Vol. 21 Issue 3

20th Anniversary

HORIZON

LA SOCIÉTÉ ROYALE D'ASTRONOMIE DU CANADA
New Brunswick Centre du Nouveau-Brunswick
THE ROYAL ASTRONOMICAL SOCIETY OF CANADA

ASTROPIC

Astropic started in the Summer 2001 issue with this Astrovid 2000 capture of the lunar crater Clavius by Adrien Bordage. Others include a lunar eclipse by Michael Boulay using a Canon S40 (Spring 2003), Derek Lapointe's sketch of Mars (Winter 2004), and Tim Doucette's jaw-dropping image of Saturn from 529 stacked shots of a Vista Pro webcam (Winter 2005).

It is July 1, 2020 and I am starting an unscheduled edition of our newsletter. On this date 20 years ago, the RASC approved the formation of the Moncton Centre at their Annual General Meeting. Later that year we had our formative meetings and the first issue of our as-yet unnamed newsletter was mailed to our members. A few years later we started phasing in electronic distribution, which included colour.

In this special issue you will find material from the first seven Volumes, with some introductory editorial comments. A blast from the past for many, perhaps a recent history lesson for others.

It's Official: HORIZON Wins

(from Winter 2001)

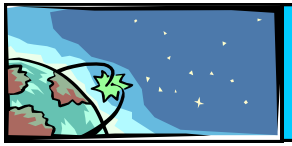
There were eight entries submitted for our "Name the Newsletter" contest: La Revolutionibus, Horizon, Constellation, Magnitude, Azimuth, Zoom, Photon, and Cosmos. All entries were required to be related to astronomy and spelled the same in French and English. The first round of voting selected the two finalists: Horizon (submitted by Andrew Leger) and Photon (submitted by Adrien Bordage). Congratulations, Andrew, on your fine choice.

SAVIEZ-VOUS ?
DID YOU KNOW ?
- par/by Francis LeBlanc

Many of the early issues had translation. Our first Centre President contributed tidbits of astronomical information, separately in each language, for several issues, which made great space-fillers. I have combined those from Winter 2001 into this one column.

À chaque seconde, 600 millions de tonnes métriques d'hydrogène (H) est transformé en 595 millions de tonnes d'hélium (He) dans la partie centrale du Soleil via la réaction nucléaire : 4H —> He + énergie. La masse manquante (m) est transformée en une quantité d'énergie (E) donnée par la fameuse équation d'Einstein E = mc2, où c est la vitesse de la lumière dans le vide. L'énergie ainsi crée est éventuellement émise sous forme de radiation à la surface du Soleil, dont une partie se trouve dans la partie visible du spectre. Il faut noter que la quantité de masse transformée en énergie est négligeable comparativement à la masse du Soleil. Donc, les réactions nucléaires ne changent pas significativement la masse des étoiles lors de leur évolution.

Every second, 600 million tonnes of hydrogen (H) is transformed into 595 million tonnes of helium (He) in the core of the Sun via the nuclear reaction: 4H —> He + energy. The missing mass (m) is transformed into an amount of energy (E) given by Einstein's famous equation E = mc2, where c is equal to the speed of light in vacuum. The energy created is eventually emitted as radiation at the surface of the Sun, part of which is in the visible part of the spectrum. It should be noted that the quantity of mass that is transformed into energy is negligible in comparison with the mass of the Sun. Thus, the nuclear reactions do not significantly change the mass of stars during their evolution.



ORBIT
around the Centre

Orbit started in Winter 2004 in an attempt to elicit brief submissions from members. This gem from Dan LeBlanc was more than I expected. See more on the next page.

What was your best observing experience in 2003?

I guess my best observation ever probably was also one of my worst. Why? Well it all started on a beautiful and spectacular Friday evening back on 23 January with crystal clear skies. I had just finished coming from my son's hockey game when I noticed what appeared to be a clear sky, something you don't get around these parts too often.

Then to the phone, I called some of my observing friends to confirm a GO, NO GO. Well, of course we had just one little technical problem to deal with and that was darn WIND CHILL. This particular evening they were announcing strong winds with wind-chills in the -38 to -40 window. Now you have to be really motivated or a bit stupid to go out in this sort of weather, and I guess I pretty well fit the bill for both of these. To make things even more interesting, four ice block friends of mine were already out there: Bob "North Pole" Crossman, Charles "Snowman" Doucet, Charles "Frostbite" Gaudet, and, of course, Pierre "Wind Chill" Foucher.

My whole purpose in going out that evening was to finally finish my Messier certification program, something I began back in 1996 and never really completed. Yes, I only needed three objects: M41, M79 and M93. I had seen these objects many times before but I never had logged them.

As I arrived at our site in the Indian Mountain area, I was taken by surprise. What I mean is a racing van passed me by leaving behind what appeared from afar to be smurf like creatures in a fast motion ballet surrounded by red lights. This was no ballet, it was four astronomers actually observing in extra fast motion, something I had never experienced before. And what about that racing van that seem to leave in a panic? That was Charles Doucet who apparently decided that if you're going to leave, then leave real fast.

Upon arrival I set up my 10˝ Dob and began my final hunt of the Messier objects. Each bull's eye required a log entry and by the second entry I could not write as three out of five fingers no longer functioned. Next, my two red lights started to fade and what was once fun suddenly seemed to be a nightmare.

Soon, my friends started to pack things up but Pierre Foucher decided to hang around with me until I had completed my list. Then, at 23:27, I had completed something I began over seven years before and I celebrated by opening a bottle of non-alcoholic wine. I told Pierre that I understood it was incredibly cold, but I would appreciate if he would share this most important drink with me. As I pulled out this special bottle, I realized it had turned to slush. Imagine for a moment poor Pierre standing there, already drinking hot liquids and trying desperately to keep his frozen body warm, and me insisting he pour ice cold slush into his frostbitten body to help me celebrate what only I could truly understand at that moment.

Cold or not, completing this project surely warmed me up to astronomy. Sometimes, projects like this can reconnect you to a hobby you felt was running away. Reconnect yourself and find out how fun it can really be.

Orbit—Around the Centre

What was your best observing experience in 2003?

Adrien Bordage

The night of 22 August was the most memorable night of 2003 to me. It was at the Astro-Atlantik star party in Mount Carleton Provincial Park, NB. I vividly recall sharing unbelievably steady, clear, transparent skies with my camping buddies Leonard Larkin and Charles Doucet, and all of the other astronomers that were present. I remember being able to attain a naked eye LVM (Limiting Visual Magnitude) of about 6.8, and Leonard and Charles were able to attain LVMs approaching 7.0! Then, along came "Eagle Eyes" Marc Pitre who was camped nearby, and he was able to identify stars down to magnitude 7.1! This is very rare indeed in our local climate.

The light of the Milky Way seemed to cast a barely detectable glow on the ground beneath us. Later on, Dave Driscoll brought over his Bausch and Lomb 20x80 binoculars, and it was a real treat to see the Veil Nebula vividly displayed in the view. Wow! What a night!

Curt Nason

Like many amateur astronomers, my observing highlight of 2003 was Mars. My appetite for observing its surface features was whetted during the 1999 apparition, and the obscuring dust storm of 2001 only added to the anticipation. I began observing in June and, although there were some decent nights, lengthy periods of steady seeing were hard to come by.

On 27 August Mars was at its best and the sky cleared after an evening shower. I decided to set up my C8 in the uptown Saint John area, on a newly opened public walkway. About 40 people stopped for a look over three hours and I got in some decent observing between visitors. The next night was clear as well so Shawn McHatten and I set up in the same place.

Near midnight I was alone and about ready to leave. My daughter had just paged me; she wanted the car to go to a party, so I thought I'd give Mars one last lingering look before packing up. Suddenly, the seeing became razor sharp and I was looking at an entirely different planet. What had been just reflective surface on the southern half became textured. I overcame my "deer in the headlights" trance and added a Barlow to my 16 mm eyepiece, but I should have gone even deeper. For ten minutes I savored this rare treat; perhaps I should have been sketching. In my logbook for that evening I described the event as like removing a dirty plastic wrap from the optics. All too soon the normal seeing conditions returned and my daughter was able to make last call.

This one from Autumn 2005 has makes me wonder whether Terry Hurd was at the IAU conference in 2006. I would like to rescind my reply.

What parameters should determine whether a body is classed as a planet in our solar system?

Terry Hurd: To me, a planet has the following characteristics:

- It has enough mass that its own gravity forces it into a nearly spherical shape, but not massive enough to ignite nuclear fusion reactions.
- It follows a stable elliptical orbit around a star.
- It is either alone in its orbit or it is many times larger than all of the nearby objects that share its orbit.

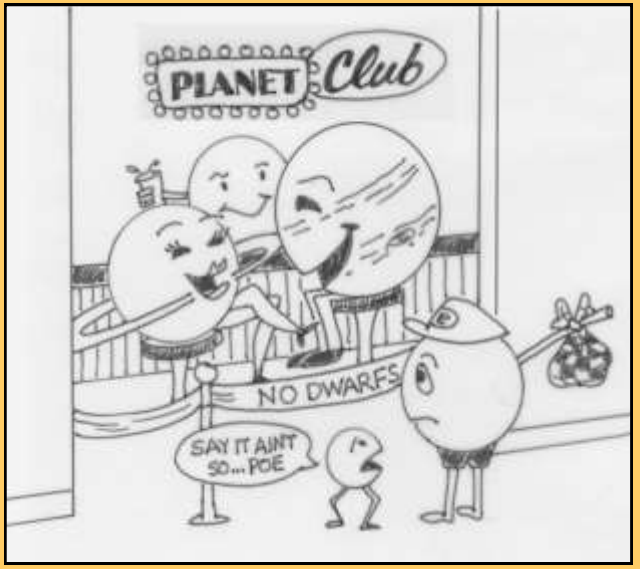
With regard to recent Kuiper Belt discoveries, certainly 2003 UB313 (Xena?) should be classified as a planet, otherwise Pluto would be in trouble! And, according to my definition, Sedna and even Quaoar would qualify, bringing the total to an even dozen!

Chris Weadick: The Greek root of the word planet means "to wander." A planet is a spherical/oval non-fusor orbiting around a star (fusor).

Curt Nason: I favour retaining planetary status for Pluto, but not for granting such status to the many Kuiper Belt Objects that have been, and will be, discovered. Therefore, I base my planet criteria around Pluto. Any body orbiting the Sun that is smaller than Pluto, has greater inclination to the solar equator, or has a greater eccentricity is not a planet.

TED'S TOON

Yes, Ted Dunphy's astrotoon tales of Dobby and others were honed in the minor league team of Horizon before moving up to the big leagues in the Journal of the RASC. (Summer 2006)



☆SPOTLIGHT ON : *Barry Leger* ☆

Most issues included an interview with a Centre member. This one from Autumn 2000 featured Barry Leger, who recently had been featured in Sky & Telescope magazine. Barry's brother Andrew was our first Webmaster, and another brother was Centre President (2009-10) and Horizon editor: Peter Jensen. The feature was later changed to "Focus On" because astronomers are not compatible with spotlights.

Do you recall what first peaked your interest in astronomy? Was it a family affair?
It was comet Hale-Bopp. Although, even as a kid, I was awed by the sheer number of stars we could see from the wharf at our summer camp on the Kingston Peninsula, it was comet Hale-Bopp that really got me wanting a telescope. After seeing it for the first time with the unaided eye, I desperately wanted to see it in a telescope. Astronomy certainly has become a family affair since then. I'm always getting my parents out on their deck to catch a glimpse of a planet or some astronomical event, and two of my brothers, Peter and Andrew, are now both heavily into astronomy.

Was this your first attempt at telescope making?
No. After seeing the comet, I began to experiment with optics by attempting to bend flat mirrors into paraboloids. I even tried casting mirror blanks by spinning epoxy to the paraboloid shape! Although I learned a lot, I ended up using commercially available mirrors. It just seemed easier than all that grinding. The first scope I made was a Sono-tubed 8" f/6 Newtonian on an equatorial mount made from PVC tubing. One of the first objects I saw through it (or any telescope for that matter) was Saturn. Clear as anything, there were the famous rings, and I was hooked. I mean there it was, in real time, Saturn, live. Wow. Although the scope worked well, it was too bulky to transport. That's when I sat down to design the truss tube.

Have you set any astronomy-related goals for yourself (for example, Messier list)?
Yes. In fact, that is my present goal. I'm up to 85 so far.

Has anyone in particular influenced you in your pursuit of astronomy as a hobby?
Yes. Hearing that I was attempting to build a scope, my uncle, Doug Murphy, came over with his Edmund Scientific books (that he had kept since the 60s) that contained all the basics of building a telescope. It was a great source of ingenious solutions using common hardware-store materials. I pored over those books when designing my first scope, he got me on the right track.

Barry Leger - In Dob we Truss

FOCUS ON: *Bernard Archer*

This interview for the Spring 2002 issue was due to an inspiring article Bernie had in the Spring 2001 issue, which follows the interview.

What tweaked your interest in astronomy?
My father had a degree in Electrical Engineering. He passed on to me a thirst for all things scientific. I had even thought I was going to go into some kind of research when I grew up. I recall his purchasing an achromatic lens that was about 5" in diameter and putting together a telescope that was the source of more frustration than satisfaction. It had no mount and we had to cradle it on a ladder. We became contortionists when we tried to see anything very far above the horizon. We lived out in the country, and I vividly recall seeing a meteor shower like I have never seen since. Nobody could have counted them. For as long as I can remember, I have been fascinated with all scientific fields that have to do with time: cosmology, astronomy, geology, palaeontology and archaeology.

Tell us about building your telescope.
If I had known back in 1968 that 95% of the people who attempt to grind and configure the optical elements for a telescope never finish them, I wouldn't have even tried! But I didn't know that. So I borrowed at least a dozen books on telescope building from the Edmonton Public Library and proceeded to build an eight inch Newtonian telescope.

I sent away for a kit that contained two 8" Pyrex glass disks, several grades of grit and polishing compounds. Some of the members of the local RASC loaned me some of their hand made equipment, and I started the 5 ½ month project of grinding the mirror and the tool disk. I used a

template that I had made by drawing an 8" arc of a circle with a 90" radius. While I was in the basement doing this grinding, my wife would be upstairs climbing the walls because of the noise of screeching glass! With each progression from a course grade of grit to one that is finer, you must very carefully wash up everything to get rid of every single trace and grain of the preceding one. One grain of the previous grit can wreak havoc in scratching the surface. I felt like a surgeon preparing for surgery.

The Foucault tester I used for the configuration of the mirror was a simple hand made gadget constructed from an aluminum cigar tube with a 7 volt light inside, and razor blades positioned at an opening so a spider web fine shaft of light could be projected at the mirror. This tester was positioned at the centre of the radius of the spherical configuration of the mirror surface. It took me at least three days to understand exactly what I was looking at. After achieving a perfectly spherical configuration, the next challenge was to make it a paraboloid with the centre of the mirror exactly 2 millionths of an inch deeper than at the circumference, and to do this evenly. I used pitch (the same stuff Noah used on his ark) for the barium compounds for the final polish. When the Hubble telescope was first put into operation, I knew exactly what their problem was. I had been there and done that!

A friend of mine in the physics department at the University of Alberta had the access of a large bell jar. We placed the mirror disk inside, evacuated the air and then vaporized a micron thin layer of aluminum on its surface. I had purchased a cardboard tube used for pouring cement posts. I cut it to the right length, soaked it in shellac to harden it, painted it a flat black inside and white enamel on the outside. I then purchased the diagonal mirror, the eyepieces, the equatorial mount and a clock drive.

It is hard to describe my elation when I took this telescope out into the night and found that I could actually separate binary stars that were optically only 0.6 arcseconds apart, provided they were fairly dim and didn't flare into each other. And I was satisfied that I could identify objects and stars down to the 14th magnitude, which is the limit for an 8 inch objective.

Do you have any other projects on the go, or observing goals?

My telescope is back in Edmonton. I used to be a binary freak, and I enjoyed the challenge of working through the Norton's Star Atlas and also Burnham's three volumes. Since I don't have a telescope at my disposal now, my present experiences are mostly of a vicarious sort that come from reading books on astronomy and cosmology and from computer programs of the heavens. Although I really enjoy reading in this field, I must honestly admit that I get some sort of cerebral indigestion when I try to understand Greene and his "Elegant Universe." One review says that this book is "refreshingly clear." It only made me feel dense! For some reason I just don't seem to be able to "do" superstrings, at least as he explains them.

Bernie Archer — our sky pilot

As a clergyman, do you encounter any conflict, personal or otherwise, between your faith and your hobby?

None whatsoever now. In my Christian philosophy, the existence of God cannot be proven scientifically! It is a matter of faith and a matter of choice, and I believe God intended it to be that way. Those Christians who have a compulsion to attempt to scientifically prove the existence of God usually try to accomplish this by making the Bible into a scientific text book. In my own mind, the Bible tells me that God created this universe. But if I want to know how he created it, I am satisfied to learn these details from scientific research, even from scientists who may have no faith. As a Christian I have no fear of the truth, no matter who discovers it.

Do astronomy and other sciences play a significant role in the advancement of theology? Should theology be static or continually evolving with science?

Let me tell you how it worked for me. Back in 1948 when I was just starting my theological education at Olivet University, I was pretty much committed to what is erroneously called "Scientific Creationism." I will never forget my first year at Olivet University. This was 1948, the year that the Hale telescope on Mount Palomar had just been completed. Through this giant eye we were looking more deeply into space than we ever had before. I went into the library one day and picked up an issue of the Life magazine. There were several full-page pictures taken through that telescope. I sat down and looked at those pictures and tried to comprehend the meaning and the implications of all that distance, size and time.

Suddenly I found myself paralysed with terror as I tried to harmonize all of this complex reality with my immature and simplistic faith and theology. When you are dealing with numbers like these, there is more than just a slim chance that, somewhere out there in all that space and time, there are other worlds like our own with men or manlike creatures on them. I suddenly felt very light headed, as though I were trying desperately not to fall off of a high wire where I was precariously balanced. I began to wonder: "Why doesn't the Bible say more about all that nearly infinite space and existence? Why, in fact, is the Bible's whole attitude and scope so provincial and local? Is this not embarrassing evidence to us that the Bible is really only a piece of local folklore?" I asked myself: "Is the God of the Bible big enough to be the God of this vast existence and time?" My next question was: "Is there any God at all?"

I closed the magazine and left the library. My heart was pounding, my stomach felt upside down. I was too afraid to lift my weak voice to the heavens and say, "Are you still there, God?" The real problem that I was grappling with was my conception of God that was not growing along with the larger universe that I was discovering.

So many Christian people have such a parochial view of the time and the universe in which they live. While I was pastoring a church in Edmonton, from time to time I would take my telescope into the church and set it up next to the pulpit. I would also show a few slides of the stars and galaxies. Then I would preach a sermon in which I rehearsed a lot of the times, distances and numbers associated with what we had seen. If nothing else, it helped them to realize that the universe doesn't revolve around them. But it could also help them to see that the God we believe in who put this universe together might also be able to help solve some of their little problems.

When Halley's Comet made its last disappointing visit, I set up my telescope in the Church parking lot before the Evening Service one Sunday and told the people that they were welcome to have at least a glimpse of the comet through my telescope. They probably wouldn't get to see it otherwise.

How about a quotation—not from the Bible—from some science fiction by Gentry Lee: "Man glorifies God by pushing one of His most spectacular creations, the human mind, to its absolute limit."

What role do you envision for the RASC Moncton Centre in the advancement of astronomy in New Brunswick?

Whenever we are dealing with subjects and pursuits in the fields of astronomy, cosmology, and astrophysics, we are dealing with subjects so massive that if they don't make us feel a bit tipsy, we are probably brain dead! It is interesting to realize that not all the significant discoveries and the important data collection have been done by the professional experts who have all that esoteric brain matter like Einstein and Hawking. A lot of it has been done by people who had ordinary brains that were caught up in the romance and the hobby of perusing the heavens with various sizes of telescopes. There is a significant place for amateurs just such as ourselves who may be looking at the right place at the right time to see something of major significance. And who really knows whether one of us will suddenly have the brainstorm that will unlock one of the plethora of mysteries that permeate these spheres of study and research?

SHARING THE UNIVERSE

by Bernard M. Archer

This is the most memorable and inspiring article I have read in our newsletter. The first time I read it, my eyes watered. And the second.

Several years back, while I was a member of the RASC branch in Edmonton, Alberta, I built my own telescope. Grinding the mirror and working with tolerances of two millionths of an inch in the configuration of the optics was an immensely satisfying accomplishment. Thereafter, I shared the universe with just about anyone who would take the time to listen to my short lectures and look through my telescope. I loved to take my own children out into the black nights of rural Alberta with the telescope. Who can look at the majestic grandeur of the heavens without asking some profound questions about where we are and who we are in this immense universe?

For several summers I was the resident astronomer at our youth camp out there in the foothills of the Canadian Rockies. Each night I would take a different group of youngsters up on a hill at the edge of the camp for an exploration of the night skies. I loved fielding the questions those teenagers threw at me. Sometimes I had answers, but other times I could only share their awe.

On the first day of one of those camps, I was collimating the optics of the telescope and fine tuning the little sighter scope. I was intending to take it up on the hill that night just for a little viewing on my own. I wanted to take advantage of those beautiful black skies. A young fellow whose name was Ralph walked over to where I had the telescope set up and he began to ask me questions about stars and planets. Though Ralph was in his late teens, he had never seen a star or a planet for himself. To all extents and purposes, Ralph was technically blind. Several times I had

seen him struggling to make out the contents of a printed page. Unless he held that page no further than an inch from one of his eyes, he had no idea what it said or contained. His reading consisted of following words letter by letter across the page. I ached inside whenever I saw him doing this.

When I told Ralph that I was going to take the telescope up on the hill that night he immediately asked if I would mind if he came along. I told him to come along if he wanted to. I was expecting to let Ralph vicariously enjoy the heavens through my eyes as I described for him what I was seeing. On the hill that night, Ralph asked if he might look through the eyepiece himself. I was sure it was a waste of time, but why not let him do it? He placed his eye on the eyepiece and began turning the focussing knob.

Suddenly, he became very excited and began to utter rapturous “oohs” and “aahs.” Neither Ralph nor I had understood the principles of optics well enough to realize that the eyepiece of my telescope would bring all those stars within his severely impaired and limited visual grasp. In fact, it was an ideal arrangement for his situation. For the first time in his life he was actually seeing the stars that he had only heard other people tell about.

Suddenly, I couldn’t see the stars very well myself because of the watery condition of my own eyes. Now I was the one who was vicariously enjoying what Ralph was seeing for the very first time. For the next hour I took him on a guided tour. We visited the double star cluster in Perseus, the globular cluster M13 in Hercules, and some of my favourite double stars. We scanned the Milky Way as we looked down into our own galaxy. Even the bright bluish sparkle of a single star like Vega was pure beauty to Ralph. I had forgotten how captivating that was to me when I saw it the first time through a good telescope.

Frankly, I wouldn’t have missed that experience for anything. I felt like I was really sharing the Universe with this young man. Not many of us have the opportunity to be present when another person is seeing the glories of the heavens above them for the very first time in their life. It is a joy that I have relived many times in my memories.

Our Astronomers, eh!

Adapted from the Canadian Encyclopedia

by Bill Demond

Bill Demond, an original Centre member and elder statesman, was a member of the Newsletter Committee and a frequent contributor. Over several issues he informed us of Canadian astronomers, as taken from the Canadian Encyclopedia. This first instalment, from the Spring 2002 issue, features prominent members from the early years of the RASC.

Carlyle Smith Beals (1899-1979) - A native of Canso, NS, Beals was Assistant Director of the Dominion Astrophysical Observatory in Victoria, BC. His work there involved the interpretation of spectral emission lines of hot stars and the nature of gas clouds in the interstellar medium. From 1946 to his retirement in 1964 he held the position of Dominion Astronomer in Ottawa, where his background in geophysics led to a successful program in the study of Canadian meteorite craters. Beals was awarded the Order of Canada, and in 1987 minor planet 3314 was named for him.

Clarence Augustus Chant (1865-1956) - This Ontario native has been called “The Father of Canadian Astronomy” for his many years of training young astronomers at the University of Toronto. Noted for his early work in X-ray photography, he is best remembered for his development of the U of T astronomy program and for his tireless dedication to the RASC. For half a century Chant was the Editor of, and a major contributor to, the RASC Journal and Observer’s Handbook. Minor planet 3315 is named for him, as is the RASC medal awarded to amateur astronomers resident in Canada for their work in astronomy.

Helen Battles Sawyer-Hogg-Priestly (1905-1993) - Born in Massachusetts, she received her Doctorate in Astronomy from Radcliffe (despite taking her courses at Harvard) and moved to Victoria when her husband, Frank Sawyer, was offered a position at the DAO. Here she was permitted to use the telescope— as long as her husband was present— to continue her studies of variable stars in globular clusters. In 1936, the Hoggs moved to Hogtown and Helen joined the teaching staff at the University of Toronto, where 40 years later she was named Professor Emeritus. She is perhaps best known for popularizing astronomy through her book *The Stars Belong to Everyone* and 30 years of weekly columns in the Toronto Star. She was the recipient of numerous awards, including having minor planet 2917 named in her honour.

Through the Eyepiece

- by Adrien Bordage

Adrien was Centre President for 2003-4 and the first Chair of the Newsletter Committee. His Through the Eyepiece column appeared in many issues, including this one from Summer 2003.

Constellation: VULPECULA (The Fox)

Vulpecula, the Fox, is one of Johannes Hevelius's "modern" constellations, introduced in his posthumously published star catalogue of 1690. It forms an asterism which resembles a flying gull seen face on.

Nicely nestled between the bright stars Altair and Vega and situated partly in the great Summer Triangle, this rather inconspicuous constellation does not contain any stars brighter than fourth magnitude, thus it requires a dark adapted observer under reasonably dark skies to be able to discern its primary stars. However, there are some very interesting deep sky objects to be found in this part of the night sky. Notably, there is one of the showpiece Messier objects, an easy binocular asterism, and a couple of very fine binary stars perfectly suited for the small to medium size backyard telescope.

Vulpecula lies nearly due south about 45º above the horizon in the post-twilight hours of late summer, so it is well placed for observing its celestial offerings. Tracing a straight line from Vega and Altair and taking the halfway point will bring us very near to Alpha Vulpeculae, the brightest and central of the three primary stars that make up the "squashed V" look of Vulpecula. Also known as Anser, it is reported to be either an optical double star (two stars appearing close to each other, but not physically connected), or a visual binary system (gravitationally bound to one another). Magnitude estimates of the primary and secondary stars in this system are 4.4 and 5.8, respectively. Their angular separation is around 7′, making it an easy split in binos. Anser is a class M0 giant with a relatively cool temperature of only 3850 K.

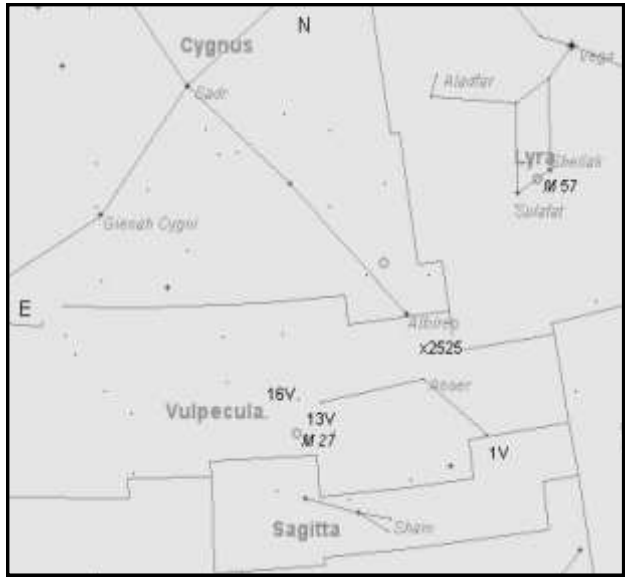


Figure 1: Vulpecula and its Surroundings

About 4º southwest of Anser is another star of the "V." This star is simply called 1 Vulpeculae, and its magnitude of 4.8 is nearly equal to Anser. Using a pair of binos look about 2.5º southeast of 1 Vulpeculae (Figure 1) toward the arrow-shaped constellation Sagitta, and you will find one of the most interesting asterisms of the night sky. The famed Coathanger cluster is a grouping of about 30 - 40 stars, although it is its ten brightest stars, ranging from magnitude 5 - 7, that form an almost perfect representation of a coat hanger (Figure 2). Also known as Brocchi's Cluster (named after D.F. Brocchi, an American astronomer who made a map of the asterism in the 1920's), it was discovered by Abd-al-Rahman Al Sufi (903 - 986), who was involved in astronomical studies in Persia based on the Almagest by Ptolemy.

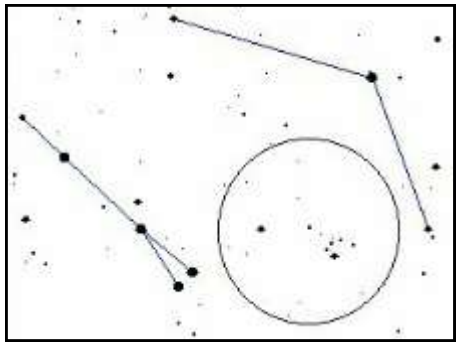


Figure 2: The Coathanger Cluster

Now, put your binos away and get ready to check out a very fine binary star system. Tracing a line from the Coathanger back toward Anser and continuing for nearly the same distance will bring us to Beta Cygni (Albireo). Look about one degree southwest of Albireo for a star of magnitude 8.1 with a secondary star of near- equal brightness at 8.4. This system, known as Struve 2525, shows two components with a separation of about 2″, which is a good test for small to medium size telescopes to split at about 100x or more on clear, steady nights. Figure 3 shows the orbital characteristics and the current position angle of the companion star (near the year 2000 tick mark). The companion star is in a highly elliptical orbit with a period of nearly 1000 years. Definitely a long period binary system, requiring repeated measurements over a long period of time to determine accurate positions.

Now if you hop about 6º southeast you will come to the third star of the "V" shape. Designated as 13 Vulpeculae, this 4.5 magnitude star is also a double and nearly as bright as Anser. Slew a couple degrees further in the southeast direction to find the only Messier object in this constellation. However, it is definitely one of the showpieces of the night sky. M27, more commonly known as the Dumbbell Nebula, is a planetary nebula and a sight to behold in even a small telescope under dark skies. With an apparent magnitude of 7.3 and an angular diameter of about 6′,

this object is even visible in binos. A small scope at medium magnification will reveal an oval shaped nebulosity with perhaps a greenish-grey hue. A larger scope will bring out the double-lobed appearance. Its central star is extremely hot at 85,000 K, making it quite bright for a white dwarf at magnitude 13.5.

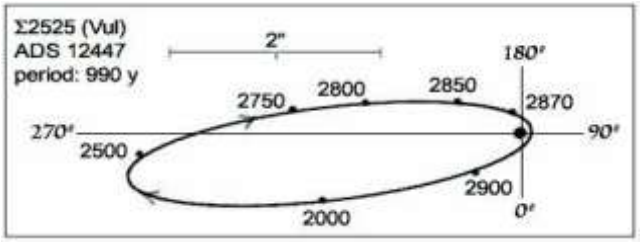


Figure 3: Orbit of Σ2525

The Dumbbell was the first planetary nebula discovered. On 12 July 1764, Charles Messier described as an "oval nebula without stars." The Dumbbell nickname goes back to the description by John Herschel, who compared it to a "double-headed shot."

Two degrees north-northeast of M27 you will find another very interesting close binary star system. This object is catalogued as 16 Vulpeculae. A good set of charts showing stars down to 8th magnitude will be helpful. However, the two components of this system shine with magnitude 5.8 and 6.2 (combined magnitude of 5.2), making them an easy target in binos and possibly naked eye under ideal conditions. But their angular separation is only 0.8˝ so you will need medium to large scope with steady clear skies to be able to split the two components. Again this target is a good test for the resolution capabilities of your scope.

Songs from the Sky

by Daniel LeBlanc

(from Spring 2004)

As I sat on my patio last week and observed the night sky, I remembered an old story my father once told me about a guy called Johannes Kepler. Kepler was a old time scientist who lived some 350 years ago. His work consisted of understanding the motions of the planets; he actually figured out that their orbits were not circular, but elliptical. His work, combined with the work of other great minds, set the stage for our understanding of the solar system as we know it today.

The reason for my little history lesson is to help you understand my story. You see, until I was at least 14 years old, I believed that the sounds of great musical instruments came from the pictures in the sky. As astronomers, we all know those pictures in the sky by names such as Orion, Hercules, and Ophiuchus.

You see, my dad told me when I was a very small boy that if one whistled at a star that it would twinkle, and that one could actually decipher a star from a planet by giving a soft whistle. After trying this for a little while, I could pick out a planet from a star 9 times out of 10; not bad for a little kid. My dad used to call this a Kepler. He'd say, "Give it a Kepler," meaning a whistle.

Why a Kepler? Well, a long time ago the Greeks believed that the stars in their turning made music. Yes, this idea is as old as the hills. Kepler used this thinking as a way to explain the planetary motions. Imagine that for a few seconds, imagine the grandeur of it all. Many of us might think this stuff is a fool's way of thinking, but it was no one less than the great Copernicus who first described it as natural law many years prior to Kepler.

Enough with ancient history. Next time you are out observing, try it for yourself or, even better, bring your child along. Kids really take this stuff seriously and it makes it really special for the story teller. Look at the stars, then whistle lightly. If you are lucky and keep whistling you'll see that dot of light blink for ya.

Then try to pick out the planets. Can you see Jupiter or maybe even Saturn? Hold on now! Do you believe in the songs from the sky? Have you tried this out in your backyard? Do the stars really dance? Of course they do, don't they?

Sometimes it's the stories that really count and the memories that follow, for without them one loses his place in the great forest we call the COSMOS.

Top 10 Reasons to be an Astronomer

by June MacDonald

(from Summer 2003)

10 You get to meet people who like the dark as much as you do.
9 You get a chance to try out your glow-in-the dark boxers (red of course)
8 You meet others who like to go "mooning."
7 Your dates think you are romantic because you want to spend time out under the stars with them.
6 You get a reputation for being intelligent because you know about Greek and Roman mythology.
5 It's the only hobby where a husband / wife can say at 9 pm "Bye honey, I won't be home 'til 6 am," and hear "Have a good time" in response.
4 You get a chance to play with some great gadgets.
3 You get to go to star parties and "Star-B-Qs."
2 You learn from the past and hope for the future.
1 You meet great people who share the same interest and learn lots.

The Aurora and Communications
by William Demond

Here is a science article by Bill Demond from the Summer 2002 issue, with an editorial comment. Andy Smith's aurora photo is from Spring 2002.

If you look at a map of the northern part of Quebec, you will notice on the border with Newfoundland and Labrador a place called Schefferville and (in brackets) Knob Lake. In the autumn of 1953, the area between "Knob" and the town of Seven Islands was the scene of round-the-clock activity as a railroad was being built to haul out the iron ore, from the great iron ore deposits of Knob Lake.

The scheme was to move in supplies, tools and even bulldozers to "Points up the Line" by cargo aircraft, while at the same time extending the railroad north from Seven Islands to move the heaviest equipment that way.

There being no such thing at that time as satellite circuits, the only means of communication was by short wave radio. This was the part of the construction that I was engaged in. This has to do with an observation that I made one evening when the aurora was quite vivid, as it often is in the North. The North Auroral Zone maximum lies about halfway between Knob Lake and Ungaua on the northern tip of Quebec. But, as is well known, the aurora may be seen sometimes north and sometimes south of the observer, and such was the case on this evening.

Now, the effect of the proton flow from the "disturbed" Sun in the presence of the Earth's magnetic field is an interaction that causes a "bubbly" sound to speech transmitted via short wave radio. I was about one-third of the way north of Seven Islands, and transmissions from Knob Lake became garbled. I took a minute to go out and look northward. Sure enough, there to the north (toward Knob Lake) was a fine band of green aurora.

About half an hour later transmissions from Knob Lake were clear, but now transmissions from Seven Islands were garbled. Again, I went outside to check the situation. Once again, the aurora was visible but this time it had shifted to between my location and the Seven Islands transmitter.

I would take this as rather strong evidence that particles from the Sun affect the ionosphere in such a way as to excite the atoms aloft to emit photons in the green portion of the spectrum, and to cause fast changes in the refractive index of the ionosphere that account for the garbled sound.

Bill is correct. The lowest layer of the ionosphere, called the D-region, is at an altitude of 80-90 km. This layer absorbs radio waves. Increased ionization in the D-region caused by emissions from the active Sun will result in greater absorption of the radio waves. Also, protons from solar events excite electrons in the ionosphere. When the electrons return to normal, they emit light at a wavelength (or colour) that is characteristic of the atom (the photon energy is equal to the energy loss of the de-exciting electron). Green light from atomic oxygen dominates at this altitude. - Ed.

Mactaquac COW Party Success

Our first public star party occurred at Mactaquac Provincial Park in July 2005. The second was held a month later in Mactaquac. The Summer 2005 issues included impressions of the Camping Observing Weekend (COW) by Stephen Tompkins (who also took the photo below), Beth MacNutt, Emma MacPhee, Peter Jensen and Ted Dunphy. Here is Ted's.

What a weekend! Sol and Selene were sublime and brought us splendid skies. Conductor Paul Gray's orchestration and hard work is greatly appreciated and worthy of a standing ovation. Steve and Don's humongous gluteus maximus light bucket was not only a treasure to behold, but a pleasure that the skies did unfold. I felt especially proud of our Centre when, wandering through the field, I heard Charles conveying in French the skies wonders. Earlier, I had these same folks at my scope but was unable to translate the wonders we were looking at. Before I get too melodramatic, I'd like to apologize for a couple of extra well done steaks; I got caught up in the viewing of solar flares through the Saint John club's PST. Astounding! And to lift a quote from Curt, "A dam fine weekend."

2003 Conference Series & Annual General Meeting

Our third annual AGM and Conference Series was held at the Université de Moncton on 8 November. The Organizing Committee had done an excellent job of publicizing the event, with brochures and posters being placed in Moncton, Fredericton and Saint John. The day kicked off shortly after 09:00 with the AGM — a wise schedule change — and it was conducted informally with little pain.

The Conference Series began at 11:00 with a casual fireside chat by Dr. Geoff Gaherty on *Urban Astronomy*. Geoff is an avid backyard observer and does not let his downtown Toronto residence interfere with his passion for the stars. He recounted his youthful endeavours as a member of the Montreal Centre in the 1950-60's and his resurgence this past decade after a long hiatus. Geoff wastes no clear nights, concentrating on planetary and variable star observing and testing a variety of equipment.

After a delicious lunch of soup and sandwiches on-site (another wise innovation by the Organizing Committee), the afternoon talks started with *Chemically Peculiar Stars—Étoiles Chimiquement Particulières* by our own Dr. Francis LeBlanc. Beginning with a succinct tutorial on stellar spectroscopy, Francis described how the abundance of elements in a star are determined by the strength of their absorption lines. Chemically peculiar (CP) stars appear to have an abnormal abundance of some elements due to radiative diffusion rather than the fusion process in their core. These elements are more apt to gain sufficient energy by photon absorption to overcome the gravitational pull of the core and rise to the surface. It is here in the star's photosphere that we detect the elements though spectroscopy. The anomalous abundances are enhanced by the star's low rotational velocity, which inhibits mixing to create stable zones within the star.

Dr. John Spray, Director of the Planetary and Space Science Centre at UNB Fredericton, gave a geologist's view of our neighbour in *The Planet Mars: An Introduction and Tour.* Following a brief history of Martian expeditions and the characteristics of the planet and its atmosphere, Dr. Spray led us on a tour of its surface features while providing theories of their origin. We discovered the unusual discrepancy in elevations between the north and south hemispheres, the Hellas impact basin, and the 11-kilometre deep gorge called Valles Marineris; plus sediment layers in craters that could indicate ancient lakebeds.

Curt Nason brought matters down to Earth with *Rainbows and other Daytime Delights*. Although the phenomena of rainbows and ice haloes are not astronomy in the strictest sense, amateur astronomers are often called upon to explain them. Curt described why they occur and gave clues on how to anticipate and observe them.

Photo by Roger LeBlanc

The final speaker was Dr. John Percy, a past President of the RASC and former Editor of the Observer's Handbook. His main interest within the Society is in the field of public education, and he combined his visit to our Conference with school presentations in Fredericton and Moncton. His talk was on *Pulsating Red Giant Stars*. Red giants, defined as those of spectral class K5 and cooler, are 25 to hundreds of times larger than the Sun and comprise about ten percent of the visible stars. They are composed of a small carbon core surrounded by shells of helium and hydrogen, and all are variable due to the tug-of-war between radiation pressure and gravitational collapse. Their periods of pulsation can be fairly regular, and approximately half have secondary periods that are about ten times longer than the primary.

The day ended with a fine meal at McGinnis Landing and observing of a spectacular lunar eclipse at the University. That Organizing Committee can arrange anything!

(from the Autumn 2003 issue)

Always focused on the Moon, here's another Ted's Toon from the Autumn 2006 issue.

Cosmic Vacations

Cosmic Vacation, a weekend getaway for Centre members, was held in Bristol in 2002 and 2003, and at Cassidy Lake in Norton in 2004. Here are some notes from June MacDonald (2002) and Emma MacPhee (2004).

2002: No, I did not expect to see Harrison Ford at the "Star Party"! I knew what I was getting into when I signed up. What I did not know was how thought provoking, how relaxing and how touching it would be, and how warm the welcome and feeling of comradeship.

This was a great weekend. The weather cooperated for the most part — one night was perfectly clear — the pool was a life-saver and the food delicious. We had a roof over our heads, indoor toilets and showers. Who could ask for more?

We settled in on Friday evening, talked and laughed over supper, and watched some of Carl Sagan's series Cosmos since it was too cloudy to do any observing. The series, even though over 20 years old, is still interesting and relevant today. It provided a lot of food for thought. People could choose what they wanted to do Saturday, but most spent the afternoon in the pool. Reading, conversation and relaxing seemed to be on everyone's menu. The evening arrived with a perfectly clear sky. There was a small fireworks display to start things off with our own "big bang"!

Looking at the stars, even without a telescope, is awe-inspiring. Watching through the eyepiece of a telescope increases that feeling a hundredfold; the wonder it engenders in our souls, the questions that fill our minds. It was interesting to hear others speak about their observations;

hearing their words, their tone of voice, their commitment and passion for studying the heavens. I learned that astronomers feel a strong sense of relation to the universe and their part in it. They know from what and where they come. As Carl Sagan said in his series, "We are made of star stuff."

I also learned that our astronomers are more hopeful than most (for clear skies), they will go farther and go to bed later just to have the best observing experience. They talk more and longer about what is out there. They will also, for the most part, watch any movie with Space in it. The people I met were willing to take the time to answer questions they've probably heard a dozen times before, with the same enthusiasm they probably started out with. They love sharing their knowledge and experience. I now know that you do not take a lunch-box size 9 volt flashlight to a star party, even if it is covered with 4 layers of red plastic! You live and learn.

I was touched by the dedication of those who came to search the heavens; to see their intensity of purpose, their infectious enthusiasm for the absolute thrill and rush of success they experience. I hope to gain the knowledge to understand exactly what I'm enthusiastic about.

2004: First impression: Nice area and clean, with the extra attraction of black flies. We arrived around 20:00; found our cabins, unpacked and settled in. Charles and Germaine were already set up in their tent trailer. Malcolm Baxter and his nephew, Randy, from the Hampton Club arrived and set up their big 13.1″ telescope. Adrien, June and Bill drove in around 21:00 and settled in. We had a snack ready for us around 21:30, along with the camp attendants.

Fortified with nachos and Coke, we got ready to do some observing. Unfortunately, some lights could not be turned off but the north, east and south sides were beautiful. We saw a very nice flare, -7 magnitude, that everyone appreciated, followed by the ISS with some ooh's and ahh's. The Hampton astronomers left before midnight, and the kids left for bed, leaving us older folks to get down to some serious stuff.

As mentioned at breakfast next morning: Astronomers do it all night. By 02:30 everyone was frozen and shivering, cutting off the "all night" business for warmer beds and zzz's. Having installed red plastic in the windows of the two cabins, we appeared to be in business. June was looking to make some money to buy some eyepieces.

Up and at it early next morning; eat and discuss our night, just to turn back to bed for extra rest. We checked the weather and Clear Sky Clock for Saturday night, and since the skies were not favourable for observing, we decided to leave for home. We were gone by late Saturday afternoon.

Beautiful skies, better than average seeing. The two things missing were an extra night of clear skies and your presence to make it an outstanding Cosmic Vacation. Maybe next time!