ROYAL ASTRONOMICAL SOCIETY OF CANADA - VICTORIA CENTRE

SKYNEWS

IN THIS ISSUE

Messier 27
The Dumbbell Nebula
by Dan Posey

NEXT MEETING

Next Monthly Meeting
Wed Feb 14th 2018
Room A104
Bob Wright Centre
UVic Campus

w w w . v i c t o r i a . r a s c . c a

On the Cover
Messier 27 - The Dumbbell Nebula
by Dan Posey

Messier 27**, (**NGC 6853) **t**he beautiful Dumbbell Nebula is also called the “Apple Core” by some. It is one of the closer planetary nebula located ~1300 light years away. Planetary nebulae comprise some of the most gorgeous and intriguing objects of the night sky. This could be the fate of our Sun billions of years from now. What to find out more about these fascinating features? Check out Page 4.

Dan obtained this wonderful image using the VCO 14 inch Meade SCT on a Paramount ME mount. Combined exposures over several nights totalled 5h20m integrating 1h40m from a QSI 583c at -15*C with 3h40m from a Canon 6D at ISO 1600. The image sets were calibrated with dark, flat, and bias master frames, and stacked/processed in Pixinsight in September 2016.

President’s Report
by Chris Purse

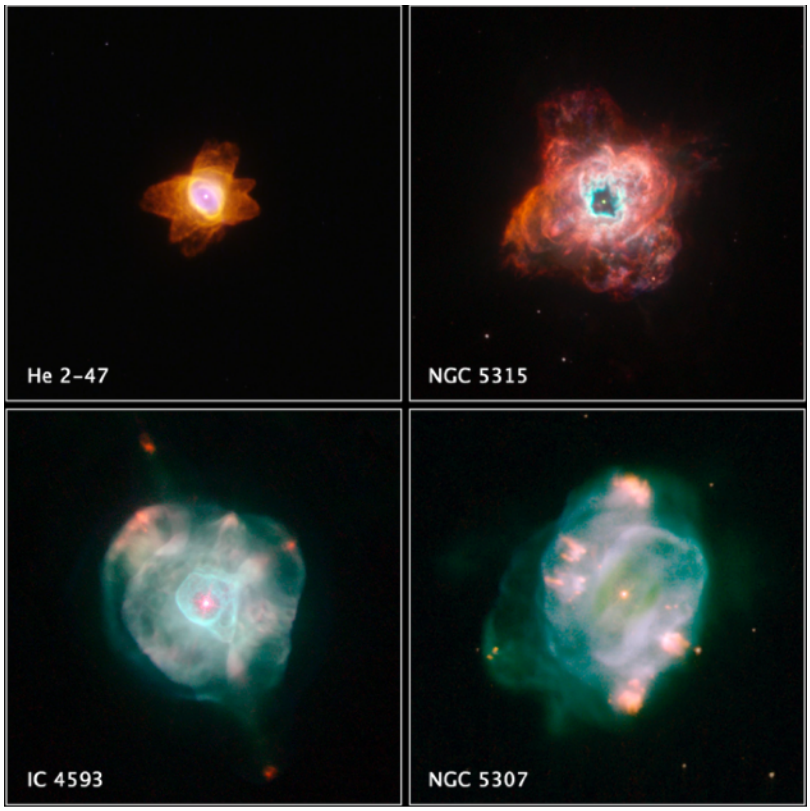
Happy New Year!

As a follow-up to last January’s report, it is time to report back about my progress with my astronomy resolutions of 2017. One of my goals was to learn more and I did achieve that. One area I know little about is astrophotography. To learn more, I purchased a CCD camera in March and have been learning to use it. Primarily, I have done this in daylight hours so I could see what I was doing. I have tried photographing distant objects, typically trees, so I can work on achieving focus. I chose a monochrome camera so I also bought a set of filters and a filter wheel so I have been figuring out how to include those in what I have been doing. As there are a number of parts to all this, i.e., camera, filter wheel, software, etc. there is a lot to learn. I have taken small steps so far but I am getting much more proficient at the tasks I have practised.

Another goal was to spend more time observing. I did spend more time looking through a telescope in 2017 which was good and I’m getting much better at finding objects. One thing to work on this year is getting out on more evenings when the sky is clear. It is still too easy to turn on the television or sit in front of the computer. So this year, my goals are to keep learning and do even more observing.

2018 is looking to be another active year for the Victoria Centre. As introduced in my December report, the first event of 2018 will be the launch of the RASC sesquicentennial on Saturday, January 27. We will be looking for helpers for this event in the coming weeks and I hope that many of you can attend.

We are planning to hold Astronomy Day in April again this year as well as Summer Star Parties at the DAO. These are great opportunities to get involved and more information will be provided as plans are made. Make sure you visit our website to keep up to date about the activities of our Centre.



Planetary Nebulae by Hubble Space Telescope
Click Here to Learn More
They Resemble Inmates of an Aquarium

January Meeting Presentation

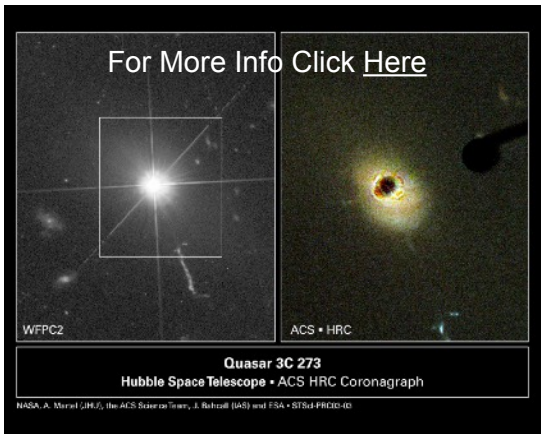
Quasars: Black Holes That You Can "See"

by Dr. Patrick Hall

Wednesday January 10th 2017 at 7:30 PM
Room A104, Bob Wright Centre.

Quasars are the brightest objects in our Universe. A quasar is a rotating disk as big as our solar system and hotter than the Sun, formed when matter spirals into a supermassive black hole at the centre of a galaxy. I will discuss these fascinating objects and how they tap the strong gravity of black holes.

Bio: Patrick Hall is an astronomer and Professor at York University. Born in California to Canadian parents, he was an undergraduate at U. C. Berkeley, a graduate student at U. Arizona, and a postdoc at U. Toronto, Princeton, and the Universidad Catolica de Chile. He divides his work time between research on quasars (and any object with a sufficiently odd spectrum), teaching astrophysics, and outreach. You can follow him on Twitter at @patrickbhall



Upcoming Speakers

Wednesday February 14th 2018
Guillaume Thomas. Dark Matter … Why Do We Need It?
Wednesday March 14th 2018
Vincent Henault-Brunet. Globular Clusters as Astrophysical Laboratories
Wednesday April 11th 2018
Dr. Henry Ngo. Exoplanet Overview
Wednesday May 9th, 2018
Karun Thanjavur, Gravitational Lensing

Our weekly **Astronomy Cafe** is an excellent, informal, way to meet us. New comers are especially encouraged. Click the link for location:. http://victoria.rasc.ca/events/astro-cafe/
Fairfield Community Centre - 1330 Fairfield Rd. Victoria.
Every Monday at 7:30pm. Contact: Reg Dunkley for further details: vp@victoria.rasc.ca

Every Monday at 7:30 PM Beginning

Email Lists

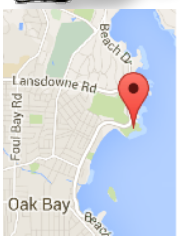
Observer / CU Volunteers / Members

Contact Chris Purse to subscribe

membership@victoria.rasc.ca

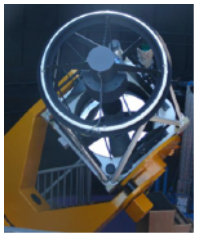
New Observers Group

Hosted by Sid Sidhu - 1642 Davies Road, Highlands. Call 250.391-0540 for information and directions.



Cattle Point observing in Victoria's own Urban Dark Sky Park.
Click the link for the date and time of the next scheduled session
http://victoria.rasc.ca/events/rascals-cattle-point/

Victoria Centre Observatory: Every Saturday Evening
*Open to those on **the Active Observers list only***
Weather permitting. Note that the road may be slippery in winter driving conditions. Exercise caution.



UVic 32 Inch Telescope
RASC Victoria Centre Session 2nd Friday of Month. Meet by the Elevator in the Bob Wright Centre at 7PM

Membership Report January 2018

Total membership is currently **260**. There are 10 members in the grace period which means their membership has expired in the past 2 months. Please contact Chris Purse (membership@victoria.rasc.ca) if you would like to check the status of your membership.

Planetary Nebulae - an Overview

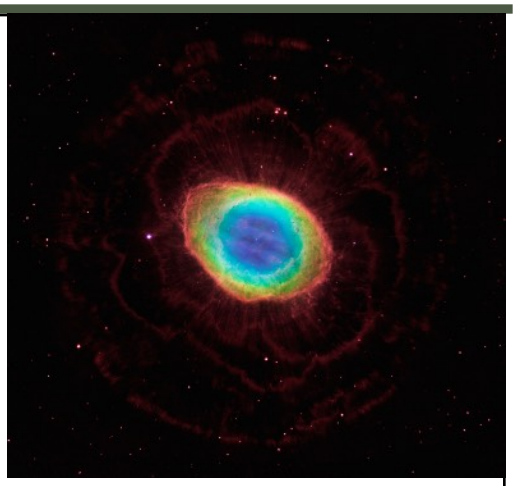
By Reg Dunkley

The aqua hue and rounded shape of the Dumbbell Nebula was similar to William Herschel's recently discovered planet Uranus and he referred to these diffuse objects as "planetary nebulae". Due to their beauty and intrigue they have received great attention from both amateur and professional astronomers. While much has been learned, improvements in imagery in a variety of wavelengths continues to add new layers of complexity and mystery.

So what has been determined? First of all they are definitely not planets. In 1864 William Huggins analyzed the spectrum and discovered that instead of being a continuous spectrum with absorption lines like the Sun, stars and Andromeda, planetary nebula spectra are comprised of emission lines. This indicates that they are composed of very rarified ionized gases. As the understanding of stellar evolution improved it was realized that planetary nebulae are formed as red giants transition to white dwarfs.

You may recall that Red Giants are luminous, relatively cool and very large with a radius R that could reach the orbit of the Earth! At that scale the gravitational attraction at the surface is so weak (remember $1/R^2$) that the speed of the solar wind can exceed the escape velocity. This allows intense solar winds and radiation pressure to drive the outermost layers away from the star at speeds of 5 to 50 km/s. It is the expulsion of these outer layers in expanding circumstellar shells that provides the material for the planetary nebula.

Stellar thermal pulsations (think long term variable stars) can accelerate this expulsion process and remove much of the stellar mass. Eventually the centre remnant star does not have enough gravity to sustain nuclear fusion. Due to the loss of outward radiation pressure the gravity compresses and heats the core producing fierce solar winds of 1000 km/s. You may recall Sun Kwok an expert in planetary nebulae, who delivered a presentation at the September 2015 Victoria Centre Monthly Meeting. He proposed that these much faster winds can catch up and interact with the initial expanding shell. This interaction can act like a "snowplow" and sculpt and compress the layers of the planetary nebula. The interaction was predicted to generate X-rays and these have been detected by the Chandra Space Telescope.The hot central star generates ultra violet radiation. It is this energetic radiation that ionizes the gases of the planetary nebula shells and enables them to emit light in the distinct colours observed.



Top: The Ring Nebula M57
Middle: Helix Nebula NGC 7293
Bottom: Butterfly Nebula NGC 6302
Hubble Images: Click links for Info

The centre star now enters the phase of a very dense white dwarf. As it's light diminishes and the expanding shell moves away from the centre star the planetary nebula fades and eventually becomes invisible. Rather than disappearing, however, the remnants of the planetary nebula join the interstellar medium and patiently wait to become swept up in another solar system.

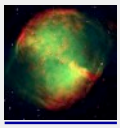
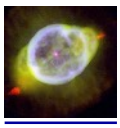
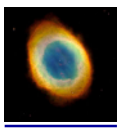
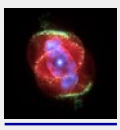
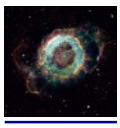
The lifetime of the visible planetary nebula phase is surprisingly short … in the range of 15000 to 20000 years. As a consequence there are only about 3000 planetary nebulae visible in our neighbourhood of the Milky Way. A small number of planetary nebulae have been detected in "nearby" globular clusters and the Magellanic Clouds.

One of the more intriguing qualities of planetary nebula is their variety of shapes and structures. There are a number of classification schemes. About 20 percent of planetary nebulae have a spherical shape. The Dumbbell and Butterfly are examples of bipolar nebulae. One explanation for the bipolar nature is that rotating stars may have a disk or ring of dust or debris at the equator. This dust would impede the expanding circumstellar shell in the equatorial zone but allow it to progress freely near the poles and result in these stunning shapes. Binary stars may also contribute to the formation of a bipolar nebulae.

With detailed images now available from space telescopes such as Hubble, Spitzer and Chandra astronomers are having a field day actively analyzing and modelling the data. This is a area of active research which is improving our understanding of stellar astrophysics. Stars that range from 0.8 to 8 solar masses may end up as planetary nebulae. If the star is heavier that 8 solar masses however, the core collapse it will go SuperNova … and leave an entirely different type of remnant!

To learn more about planetary nebulae check out Sun Kwok's book *Stardust* or Martin Griffiths recent book Planetary Nebulae and How to Observe Them. Or better yet head to the VCO and point the 16inch RC at one of the targets in the table!

The Brightest Planetary Nebulae in the Northern Hemisphere

Image	Name	M#	NGC	Discov Date	Dist (kly)	Vis Mag	Constellat
	Dumbbell Nebula	M27	NGC 6853	1764	1.36 +0.16 -0.21	7.5	Vulpecula
	Helix Nebula		NGC 7293	1824	0.68 +0.15 -0.08	7.6	Aquarius
	Skull Nebula		NGC 246	1785	1.6	8	Cetus
			NGC 6572	1825	2.5	8.1	Ophiuchus
	Blue Snowball Nebula		NGC 7662	1784		8.6	Delphinus
	Ghost of Jupiter		NGC 3242	1785	1.4	8.6	Hydra
	Blinking Planetary		NGC 6826		2.0	8.8	Cygnus
	Ring Nebula	M57	NGC 6720	1779	2.3 +1.5 -0.7	9	Lyra
			NGC 6210		4.7	9.3	Hercules
			NGC 1514	1790	2.2	9.4	Taurus
	Cat's Eye Nebula		NGC 6543	1786	3.3 ± 0.9	9.8B	Draco
	Little Ghost Nebula		NGC 6369	1800 (prior to)		9.9	Ophiuchus

Letters to the Editor

I have a little to add on your historical vignette on George Ritchey (See December 2017 SkyNews Page 6). As you may know, the impetus to develop the 72" reflector here in Victoria was driven by a visit Plaskett made to Mt. Wilson in 1911. After the project was approved by the Canadian Government he maintained his close connections with the staff in California, debating design choices and plans for the facility. After George Ellery Hale turned down the plan to use the RC design on the Hooker 100" mirror, Ritchey approached Plaskett to convince him that the Canadian telescope could use the design.

By this point in late 1913 Plaskett already had his design concept, including a true cassegrain focus to place the spectrograph at the centre of mass for the tube. Ritchey heatedly opposed the plan to introduce a 10" hole in the centre of the mirror blank required by Plaskett's choices. Ritchey's proposal was untested, and would require extensive changes to almost every aspect of the mounting and optics. This, coupled with Plaskett's confidence in the Brashear Optical Company, means the proposal was not seriously considered, but the chance was there.

Cheers,
Dan Posey

Clouds getting you down? Let The Planets blow your winter blahs away!

The Symphony's dynamic new Music Director, Christian Kluxen, brings Gustav Holst's masterpiece, The Planets, alive with the combined musical forces of the Victoria Symphony and the Greater Victoria Youth Orchestra. This is going to be an exceptional musical experience inspired by some our favourite nearby astronomical objects! Since assuming the baton last summer from beloved Maestra Tania Miller, Conductor Kluxen and his musicians are garnering rave reviews for their performances. The full program includes a world premier by former composer in residence, Jared Miller, and Brahms Violin Concerto in D with Caroline Goulding, whom Gramophone magazine called "precociously gifted". Royal Theatre performances Sat., January 20th 8:00 - 10:00 pm and Sun., January 21st 2:30 - 4:30 pm.

Full information: https://victoriasymphony.ca/concerts/the-planets/2018-01-20/

Jim Hesser

The Planets accompany many of the outstanding videos that appear on Knowledge Networks Space Suite

Have computer and able to assist the RASC from your home?

As part of the RASC's sesquicentennial year 2018 a national (indeed, international) contest is being launched. Imagining the Skies is aimed at encouraging newcomers to share inspiration they receive during 2018 by photography or sketching at the eyepiece, or by other creative means (painting, quilting, sculpture…). The contest has been developed by Centre members Lauri Roche and Jim Hesser, with invaluable technical assistance from U.Vic astronomy graduate student Doug Rennehan. Each submission to the contest needs to be vetted to ensure that no inappropriate material is posted on the website. We would seek a small group of people to take turns with us performing vetting duties from the comfort of their homes, on their own schedules during 2018. It's an ideal volunteer activity for people who for whatever reason may not feel able to participate in some of the Centre's other activities. All you need is a computer with internet connection and the desire to help celebrate the RASC's 150th from your home. If interested, please contact either of us for more information.

Lauri Roche, Jim Hesser

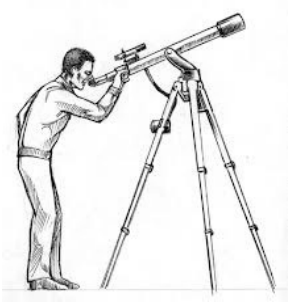
RASC Victoria Centre Council 2017 / 2018

POSITION	NAME	E-Mail
Past President:	Sherry Buttnor	pastpres@victoria.rasc.ca
President	Chris Purse	president@victoria.rasc.ca
First Vice President	Reg Dunkley	vp@victoria.rasc.ca
Second Vice President	Deb Crawford	vp2@victoria.rasc.ca
Treasurer	Bruce Lane	treasurer@victoria.rasc.ca
Secretary	VACANT	secretary@victoria.rasc.ca
Librarian	Michel Michaud (Diane Bell)	librarian@victoria.rasc.ca
Technical Comm Chair/Sys Admin	Matt Watson	admin@victoria.rasc.ca
Skynews Editor	Reg Dunkley	editor@victoria.rasc.ca
Public Outreach	Ken Mallory	outreach@victoria.rasc.ca
School Outreach	Laurie Roche / Sid Sidhu	
Telescopes	Sid Sidhu	telescopes@victoria.rasc.ca
National Representative	Nelson Walker	nationalrep@victoria.rasc.ca
Light Pollution Abatement	Dave Robinson	lighting@victoria.rasc.ca
Membership Coordinator	Chris Purse	membership@victoria.rasc.ca
Observing Chairperson	Jim Stillburn	obschair@victoria.rasc.ca
Website Content	Joe Carr	web@victoria.rasc.ca
Members at Large		
National Officer	Chris Gainor	
Astro Cafe	John McDonald	
NRC Liaison	James di Francesco	
Nat RASC Anniversary Wrkg Group	Dr. James Hesser	james.Hesser@nrc-cnrc.gc.ca
FDAO Liaison	Laurie Roche	
UVic Liaison	Alex Schmid	
Observing	David Lee	
	Li-Anne Skibo	
	Dan Posey	

Online Resources

Magazines

SkyNews Our National RASC Newsletter
Sky & Telescope Magazine
Astronomy Magazine
Astronomy Now Astronomy in the UK
Amateur Astronomy Magazine
Astrophotography Magazine



Borrowing Telescopes

The centre has telescopes for new and seasoned observers that members can use. Contact Sid Sidhu from the email list above.