

Saskatoon Skies

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

Volume 52, Number 02

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Royal Astronomical Society of Canada
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INSTAGRAM: [@RASCYXE](#)

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

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MEMBERSHIP? JOIN TODAY!

Regular: \$96.00 /year

Youth: \$52.00 /year

Family: \$90.50 + \$41/additional adult + \$21.10/additional youth

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>.

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)
- borrow the Centre's 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>
- use of the Centre library
- SkyNews Magazine (bimonthly)

SASKATOON CENTRE'S MAIN OFFICERS:

President – Ron Waldron

Vice-President – Mike Dolan

Secretary – Rick Huziak

Treasurer – Norma Jensen (until Jan. 2021)/Donna-Lee May (Jan. 2021 onward)

National Council Rep – Les Dickson

Canadian Tire money - Darrell Chatfield

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

NEWSLETTER INFO

Newsletter Editor – Colin Chatfield

Copy & Collate – Les & Ellen Dickson

Labels & Temps – Mark de Jong

Web Posting – Gord Sarty

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 colcha@gmail.com in MS Word or text format. Images (new or old): any format, less than 30MB, sent by e-mail as attached files. Send any articles of interest to the night sky or astronomy. **Deadline for submission of all articles for an upcoming issue is the first Friday of each month!**

Saskatoon Skies is also posted on our Saskatoon Centre homepage as a .pdf file and can be downloaded free-of-charge. Members may choose to receive the newsletter by regular mail or via the Internet. Articles may be reprinted from Saskatoon Skies without expressed permission (unless otherwise indicated), provided that proper source credit is given. Saskatoon Skies accepts commercial advertising. Please email the editor at colcha@gmail.com for rates. Members can advertise non-commercial items for free.



Mercury taken by Gord Sarty on January 23, 2021

U OF S OBSERVATORY

The U of S Observatory is open to the general public every Saturday of the year. Admission is free. The observatory is located on campus, one block north of the Wiggins Avenue and College Drive entrance. On clear nights, visitors may look through the vintage 6-inch and tour several displays. Current events are recorded on the Astronomy Information Line at 306-966-6429.

Observatory Hours.

January – February	7:00 – 9:30 pm
March	8:00 – 10:30 pm
April – August	9:15 – 11:45 pm
September	8:30 – 11:00 pm
October – December	7:00 – 9:30 pm

Temporarily Closed. Check the website for updates!

Website - <https://artsandscience.usask.ca/physics/facilities/observatory.php>

Facebook - <https://www.facebook.com/usaskobservatory/>



Aurora taken in July 2020 by Tara Magee

RASC CALENDAR OF EVENTS & MEETING INFO

Feb 22	RASC General Meeting - 7:00pm (info below)	Ron Waldron
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Observer's group viewing starts at dusk at the Sleaford Observatory dark site. Get there early and set up for a great night of observing! Members and their guests only.

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

February RASC General Meeting

for all members and guests

Join us on February 22, 2020 at 8:00PM (Executive meeting at 7:00pm)
Webinar (info below)

7:00pm - **RASC Executive Meeting** (Members may attend the executive meeting as observers if they wish)

Speaker: Jim Gorkoff - "Introduction to Centre Bylaws"

A Zoom registration link and phone-in numbers will be emailed to Members.

After that, the procedure to register and join the meeting is the same as for the webinar (explained below).

8:00pm - **Main Program**

NOTE: links to register to attend the webinar will be emailed out as well so we know who is planning to attend. After registering, an email invitation will be sent with a link to join via computer or a number to phone in. When joining via computer, participants will have to first download and install the Zoom app, if they have not done so already.

Speakers:

- **Rick Huziak - The RASC's 2021 Night Sky Almanac - A Book Report**
- **Tim Yaworski - National Astrophotography Certificate Program**

SPEAKERS FOR MEETINGS

Rick Huziak

I have been bothering everyone to volunteer to fill Zoom meeting speaker spots and have had pretty good response, though I still need main speakers for May and June. But looking at the line-up and past talks, most take the form of imaging and astrophotography topics. These are certainly very interesting and offer spectacular images, but, as soon as the February meeting, it would be great to see a diverse range of topics that will also interest those who are just starting out in astronomy and who may be visual observers with limited knowledge and equipment.

Each month I wouldn't mind having a short 5 to 10-minute talk preceding the main speaker. Topics could cover beginning or basic astronomy: what's in the sky, current events in the news, basic concepts, explanation of a section in the *Observer's Handbook* or similar topics that would appeal to the entire scope of interests in the group. If you have an idea, please volunteer to give a short talk at an on-line meeting. Send me an e-mail at rickhuziak@shaw.ca.

PAST HISTORY OF SASKATCHEWAN ASTRONOMY

Rick Huziak

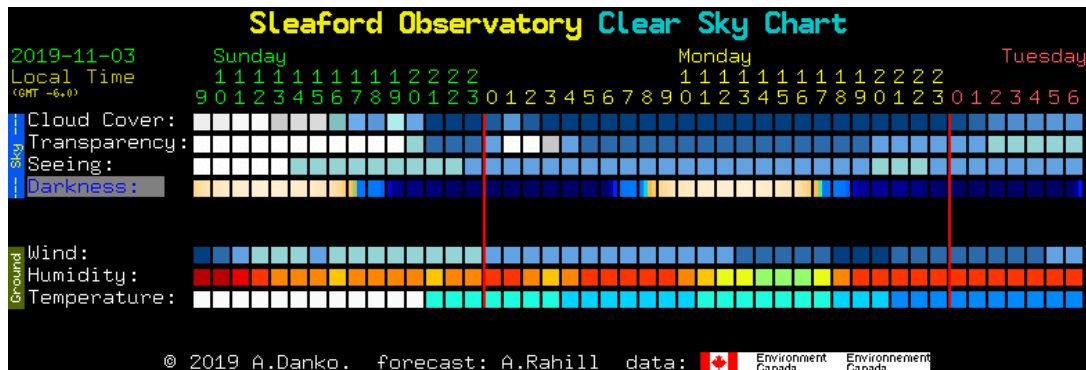
While researching a UFO story from 1956 (Science Channel's *The Unexplained Files*) that referenced the 1956 Perseid meteor shower as a possible explanation for the sightings, I chanced on a JRAC article that talked about how strong that shower was. The article can be found by with Bibliographic Code: 1957JRASC..51..161M. The shower turned out to be fairly impressive, but even more impressive is the reference to what astronomical societies existed in Saskatchewan at the time. The dominant society was the Regina Astronomical Society, and at the same time, there existed the Saskatoon Astronomical Society, the Kindersley Astronomical Society, the Moose Jaw Astronomical Society, and the Indian Head Astronomical Society. By other means, I know that the Eastend Astronomical Society also existed at the time. Other than the Regina, Saskatoon and Eastend clubs, I had not previously heard of the others, but they may well be described either in *Looking Up: A History of the Royal Astronomical Society of Canada* by R. Peter Broughton (1994) or *100 Years of Astronomy in Regina* by Ross H. Parker (2015). Since I have both of these books, I'll have to look, but it is likely that with the conversion of the Saskatoon Astronomy Society to the Saskatoon RASC Centre in 1969 and the Regina Astronomical Society to the Regina RASC Centre in the 1980s, easier modern communication likely caused the outlying Societies to be absorbed, the lone survivor being the Eastend society, that has now been reconstituted as the Eastend Astronomy Club. I guess I'm going to have to read my books to know the truth!

CLEAR SKY AND WEATHER INFO

To find clear skies, visit the Clear Dark Sky website -

<https://www.cleardarksky.com/csk/>

Once there, one can enter your location to find clear skies. The chart will appear as follows:



Environment Canada provides weather information for astronomy -

www.weather.gc.ca/astro



Saskatchewan Light Abatement Committee -

<http://myotherlife.net/slpac/>



www.darksky.org



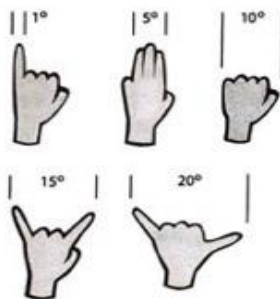
Photo taken in 2013 when Tenho Tuomi, Larry Scott, and Norma Jensen were out observing at Lucky Lake. For the full story, see the article by Norma in the February 2013 newsletter here http://www.usask.ca/rasc/Newsletters/SS_1302.pdf

FEBRUARY NIGHT SKY EVENTS AND INFO

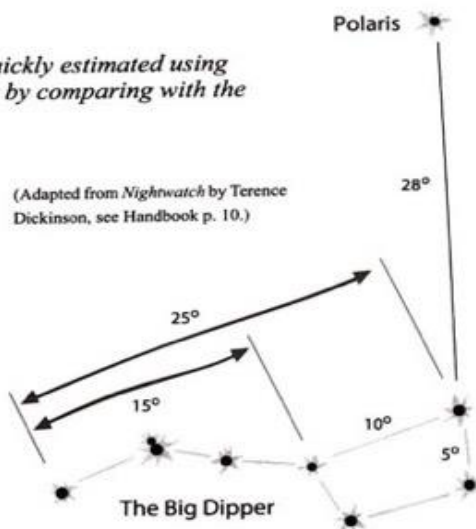
Images on the next few pages taken with permission from the 2020 Observer's Handbook. It can be obtained by joining the RASC here <http://rasc.ca/join> or ordered from <https://secure.rasc.ca/Portal/Shop/RASC/Store/StoreMain.aspx?Category=CURRPUB>

HANDY SKY MEASURES

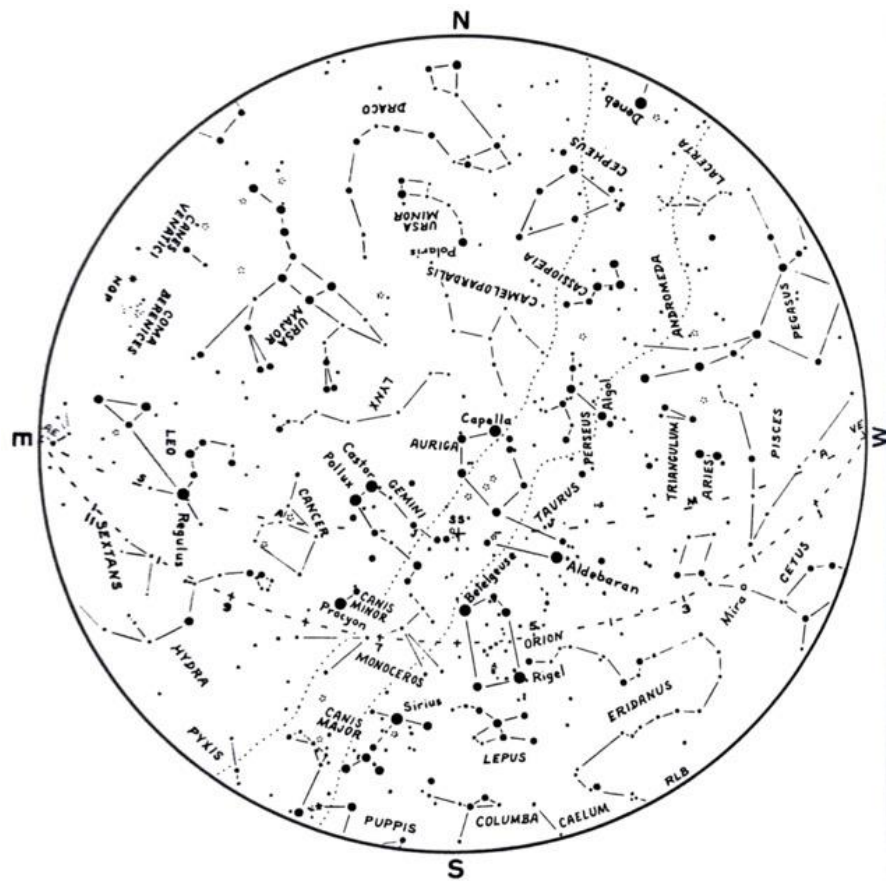
Angular measure in the sky can be quickly estimated using the fingers of an outstretched arm, or by comparing with the star separations in the Big Dipper.





















(Adapted from *Nightwatch* by Terence Dickinson, see Handbook p. 10.)



RASC OBSERVER'S HANDBOOK 2020



Moon with Jupiter and Saturn taken by Gord Sarty in December 2020

Time (UT)			FEBRUARY EVENTS		Jupiter's Satellites	
d	h	m			West	East
Mon.	1	13 09	Algol at minimum		1.0	III
Tue.	2				2.0	
Wed.	3	19	Moon at perigee (370 116 km)		3.0	IV
Thu.	4	9 58	Algol at minimum		4.0	
		17 37	Last quarter		5.0	II
Fri.	5				6.0	
Sat.	6	5	Venus 0.4° S of Saturn		7.0	I
Sun.	7	6 47	Algol at minimum		8.0	
Mon.	8		Mercury at greatest heliocentric lat. N		9.0	
		14	Mercury in inferior conjunction		10.0	
Tue.	9	20	Pallas in conjunction with the Sun		11.0	
Wed.	10	3 36	Algol at minimum		12.0	
		11	Saturn 3° N of Moon		13.0	
		20	Venus 3° N of Moon		14.0	
Thu.	11	12	Venus 0.4° S of Jupiter		15.0	
		19 05	New Moon (lunation 1214)		16.0	
Fri.	12				17.0	
Sat.	13	0 25	Algol at minimum		18.0	
Sun.	14				19.0	
Mon.	15	21 14	Algol at minimum		20.0	
Tue.	16				21.0	
Wed.	17	16	Uranus 3° N of Moon		22.0	
Thu.	18	10	Moon at apogee (404 467 km)		23.0	
		18 03	Algol at minimum		24.0	
		23	Mars 4° N of Moon		25.0	
Fri.	19	18 47	First quarter		26.0	
Sat.	20		Venus at aphelion		27.0	
		13	Mercury stationary		28.0	
Sun.	21	14 52	Algol at minimum		29.0	
Mon.	22	8	Moon 0.4° N of M35		30.0	
Tue.	23				31.0	
Wed.	24	11 41	Algol at minimum			
Thu.	25					
Fri.	26					
Sat.	27	8 17	Full Moon			
		8 30	Algol at minimum			
Sun.	28					

MINUTES OF JANUARY MEETINGS

Rick Huziak

Minutes of the Executive Meeting of the RASC Saskatoon Centre

January 18, 2021 - 7:00 p.m. Online (via ZOOM)

Secretary: Richard Huziak

Attending (on-line): Ron Waldron, Mike Dolan, Donna-Lee May, Richard Huziak, Les Dickson, Ellen Dickson, Darrell Chatfield, Ike Thiessen, Daryl Janzen, Colin Chatfield, Grant Ursaki, Brent Burlingham, Tim Yaworksi, Mark de Jong, Yannis Pahatouroglou.

1. Call to order – Ron Waldron. 7:03 PM

2. Old business:

2.1 Submission of Annual Report to National – Rick Huziak – ready to submit Annual Report this week. (Need to gather a few images.)

2.2 Ron Waldron announcement: Centre Bylaws to be updated by Jim Gorkoff at the February Executive meeting.

3. New business:

3.1 Treasurer's Preliminary Report – Donna Lee May

- \$1100.00 sent to Les Dickson for Resort at Cypress Hills booking for SSSP 2023. Les has sent this out.
- \$82.32 for newsletter/postage has been reimbursed to Les Dickson.
- account books & Centre documents have been picked up from Norma and given to Donna-Lee. Jim Gorkoff has transferred the GL and other information to Donna-Lee.
- Ron Waldron is checking (via RASC ticket) if the 2020 Financial Statement was sent to the National Office.
- Donna-Lee is checking if Jim Gorkoff has sent the balance sheet to Sask. Justice Corporate Branch.

3.2 Update on publication and mailing costs of our newsletter – to potentially reduce costs, Les Dickson is checking if those who get printed copies still want them.

3.3 Budgets: Donna-Lee suggests that committees or activities like newsletter production get budgets that can be annually reported. **Motion:** Donna-Lee: “Les Dickson to have a budget of \$400 for the year for newsletter production.” **Seconded:** – Mike Dolan. **Motion:** Donna-Lee (after discussion): “Amend budget to \$500 annually.” **Seconded:** Mike Dolan. **Vote: CARRIED.**

- Discussion ensued on how newsletters are mailed out.

3.4 Les Dickson questions if publishing of 2019-2020 **Annual Financial Statement** in the newsletter should be done. Donna-Lee notes the statement is reviewed by the executive Committee and suggests not to publish the financial statement due to possible fraud and other reasons. Members can request copies if they wish. **Committee agrees not to publish statements going forward.**

3.5 16” Telescope: Ron Waldron requests Yannis Pahatouroglou, Rick Huziak & Daryl Janzen create a plan and timeline for repair and refurbishing of the 16-inch telescope from Sleaford. This may be restricted by COVID-19 at a U of S workspace. Rick will write a plan. Daryl will check with Physics for workspace and if the machine shop is available. Ron suggests that Donna-Lee provide a budget for the Telescope Repair Project. Rick will provide a budget request as part of the work plan.

3.6 Daryl Janzen: **Sleaford Maintenance budget** needed (administered by Darrell Chatfield & Les Dickson) for yearly Joint Committee expenses and site maintenance costs. The amount will be determined in the near future.

4.0 Call to adjourn 7:54 P.M. Moved: Ron W. Adjourned.

**Minutes of the General Meeting of the RASC Saskatoon Centre
January 18, 2021 - 8:00 p.m. Online (via ZOOM)
Secretary: Richard Huziak**

26 members attending at the beginning of the meeting.

1. Call to order. – Ron Waldron 8:00 pm

2. Adoption of December General Meeting minutes as published in the December 2020 newsletter. **Moved:** Tim Yaworski. **Seconded:** Les Dickson. **CARRIED.**

3. Treasurer's Preliminary Statement – Donna-Lee May – no report.

4. Ron Waldron welcomes new member **Laureen Sumner.**

5. Highlights of the Executive Meeting summarized – Ron Waldron

- Jim Gorkoff will present bylaws at the Feb. Executive meeting
- Donna-Lee will do budgets for committees and work tasks
- 16" telescope will get a plan to be upgraded

6. Speaker: Murray Paulson, Edmonton Centre – *Mars 2020 – The Great Mars Apparition:*

7. Q&A Discussion ensued for 25 minutes.

8. Adjournment: Moved: Ron Waldron. **Adjourned at 9:25 p.m.**

BOOKS FOR SALE

All books are in either new, or like new condition. Retail price in brackets. Please email at novachat@sasktel.net or text/call 306-222-0515 if you want a particular book to make arrangements. All books being sold by Darrell Chatfield.

.....**"Deep-Sky Observers Handbook"** Volume 1-5 Enslow-Lutterworth \$40.00

.....**"International Encyclopedia of Astronomy"** 1987 Patrick Moore Color \$10.00

.....**"Backyard Astronomers Guide"** T. Dickinson & Alan Dyer 2008 Color \$25.00

.....**"Atlas of Deep Sky Splendors"** 1978 H. Verhenberg (50.00) B & W \$22.00

.....**"Amateur Astronomers Catalog of 500 Deep Sky Objects"** Vol 1 1980 B & W
R. Morales \$15.00

.....**"Observing the Constellations"** 1989 J. Sanford Color charts \$10.00

EQUIPMENT FOR SALE

1. Meade AR 5 achromatic refractor. It is the version you can collimate and has a GSO focuser. This is a good traditional visual scope. Surely somebody could use it! \$100 OBO.
2. Meade SN 8 Schmidt Newtonian. Has been flocked, has a primary mirror clips removed, has a GSO focuser and focusing motor. Would need collimation as I never got around to it. \$100 OBO
3. Bushnell binoculars 15x70. Need a tripod - not practical for handheld use. \$50 OBO

Email nigel.west@usask.ca for any of the above

4.5-inch Meade Model 4550 f/8 Reflecting Telescope on Equatorial Mount – Good condition with two quality eyepieces (9mm and 25mm) and a 2X Barlow lens. This telescope has a 910 mm focal length. A great starter scope. \$300 obo.

Contact Dwayne at dwayne2013@sasktel.net



ONLINE ASTRONOMY TEACHING DURING COVID

Ron Waldron

As many of you know, in my retirement from 36 years as an educator, I run a small business called [Living Skies Stargazing](#). When Covid-19 broke in March of 2020 and schools closed, I had \$7000 worth of bookings cancelled within a month. This included evening Star Talks and Telescope Viewing at Brightwater Environmental Centre, a month at the U of S showcasing the STARLAB planetarium and two back-to-back cruises in Norway in October showcasing the northern lights to tourists.

Rather than wine and complain (I truly know how to do that), I spent the two summer months, reinventing my business plan. I developed four brand new PowerPoint programs designed to be presented online using Zoom technology. When schools re-opened in the fall and I found myself and any other guests locked out once again, I waited three months to see if that situation would change. It did not, so at the end of November with the help of key educators in the Saskatoon Public School System, I launched my new program titled Online Star Talks and Virtual Planetarium Tours.

Here is what went out to teachers:

Online Star Talk and Virtual Planetarium Tours in the safety and comfort of your classroom

Attention classroom teacher(s):



I am a “retired” elementary teacher with over 36 years’ experience in the classroom. My specializing was science, but my passion was always astronomy. I know that Covid-19 has made access to many regular activities this year more challenging for teachers and I think I can help. I have developed four digital astronomy presentations by grade level suitable for zoom technology and suitable for the projection screen in your classroom. Each of the four programs includes a Starlab-like tour of the current night sky using the same

planetarium and simulation software found in STARLAB. Time for students’ questions follow the presentation and a related grade level activity will be e-mailed to the classroom teacher following the presentation.

At your invitation and via Zoom meeting software, I can present any one of the four topics to your students in the comfort and safety of your classroom. You need only invite me with your Zoom link and provide a semi-dark classroom and projection screen.

The sun, moon and stars (grades K–2)

This digital presentation introduces your young people to the sun, moon, and important constellations visible in the current night sky. 30 min + questions.

The sun's family of planets (grades 3-5)

This digital presentation introduces students to the wonders of our solar system including the sun and its family of planets. 40 min + questions.

Our place in the universe (grades 6-8)

This digital presentation helps students learn the answer to where our earth is in the vastness of the universe. 40 min + questions.

The possibility of life in the universe (9-12)

This digital presentation explores the possibility that there may be life elsewhere in the universe. Students learn the basics of what created life on earth and learn if those conditions exist in other worlds. 40 min + questions.

Within a day, I had 10 bookings from teachers and then it snowballed! During December alone, I gave over 30 presentations and in January, over 40. It is so gratifying to be able to do this in a way that is almost as effective as being there in person. I have to admit, my favorite part of each program is the students asking me questions at the end. You never know what might be coming and you can only hope that you have your best answer somewhere in your back pocket.

*The best news, however, is that my small business appears to be better because of Covid-19. I now can offer these programs anywhere and have already given presentations to a school in Assiniboia and Grand Coulee, Saskatchewan. I now find myself working on more online topics/programs designed specifically for teachers and students at specified grade levels. In development are two more – **Amazing Aurora** and **Meteors, Asteroids, and the Death of the Dinosaurs**.*

I know that I am luckier than most small businesses during these unprecedented times, so I count my blessings every day.



CANADIAN ASTRONOMY EQUIPMENT VENDORS

Rick Huziak

A few months ago, a discussion on the RASCList asked what astronomy vendors might exist across Canada and everyone's suggestions ended up with a brainstorm list. I've spent some time compiling more information on these vendors. The list is most likely incomplete, but it is a start. Companies are arranged by province and information is formatted as shown in the first entry.

Company Name

Location & Province

Website

Address

Proprietor

Phone Contact

E-mail Contact

Accessories or Services

All-star Telescope

Didsbury, AB

<https://www.all-startelescope.com/>

Ken From

1-866-310-8844

info@all-startelescope.com

Telescopes & accessories

Fervent Astronomy

Edmonton, AB

<https://ferventastronomy.com/>

1-587-557-1052

info@ferventastronomy.com

Mounts & trackers

Imaging Starlight

Carstairs, AB

<https://www.imagingstarlight.ca/>

George Cavanaugh

1-403-612-1553

sales@imagingstarlight.com

Small imagers, filters, accessories

Brandon Optics

Burnaby, BC

<https://www.brandonoptics.com/>

1-604-998-7071

Telescopes & accessories

Antares Telescope/Sky Instruments

Richmond, BC

<http://www.vectorwarrior.com/antares/index.htm>

Glen Speers

1-604-270-2813

skyinstruments@hotmail.com

Telescopes, eyepieces, accessories, ATM parts

Quarky Science

Victoria, BC

quarky@quarkyscience.com

8550 East Saanich Rd, V8L 1H1

Bruce

1-250-544-2038

Telescopes, accessories & science products

Markarian Fine Optics

Vancouver, BC
<https://markarianfineoptics.ca/>
1481 Kingsway, V5N 2R6
Harout
1-778-657-5330
info@markarianfineoptics.ca
Telescopes & accessories

KW Telescope

Kitchener, ON
<https://kwtelescope.com/>
25 Manitou Dr, N2C 1K9
1-877-345-5757
Telescopes & accessories

Ontario Telescope and Accessories, Inc.

Caledon, ON
<https://www.ontariotelescope.com/>
sales@ontariotelescope.com
1-905-487-6363
Telescopes & accessories

Focus Scientific

Nepean, ON
<https://focusscientific.com/>
1891 Merivale Rd Unit 4, K2G 1E5
1-613-723-1350
Telescopes, imagers, accessories

Khan Scope Centre

North York, ON
<https://khanscope.com/>
3243 Dufferin Street
Ray Khan
1-800-580-7160
info@khanscope.com
Telescopes & accessories

Sky Observing

Scarborough, ON
<http://skyobserving.ca>
4158 Kingston Rd #7, M1E 2M4
1-647-575-2824
Telescopes & accessories

Kendrick Astro Instruments

Toronto, ON
<https://www.kendrickastro.com/>
104-2775 Dundas St. West
1-800-393-5456
info@kendrickastro.com
Dew shields, heaters, solar filters

Astronomy Plus

Longueuil, QC
<https://astronomyplus.com/>
373 Rue de Gentilly O, J4H 1Z8
1-888-540-0444
Telescopes & accessories

La Maison de l'Astronomie

Montreal, QC
<https://maisonastronomie.ca/>
8074 St Hubert St, H2R 2P3
1-514-279-0063
maison.astro@bellnet.ca
Telescopes & accessories

Optiques Fullum

Vaudreuil-Dorion, QC
<https://www.optiquesfullum.com/>
1111 Route Harwood #6, J7V 8P2
Norm Fullum
1-514-967-1909
info@optiquesfullum.com
Custom optics, telescopes, aluminizing

JANUARY COMET PICTURES

Tenho Tuomi



88P/Howell



141P/Machholz



29P



C/2019 L3



156P/Russell-LINEAR



11P/Tempel-Swift-LINEAR



398P/Boattini



C/2020 M3 (ATLAS)

Since the skies were clear at the beginning of January, I photographed all eight comets that were in the sky. They are in the picture above in order from west to east.

141P is the brightest comet of this month. C/2019 L3 will be brightest next December. The rest are comets from last year and are fading. I had photographed 88P before in 2010.

According to the Sky and Telescope comet forecast no presently known comet will be naked eye brightness until December. We had the same pessimistic forecast a year ago but still ended up with a bright comet. As the Comet Chasing website says, “But always remember, comets are like cats. They both have tails and do what they want, and not always what we expect. This is one of the things that makes comet chasing interesting!”

OBSERVING CERTIFICATES AND CLUBS

RASC OBSERVING PROGRAMS AND CERTIFICATES

The RASC offers four observing certificates for **members** who observe all objects in each of the following observing lists in this chapter:

THE MESSIER CATALOGUE (p. 314)

THE FINEST NGC OBJECTS (p. 318),

THE DEEP-SKY CHALLENGE OBJECTS (p. 322),

DEEP-SKY GEMS (p. 324).

See www.rasc.ca/certificate-programs for details and contact the RASC Observing Committee Chair at rasc.ca/contact/observing for further information.



The RASC also offers the **Explore the Universe Certificate** for novice observers (who do not have to be RASC members), the **Explore the Moon Certificate** for beginning members, and the **Isabel Williamson Lunar Observing Certificate** for intermediate to advanced members. In addition, **Astroimaging certificates** are available for those members with a photographic bent. See www.rasc.ca/astro-imaging-certificate

RASC OBSERVER'S HANDBOOK 2020

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,
Donna-Lee May*

Ron Waldron	108
Marcel Müller-Goldkuhle	94
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
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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

EXPLORE THE MOON CERTIFICATE

T. Yaworski

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 here <http://www.rasc.ca/explore-universe>

On-line Messier and Finest NGC lists, charts and logbooks:

<http://www.rasc.ca/observing>

On-line Herschel 400 List:

<http://www.astroleague.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>