Saskatoon Skies

The Newsletter of the Saskatoon Centre of the Royal Astronomical Society of Canada

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The Chile/Argentina annular eclipse of the sun occurred on Februrary 26th. While on vacation in South America, Margaret Phillips of Yorkton, SK, took this image of the partially eclipsed sun projected as "pin-hole camera" images through gaps in the leaves from a nearby tree. Sometimes people get so enthralled with the eclipse that they forget to look at what is going on around them. Margaret didn't! Submitted by Jim Huziak.

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To view *Saskatoon Skies* digitally, see our website: http://www.usask.ca/rasc/newsletters.html

In This Issue:	
Membership Information / Bottle Drive / Officers of the Centre	2
U of S Observatory Hours / Light Pollution Abatement Website	2
Calendar of Events / Notice of Meeting	3
Minutes of the February Meetings - *Marcel Müller-Goldkuhle*	4-6
SDR Follow up – *Alan Duffy*	6-7
My Intro to Astrophotography – *Tim Yaworski*	8-10
Observers Group – *Larry Scott*	10
Observing Clubs and Certificates	11

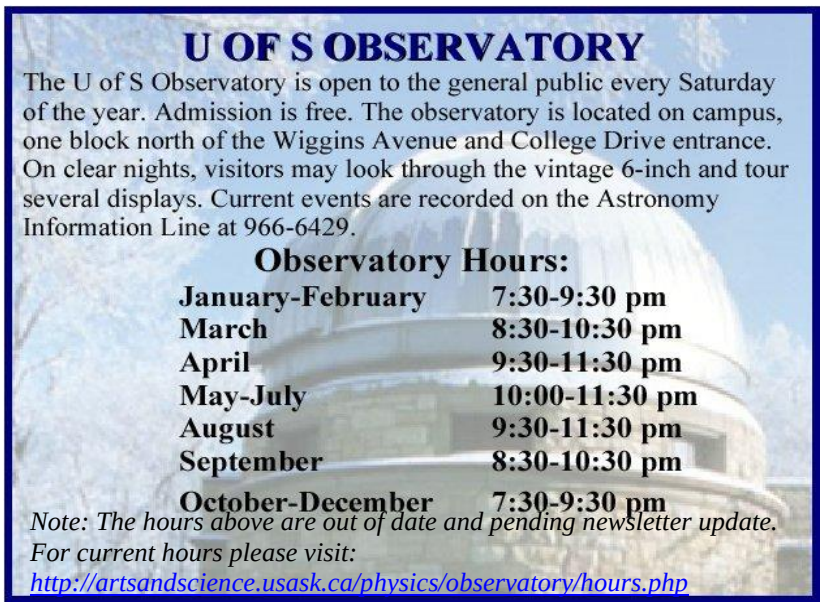
MEMBERSHIP? JOIN TODAY!

Regular: $85.00 /year **Youth: $45.00 /year** **Family: $80/year**

The Saskatoon Centre operates on a one-year revolving membership. You will be a member for the next 12 months no matter when in the year you join. Members are encouraged to renew early to avoid disruption in publications. Renew through the National Office at http://www.rasc.ca/join-us

Benefits of Membership in the Saskatoon Centre

- knowledgeable & friendly amateur astronomers
- use of the Sleaford Observatory
- use of the U of S Observatory (after training)
- Saskatoon Skies Newsletter
- Observer's Handbook
- Journal of the RASC (electronic format)
- SkyNews Magazine (bimonthly)
- borrow the Centre's Data Projector to give astronomy outreach presentations – contact Les Dickson at astrochem@sasktel.net
- rent the Centre's Telescopes https://www.usask.ca/rasc/telescopes.html
- discounts to Sky &Telescope Magazine*
- use of the Centre library

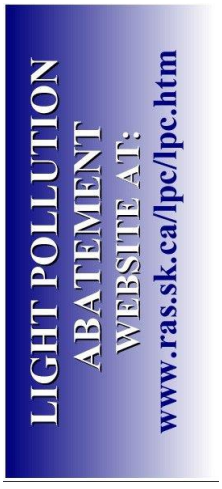


SASKATOON CENTRE'S
MAIN OFFICERS:

President – Tim May
Vice-President – Alan Duffy
Secretary – Marcel Müller-Goldkuhle
Treasurer – Norma Jensen
National Council Rep – Rob Shepard

Bottle Drive &
Canadian Tire $
By Les Dickson

If you cannot attend a meeting but would like to donate your Canadian Tire money please email me at astrochem@sasktel.net



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Saskatoon Skies is published monthly by the Saskatoon Centre of the RASC. Distribution is approximately 100 copies per issue. Saskatoon Skies welcomes unsolicited articles, sketches, photographs, cartoons, and other astronomy or space science material. Submissions should be sent by e-mail to the editor at krisohn@gmail.com in msword or text format. Images: any format, less than 30MB, sent by e-mail as attached files. **Deadline for submission of all articles for an upcoming issue is the first Friday of the month!**

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RASC CALENDAR OF EVENTS

March 20	**RASC General Meeting**	Tim May
March 25	**Messier Marathon at Sleaford**	Larry Scott
March 27	**Youth Astronomy Club Meeting**	Ron Waldron
April 17	**RASC General Meeting**	Tim May
April 22	**Observers Group at Sleaford**	Larry Scott
April 24	**Youth Astronomy Club Meeting**	Ron Waldron

For a complete list of club events, please visit: http://www.usask.ca/rasc/activities.html

March RASC General Meeting

for all members and guests, Room 175 Physics Bldg
University of Saskatchewan, on

Monday, March 20th, 2017 at 8:00PM

Presented by Brent Harrold:

My Five Favourite Moons of the Solar System

This month I will be discussing my favourite satellites of the solar system. Moons amaze me with their variety and the clues they give us of our own creation. I will share my thoughts with the group and explain why I feel each is interesting, important scientifically or just plain neat. I hope to see you there.

Presented by Rick Huziak:

Subaru & Dark Skies

Richard Huziak will discuss Subaru Canada's partnership with the RASC, and will suggest how the RASC and Subaru can work together to raise public awareness of the need for dark skies.

Note: There will be an Executive Meeting at 7:00PM

Minutes of the February Meetings - *Marcel Müller-Goldkuhle*

Minutes of the Executive Meeting, February 27, 2017

Meeting called to order by Tim May at 7:07 PM
Approval of minutes of Jan 16 Executive Meeting: Moved by Rob, seconded by Rick. Approved.

Reports:

Sleaford:	The Electrician who was contacted is willing to do the installation work, costs are estimated to be $5000 or less. The existing breakers can be reused in the new panel.
National:	No Update
Membership:	Currently 85 members in total, this is 9 more than Feb 2016
SSSP:	Next committee meeting is held on March 9.
	Registration for Camping and SSSP opens April 9
	Speakers TBD by end of March
	An idea is to offer an equipment drop off at the resort, which could be used by people who drive south to the solar eclipse. To be discussed with the resort, responsibility and security issues TBD.
	George Charpentier was asked to show the Saskatoon Centre Photo Documentation at the SSSP. Further discussion required.
	Concerns about the security of the PayPal system were raised. Rick to contact National/Randy to get his view on this.
Newsletter:	Closing Date for the next Newsletter edition is March 3rd. Article submissions are always welcome.
Other:	The position of the coffee supply coordinator is to be filled.

Old Business:

Event Coordinator:	Position still to be filled.
Astronomy Youth Club:	Currently 6 participants.
Stand Up Signs:	Approval is in place for 1 horizontal and 1 vertical banner, maximum costs $600.
	Design Drafts were shown for both banners. High res pictures were received from National.
	Horizontal banner would cost $200 at Pelican Signs.

Vertical banner from Pelican Signs would cost about $400 retractable, about $280 with an x-frame. Hub City offers a banner with an end of line, but high quality frame for $295.

Business Cards: Les showed a design draft for the cards.

Linda's Printing offers 500 cards for $149, 1000 for $176.

Vista Print was discussed as an alternative with probably lower costs. Les to check their pricing.

Motion by Les for the purchase of 500 business cards for at max $200, seconded by Rick. Passed.

Canada's 150-year Anniversary:

Tim informed the National Centre that the Club is interested in participating.

Sky News: Handout magazines and sky finders arrived.

Asteroid Day: Timing for this event is seen difficult (June 30)

50th Centre Anniversary:

The Club's 50th Anniversary is taking place in 2018, discussion about events and an agenda to be started this year.

New Business:

Financial Report: Due to depreciation the report shows losses for 2016 of about 1,200 $.

Compared to 2015, there are no big deviations.

Approval of the Financial Report moved by Les, seconded by Mark. Passed.

USB-Hub for Roll-Off-Shelter:

Alan Duffy suggested to install a USB-Hub in the roll-off-shelter and to route a cable from there to the warm-up-shelter. Telescopes, cameras etc. could be controlled from inside the warm-up-shelter.

A 4" cable conduit connects the two shelters and can be used for this purpose.

Alan to determine the required equipment and bulks, to be discussed in the next meeting.

RASC-Handbook: Updates can be downloaded at www.rasc.ca/handbook/updates/2017

Meeting adjourned at 8:01 PM.

Minutes of the General Meeting, February 27, 2017

Meeting called to order by Tim May at 8:18 PM.
Approval of minutes of Jan 16 General Meeting: Moved by Rick, seconded by Ellen. Approved.

Report:
Tim gave an update about the topics, which were discussed during the Executive Meeting.

New Business:

Yahoo Group:	Jeff Swick doesn't want to maintain the Yahoo website any longer, question is if anyone is willing to take over this task from Jeff. Otherwise it would be removed from the web.
	Alternatives to be discussed in the next meeting.
Annual Report:	An annual report about the club's activities has to be issues and submitted to National.

Presentations:

Tenho Tuomi:	The new RASC Astroimaging Certificate.
Alan Duffy:	Astronomy with Software Defined Radio (SDR)

SDR & Radio Astronomy Follow-up – *Alan Duffy*

Editor's Note: Alan provided this section in case anyone wanted to pursue further detail in the large field of SDR and radio astronomy. This is largely link based and is best viewed in PDF format!

Software Defined Radio Equipment

- Software Defined Radios: http://www.rtl-sdr.com/roundup-software-defined-radios

- Software to run an SDR unit (SDR#, GnuRadio, SDR-Radio.COM V2, etc...):

  http://www.rtl-sdr.com/big-list-rtl-sdr-supported-software

- Antenna required will depend on frequency (there are lots available). Here are a few suppliers:

  http://www.universal-radio.com/catalog/index2.html
  http://www.buddipole.com/ ("an HF/VHF portable dipole antenna system which is designed to be modular versatile and efficient").
  https://radiojove.gsfc.nasa.gov/office/kit_requests.htm Radio JOVE Antenna Kit (specifically for "Listening to Jupiter").
  http://www.radioastronomysupplies.com/ (primarily for 1420 MHz radio astronomy).
  - DIY is always an option (there are lots of examples online).

- Antenna modeler and optimizer (Windows) (Free) based on Numerical Electromagnetics Code (NEC). http://www.qsl.net/4nec2/ Useful for figuring out beam pattern of antennas.

  Note: simulating in 4NEC2 lets you know a theoretical gain of an antenna configuration. For example Buddipole vs. Radio JOVE Antenna Kit and performance as a function of height. The beaming pattern can be brought closer to the horizon by raising the dipole(s).

Meteor/Auroral Scatter

- First determine FM broadcasts (or TV signals) that are ideally between 500 km and 1000 km away). Database of worldwide FM radio, DAB and TV at www.fmlist.org and www.fmscan.org

- Also check out www.TVfool.com and click 'online TV maps' to see broadcast range/coverage maps.

- The following VHF broadcasts were picked up in Saskatoon during an auroral storm (dipole tuned to 15 m band oriented North-South):

    - VHF 6 – CKCK-TV-2, Willow Bunch (SK) video carrier is at 83.24 MHz

    - VHF 6 - CHAT-TV/CBC, Medicine Hat (AB) video carrier is at 83.25 MHz

    - VHF 6 - CFQC-TV-2, North Battleford (SK) video carrier is at 83.26 MHz

    - Note: VHF 3 - Stranraer - CFQC-TV-1 – 61.240 MHz (Video carrier) and 65.740 (Audio carrier) MHz are also detectable (however this station is too close to Saskatoon to be useful for meteor/auroral scatter). These signals are "line of sight" as well as local channels 8 and 42 (see "North American television frequencies" on Wikipedia for frequencies).

    - Note: there are several just out of range FM broadcast stations at 89.9 MHz in Saskatchewan that might work (not at ideal distance but accessible with simple FM radio).

- Listen to live meteor echoes at www.livemeteors.com located in DC Metropolitan area.

Miscellaneous Links

- NASA's Radio JOVE Project: Home Page: www.radiojove.gsfc.nasa.gov

- Jupiter Radio CG Gallery: http://jupiter.kochi-ct.jp/cg/ Animations of Io Flux Tube (IFT) and Previously Excited Flux Tube (PEFT).

- Radio-Sky Publishing: http://radiosky.com/ (see blog for details on using SDR# with Radio-Sky Spectrograph).

- Zebra spectral structures in Jovian decametric radio emissions: http://meetingorganizer.copernicus.org/EPSC2015/EPSC2015-164.pdf

- "A super cheap radio telescope for radio astronomy experiments." http://www.rtl-sdr.com/rtl-sdr-for-budget-radio-astronomy/ (contributed by Marcus Leech now director of Canadian Centre for Experimental Radio Astronomy http://www.ccera.ca)

- Itty Bitty Radio Telescope Observing the Sun at 12 GHz: http://www.stargazing.net/david/radio/itty_bitty_radio_telescope.html

    - Animation L-Band 1420 MHz: https://youtu.be/NL3YYqwJ0tA

My Intro to Astrophotography – *Tim Yaworski*

My worst astrophotograph and why it is my sentimental favourite.

My journey to astrophotography was delayed somewhat.

I was 14 years old when I got my first 35mm SLR in 1975. At the time I was dabbling in astronomy with an enthusiastic group of members of the Vancouver Centre of the Royal Astronomical Society of Canada (RASC). They had started an off-shoot club in our small bedroom community.

The Maple Ridge Amateur Astronomers Society met monthly in an old community hall deep in a forest out of town. There were no clear skies there…our observing nights were held on the shores of Stave Lake, another 40 minutes down the road.

I tried to marry my love of photography to astronomy with little success. Partly it was a lack of patience and opportunity, partly it was a lack of experience but mostly it was a lack of funds. The days of film meant that each click of the shutter cost you money. I was not exactly a teenager with a lot of cash reserves.

Eventually, astronomy took a backseat to photography. It was many years later when I went back to it, largely due to the addition of children to my life. I purchased some 7x50 binoculars and a small Meade go-to scope and shared what little knowledge I had with them. I wanted them to experience the awe and wonder I felt every time I looked up at the night sky.

Jump ahead to June 2015 when my oldest daughter, no longer a little girl, gave me a membership to the RASC for my birthday. It was her way of prodding me to return to my youthful love of astronomy.

August 12, 2015 was a special night. Moonless, cloudless, pleasant temperature (mid 20s C) and the peak of the Perseid meteor shower. I decided this was the night I would give astrophotography another go. I packed two cameras, two tripods, some Tim Horton's coffee and Deep Woods Off (for the inevitable mosquitos) and headed straight east out of town.

As I drove out on Highway 5 I decided to set myself some short and long-term goals. My goal for tonight was to capture at least one meteor with my camera.

For other trips, I wanted to get a good shot of the Milky Way, get some good shots of the moon and capture some aurora.

As I slowed down on a dark, gravel road in the middle of the prairie I spied some clouds near the northern horizon.

"Oh crap", I thought. After a 45 minute drive out of town my night was going to get washed out by clouds!

Soon afterward, I pulled off the road onto a field access lane, killed the engine, doused myself with bug spray and stepped out under the universe.

I spent the next 10 minutes setting up the cameras and the lawn chair and letting my eyes get used to the darkness, all the while watching that northern cloudbank which was now joined in the distant eastern horizon by heat lightning.

My first test shot with my Fujifilm XE-2 and a Bower 8mm fisheye was pointed towards the northeastern sky. 30 seconds, f2.8 at 3200 iso. After the shutter closed the LCD on the back of the camera showed me the image for 1.5 seconds.

I just about screamed with excitement.

That wasn't a cloud…that was aurora!!!

I had just taken my first photo of aurora.

That was the start of one of the most magical nights of my life. Over the course of the next three hours I slouched back in my lawn chair, sipped my black, dark roast coffee and watched the universe slowly spin over me as I just drank in its beauty while the intervalometers in my cameras did their work.

Only one car drove past me the entire time but I was not alone. Distant cows, owls, coyotes, ducks, geese and the not so distant mosquitos, constantly serenaded me.

Heavy eyelids and the prospect of working at 8:30am were the only things that could drag me away from this celestial paradise. At 3 am I packed up my gear, hopped in the cab and pointed my truck back home.

The following evening, after supper, I anxiously downloaded my files and proceeded to scan the previous night's work for some Perseid meteors.

I had a few small, faint ones in a few frames from my camera that was pointed to the southeast. They were taken with my five year old DSLR and a Sigma 10-20mm f3.5. Using this camera for astrophotography for the very first time showed me just how far technology had progressed in five years. I knew that I would not be keeping any of these files.

When I downloaded the files from my XE-2 with the 8mm fisheye, my spirits soared. Images taken with the same settings as my DSLR (which were noisy, flat and lifeless) looked absolutely stunning on my mirrorless camera. There was no comparison. That night was the death knell for my DSLR system. Within a year it had all been sold off and I was fully immersed in the world of Fujifilm X cameras.

Scanning the files from the Fujifilm, I quickly found the most beautiful image I had seen in a long time. A Perseid meteor drew a smooth arc across the centre of the frame. Goal #1 achieved. Below it was a band of beautiful aurora along the northern horizon. Goal #2 achieved. Connecting the two was a vertical cloud of dense stars…the Milky Way! Goal #3! In one image, on my first night out with a camera in almost 40 years, I scored a hat trick!

It was arguably the worst astrophotography I had shot. To start off with it was taken as a JPEG. My XE-2 takes amazing JPEGs in the daytime so why should it be any different in the night? I learned that day there was a huge difference. What little I could do in post-production left me with an image that looked over processed, but I didn't care…it was MY shot and I was incredibly proud of it.

I wanted to share it with someone who might appreciate it so I naively emailed it to the editor of Sky News Magazine. I never received a reply and assumed that he probably was inundated with people just like me sharing their small victories.

Many weeks later I was relaxing in my recliner and absent-mindedly flipping through the latest issue of Sky News when I saw a photo that made me think, "I have a shot like that one". It was only when I read the cutline that I learned it was my shot!

That was it. I was hooked and there was no turning back.

Since that beautiful August night in 2015 I have spent many a satisfying hour sweating, swatting or freezing under our amazing universe and working to improve my ability to capture it with my camera.

I still have much to learn and I am having a great time while learning it.

Editor's Note: If you wish to read more from Tim you can find him at www.timkip.com or reach him at tim@timkip.com

Observer's Group – *Larry Scott*

The Observer's Group for February 25th was cancelled due to weather conditions. I was second guessing myself that evening as a large clear area passed over Saskatoon, but then it snowed and I felt better about my decision.

Well I finally got out to Sleaford for a few hours of stargazing on a decent evening. Looked at M78 and some Herschel objects in Ursa Major as well as some favourites here and there. Despite clouding over around midnight and the skies being average till then, it was great to get out after almost three months without observing. There was some naked eye and binocular observing of the moon and Venus these last few weeks as well.

I'm sure our next dark-sky period, March 16th to 30th, will give us some good opportunities to observe. Temperatures are beginning to improve and there's enough daylight to get out to Sleaford before sunset. The annual Messier Marathon will be held at Sleaford on March 25th. (Or March 24th depending on weather conditions.) Preparation is vital to your marathon's success so if you've got any questions let me know at larry.scott@sasktel.net.

I will be unavailable for the April 22 Observer's Group at Sleaford and would appreciate a stand-in to open up and host, thank you.

Observing Clubs and Certificates

Join the Club! Observe all 110 Messier, 110 Finest NGC, 400 Herschel I or II, 140 Lunar, 154 Sky Gems or 35 Binocular objects, or Explore the Universe and earn great OBSERVING CERTIFICATES!

MESSIER CLUB
Certified at 110 Objects:
R. Huziak, G. Sarty, S. Alexander, S. Ferguson, D. Chatfield, T. Tuomi, L. Scott, G. Charpentier, B. Johnson, L. Dickson, B. Burlingham, Norma Jensen

Ron Waldron	108
Wade Selvig	75
Wayne Schlapkohl	43
Ellen Dickson	34
Graham Hartridge	9

Chatfield BINOCULAR CERTIFICATE
Certified at 35 to 40 Objects:
T. Tuomi, R. Huziak

Jim Goodridge	12

FINEST NGC CLUB
Certified at 110 Objects:
R. Huziak, G. Sarty, D. Chatfield, T. Tuomi

Larry Scott	110
Scott Alexander	97
Norma Jensen	83
Sandy Ferguson	23
George Charpentier	13

EXPLORE the UNIVERSE
Certified at 55 to 110 Objects:
T. Tuomi,

Wayne Schlapkohl	55
Jim Goodridge	35

Isabel Williamson Lunar Observing Certificate
Certified at 140 Objects:
T. Tuomi, N. Jensen

HERSCHEL 400 CLUB
Certified at 400 Objects:
R. Huziak, D. Chatfield, T. Tuomi

Gordon Sarty	251
Scott Alexander	117
Larry Scott	45
Sandy Ferguson	18

HERSCHEL 400-II CLUB

Darrell Chatfield	400
Tenho Tuomi	378
Rick Huziak	246

LEVY DEEP-SKY GEMS
Certified at 154 Objects:

Tenho Tuomi	150
Darrell Chatfield	70

The Messier, Finest NGC and David Levy's Deep-Sky Gems lists can be found in the *Observer's Handbook*.
The Explore the Universe list is available on the National website.
On-line Messier and Finest NGC lists, charts and logbooks: **http://www.rasc.ca/observing**
On-line Herschel 400 List: **http://www.astroloeague.org/al/obsclubs/herschel/hers400.html**
Binocular List is at: **https://www.usask.ca/rasc/Chatfield_Binocular_List.pdf**
"Isabel Williamson Lunar Observing Program Guide:
http://www.rasc.ca/sites/default/files/IWLOP2015.pdf
Program details can be found at: **http://www.rasc.ca/williamson/index.shtm**