

Saskatoon Skies

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

Volume 55, Number 07

July/August 2024



Royal Astronomical Society of Canada
Saskatoon Centre Incorporated
Box 31086, RPO Broadway
Saskatoon, SK S7H 5S8

WEBSITE: <https://saskatoon.rasc.ca/>

E-MAIL: sk_centre@rasc.ca

FACEBOOK: [RASC Saskatoon Centre](#)

INSTAGRAM: [@RASCYXE](#)

To view *Saskatoon Skies* digitally, see our website:

<https://saskatoon.rasc.ca/newsletters.html>

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MEMBERSHIP? JOIN TODAY!

Regular: \$111.00 /year

Youth: \$61.10 /year

Family: \$105.50 + \$42.90/additional adult + \$22.20/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://saskatoon.rasc.ca/telescopes.html>
- use of the Centre library
- SkyNews Magazine (bimonthly)

SASKATOON CENTRE'S MAIN OFFICERS:

President – Brent Burlingham

Vice-President – John Takala

Secretary – Lorie Tedford

Treasurer – *vacant* (**Les Dickson interim**)

National Council Rep – Joelle Sheard-Patrick

Canadian Tire money - Darrell Chatfield

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

NEWSLETTER INFO

Newsletter Editor – Colin Chatfield

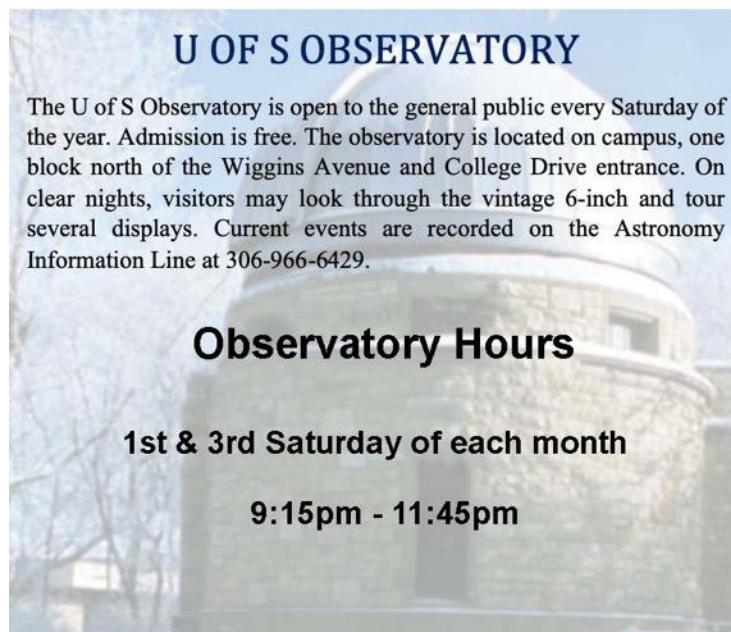
Copy & Collate – Les & Ellen Dickson

Labels & Temps – Mark de Jong

Web Posting/Content Editor – Tenho Tuomi/Andrew Kostiuk/Brent Burlingham

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.



Hours subject to change, so check below for more info -

Website - <https://artsandscience.usask.ca/physics/facilities/observatory.php>
Facebook - <https://www.facebook.com/usaskobservatory/>

RASC CALENDAR OF EVENTS & MEETING INFO

Aug 7-11	Saskatchewan Summer Star Party	Cypress Hills
Sept 8	Observer's Group	Brent Burlingham
Sept 16	RASC Saskatoon Centre General Meeting	Brent Burlingham

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: <https://saskatoon.rasc.ca/activities.html>

September RASC General Meeting for all members and guests

Join us on September 16th, 2024 at 8:00PM (Executive meeting at 7:00pm)
Webinar (info below)

***Please note:** the meeting will be at the U of S Observatory at 108 Wiggins Ave (on the U of S Campus)*

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

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).

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.

8:15pm - **Main Program -**
“What’s Up This Month?” – Colin Chatfield

“Imaging Group update” - Jeff Swick

BOOKS AND EQUIPMENT 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

NOTE: “I will be advertising the astronomy equipment and accessories from the Melby Estate in the next few newsletters. I will also bring a selection of eyepieces, etc. to the next few meetings for your perusal. Some items were never used. All monies go to the Estate. Thank you.” Darrell Chatfield

FOR SALE FROM THE MELBY ESTATE - A PARTIAL LISTING

Please email me if you want to see any other set - novachat@sasktel.net. Darrell Chatfield

- **2 - 1.25” rack and pinion focusers** for refractor type telescopes. Brand new. Never used. Inset diameter is 57mm. Heavy duty type with metal knurled knobs. All have boxes. \$20.00 each.

- **Original Celestron orange tube C5” scope** with tangent arm. Fork arms. SCOPE ONLY. No tripod or wedge. 5 x 30 finder, 1.25” visual back, diagonal, eyepiece, lens cap, metal case. Was used as a spotter scope. Not a mark on the tube. Clean looking. \$250.00

- **Original orange tube C14” scope**. Comes with fork arms, base, wedge, lens cap, 2” visual back, huge 2” diagonal, 5 x 70 finder, swing through locking tripod; 40, 25, 12, and 6mm Kellner eyepieces, 2” – 32mm. Konig eyepiece, 2x barlow, tele extender, hand toggle controller box for slow motion controls, counterweights and 2 rails, power cord, fitted carrying case. All in like new condition. Great looking scope. Hardly used! \$3000.00

2	T mount adapters for Miranda cameras	\$5.00 each
3	1.25” diagonals 2 new in boxes	\$15.00 each
1	2” – 32mm Erfle eyepiece new in box	\$85.00

1	2" – 60mm Kelner eyepiece	new in box	\$85.00
1	1.25" Celestron volcano top eyepiece	in box	\$15.00
1	1.25" Celestron volcano top eyepiece	in box	\$15.00
1	1.25" eyepiece extender - 3" long		\$20.00
1	5x24mm Celestron orange tube finder	new in box	\$20.00
1	1.25" Celestron off axis guider c/w 12.5mm ep.	Can be illuminated. New.	\$45.00
1	Celestron 4x 1.25" eyepiece turret	new in box	\$65.00
1	Celestron 1.25" reticle.	Can be illuminated	\$20.00
1	3.5" long 1.25" tele-extender		\$20.00
3	1.25" visual backs	new	\$10.00 each
1	1.25" to 0.965' visual back		\$10.00
1	Camera to visual back adapter	Lightly used	\$10.00
1	Threaded visual back to 16mm male threads camera adapter		\$10.00

SLEAFORD UPDATE

Darrell Chatfield - Sleaford Site Coordinator

I thought I would write a small article about the grass cutting we did at Sleaford on July 6/24. I was able to assemble a small crew of willing and able volunteers to help with this somewhat large task. I first met Lori Tedford out there around 5 pm. We got the new battery put in the riding mower and got it fired up which we were glad to see. Then I had her start out with my weed trimmer since she has had experience in that area. I started cutting grass on the east side of our warm-up shelter and moved onto the larger areas.

The mower worked well but It takes a bit of getting used to with all the various controls, etc. But it sure cuts a lot of grass in a shorter amount of time as opposed to a walk behind. Around 6pm Larry Scott and Norma Jensen got out to the site. They first did a bit of nature viewing before Larry got behind the self-propelled and cut all the grass in the sloping ditch behind and to the East of our shelter. It took us about 3 hrs to do what we had to do, but the site looked a lot better after that. Later on, Joelle Sheard Patrick and Brent Burlingham arrived to do some viewing. The skies got better around 12:15am, but I had left around 11:30pm. Lisa came out around midnight to observe also.

Anyways, I wanted to thank Lori and Larry for helping out in such a big way to keep our site neat and trimmed up.

As an aside note, if anyone uses the site, make sure that you PULL on the longer left gate before driving in. The gates have been set up to work that way with the wheels, rather than PUSHING them in.

Well thanks for now. More site news in the next newsletter.



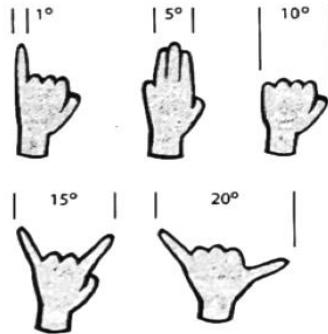
Earthshine Moon, with Jupiter below, and the Pleiades at top left. Taken by Colin Chatfield.

AUGUST NIGHT SKY EVENTS AND INFO

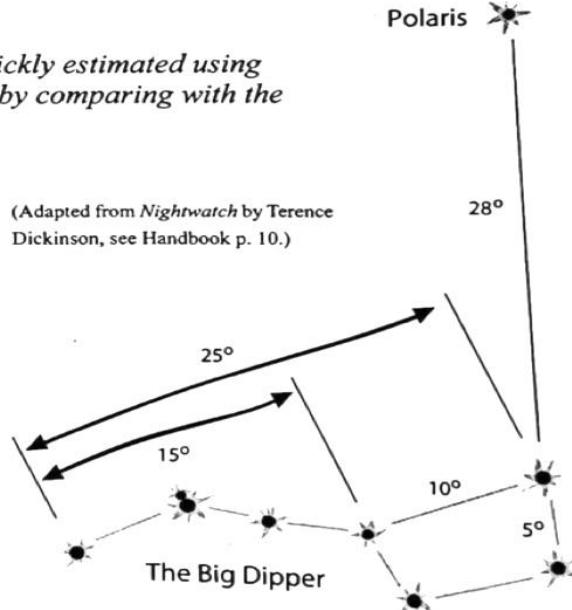
Images on the next few pages taken, with permission, from the 2024 Observer's Handbook. It can be obtained by joining the RASC here <http://rasc.ca/join> or ordered from <https://secure.rasc.ca/store/product/observer-s-handbook-2024>

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.

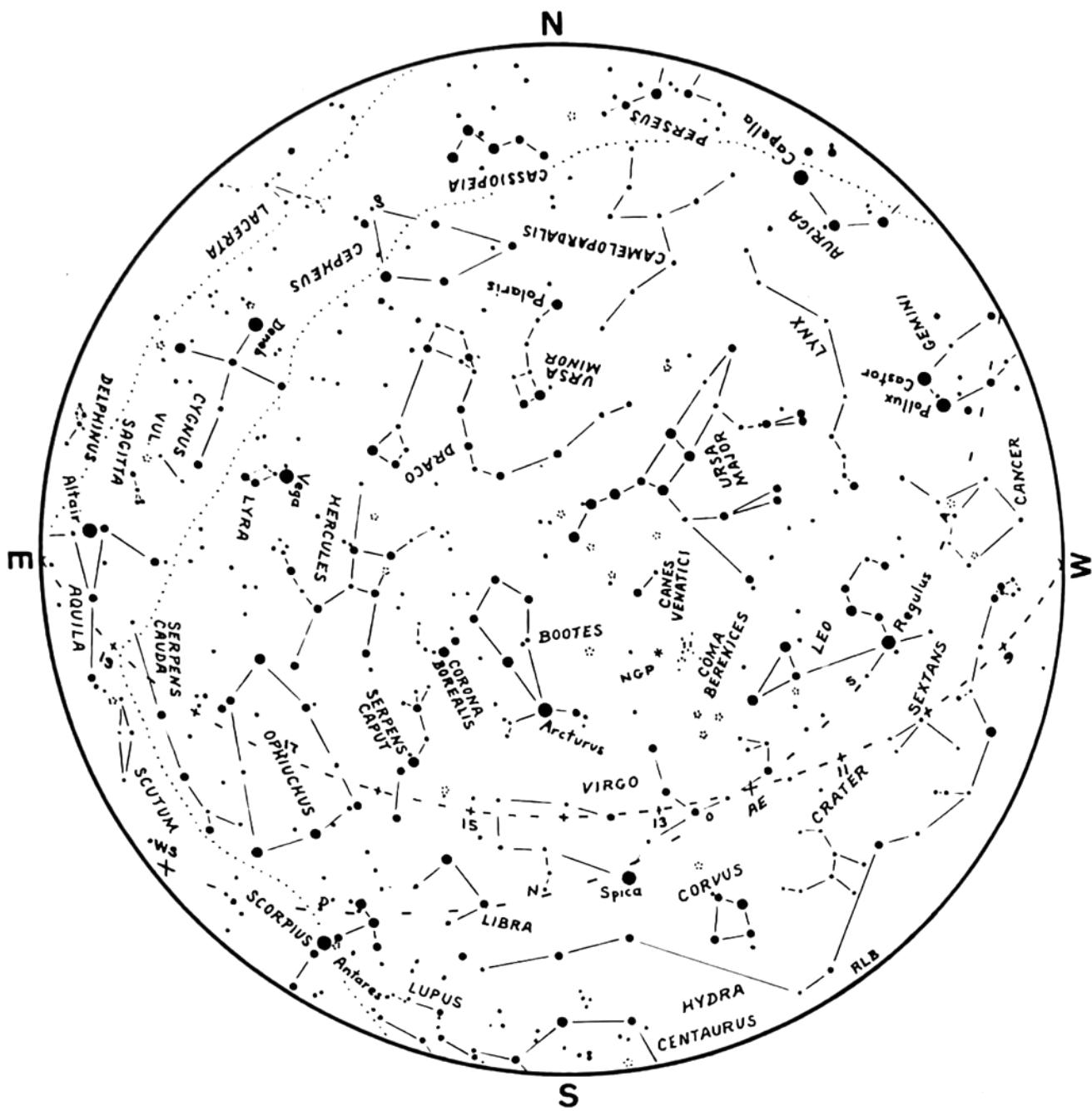


(Adapted from *Nightwatch* by Terence Dickinson, see Handbook p. 10.)



AUGUST EVENTS				Jupiter's Satellites
	Time (UT)	d h m		West East
Thu.	1	23 22	Double Shadows on Jupiter	
Fri.	2		Pollux 1.8° N of Moon	
Sat.	3	0	Algol at minimum	
		8 31	Double Shadows on Jupiter	
		17 50	Double Shadows and Transits on Jupiter	
Sun.	4	19 54	Mercury stationary	
		8	new Moon (lunation 1257)	
		11 13	Venus 1.1° N of Regulus	
		22	Venus 1.7° S of Moon	
Mon.	5	22	Algol at minimum	
Tue.	6	5 20	Double Shadows on Jupiter	
Wed.	7	6 54		
Thu.	8		Moon at descending node	
Fri.	9	1 06	Moon at apogee (405 297 km)	
		2	Algol at minimum	
		2 08	Double Shadows on Jupiter	
		2 51	Spica 0.7° S of Moon, occultation†	
Sat.	10	10	Double Shadows on Jupiter	
		20 12		
Sun.	11	22 57	Algol at minimum	
Mon.	12	14	Perseid meteors peak	
		15 19	first quarter	
Tue.	13			
Wed.	14	5	Antares 0.004° N of Moon, occultation‡	
		9 31	Double Shadows on Jupiter	
		17	Mars 0.3° N of Jupiter	
		19 45	Algol at minimum	
Thu.	15			
Fri.	16		Mercury at greatest heliocentric lat. S	
Sat.	17	16 34	Algol at minimum	
		22 49	Double Shadows on Jupiter	
Sun.	18			
Mon.	19	2	Mercury in inferior conjunction	
		18 26	full Moon	
Tue.	20	9	Vesta in conjunction with the Sun	
		13 22	Algol at minimum	
Wed.	21	3	Saturn 0.5° S of Moon, occultation*	
		5	Moon at perigee (360 196 km)	
		12 08	Double Shadows on Jupiter	
		22	Neptune 0.7° S of Moon, occultation§	
Thu.	22	10 27	Moon at ascending node	
Fri.	23	10 11	Algol at minimum	
Sat.	24			
Sun.	25	1 26	Double Shadows on Jupiter	
Mon.	26	0	Uranus 4° S of Moon	
		4	Moon in Pleiades (M45)	
		7 00	Algol at minimum	
		8	Ceres stationary	
		9 26	last quarter	
Tue.	27	13	Jupiter 6° S of Moon	
Wed.	28	0	Mars 5° S of Moon	
		3	Mercury stationary	
Thu.	29	3 48	Algol at minimum	
Fri.	30	5	Pollux 1.7° N of Moon	
Sat.	31			

†Parts of E Europe, W half of Russia, most of Asia, N Indonesia, S Japan, W Micronesia.



REIMBURSEMENT FOR CENTRE EXPENSES

The Centre has a reimbursement procedure on submission of expense claims. A writeable pdf claim form can be found on the Centre webpage under the Executive tab. The expense form **must** be submitted *along with original receipts* to the Treasurer within 30 days of the transaction. All expenditures must be preapproved by the Executive or be within allocated budgets.

Please contact the Treasurer with any inquiries.

PRAIRIE LAKE PARK

Tenho Tuomi - pictures by Velma

After the thunderstorm on Friday, Velma and I drove to Prairie Lake Park on Lake Diefenbaker where we had been invited to bring our telescopes and show stars. The sky was clear that night but the forest fire smoke was so thick we could hardly see across the lake from the hilltop where we set the telescopes.



Sunset in the smoke. The Park is very hilly.



It was windy so I set my three telescopes in the shade of my camper, a 50mm, 80mm, and 12 inch.



We looked at the Moon until it got dark. However the smoke was so thick that the only objects I could find and show were stars;

Arcturus (in Bootes), Vega (in Lyra), Epsilon Lyrae double stars, Alcor & Mizar double stars in the Big Dipper, Albireo different color double stars in Cygnus. I did find the M13 Hercules star cluster.

From 2002 to 2016 I used to go regularly with other astronomers to parks in Saskatchewan to show the sky. This is the first time I have gone alone. I enjoyed it but felt too old for this.

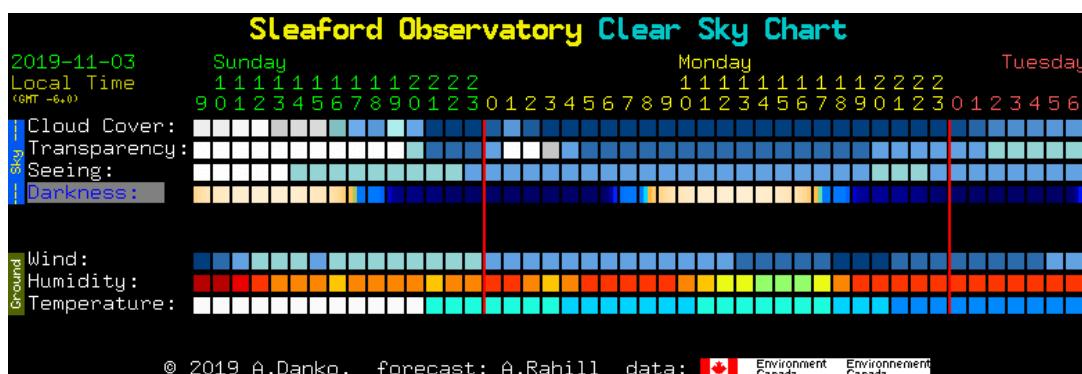


CLEAR SKY AND WEATHER INFO

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 Pollution Abatement Committee -

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



www.darksky.org

PRESIDENT'S MESSAGE

Brent Burlingham

I wanted to provide an update on the work of the dome committee, which we created to evaluate the possibility of moving the SkyShed Pod Max dome from the roof of the Physics Building on campus to our dark site at Sleaford. This was a very attractive opportunity, as the dome was being offered at no cost and would provide a permanent installation location for our Meade 16" telescope currently in storage.

The committee (consisting of Yannis Pahatouroglou, Darrell Chatfield, Colin Chatfield, Jeff Swick and myself) discussed the dome at our last executive meeting on June 17th. Darrell provided some preliminary cost estimates on a cement pad, and we estimated crane and transportation costs. The pad was estimated at \$8,000, and the crane and transport to Sleaford at \$2,000. In addition to these costs, the effort involved in deconstructing the dome and re-assembling at Sleaford would be substantial.

Each member of the committee expressed the opinion that this wasn't a project our club, in its present state, would be capable of completing. The costs involved would be more than our financial situation could bear. Although we might be able to cover the costs involved, it would deplete our financial reserves, at a time when our membership numbers are dropping. Everyone agreed that the idea was great, but the reality was we simply can't afford it at the present time.

I think it would be wiser for the club to concentrate on outreach activities and utilization of our members' skills to drive new membership. With an expanded membership and increased use of our Sleaford facility, we might be able to consider this project at some point in the future.

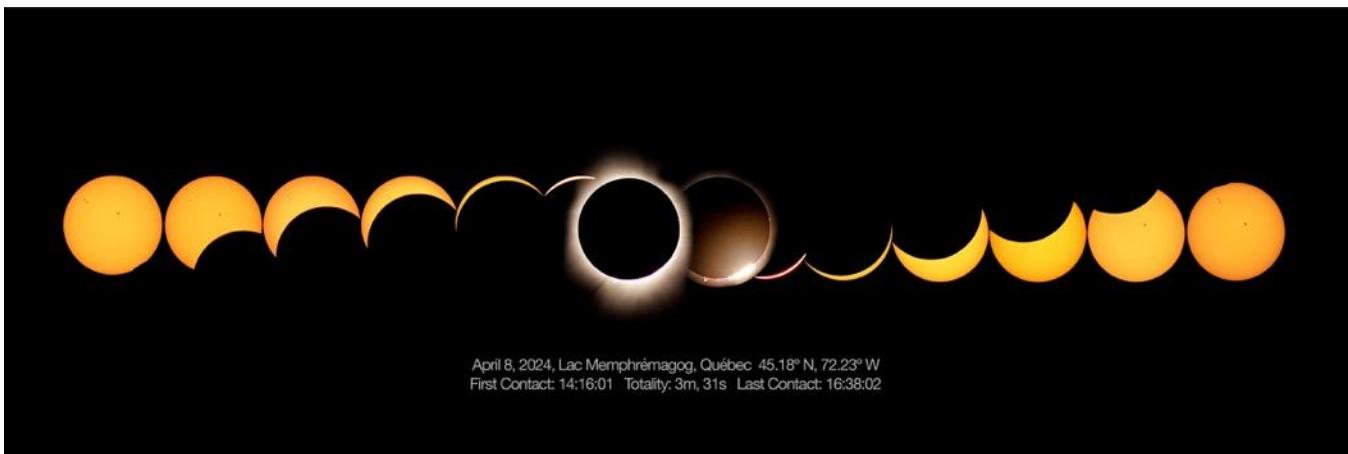
I'd like to thank the members of the committee for their participation and advice. Although we won't be moving ahead with this project at this time, I am encouraged by the quality and level of engagement the current executive is experiencing.

See you at SSSP!





April 8, 2024 solar eclipse captured on the shore of Lac Memphrémagog in the rural eastern townships of Quebec. Images taken at 5 minute intervals with Fujifilm X-T5 camera and 16-80mm lens. Totality lasted 3min 31sec at this location. By Tim Yaworski.



A compilation of the progression of the April 8, 2024 solar eclipse. Photographed with the SeeStar S50 smart telescope by Tim Yaworski.

MINUTES OF JUNE MEETINGS

Lorie Tedford

Minutes of the Monthly Executive Meeting of the RASC Saskatoon Centre Monday, June 17, 2024 - 7:00pm. Hybrid: Online & In person: U of S Observatory

Attending: Brent Burlingham, Lorie Tedford, Les Dickson, Yannis Pahatourogloou, Joelle Sheard-Patrick, Colin Chatfield, John Takala, Darrell Chatfield

- 1. Call to order** 7:00 pm – Brent Burlingham (President and Chair)
- 2. Approval of the Executive meeting minutes for May 2024** as printed in the June newsletter. Moved by Darrell Chatfield, seconded by Les Dickson; carried.
- 3. Call for additional announcements/items to add to the agenda.**
 - Addition of financial report in Section 5
 - Addition of bylaws update in Section 5
- 4. Announcements from the Chair** – Brent Burlingham
 - No announcements presented.

5. Old Business - Reports from the Executive Council

5.1 President's Report – Brent Burlingham.

- Discussed meeting with Ted Toporowski to evaluate the SkyShed Pod Max that is being offered to the RASC Saskatoon Centre by Daryl Janzen. Reports and opinions in 5.6 of those who attended the meeting.
- Three telescopes and binoculars with Orion Paragon Plus mount was donated to the club by Olivia Lowery, widow of Gordon Lowery. Ike presented a list and planned usage of all donated items. A thank you letter was sent to Olivia.

5.2 Acting Treasurer – Les Dickson.

- Discussed the financial report as of this year. Need to have more sources of income other than the Star Party.
- SkyShed Pod Max project would need an extensive evaluation of costs and funding options.
- The decision to not file a financial report to ICS, has caused potential issues with the non-profit registry. Les was going to get a second opinion from an accountant before moving forward.

5.3 National Council Rep – Joelle Sheard-Patrick

- Discussed the possibility of increasing membership fees. Each centre is to decide to also increase membership to obtain the same revenue from each membership.

5.4 Activities Coordinator – Joelle Sheard-Patrick

- Cameras from SGI being donated to the club for use.

5.5 Bylaws Committee – Les Dickson

- An update was sent out via email to the Executive for feedback.

5.6 SSSP 2024 Update – Les Dickson

- Early registration and banquet ticket sales end July 6.

5.7 Sleaford Update – Darrell Chatfield

- The user's manual and website updated, the manual is now for member access only.
- A new battery for the riding mower was purchased.
- The RM should of made the first cut of grass for the year, only need to maintain it for the summer.

6. New Business

1. Sleaford – Site Maintenance

- Larry Scott offered to purchase the snowblower at Sleaford for him and those trained by him to use.

2. Ike Thiessen – Olivia Lowery Donation Report

- Discussed adding the scopes to the rental program and the possibility of making them available for schools to use.

3. Dome Evaluation Reports Summary

- A detailed evaluation of how to proceed with relocated the dome, setting up the dome at Sleaford and security will need to be created.
- Appetite of the club members of potential use of the dome and telescope will influence the decision to proceed.
- The project will take a significant amount of time.
- An evaluation of finances and costs to determine if accepting the dome is feasible.

4. Discontinuation of Printed Newsletter

- Motion to discontinue printing newsletters made by Les Dickson, seconded by Joelle Patrick-Sheard. Carried

5. Library Update – Darrell Chatfield

- Continuing culling books.

7. Motion to adjourn by Les Dickson; carried. 8:10 PM.

**Minutes of the Monthly General Meeting of the RASC Saskatoon Centre
Monday, June 17, 2024 - 7:00pm. Hybrid: Online & In person: U of S Observatory**

Minutes taken and prepared by Lorie Tedford.

- 1. Sharing/Networking Time** - 8:00-8:15 pm – all members.
- 2. Call to Order** – 8:24 pm – Brent Burlingham (President and Chair)
- 3. Call for additional announcements/items to add to the agenda.**
- 4. Call out to new members/guests:** Mike Marsh.
- 5. Adoption of the May General meeting minutes** as printed in the June newsletter.
Moved by Les Dickson, seconded by Darrell Chatfield, carried.
- 6. Executive Meeting Summary** – Brent Burlingham
 - Olivia Lowery, widow of Gordon Lowery donated three telescopes and binoculars to the club. A thank you letter was sent. Ike has the detailed list of items and potential uses for the rental program.
 - Discussed the meeting with Ted Toporowski and members of the club to evaluate the SkyShed Pod Max. Initial opinions from those present at the meeting and preliminary research that needs to be conducted was discussed.
 - The SkyShed Pod will need a detailed budget, time involved, the steps involved in moving the dome to Sleaford and initial setup, security of the dome and appetite from members of the club for usage of the dome as there will be no remote access to the telescope.
 - Early registration and banquet tickets end on July 6.
 - Printed newsletters are being discontinued. There is online access to all newsletters.
 - Discussed hiring an accountant to fix the financial report so that there is no further issues going forward and to have a proper report to file with ICS.
- 7. New Business** – no items brought forward to discuss.
- 8. Program**
 - 8.1 The Upcoming Sky presented by Colin Chatfield
 - 8.2 “Astronomical Holiday in the Atacama Desert” – John Takala, RASC Saskatoon Centre Vice-President, will share his experience exploring astronomical opportunities in the Atacama Desert in Chile.
- 9. Call to adjourn** – Moved by Les Dickson, seconded by John Takala; carried.

Imagine if people knocked on your door to talk about science instead of religion. "Hi, we'd just like a quick chat about the possibility of life in the atmosphere of Venus, and thought you might be interested in hearing about phosphine"?

Provided by Cam McClelland

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. 312)
THE FINEST NGC OBJECTS (p. 316),
THE DEEP-SKY CHALLENGE OBJECTS (p. 320),
DEEP-SKY GEMS (p. 322).

See 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** and the **Double Stars Observing Certificate** for intermediate to advanced members. In addition, **Astroimaging certificates** are available for those members with a photographic bent. See rasc.ca/astro-imaging-certificate

RASC OBSERVER'S HANDBOOK 2023 – STANDARD EDITION

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
Brent Gratias	104
Marcel Müller-Goldkuhle	94
Wade Selvig	75
Wayne Schlakohl	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
Brent Burlingham	97

EXPLORE THE UNIVERSE

Certified at 55 to 110

Objects: *T. Tuomi, B. Gratias*

Wayne Schlakohl	55
Jim Goodridge	35

**ISABEL WILLIAMSON
LUNAR OBSERVING
CERTIFICATE**
Certified at 140 Objects:

T. Tuomi, N. Jensen

**EXPLORE THE MOON
CERTIFICATE**

T. Yaworski

Brent Gratias	37
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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

Messier, Finest NGC, and David Levy's Deep-Sky lists in the *Observer's Handbook*.

The Explore the Universe list is available here <http://www.rasc.ca/explore-universe>
Messier and Finest NGC lists, charts and logbooks: <https://www.rasc.ca/certificate-programs>
Herschel 400 List: <http://www.astrologeague.org/al/obsclubs/herschel/hers400.html>
Chatfield Binocular List is at: https://saskatoon.rasc.ca/Chatfield_Binocular_List.pdf
“Isabel Williamson Lunar Observing Program Guide” program details can be found at:
<https://www.rasc.ca/isabel-williamson-lunar-observing-program>