Star Gazer News

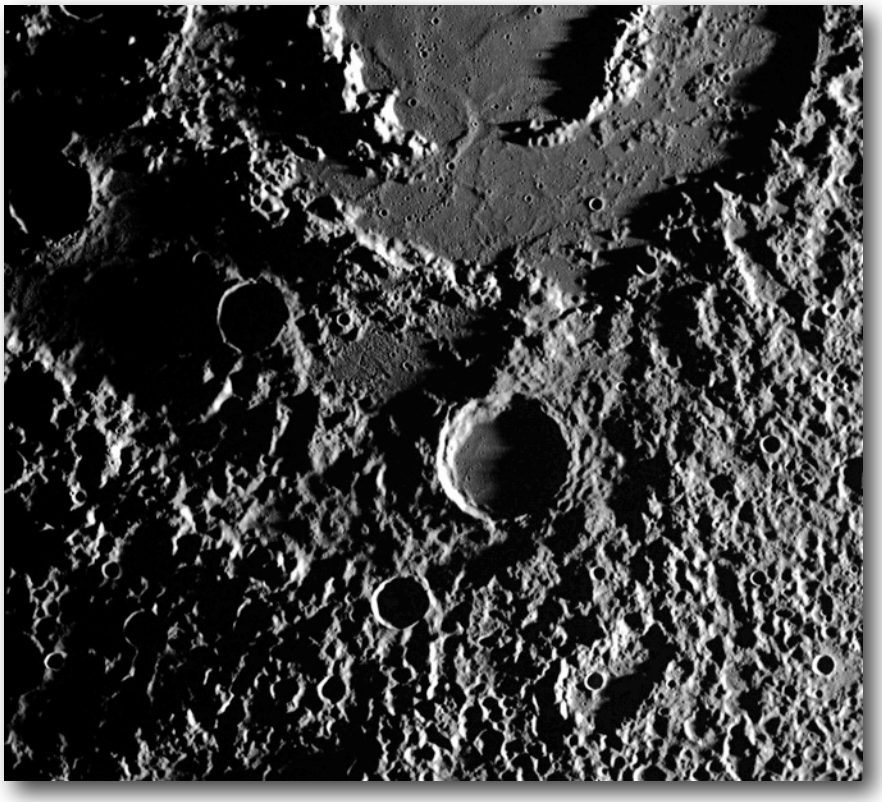
Astronomy News for Bluewater Stargazers
Vol 6 No.11 Nov 2012

November 2012 Contents

Third Annual Harvest Dinner Oct 27. 2012

This year's version of the Harvest Dinner fundraiser boasted a full house (less two, actually). A nautical theme complemented the speaker's talk of sea-going visitors from Europe travelling to North America before the Vikings. More details to come in the Dec SGN.

Mercury Surface Full of Sulphur?



Named for the 17th-century Venetian composer, the southern half of Mercury's Vivaldi basin is seen in this image acquired on August 26 by NASA's MESSENGER spacecraft. The 213 km wide crater's smooth floor is contrasted by the incredibly rugged terrain beyond its outermost ring — a result of the ejected material that was flung out from the impact site and emphasized by the low angle of illumination. The floor of the crater remained relatively smooth due to molten material that erupted in the wake of the impact event, flooding the basin.

Recent findings from the MESSENGER mission have revealed variations in Mercury's surface composition due to volcanism that occurred at different times, as well as a surprising concentration of elements like magnesium and sulfur — much more so than any of the other terrestrial planets.

In results to be published in the Journal of Geophysical Research, scientists report that Mercury's volcanic smooth plains differ in composition from older surrounding terrains. The older terrain has higher ratios of magnesium to silicon, sulfur to silicon, and calcium to silicon, but lower ratios of aluminum to silicon, suggesting that the smooth plains material erupted from a magma source that was chemically different from the source of the material in the older regions, according to Shoshana Weider of the Carnegie Institution of Washington, the lead author on the paper.

Mercury's surface was also found to be high in magnesium and sulfur-enriched minerals. "None of the other terrestrial planets have such high levels of sulfur. We are seeing about ten times the amount of sulfur than on Earth and Mars," Weider said. "In terms of magnesium, we do have some materials on Earth that are high in magnesium. They tend to be ancient volcanic rocks that formed from very hot lavas. So this composition on Mercury tells us that eruptions of high-temperature lavas might have formed these high-magnesium materials."

The data was gathered with MESSENGER's X-Ray Spectrometer (XRS) — one of two instruments designed to measure the abundances of many key elements in the top 2mm of Mercury's crust. XRS detects emissions from elements in the 1-10 kiloelectron-volt (keV) range – specifically, magnesium, aluminum, silicon, sulfur, calcium, titanium, and iron.

Read more on the MESSENGER mission site here.

Image credit: NASA/Johns Hopkins University Applied Physics Laboratory/Carnegie Institution of
Read more: http://www.universetoday.com/97667/mercurys-surface-is-full-of-sulfur/#ixzz28lTqjXgl

BAS Executive 2011-2013

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BAS Events for Nov/Dec 2012

Nov 7 BAS Meeting Member's Night Grey Roots 7:00 pm
Nov 17 BAS Viewing Leonid Meteors (20/h) ES Fox Obs.
Dec 5 BAS Meeting Grey Roots 7:00 pm
Speaker: John Hlynialuk "Christmas Star"
Dec 13 BAS Viewing Geminid Meteors (120/h) @dark
ES Fox Observatory

Dr. Albert is not amused...

Border Collies are considered one of the smartest of dog breeds.

My 3 month old Border Collie "Galaxy" (SB class barred spiral) has an appetite for learning.

Science is an area he finds you can really sink your teeth into.

But even he is finding Einstein a bit difficult to digest!

From Frank Williams

Editor's Report

Naked Eye Observing with Dr. Mike Inglis: (Starfest speaker)

Dr. Mike Inglis was one of the speakers at Starfest this past year and I was really impressed with his presentation. He provided an engaging talk about some of the celestial objects that people have reported seeing with only the naked eye. There are the obvious candidates like the Andromeda Galaxy, M31 and the Lagoon Nebula, M8. Also in the list, of course, are the Double Cluster in Perseus as well as M13, the globular cluster in Hercules, the Orion Nebula M42 and the obvious Pleiades M45. Other Messier objects would include ones that I have seen naked eye like M44 (Beehive), M6 (Butterfly) and M7 (Ptolemy), M22 the globular cluster as well as the easy Sagittarius Star Cloud, M24.

As for planets, some observers have seen two of the four moons of Jupiter. According to the RASC Observer's Handbook, the moons in order of brightness are Ganymede (4.6), Io (5.0), Europa (5.3) and Callisto (5.7). Two of the moons are good candidates for naked eye sighting -Ganymede and Europa since they are both bright and far enough away that they can be seen separately from the glare of Jupiter. A third, Callisto has been reported but Io remains elusive since it is so close to Jupiter.

Other possible naked eye sightings include planetary bodies like Neptune at magnitude 5.7, Asteroid Vesta at opposition magnitude 6.4 and Ceres at 6.7 (under dark skies with a little help from binos possibly).

Dr Inglis issued a real challenge at the end of his talk: spotting a Gamma Ray Burster. These events sometimes reach 5th or 6th magnitude but only last for a minute or so. They occur at random locations in the sky so it would be totally accidental to see one with the naked eye or through a telescope. Still, if you do, you would be the only one to see an object that could easily be several billions of light years away!

Dr Inglis issued a challenge to provide him with a list of the faintest objects that you have seen with your naked eye. You can add to his list at: http://www.mikeinglis.net/faintestobject/Report_Form.html

Education Minister Helps BOEC celebrate 40th *by John H.*

Ontario Minister of Education Laurel Broten attended the Bluewater Outdoor Education Centre's 40th Anniversary celebration Oct 19.

But not without some controversy. Her car was met at the entrance by about 40 elementary and secondary teachers carrying banners and signs protesting Bill 115 in particular and the Liberal governments approach to collective bargaining in general. Both local teacher's groups and our board of education, normally adversaries during negotiations, have spoken out against the antagonistic process the present government followed, -a process which incidentally contravened the Ontario Labour Code which spells out who negotiates on behalf of whom in Ontario.

In her speech, Minister Broten praised the foresight of local organizers in establishing the outdoor ed centre in 1972. She also praised the innovative way that the Bluewater Education Foundation found to keep the centre operating even in the era of tight budgets. [In spite of this, she did not "hand over a cheque" for the funding necessary to just maintain the status quo let alone expand programming at the centre]. Only one speaker (Board Chair Jan Johnstone) laid it on the line saying publicly that the funding amounts for the outdoor education were inadequate and the centre could not be operated with a full staff complement on the smaller budget provided by the Ministry for outdoor education.

I had an opportunity to actually read through the on-line document where the Ministry of Education provided the funding amounts allocated to each board. Toronto got over a million dollars. The allocation for Bluewater was $179 000, -far short of the $220 000 the board required to maintain a staff of 5 at the centre. The difference was made up by reducing the staff at OEC to 3 and eliminating some programs (like astronomy for the elementary students) and reducing the time that staff spent overnight with the students in their residential programs.

In later discussions I had with a BEF member who walked around on the tour with Minister Broten, I was informed that the Minister was suitably impressed with the facility. I hope that translates into more funding for outdoor ed facilities like ours in general, but I will not hold my breathe until I see the cheque.

Another thing that was clear from the funding document I mentioned earlier was that the Ministry was encouraging partnerships with community groups who they expect to offer volunteers to provide programs [that have been cut by reduced funding!!] This is a great way to burn out those that do a lot of this already and reduce the quality of the instruction at the same time. For sure, there are some very knowledgeable folks out there who do a wonderful job (because they have a passion for the subject) but the Ministry's notion is totally wrong-headed if they think non-professionals are going to start picking up the slack when boards have to cut back staff because of funding reductions. "Pick up the slack there BAS, oh and by the way, you aren't going to get paid for your teaching services."

One of the leaders of the protesting group summed it up nicely when he said that the money never was the issue. The interference of government in the bargaining process, the introduction of legislation before there was any indication of teacher strikes is totally unwarranted and unprecedented in Ontario labour relations. It is hard to tell by government actions that we live in a democracy.

A Well-Deserved Honour: Bill Walker presents an award to Ray Fenton as representative of the BEF on the 40th Anniversary of the Outdoor Ed Centre. Ray has been a long-time member of BEF and continues to contribute to the Foundation's efforts to maintain the site.

Education Minister Broten met with reps from the local teachers' organizations behind closed doors. The protest was at times noisy but the participants were well-behaved and did not interfere with access to the site. [No teacher took time off to attend. -ed]

BAS members Dan G. and Elizabeth B. pose with Minister of Education Laurel Broten during a tour of the ES Fox Observatory. Hopefully the message gets through that great things are being done in Bluewater. [All photos by John H.]

Curiosity Finds Old Stream bed on Mars

Image credit: NASA/JPL-Caltech/MSSS

Link to a Watery Past
In this image from NASA's Curiosity rover, a rock outcrop called Link pops out from a Martian surface that is elsewhere blanketed by reddish-brown dust. The fractured Link outcrop has blocks of exposed, clean surfaces. Rounded gravel fragments, or clasts, up to a couple inches (few centimeters) in size are in a matrix of white material. Many gravel-sized rocks have eroded out of the outcrop onto the surface, particularly in the left portion of the frame. The outcrop characteristics are consistent with a sedimentary conglomerate, or a rock that was formed by the deposition of water and is composed of many smaller rounded rocks cemented together. Water transport is the only process capable of producing the rounded shape of clasts of this size.

The Link outcrop was imaged with the 100-millimeter Mast Camera on Sept. 2, 2012, which was the 27th sol, or Martian day of operations.

The name Link is derived from a significant rock formation in the Northwest Territories of Canada, where there is also a lake with the same name.

Scientists enhanced the color in this version to show the Martian scene as it would appear under the lighting conditions we have on Earth, which helps in analyzing the terrain.

Sept. 27, 2012: NASA's Curiosity rover mission has found evidence a stream once ran vigorously across the area on Mars where the rover is driving. There is earlier evidence for the presence of water on Mars, but this evidence -- images of rocks containing ancient stream bed gravels -- is the first of its kind.
"From the size of gravels it carried, we can interpret the water was moving about 3 feet per second, with a depth somewhere between ankle and hip deep," said Curiosity science co-investigator William Dietrich of the University of California, Berkeley. "Plenty of papers have been written about channels on Mars with many different hypotheses about the flows in them. This is the first time we're actually seeing water-transported gravel on Mars. This is a transition from speculation about the size of stream bed material to direct observation of it."

The finding site lies between the north rim of Gale Crater and the base of Mount Sharp, a mountain inside the crater. Earlier imaging of the region from Mars orbit allows for additional interpretation of the gravel-bearing conglomerate. The imagery shows an alluvial fan of material washed down from the rim, streaked by many apparent channels, sitting uphill of the new finds.

The rounded shape of some stones in the conglomerate indicates long-distance transport from above the rim, where a channel named Peace Vallis feeds into the alluvial fan. The abundance of channels in the fan between the rim and conglomerate suggests flows continued or repeated over a long time, not just once or for a few years.

The discovery comes from examining two outcrops, called "Hottah" and "Link," with the telephoto capability of Curiosity's mast camera during the first 40 days after landing. Those observations followed up on earlier hints from another outcrop, which was exposed by thruster exhaust as Curiosity, the Mars Science Laboratory Project's rover, touched down.

"Hottah looks like someone jack-hammered up a slab of city sidewalk, but it's really a tilted block of an ancient stream bed," said Mars Science Laboratory Project Scientist John Grotzinger of the California Institute of Technology in Pasadena.
The gravels in conglomerates at both outcrops range in size from a grain of sand to a golf ball. Some are angular, but many are rounded.
"The shapes tell you they were transported and the sizes tell you they couldn't be transported by wind. They were transported by water flow," said Curiosity science co-investigator Rebecca Williams of the Planetary Science Institute in Tucson, Ariz.

The science team may use Curiosity to learn the elemental composition of the material, which holds the conglomerate together, revealing more characteristics of the wet environment that formed these deposits. The stones in the conglomerate provide a sampling from above the crater rim, so the team may also examine several of them to learn about broader regional geology.
The slope of Mount Sharp in Gale Crater remains the rover's main destination. Clay and sulfate minerals detected there from orbit can be good preservers of carbon-based organic chemicals that are potential ingredients for life.

"A long-flowing stream can be a habitable environment," said Grotzinger. "It is not our top choice as an environment for preservation of organics, though. We're still going to Mount Sharp, but this is insurance that we have already found our first potentially habitable environment."

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

Astronomers Discover Milky Way's Hot Halo

by JASON MAJOR *Universetoday.com*
SEP 24, 2012

Our galaxy — and the nearby Large and Small Magellanic Clouds as well — appears to be surrounded by an enormous halo of hot gas, several hundred times hotter than the surface of the Sun and with an equivalent mass of up to 60 billion Suns, suggesting that other galaxies may be similarly encompassed and providing a clue to the mystery of the galaxy's missing baryons.
The findings were reported today by a research team using data from NASA's Chandra X-ray Observatory.

In the artist's rendering above our Milky Way galaxy is seen at the center of a cloud of hot gas. This cloud has been detected in measurements made with Chandra as well as with the European Space Agency's XMM-Newton space observatory and Japan's Suzaku satellite. The illustration shows it to extend outward over 300,000 light-years — and it may actually be even bigger than that.

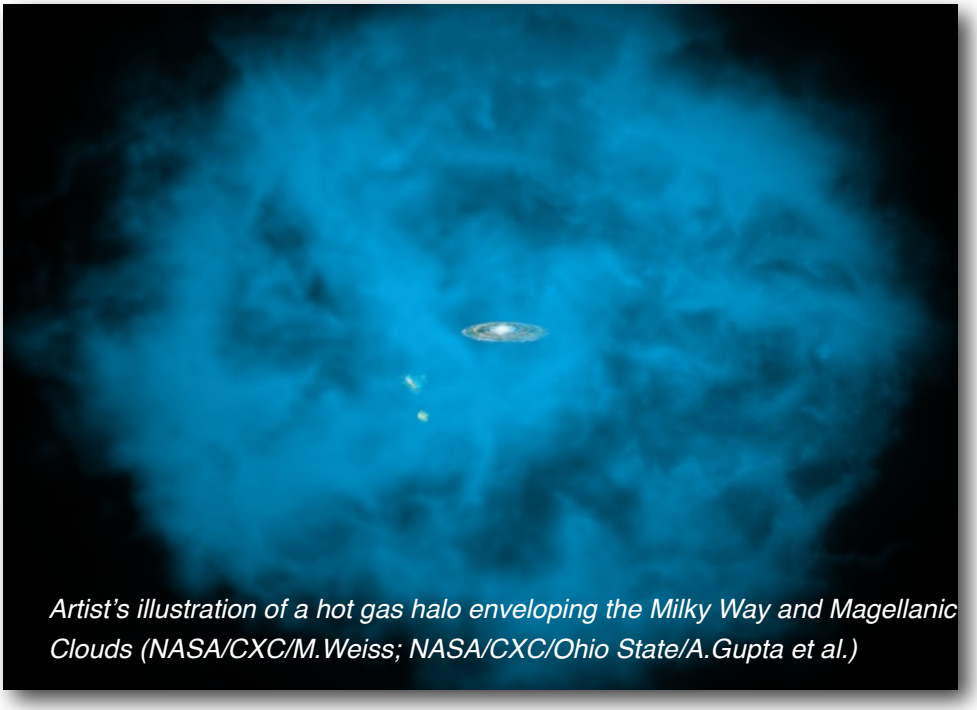
While observing bright x-ray sources hundreds of millions of light-years distant, the researchers found that oxygen ions in the immediate vicinity of our galaxy were "selectively absorbing" some of the x-rays. They were then able to measure the temperature of the halo of gas responsible for the absorption.

The scientists determined the temperature of the halo is between 1 million and 2.5 million kelvins — a few hundred times hotter than the surface of the Sun.

But even with an estimated mass anywhere between 10 billion and 60 billion Suns, the density of the halo at that scale is still so low that any similar structure around other galaxies would escape detection. Still, the presence of such a large halo of hot gas, if confirmed, could reveal where the missing baryonic matter in our galaxy has been hiding — a mystery that's been plaguing astronomers for over a decade.

Unrelated to dark matter or dark energy, the missing baryons issue was discovered when astronomers estimated the number of atoms and ions that would have been present in the Universe 10 billion years ago. But current measurements yield only about half as many as were present 10 billion years ago, meaning somehow nearly half the baryonic matter in the Universe has since disappeared.

Read more: http://www.universetoday.com/97535/astronomers-discover-milky-ways-hot-halo/#ixzz28CBWvGnY



Artist's illustration of a hot gas halo enveloping the Milky Way and Magellanic Clouds (NASA/CXC/M.Weiss; NASA/CXC/Ohio State/A.Gupta et al.)

Recent studies have proposed that the missing matter is tied up in the comic web — vast clouds and strands of gas and dust that surround and connect galaxies and galactic clusters. The findings announced today from Chandra support this, and suggest that the missing ions could be gathered around other galaxies in similarly hot halos.
Even though previous studies have indicated halos of warm gas existing around our galaxy as well as others, this new research shows a much hotter, much more massive halo than ever detected.

"Our work shows that, for reasonable values of parameters and with reasonable assumptions, the Chandra observations imply a huge reservoir of hot gas around the Milky Way," said study co-author Smita Mathur of Ohio State University in Columbus. "It may extend for a few hundred thousand light-years around the Milky Way or it may extend farther into the surrounding local group of galaxies. Either way, its mass appears to be very large."

NOTE: the initial posting of this story mentioned that this halo could be dark matter. That was incorrect and not implied by the actual research, as dark matter is non-baryonic matter while the hot gas in the halo is baryonic — i.e., "normal" — matter. Edited. – JM

Image right: NASA's Chandra spacecraft (NASA/CXC/NGST)

Read more: http://www.universetoday.com/97535/astronomers-discover-milky-ways-hot-halo/#ixzz28CC23jJP

UK Meteor Circles Earth, Then Re-enters (maybe not) over Quebec

UK Earth-hugging Asteroid Circled the Earth and Hit Again

-Sep 28, 2012

The following news is published jointly by ***Tähdet ja avaruus*** - magazine of Finland and The Latest Worldwide Meteor/ Meteorite News in Tokyo, Japan.

According to the modeling done by Finnish mathematician Esko Lyytinen, the big UK fireball of the 21st of September was captured by Earth`s gravity. After one circle around the Earth one of the remnants seems to have re-entered the skies over North America. "It looks now that the fireball witnessed 155 minutes later in US and Canada, may have been one fragment of the British fireball, most probably the biggest one. This was its second entry into the Earth`s atmosphere", Lyytinen says. "If so, this is very rare observation, but it needs to be confirmed."

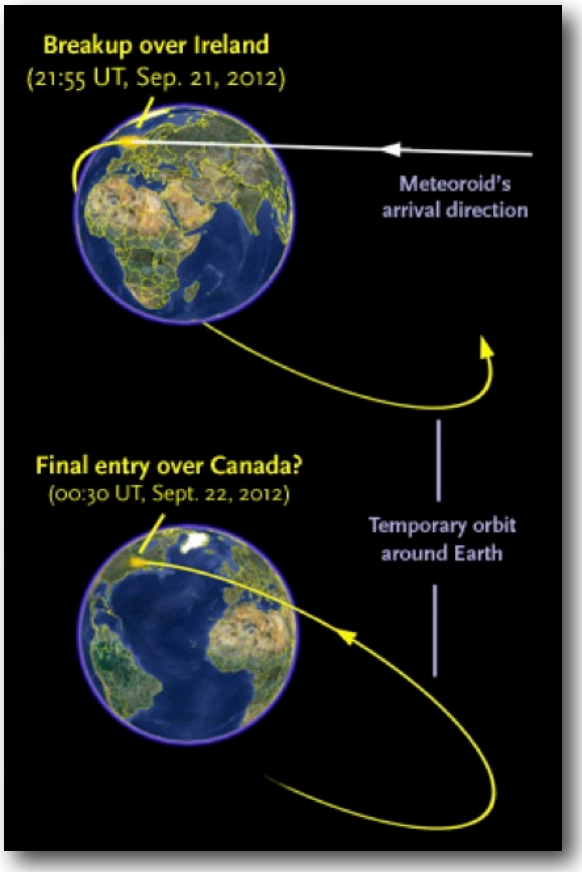
The large meteoroid entered the atmosphere with a very low speed of approximately 13 km/s, only a little more than the escape velocity. Due to the low velocity and angle of entry the gravity of Earth pulled the meteoroid and curved its trajectory. This made the exceptionally long passage in atmosphere possible. "I estimate that the fireball came to its closest point at 53 km above the Earth", says Lyytinen.

The entry mass of the asteroid has been estimated to be in the range of tons of kg or tens of tons. Probably a significant portion of the mass was lost during the luminous-flight fireball phase. Videos taken of the UK event show that the fireball fragmented into multiple pieces. According to Lyytinen, the deceleration during the fireball phase left the meteoroid at the speed of only 9.2 km/s as it was leaving the atmosphere. Hence it remained travelling around the Earth until it re-entered the Earth's atmosphere. "After leaving the atmosphere it probably made about a full revolution around the Earth before re-entering", Lyytinen says.

Lyytinen predicted two days ago, that the US/ Canada fireball might be a part of the same event. The idea was studied yesterday by Dr. Robert Matson, an aerospace engineer and meteor expert. Matson found that the direction of fireball over Quebec seems to fit the prediction. Moreover the required speed for this space rock according to Matson to show up at the observed times over UK and America is 9.08 km/s, which is excitingly near Lyytinen`s value.

Matson in his study also had independently concluded that the UK fireball was starting to rise up at the end of the observed track. Lyytinen estimates, that during the fireball`s long first flight over UK it was visible from the ground for almost a full three minutes. "I have no information of a similar duration of a fireball ever being observed", Lyytinen admits. "Naturally it is theoretically possible, but this is so rare that I'm amazed that it really happened."

However, after a close look at the event over North America, Matson is now skeptical that it's related to the earlier graze seen across the Atlantic. "Using two all-sky videos from Ontario, Canada [the UWO Meteor Network], I was able to roughly triangulate the location of the Québec fireball to a spot between Ottawa and Montréal," he says. "Unfortunately, I cannot dynamically link this location and timing with that of the U.K. fireball — it is too far west." Moreover, Matson adds, the videos show a fairly short-duration event and a much steeper trajectory than a UK remnant could have had.



Dynamicists believe a large meteoroid broke apart as it passed over Ireland on the night of September 21, 2012. Slowed by its atmospheric passage, the object may have entered a temporary orbit around Earth and returned to the sky over eastern North America 155 minutes later [maybe -ed].
S&T: J. Kelly Beatty

Video Collection Page of the UK Ireland Event 21SEP2012
http://lunarmeteoritehunters.blogspot.jp/2012/09/uk-ireland-holland-bolide-videos-on-web.html

Measuring Public Awareness of Dark Skies

" A Star !
Look skyward now ..
and see above ... INFINITY
Vast and dark and deep
and endless ... your Heritage."
Astronomer Robert Burnham Jr

It will come as no surprise to readers of this column that any effective effort to preserve Dark Night Skies would be contingent on public awareness and support. Our Municipality of Northern Bruce Peninsula (MNBP), because of its geography, its low population density, and lack of urbanization, is blessed with the darkest night skies in Southwestern Ontario. Indeed, at Cape Hurd, Upper Andrew Lake, and Little Pine Tree Harbor, the magnitude of the faintest stars visible on our best nights is an incredible 7.0. Under these night skies, the dazzling winter star clusters of Canis Major, Taurus, Gemini, and Auriga are riveting, and our summer Milky Way vistas are unforgettable! Now, that is a conservation value worth protecting!

So, for the past 12 years, that is what we have been doing. Our current 10-member Dark Sky Committee, under the very capable leadership of Elizabeth Thorn, has embarked on a number of initiatives designed to reduce light pollution, gather broad public support for preservation, and focus public awareness on the issue of light pollution. Our successes have been many and have resulted from the efforts of our dedicated committee members. Our Municipality has declared itself a Dark Sky Community, and our Bruce Peninsula and Fathom Five National Parks have been declared Dark Sky Preserves. An astronomy outreach initiative, called Bayside Astronomy, has introduced over 1800 people this summer to the wonders of the night sky. We began a scientific monitoring of the quality of our night skies to better determine the success of our light pollution abatement efforts. We were able to hire two students to visit homes and businesses to conduct light audits and encourage people to change their outside light fixtures. Now, the communities of Lion's Head and Tobermory are in the process of changing their street lights to become dark sky compliant. Indeed, even the Owen Sound Transportation Company made changes to their lights at the Tobermory ferry parking lot that dramatically reduced the spillover light pollution! Committee member, Rod Steinacher, was instrumental in designing and executing the scientific measurements that convinced the Chi-Cheemaun's owners that lighting changes would reduce light trespass while, at the same time, enhancing parking lot illumination. A win for everyone!

Milky Way from Little Pine Tree Harbour (D. Cunningham)

Initially, people were unaware of the need to preserve our dark night skies. The common attitude was that the stars have always been there and our dark skies would continue to be there for us. So, now after 12 years of our public education efforts, it was time to take the pulse of our community on this issue. Ken Clark, a member of our Dark Sky Committee, volunteered to initiate and oversee this survey. He wanted a professional polling company to conduct the survey and accordingly we hired "Insight" from London, Ontario, to conduct the poll. I was fascinated as Ken reported the survey results and conclusions. The survey was based on telephone interviews of 62 MNBP home owners and, to ensure a representative sample, quotas were set on geographic area (rural vs town), gender, and age. All were home owners, with 15% being town residents, 55% rural residents, and 30% cottagers.

The 14 page **Insight Report** confirmed our perceptions of community support but also pointed to some areas for future initiatives :

Survey Points to Community Support

a) Fully 92 % of the respondents were aware of "Dark Skies";
b) North Bruce residents are proud of Dark Skies, and are glad to live in such an environment and want this to be strengthened;
c) Respondents name "clear night skies" as a natural way to live;
d) All respondents practice some form of Dark Sky friendly behaviors;
e) Respondents valued BPEG and BPBA support of dark skies;
f) Dark Sky practices cut across socio-economic lines;
g) North Bruce has a well-educated, active, retirement community with a deep knowledge and respect for Dark Skies;
h) North Bruce residents are much more aware of Dark Skies than the general provincial population;
i) North Bruce residents value living in a Dark Sky Community and wish this to be a local government priority;

Survey Points to Future Work

a) A perception still exists about safety risks with dark skies;
b) A serious implementation gap exists for dark sky friendly fixtures; (i.e. while knowledge of dark sky practice is high there is a significant inertia when it come to making changes to their own home lighting. Some cited costs, some indicated no need, and some said they just don't turn their lights on at night) ;
c) Less than 50% of residents know that the North Bruce is a Dark Sky Community and confuse this designation with the Villages of Lion's Head and Tobermory;
d) Continuing communications and education about Dark Skies is recommended.

Finally, I found it most heart warming to read the respondents long list of benefits of living with dark night skies. Most of them focused on the aesthetic benefits of a star- studded sky. I liked that! Robert Burnham Jr also captured this wonder, poetry, and mystery in his Celestial Handbook's Introduction ...

"Silent clouds of stars,
Other worlds uncountable, and other suns beyond numbering
and realms of fire-mist and star-cities
as grains of sand ...
drifting ...
across the void." -Robert Burham Jr.

Hercules (Her)

α-Herculis - Ras Algethi
ζ– Herculis - Ruticulus
λ–Herculis - Masym
β–Herculis _ Kornephoros
κ–Herculis - Marfik
ω–Herculis - Cujam

The keystone shaped figure formed by the stars π, η, ζ and ε Herculis helps to identify this constellation; also the stars θ and ι–Herculis representing respectively the bent left knee and the left foot of the kneeling Hercules, appear to rest directly on the head of Draco, the Dragon. It is one of the most ancient of the constellations. The outstanding feature of Hercules is the great globular cluster M13, the finest visible in the northern latitudes. On dark nights it is barely visible to the naked eye but it is easily seen in binoculars. A small telescope begins to reveal its beauty, while al least a 4" telescope is necessary to resolve the stars, In a large telescope, it is a never-to-be-forgotten sight. There are thought to be no less than 100,000 stars in this cluster. Ras Algethi is a binary and also an irregular variable, varying in magnitude from 3.1 to 3.9.

DOUBLE STARS

	Mag.	Sep (s)	Location	Remarks
α	3.1 to 3.9-5.	5	171314	Orange-blue, beautiful.
γ	3.8-9.0	41	161919	White-Lilac,
δ	3.0-8.1	11	171325	Green-Pale Purple.
ζ	2.9-5.5	1	164032	
κ	5.3-6.5	29	160518	Yellow -Red,
μ	3.4-9.8	33	174528	
ρ	4.5-5.5	4	172237	Both Pale Green,
95	5.1-5.2	6	175922	Green-Red.
100	5.9-6.0	14	180526	A striking pair.
Σ2063	5.7-8.2	16	163146	
Σ2101	6.3-9.0	4	164436	
Σ2104	6.2-8.0	6	164736	Beautiful.
Σ2190	6.0-9.5	10	173421	
Σ2277	6.3-8.2-9.9	27-88	180249	Triple.

MESSIER OBJECTS

	Mag	Location	Remarks
M 13	5.7	164037	Globular Cluster. The "Hercules Cluster". See above.
M 92	6.2	171643	Globular Cluster.

Other Objects of Interest in Hercules

NGC 6210 -Planetary Nebula Magnitude 10, Location 164324
u Herculis -Eclipsing variable, magnitude range 4.8-5.3, period 2 days 1 hr. 12 min. Location 171533
S Herculis -Long period (307 days) variable, maximum magnitude 7.6. Location 165015.

The designation "**Location**" in these tables is a six-digit code that gives the RA and Dec of the object in question. For example "164324" means 16 h 43 min in RA and 24 degrees in Dec. If the Dec value is negative the digits are in bold type: 164**24** indicates **-**24 degrees declination. Values given are for Epoch 1950.0 so they are somewhat different than current 2000.0 values but sufficiently accurate to get a close location.

Corona Borealis (CrB)

α-Coronae Borealis -Gemma
β-Coronae Borealis - Nusakan

Corona Borealis is a very attractive semicircular group of stars between Hercules and Bootes, all the stars being of the 4th and 5th magnitudes with the exception of Gemma, the "Pearl of the Crown." There are a relatively large number of variable stars in this constellation; two of them, both irregular variables, are especially interesting. R Coronae (Location 162132) remains for months and sometimes years as a 6th magnitude star; then, for no apparent reason. it will decrease rapidly to the 12th or 13th magnitude. T Coronae is even stranger; normally a 9th magnitude star, in May 1866 it suddenly became very bright, reaching the 2nd magnitude. In 1946 it suddenly brightened again to the 3rd magnitude, only to fade again to its original brightness. It belongs to a special group of stars known as recurrent novae.

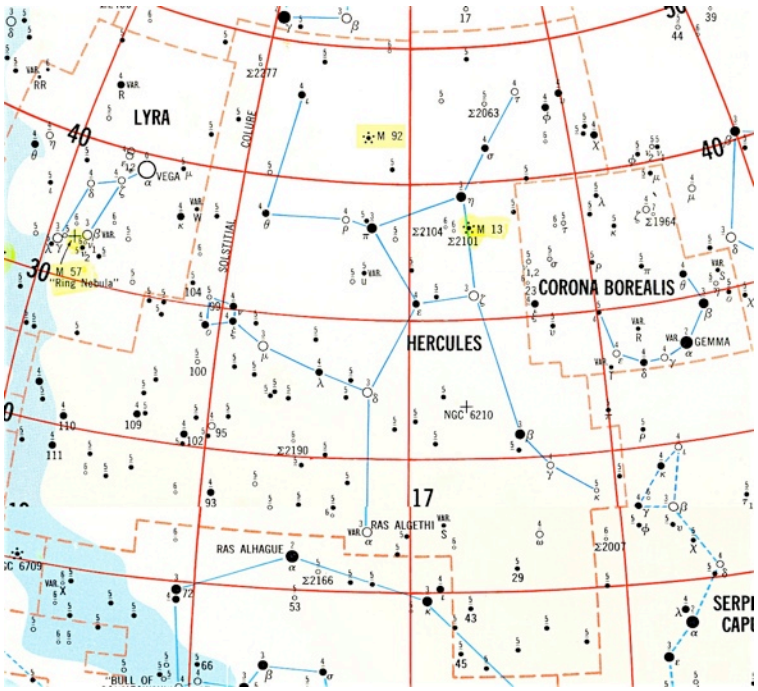
DOUBLE STARS

	Mag.	Sep (s)	Location	Remarks
ζ	5.1-6.0	6	153837	Greenish White-Green.
ε	6.0-7.0	0.8	152131	
ν	5.3-5.4	371	162034	Both Golden.
σ	5.8-6.7	5	161334	
Σ1964	7.3-7.4-8.8	15-2	153737	Triple.
23	6.3-8.8	35	162132	

There are no Messier Objects in Corona Borealis

Chart Legend
- Star Location
- Double Stars
- + Nebulae
- ✱ Clusters
- Variable Stars
Var

Star magnitudes are labeled as numerical values above (or near) the star. Underlined values are half magnitudes. Larger star dots denote brighter stars.



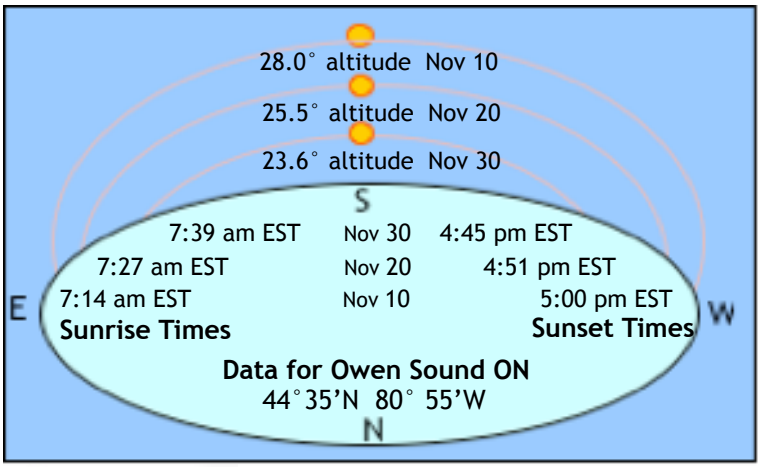
Nov 1 **Jupiter 0.9° N of Moon**
Nov 4 **Daylight Saving Time ends (2 am Sunday)**
Nov 5 S. Taurid meteor peak (10/h) Moon 67% waning (LQ)
Nov 6 **Last Quarter Moon rises at 12:46 am EST**
Nov 11 Venus 5° N of Moon
Spica 0.8° N of Moon
N. Taurid meteor peak (15/h) Moon 4% (Last Cres)
Nov 12 Saturn 4° N of Moon
Nov 13 **New Moon rises at 7:55 am EST**
Total Solar Eclipse (vis in N. Australia & S. Pacific)
Nov 15 Venus 4° N of Spica
Nov 16 Mars 4° S of Moon
Nov 17 **Leonid meteors peak (20/h) Moon 16% (First Cres)**
Nov 20 **First Quarter Moon rises at 1:51 pm EST**
Nov 27 **Venus 0.6° S of Saturn (both visible at low power in same FOV)**
Nov 28 **Full Moon (Frost Moon) rises 5:17 pm EST**
Penumbral Eclipse of Moon (difficult)
Jupiter 0.6° N of Moon

BAS Events

Nov 7 BAS Meeting Member's Night Grey Roots 7:00 pm
Nov 17 BAS Viewing Leonid Meteors (20/h) ES Fox Obs.
Dec 5 BAS Meeting Grey Roots 7:00 pm
Speaker: John Hlynialuk "Christmas Star"
Dec 13 BAS Viewing Geminid Meteors (120/h) @dark
ES Fox Observatory

Planets

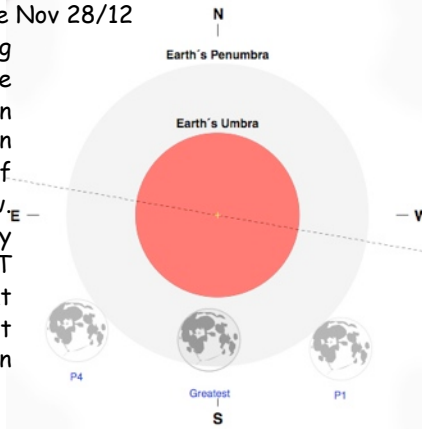
MERCURY, is not visible until the end of Nov and only then with difficulty after Venus rises in the morning. **VENUS**, (-4.0) is a dawn planet in Nov and moves quickly through Virgo, passing 4° N of Spica on Nov 15 and then appearing less than a degree from Saturn in the morning Nov 27. **MARS** (1.2), hangs around above the western horizon for the month. It moves into Sagittarius but sets fairly soon in the evening. **JUPITER**, (-2.8) rises just after dark and is retrograding between the horns of Taurus in November. Jupiter is well-placed for observing. The moon occults Jupiter twice this month but neither is visible from N. America. **SATURN**, (mag 0.6), is located in Virgo this month rising well after Venus appears. The two are about 1° apart on Nov 25-27. Ring tilt is 18° by month-end. **URANUS**, (5.7) and **NEPTUNE**, (7.8) are well up by dark and set before 5 am. Finder charts are available on S&T website in their Observing section.
Finder charts for two **asteroids, Vesta (8.2)** and **Ceres (9.0)** are found on page 8 in the Oct SGN. Vesta is below the left horn of Taurus in November and Ceres is near M35 in Gemini. **PLUTO** (mag. 14) is low in the west. Look behind Mars at the end of the month. You can get accurate charts from S&T and Sky News or in the RASC Observer's Handbook.
The diagram below gives the sunrise/sunset times and the sun's altitude on three dates this month. The sun continues to sink lower as it approaches solstice in late Dec. The moon calendar below the sun chart shows lunar phases for the month. Times of moonrise for NM, FQ, FM and LQ are in the Sky Calendar listing at left. Note DST ends on Nov 4.



Special Events

A (sad) Tale of Two Eclipses

The last two eclipses in 2012 turn out to be difficult if not invisible from Ontario. The lunar eclipse is only a penumbral one, meaning that the moon passes through the outer shadow of the Earth. This will be a difficult observation by naked eye, if it is at all detectable. A light metre on a telescope might do a better job of recording the subtle change in reflective power of the moon. Long ago, during the era of Apple 2+ computers, I measured the light changes for a total eclipse using a photocell connected to the game port of my early Apple. The Nov 28/12 penumbral eclipse might be detectable again using the same system. But unfortunately, mid-eclipse occurs while the moon is setting locally. Once again the west coast is the best place to be, but even there, it is a difficult observation since none of the moon is actually covered by umbral shadow. The greatest eclipse and best time to see any difference in the moon's appearance is at 14:33 UT or 9:33 am Nov 28 but the moon sets locally at about 7:30 am or just about the time of the start of the penumbral eclipse. Pretty much an impossible observation from here.



The solar eclipse is also not visible from North America as the track passes over N. Australia (Gulf of Carpentaria) and then out over the South Pacific Ocean. The track passes over no more land (even islands) as it crosses toward the central part of Chile. It leaves the Earth's surface before it gets there, however. So the only place to be is in Australia -good luck BAS eclipse chasers!

Nov 2012

Sun	Mon	Tue	Wed	Thu	Fri	Sat
By permission University of Texas McDonald Observatory				1	2	3
4	5	6 LQ	7	8	9	10
11	12	13 NM	14	15	16	17
18	19	20 FQ	21	22	23	24
25	26	27	28 FM	29	30	

BAS Member Loaner Scopes

One 12-inch Dob now available.

One 12-inch telescope is now available for the fall, and we have at least one **8-inch dobsonian** for free member loan. Contact Brett T. or John H. if you are interested.

Scopes come in and out periodically so keep checking with Brett or John if you are interested in a loaner.

SGN Classified Ads Section

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

15.1 Mp Excellent noise reduction features for night photos.

Asking $ 600. 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

FREE STUFF:

Andreas Gada has donated back issues of
Sky & Telescope and Astronomy magazines
These are free to pick up at the ES Fox Observatory
Next time you are there, HELP YOURSELF !

MORE FREE STUFF:

We are accumulating several small refractors and other equipment that we cannot use.

Check out the FREEBIE SCOPE BIN at the ES Fox Observatory
Next time you are there, HELP YOURSELF !

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

Review/pictures can be found here: http://www.cloudynights.com/item.php?item_id=798

For Sale: HUTECH part # 3101 Single Arm Compact Fork Mount Head,

Can be used in Alt-Az as well as Equatorial mode with lightweight Scope (I have used it with PRONTO on Manfrotto 128RC Photo-tripod). Has Slo-Mo knobs (flexible shafts can be added to it - not included)
1/4 - 20 thread on base Size: 3" x 3" x 6".
Asking $ 200.-- Firm

Anton VanDijk 519 376-9912
e-mail: ravand@rogers.com

October 8, 2012 Aurora

Thanksgiving Day, after supper in both Ontario and Spruce Grove, Alberta, northern lights displays were recorded by your intrepid photographers, Aaron T. Steve I. and John H. The top image by John from Spruce Grove (53.6° N, 114.2° W) was taken during a peak in the display there around 9:02 local time (11:02 EST) and the lower image was taken by Aaron near Shallow Lake (44.6° N, 81.0° W). He reported imaging from 8 to 10:30 pm or so which corresponds with the times in Alberta. The weather forecast was not favourable out west but there was a break in the clouds at just the right time, -the aurora gods were smiling down this time. Image was a 6 second exposure at ISO 2000, f/2.8 at 10 mm.

I get emails:

From Cheryl:
Hi John,
I had company from B.C. and they were so absolutely gobsmacked. The aurora was up so high it nearly covered Cassiopeia and west to east. It was a very impressive end to their holiday. My nephew had never seen an aurora.
Cheryl

From Murray:
Hi John,
The aurora borealis last Monday was terrific. We were out to dinner at friends north of Kemble and stood in their field enthralled for over half an hour. We gave the heads up to Steve Irvine and he got some fine pictures!
Warmest regards,
Cory and Murray

From Lorraine:
John,
I'm so glad you got to enjoy the display last night too! The photo is lovely. You obviously saw Aaron's, since you got yourself a Flickr account. He texted me at 8:18pm and I left Waterloo very shortly after. I got my daughter to look out back where she's living with my dad (attending U of W) because they're just north of the city. She was able to see the auroras from there. That's impressive for a big city.
I stopped outside of Conestogo and stood in wonder for several minutes. Some of Aaron's pics look just like what I saw, minus most of the colours. Then I pulled over several times on the way home, whenever the auroras got very bright and light pillars were very obvious. What a wonderful night! Aaron and I agree that was the best aurora display we've seen so far!!!
Lorraine

Aaron's all-sky lens recorded the beautiful violet streamers that were present at the start of the display but which were partly obscured by day light and then thin clouds at my site near Spruce Grove AB.

Colours are associated with specific atomic emissions involving oxygen and nitrogen. Oxygen can produce reds and greens but although nitrogen can produce red, blues are only produced by nitrogen gas. The most common colour is green because this involves the least amount of energy in the collision between solar particles and atmospheric molecules. Next most common are pink, a mixture of light green and red, followed by pure red, yellow (a mixture of red and green), and lastly, pure blue.

Aaron's image was a 32 second exposure with a 5mm fish-eye lens set to f/2.8 and ISO of 1250.

Images from Big Bay, ON, Saskatoon,SK, Spruce Grove, AB and Edmonton, AB

Steve I. from Big Bay was alerted to the aurora and got a few shots of the display from there.

Canon 50D, lens at 24mm and f/4, ISO 1600, exp. 20 s

It doesn't pay to sleep on aurora nights. My image left was recorded at 11:03 pm. Then the display died down to very faint levels so I quit for the night.
The image below, one of many taken by Adam Chow of Edmonton was recorded after midnight [and I had gone to bed].
Canon EOS 5D Mark II, 13 s exp. f/2.8 ISO 1600

My image: Canon 50D, 10 mm lens, f2.8, 6 s, ISO 2000. Taken from near Spruce Grove, AB

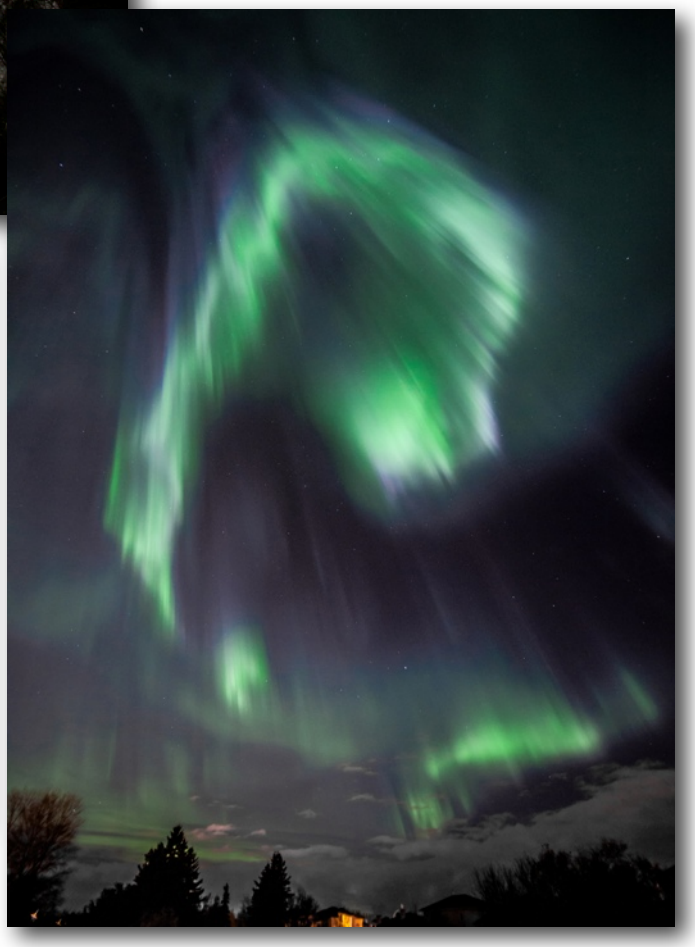


Image right taken in Saskatoon Oct 13 around 5 am. This display just did not want to quit. The Earth's magnetic field continued to be affected by a long-lasting ejection of particles earlier in the week and auroras appeared on and off for several days after the initial Oct 8 blast. Colin Chatfield image at right:
"This is from my backyard around 5:00a.m. this morning," says Chatfield. "Never have I seen the auroras so bright, especially from within the city. They were astounding, with purple visible to the naked eye."

Colin Chatfield image taken at 5 am from Saskatoon, SK (posted on Spaceweather.com).