, (mag 0.5) is past the meridian at sunset and in the western sky all month. By July 30, it is setting at midnight. Ring tilt increases slightly to 17.4° in July. Both **URANUS**, (5.7) and **NEPTUNE**, (7.8) are above the horizon by 1 am in July. They straddle the meridian by sunup at the end of the month. Both **asteroids, Vesta (7.8)** and dwarf planet, **Ceres (8.1)** are now too close to the sun to observe. **PLUTO** (mag. 14) is in dark sky for much of the night and well-placed for viewing in July.The September BAS@Fox viewing night will target Pluto. Diagram below gives the sunrise/sunset times and sun's altitude on three dates this month. The sun is now dropping in elevation. The July moon graphic shows lunar phases. Times of moonrise for NM, FQ, FM and LQ in July are given in the Sky Calendar listing at left.



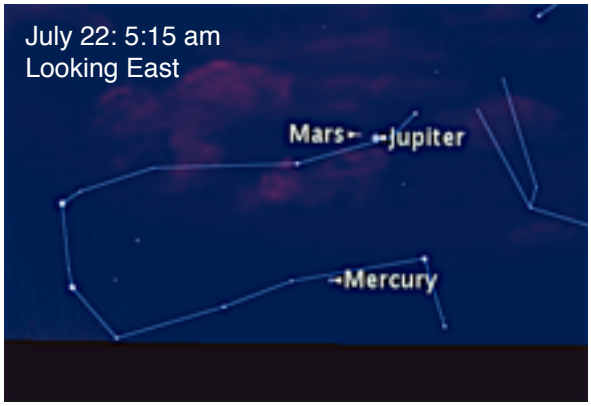
Special Events

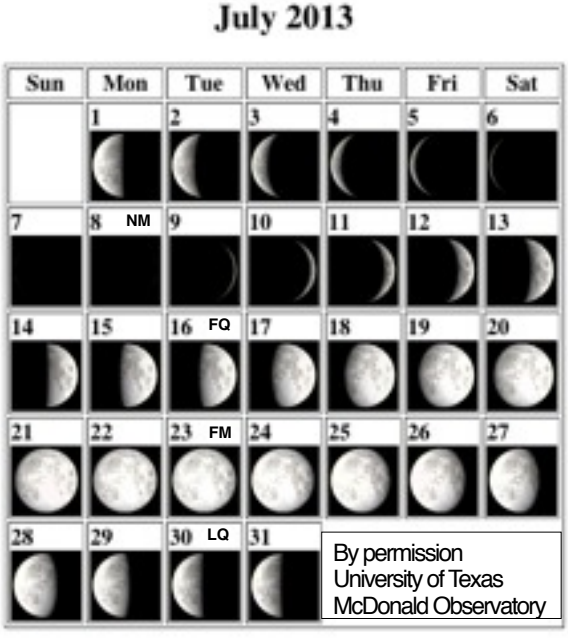
Venus, Beehive, Regulus

The bright star you are seeing regularly now in the West is once again the Evening Star, Venus. Mercury was nearby in June but now is too close to the sun to see. (But check out its morning apparition in the item below). Venus makes a quick pass through the top of the Beehive July 3, from about 2 pm to midnight, and is best positioned about 10 pm July 3. Note that it sets locally about 10:45 so there will be some dark sky when it is above the horizon. Venus continues on towards Regulus and the two are less than 2° apart July 10.

Bonus: Mars, Jupiter, Mercury in morning sky

By the end of the month, Mercury re-appears in the morning sky. It forms another 'planet trio" this time with Mars vs Venus. This one is not as nice a triangle as the May 26 event as shown in the SN chart at right for 5:15 am July 22. Mars and Jupiter are closest this morning at 47 min of arc separation, less than a degree!





BAS Member Loaner Scopes

Solar H-alpha scope now out on loan.

Our Lunt solar scope can be borrowed by BAS members but there is a waiting list! Contact Aaron to get your name on it. You need to provide a mount like a heavy-duty tripod, or a regular equatorial or azimuth mount). A short training session will be provided on pickup.

One 12-inch Dob still available.

One 12-inch telescopes has been spoken for but the other is still available for the summer. We have two **8-inch dobsonians** for free member loan as well. Contact Brett T. or Aaron T. Scopes come in and out periodically so keep checking with Brett or Aaron if you are interested in a loaner.

SGN Classified Ads Section

(Now also on our website)

FOR SALE: Canon EOS 50D DSLR
(body only)

New Lower Price!

15.1 Mp Excellent noise reduction features for night photos. Includes spare battery and charger, strap, software and manual.
Asking $ 500. John H. 519 371-0670 stargazer@wightman.ca
Information about the 50D can be found here:
http://en.wikipedia.org/wiki/Canon_EOS_50D
and here: http://www.imaging-resource.com/PRODS/E50D/E50DA.HTM

SOLD!

FOR SALE: Apple iPod 4th Gen. 32 G

Belkin Case, stylus. Screen protected cover from day 1. Will do everything an iPad or iPad mini does. Note, iPods can be used for email and web access but they are **NOT** an iPhone. Asking $ 180. John H. 519 371-0670
stargazer@wightman.ca

FOR SALE: Televue Pronto

2 element E.D. Refractor, 2.7" / 70mm diameter. f.l. 480mm, f/6.8. with 1-1/4" Star Diagonal, with 45 degree Prism diagonal (for terrestrial viewing), with TeleVue Red dot finder, complete with TeleVue Soft Case. Asking $ 700.-- Firm Anton VanDijk 519 376-9912
ravand@rogers.com

WANTED: Old-style slide projection table with AC outlets -collapsible.
Something like image at right. Will pay up to $40. Contact stargazer@wightman.ca

Found 2! Thanks Larry and Dave.

FOR SALE: Meade LXD75 telescope mount

Meade LXD75 with the 497 AutoStar hand controller (GOTO system). It comes with two balance weights and 12 V power supply. This mount is a medium-duty mount that will support 30 pounds. Vixen-style dovetail mount suitable for up to 5 or 6-inch refractors or up to 9.25-inch SCT. ASKING $350.00
See http://www.cloudynights.com/documents/lxd75.pdf or http://www.cloudynights.com/item.php?item_id=2014 for more information.
Contact Brett Tatton (bretttatton@gmail.com)

Horroscope for July-August: Cancer

You like to know what's going on in the lives of everyone in the galaxy. However, you tend not know know what's going on in your own. If you are lucky, your friends will tell you. Cancerians only get dressed because they have to, and their fashion sense can only be described as "erratic." You are more likely than any other sign in the zodiac (except Pisces, who does not iron) to iron your clothes by sleeping with them sandwiched between the mattress and box-spring. Likewise, you can stretch one pair of underwear out for almost a month. Despite your need to be everyone's savior, you need no social interaction. A Cancer is like a walking Ladies' Home Journal, quick on the draw with shortcake recipes and helpful hints on how to talk to your teen. Whether they know it or not, they are all born with an exceptional talent for cross-stitch. So much for buying the world a Coke - they would breast-feed the world if they could. This trait is not gender-specific. You will never excel in sports because you have to rest for fifteen minutes every time you breathe. You do not mind, since you plan to conduct your career from the comfort of your own bed. You maintain your questionable health through a steady diet of subs and beer. You also imbibe a great deal of Pepto-Bismol in order to confuse your numerous ulcers. People walk out on you often. The most entertaining thing about this is that you like it. You strive to be a doormat. Cancerians coin their own words to describe philosophical concepts. Cancerians have minimal influence over their friends, even though they show up with homemade soup to remedy every minor or major tragedy. Cancerians know what everyone is thinking at any given time. This is why they are never invited to parties. Cancerians are always appointed to take their drunken, drooling friends home. These friends are usually Pisceans.