

skynews



The “Christmas Tree” Cluster

by Charles Banville

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January 2012 Meeting

Wednesday January 11th, 7:30pm

A104 Bob Wright Bldg,
University of Victoria
3800 Finnerty Rd.

www.victoria.rasc.ca

ON THE COVER

The Christmas Tree Cluster

by Charles Banville

A busy field focused on the Christmas Tree Cluster. Four reflection nebulae: NGC 2245, NGC 2247, IC 446, and the larger IC 447 are to the right of this image. The area north of IC 447 features two dark nebulae: B37 and B38. The open cluster Trumpler 5 also stands out while the open cluster NGC 2259 blends in. Notice the small triangle shaped object at the bottom of this image. This is Hubble's Variable Nebula, NGC 2261, very interesting when viewed through an eyepiece.

NGC_2264 – January 30, 2009

Constellation: Monoceros

Location: Death Valley National Park, CA

Optics: Borg 77EDII at f/4.3 on HEQ5 mount

Camera: Canon 20Da

Exposures: 38 RAW light frames of 120 seconds, ISO 800.

Process: Calibrated with 30 dark frames and 20 flat frames in ImagesPlus. Combined using MinMax Excluded. Colour balance in Photoshop.

DECEMBER MEETING

Dr. James Hesser

Director, Dominion Astrophysical Observatory
NRC Herzberg Institute of Astrophysics | www.nrc-cnrc.gc.ca/hia

National Research Council Canada | Government of Canada

Affectionate memories of the initial years of the Cerro Tololo InterAmerican Observatory

Abstract: As a result of a life changing casual encounter and a free beer at an astronomy meeting, Betty and I arrived in La Serena, Chile with our infant daughter in September 1968 to spend two years that eventually extended to late 1977. There we enjoyed the opportunity to be involved with the development at CTIO of the largest telescope in the southern hemisphere for some 25 years. Those nine years offered extraordinary adventures: in astronomy, with distinct cultures, and under conflicting economic and political systems. From a perspective of some 40 years and using our photos, I share some of the challenges of building a truly inter-American observatory during interesting times (e.g. the Allende and Pinochet governments) under the leadership of visionary astronomer Victor Blanco who passed away in March two days shy of 93.

PRESIDENTS REPORT

by Laurie Roche



Hmmm. Let's see what happened in 2011: An increase in sunspots and prominences, close-up exploration of Mercury and Vesta, the last American Space Shuttle launch, a near earth asteroid flyby, hundreds

of extra-solar planets found from the Kepler mission including a possible earth twin, Einstein's theories questioned, dark matter probed even further and the last full lunar eclipse that we will see for two years. Space and astronomy seems to have been rather busy during the past year.

But, it's been a busy year for us down here, as well. We've spent most of the year either

laughing or crying over the weather. There have been hundreds of hours of public outreach in schools, senior's residences, at fairs, star parties and night-sky viewings from Oak Bay and Cattle Point to Metchosin and way up-island. Many more hours have been spent fine tuning the observatory and some excellent observing and photography was done this year on "the hill" once the weather gods cooperated. We had some initial success in bringing our stance on quality lighting to Victoria and Saanich municipal councils and are looking forward to updating our Sky Quality Maps in the New Year. New initiatives for membership, managing our equipment inventory, and communication with the public have all been on the radar this year and will continue to be in the next few months. We certainly won't ever run out of things to do down here just as there is much more to explore "out there".

Just a quick note to say thank you to all those who helped put on our Annual General Meeting and Dinner last month at the Cedar Hill Golf Course. We had a wonderful meal, a great speaker, and some good conversation with new and old friends. If you were not able to join us this year, put us on your "To-Do" list for next November.

Happy Holidays everyone. Have a good time with friends and family and don't forget to get outside and do some observing over the holidays.

Clear Skies,

443 EROS TO PASS EARTH

On January 31, 2012, Eros will pass the Earth at 0.17867 about 70 times the distance to the Moon, with a visual magnitude of +8.1. During rare oppositions, every 81 years, such as in 1975 and 2056, Eros can reach a



magnitude of +7.0 which is brighter than Neptune and brighter than any main-belt asteroid except 4 Vesta and, rarely, 2 Pallas and 7 Iris. Under this

condition, the asteroid actually appears to stop, but unlike the normal condition for a body in heliocentric conjunction with the Earth, it never appears to be retrograde. Its synodic period of over 846 earth days is among the largest of any body in the Solar System.

Eros was one of the first asteroids to be visited by a spacecraft, and the first to be orbited and soft-landed on. NASA spacecraft NEAR Shoemaker entered orbit around Eros in 2000, and came to rest on its surface in 2001.

433 Eros is a near-Earth asteroid (NEA) discovered in 1898, and the first asteroid to be orbited by a probe (in 2000). It is an S-type asteroid approximately $34.4 \times 11.2 \times 11.2$ km in size, the second-largest NEA after 1036 Ganymed, and belongs to the Amor group.

Eros is a Mars-crosser asteroid, the first known to come within the orbit of Mars. Objects in such an orbit can remain there for only a few hundred million years before the orbit is perturbed by gravitational interactions. Dynamical integrations suggest that Eros may evolve into an Earth-crosser within as short an interval as 2 million years, and has a roughly 50% chance of doing so over a time scale of 108–109 years. It is a potential Earth impactor, believed to be larger than the impactor that created the Chicxulub Crater that led to the extinction of the dinosaurs.

The NEAR Shoemaker probe visited Eros twice, first with a 1998 flyby, and then by orbiting it in 2000 when it extensively photographed its surface. On February 12, 2001, at the end of its mission, it landed on the asteroid's surface using its maneuvering jets.



It's surface gravity depends on the distance from a spot on the surface to the center of a body's mass. The Erosian surface gravity varies greatly, since Eros is not a sphere but an elongated peanut-shaped (or potato- or shoe-shaped) object. The daytime temperature on Eros can reach about 100 °C at perihelion. Nighttime measurements fall near -150 °C. Eros's density is 2,400 kg/m³, about the same as the density of Earth's crust. It rotates once every 5.27 hours.

NEAR scientists have found that most of the larger rocks strewn across Eros were ejected from a single crater in a meteor collision approximately 1 billion years ago. This impact may also be responsible for the 40 percent of the Erosian surface that is devoid of craters smaller than 0.5 kilometers across. It was originally thought that the debris thrown up by the collision filled in the smaller craters. An analysis of crater densities over the surface indicates that the areas with lower crater density are within 9 kilometers of the impact point. Some of the lower density areas were

found on the opposite side of the asteroid but still within 9 kilometers.[6]

In an experimental legal case, Eros was claimed as property by Gregory W. Nemitz of OrbDev. Nemitz argued that, according to the homestead principle, he had the right to claim ownership of any celestial body that he made use of; he claimed he had designated Eros a spacecraft parking facility and wished to charge NASA a parking and storage fee of twenty cents per year for NEAR Shoemaker. An expert in extraterrestrial real estate issues, Virgiliu Pop, responded by using the same novelty-deed registry Nemitz had used for Eros to claim ownership of the Sun, stating:




I, for one, intended this move only to show how ridiculous a property rights system in outer space would be if it were to be based solely on claim unsubstantiated by any actual possession.

—Virgiliu Pop [14]

Nemitz's case was dismissed and an appeal denied.

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HOLIDAY SHOPPING AT THE CENTRE OF THE UNIVERSE

From Dec. 14th to 16th, between 1 pm and 4 pm, the Centre of the Universe will temporarily open its gift shop to the public. Stop in and pick up some unique stocking stuffers or holiday gifts for the astronomy buff in your family. Stock items include the Night Sky Monopoly board game, UV-reactive nail polish that changes colour when exposed to UV light, space food and many informative books and DVDs about astronomy.

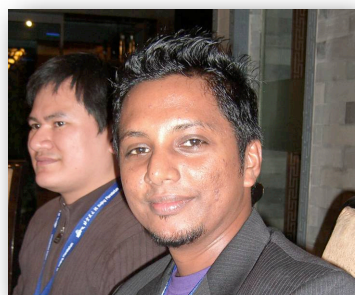
As a special courtesy to our loyal newsletter readers, we will also open our gift shop upon request during the month of December. Please call us at 250-363-8262 or email us at cu@nrc-cnrc.gc.ca to arrange a time to visit our shop.

James Hesser

Canadian astronomical group seeking books to start an astronomy club library in his hometown. He had gotten a much appreciated response from Canada, although he couldn't remember the name. Something about his remark struck a feeble memory from Council and Centre meetings long past, prompting me to ask, "could it have possibly been Sid Sidhu from the Victoria Centre of the Royal Astronomical Society of Canada?" To my delighted surprise he emphatically replied "Yes, that's the name!" Out came my BlackBerry to send a message to Sid who is now reconnected with a grateful Thilina. I'm not sure how to calculate the probability of what occurred that evening in Beijing, but it truly underscored the impact that individuals in the RASC have when they enthusiastically and generously share their knowledge with youth whether in their immediate community or halfway around the world.

James Hesser

IT'S A SMALL WORLD



During the banquet of the meeting, Communicating Astronomy with the Public 2011, on 13 October in Beijing, Eric Chisholm and I were at a table with people from seven

distinct countries, including Thilina Heenatigala of Sri Lanka (in the foreground of the attached photo). At 25 years of age, Thilina is extremely active in Astronomers Without Borders activities including The Galileo Teachers Program, an IYA initiative that continues to grow during Beyond the International Year of Astronomy. (I seem to get at least one email a week from his postings to that group.) Thilina told me that when he was a 15 year boy he wrote to a

SKY EVENTS - DECEMBER

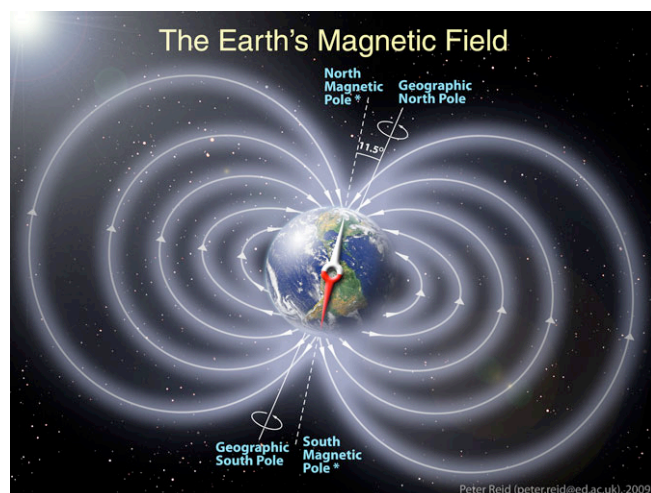
Meteors

Geminids	Wed	14th - Moon 80%
Ursids	Sun	23rd - Moon 2%

Celestial Events

Sat.	17th	13h UT	Mars 8° S. of Moon
Tues.	20th	10h UT	Saturn 7° N. of Moon
Thurs.	22nd	5h 30m	Solstice
Fri.	23rd	3h UT	Mercury 23° W. of Sun
Wed.	28th	3:52h	Double shadow Transit of Jupiter

Magnetic Pole Reversal Happens All The (Geologic) Time



*Schematic illustration of Earth's magnetic field.
Credit/Copyright: Peter Reid*

Scientists understand that Earth's magnetic field has flipped its polarity many times over the millennia. In other words, if you were alive about 800,000 years ago, and facing what we call north with a magnetic compass in your hand, the needle would point to 'south.' This is because a magnetic compass is calibrated based on Earth's poles. The N-S markings of a compass would be 180 degrees wrong if the polarity of today's magnetic field were reversed. Many doomsday theorists have tried to take this natural geological occurrence and suggest it could lead to Earth's destruction. But would there be any dramatic effects? The answer, from the geologic and fossil records we have from hundreds of past magnetic polarity reversals, seems to be 'no.'

Reversals are the rule, not the exception. Earth has settled in the last 20 million years into a pattern of a pole reversal about every 200,000 to 300,000 years, although it has been more than twice that long since the last reversal. A reversal happens over hundreds or thousands of years, and it is not exactly a

clean back flip. Magnetic fields morph and push and pull at one another, with multiple poles emerging at odd latitudes throughout the process. Scientists estimate reversals have happened at least hundreds of times over the past three billion years. And while reversals have happened more frequently in "recent" years, when dinosaurs walked Earth a reversal was more likely to happen only about every one million years.

Sediment cores taken from deep ocean floors can tell scientists about magnetic polarity shifts, providing a direct link between magnetic field activity and the fossil record. The Earth's magnetic field determines the magnetization of lava as it is laid down on the ocean floor on either side of the Mid-Atlantic Rift where the North American and European continental plates are spreading apart. As the lava solidifies, it creates a record of the orientation of past magnetic fields much like a tape recorder records sound. The last time that Earth's poles flipped in a major reversal was about 780,000 years ago, in what scientists call the Brunhes-Matuyama reversal. The fossil record shows no drastic changes in plant or animal life. Deep ocean sediment cores from this period also indicate no changes in glacial activity, based on the amount of oxygen isotopes in the cores. This is also proof that a polarity reversal would not affect the rotation axis of Earth, as the planet's rotation axis tilt has a significant effect on climate and glaciation and any change would be evident in the glacial record.

Earth's polarity is not a constant. Unlike a classic bar magnet, or the decorative magnets on your refrigerator, the matter governing Earth's magnetic field moves around. Geophysicists are pretty sure that the reason Earth has a magnetic field is because its solid iron core is surrounded by a fluid ocean of hot, liquid metal. This process can also be modeled with supercomputers. Ours is,

without hyperbole, a dynamic planet. The flow of liquid iron in Earth's core creates electric currents, which in turn create the magnetic field. So while parts of Earth's outer core are too deep for scientists to measure directly, we can infer movement in the core by observing changes in the magnetic field. The magnetic north pole has been creeping northward – by more than 600 miles (1,100 km) – since the early 19th century, when explorers first located it precisely. It is moving faster now, actually, as scientists estimate the pole is migrating northward about 40 miles per year, as opposed to about 10 miles per year in the early 20th century.

Another doomsday hypothesis about a geomagnetic flip plays up fears about incoming solar activity. This suggestion mistakenly assumes that a pole reversal would momentarily leave Earth without the magnetic field that protects us from solar flares and coronal mass ejections from the sun. But, while Earth's magnetic field can indeed weaken and strengthen over time, there is no indication that it has ever disappeared completely. A weaker field would certainly lead to a small increase in solar radiation on Earth – as well as a beautiful display of aurora at lower latitudes -- but nothing deadly. Moreover, even with a weakened magnetic field, Earth's thick atmosphere also offers protection against the sun's incoming particles.

The science shows that magnetic pole reversal is – in terms of geologic time scales – a common occurrence that happens gradually over millennia. While the conditions that cause polarity reversals are not entirely predictable – the north pole's movement could subtly change direction, for instance – there is nothing in the millions of years of geologic record to suggest that any of the 2012 doomsday scenarios connected to a pole reversal should be taken seriously. A

reversal might, however, be good business for magnetic compass manufacturers.

Patrick Lynch
[NASA's Goddard Space Flight Center](#)

SKY BYTES

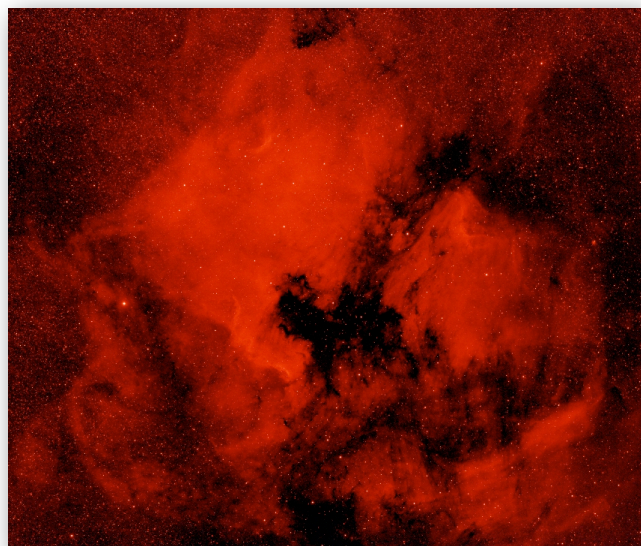
Star Party 2012

The Victoria RASC'al Star Party for 2012 will be held on August 17th, 18th and 19th at the Cricket field in Metchosin, B.C. Last year RASC'als had unfortunate weather that was uncharacteristic for Summer time of year. I promise that for the 2012 Star Party that we won't have - slight gale force winds, a little bit of rain on the last day of the star party and the campers tents won't roll across the field like tumble weeds. instead there will be perfect weather, dark skies and everyone will win a door prize.

New National Web Site

Don't forget to visit the National RASC [website](#) once in a while. It has been recently been redesigned and now easier to navigate.





The North America Nebula and the Pelican Nebula imaged with a hydrogen-alpha filter.

by Charles Banville

Date: December 8, 2011 **Constellation:** Cygnus

Location: Dominion Astrophysical Observatory, Victoria, BC

Optics: Borg 77EDII, f/4.3 with Baader Planetarium

Narrowband 7nm H-Alpha filter

Mount: Paramount ME, guided using PhD

Camera: Hutech modified Canon EOS 5D Mark II

Exposure: 31 light frames of 300 seconds, ISO 1600

Processing: Light frames calibrated with dark and flat frames in

ImagesPlus. Light frames normalized and combined using

MinMax Excluded. Image cropped.

ASTRONOMY CAFÉ



Fairfield Community Centre

1330 Fairfield Rd. Victoria,

7:30pm - 10pm

Call Malcolm at (778) 430-4136
for directions and information.

New comers are especially
encouraged.



New Observers Group

Hosted by Sid Sidhu

1642 Davies Road, Highlands.

Call (250).391-0540 for
information and directions.



Email Lists

**Observer / CU Volunteers /
Members**

Contact Joe Carr to subscribe

web@victoria.rasc.ca

NEXT REGULAR MEETING

Wednesday January 11th 7:30pm - A104 Bob Wright Bldg, University of Victoria, 3800 Finnerty Rd.

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