

Saskatoon Skies

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

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

<https://saskatoon.rasc.ca/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://saskatoon.rasc.ca/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 – Donna-Lee May

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

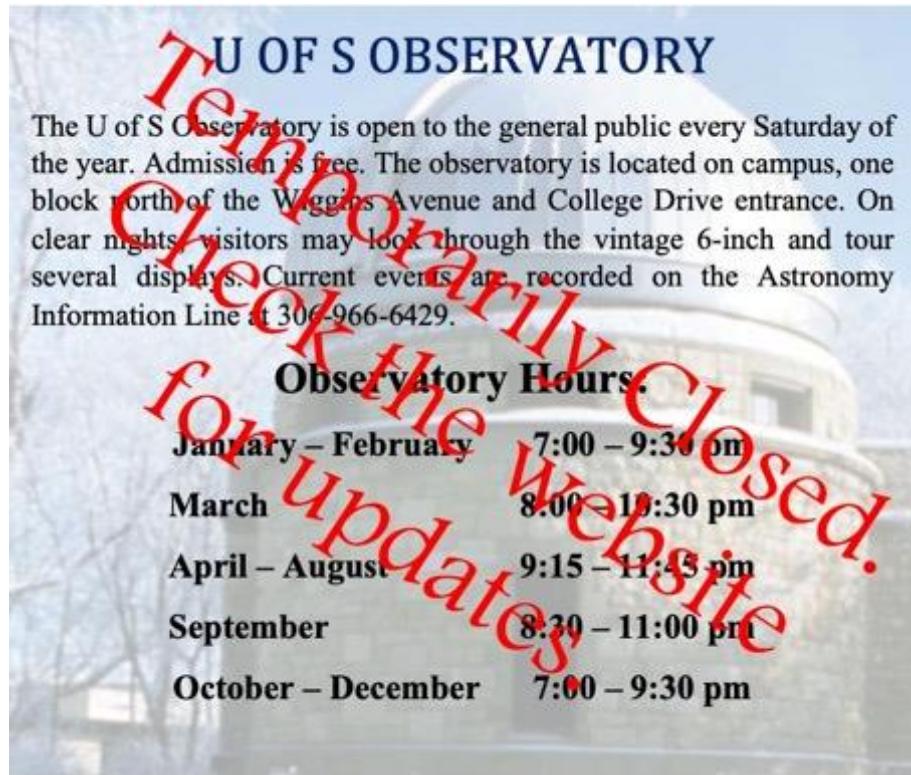
Web Posting – Gord Sarty

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.



This summer has featured several excellent Noctilucent Cloud (NLC) displays. Rick Huziak took this image 11:10 pm on June 27 from 29th Street in Saskatoon with a Galaxy S9 phone camera in night mode. NLCs are visible above the north horizon between May 22 and August 12 each year when the sun spends significant time between 6- and 16-degrees below the horizon. But whether or not they appear depends on many factors, such as how much meteoritic dust the earth sweeps up from space, and whether or not upper atmospheric conditions are correct so that the dust particles at the edge of space can get coated with ice, which allows them to be very reflective. Recent studies indicate that the clouds are a recent phenomenon for earth observers, correlating with increasing industrial methane emissions that allow water creation high in the atmosphere. The frequency of displays has also been steadily increasing over the last few decades.



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

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



Noctilucent clouds around 3 am on June 20, taken with a Nikon D700 camera and F/1.7 50mm lens, 1 second exposure at ISO 1600. Taken by Garry Stone

RASC CALENDAR OF EVENTS & MEETING INFO

August 4-9	Saskatchewan Summer Star Party	Cypress Hills
August 12	Perseid/Astronomy Outreach - Pike Lake	Tim Yaworski
August 14	Perseid/Astronomy Outreach - Blackstrap	Tim Yaworski
Sept 11	Observer's Group - Sleaford Observatory	Larry Scott
Sept 20	RASC General Meeting - 8:00pm (info below)	Ron Waldron

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 20th, 2021 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)

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 FOR MEETINGS

Rick Huziak

The Centre always needs speakers for meetings - plain and simple. Email rickhuziak@shaw.ca to volunteer to give a short or long talk. We want to hear about what you are doing! Thanks in advance.

MINUTES OF JUNE MEETINGS

Donna-Lee May

Minutes of the Executive Meeting - RASC Saskatoon Centre

June 21, 2021 - 7:00 pm

Online (ZOOM) - Recorded by Donna-Lee May

Attending: Ron Waldron, Mike Dolan, Donna-Lee May, Darrell Chatfield, Colin Chatfield, Tara Magee, Les Dickson, Grant Ursaki, Yannis Pahatouraglou, Tim Yaworski, Mark de Jong.

1. **Call to order** 7:02 pm– Ron Waldron.
2. **Approval of the Executive Minutes** as circulated. **Moved:** Mike Dolan. **Seconded:** Darrell Chatfield. **CARRIED.**
3. **Call for additional announcements/items** to add to agenda
- Donna-Lee will take minutes as Rick Huziak has a prior commitment.
4. **Committee Reports**
 - Ike Thiessen (Telescope Rentals) is requesting an assistant.
 - Mark deJong (Membership) is having trouble getting membership centre reports from National due to iMis replacement system rollout. Mike Dolan will look into.
5. **Old business**
 - **Website Server** changeover – Andrew Kostiuk discussed server changeover and content update. Andrew will talk to Regina RASC to see if we can use their template. Ron Waldron will follow up with Regina to find their webmaster contact.

- **16-inch Sleaford telescope update** – Yannis P. Correction to newsletter: telescope focusing mechanism was not rebuilt, but was cleaned and regreased. Main mirror and corrector plate was cleaned and glass chips removed. The optics were collimated. The scope will be set up at the Physics building machine shop for testing outdoors. **Question:** what will happen to scope afterward: will it be stored, further tested or used for optical or CCD work? If CCD, then more testing will be required.
 - Ron asked for Executive opinions as to leave it for optical or CCD. Decision was to leave it as optical at this time.
- **Future location and plans for the refurbished 16-inch telescope** – Rick Huziak (*read by Donna-Lee May*) is suggesting that the 16-inch telescope (and existing pier) be moved out of the U of S Roll-off and be adapted to the old Patterson Observatory pier and a roll-off observatory be planned and built, utilizing the old observatory footings in part. A power run is already in place if that structure were to be built.
 - Idea is tabled since we want to assure the telescope repair is complete.
- **Centre Bylaws** update & where do we go from here? - Ron Waldron. Jim Gorkoff was to drop off the Minute Book & did so. Bylaw discussion is tabled until after the summer, and will resume in the fall.

6. New business:

- **Treasurer's Report** – Donna-Lee May. Cheques sent:
 - \$438 to Trigon Int'l for payment of SSSP pin production.
 - \$200 to pin designer, payable to Dianne Lesko.
 - \$200 event fee to Cypress Hills Park for SSSP event fee.
- **Sleaford Observatory** - Dust suppressor is suggested to be applied on the grid road adjacent to the Sleaford Observatory due to increased traffic. The Joint Committee has agreed that costs (approx. \$700, based on previous pricing) could be shared. **MOTION:** Darrell Chatfield: "That the RASC split the cost evenly with the U. of S., approx. 350.00 each.". **SECONDED:** Ron Waldron. **CARRIED.**
- **Announcements:**
 - **Sleaford: Open House** – Saturday, October 2, 2021 – 7:30 PM
 - **Clean-up of the Sleaford Site** – Sunday, Sept. 26, 2021

- **Changing our status from not for profit to a charitable organization –**
Mike Dolan - Tabled to a future meeting.
- Request to do **Perseid/astronomy outreach programming at Pike Lake (Thurs, Aug. 12) & Blackstrap (Sat. Aug. 14) Provincial Parks**

Ron Waldron & Mike Dolan will do Pike Lake event. Tim Yaworski will call for volunteers to do the Backstrap event at the General meeting.

Ron Waldron spoke to Parks coordinator (Abby) and confirmed \$90 will be paid for each event, payable to the Centre.

7. **Call to adjourn.** 8:05 pm **Moved:** Ron Waldron. **Seconded:** Donna-Lee May. **CARRIED.**

Minutes of the General Meeting - RASC Saskatoon Centre

June 21, 2021 - 8:00 pm

Online (ZOOM) - Recorded by Donna-Lee May

18 members in attendance at beginning of meeting.

1. Sharing / Networking Time – all members
2. **Call to order.** 8:15 PM – Ron Waldron
3. **Call out to new members/guests.** None in attendance.
4. **Adoption of May General meeting minutes** as circulated.
Moved: Tim Yaworski. **Seconded:** Les Dickson. **CARRIED**
5. **Treasurer's Report** – Donna-Lee May
- same report as Executive meeting. See Executive minutes.
6. **Committee Reports**
 - **SSSP:** Les Dickson. Discussion on budget. SSSP will try to get speakers (Dr. Samantha Lawlor to be confirmed), two clinics: sketching & binocular star-walk. Provincial Covid regulation will be followed. Early Registration end July 5.
- Donna-Lee May stated that Covid coverage is a non-issue with insurance.

- **Outreach:** Tim Yaworski called for volunteers to help out at Blackstrap & Pike Lake provincial park events (see Executive minutes.) Abby (Parks) requires immediate confirmation. Rick Huziak, Donna-Lee May and Jim Goodridge volunteered for Blackstrap. (Ron & Mike will lead the Pike Lake event – see Executive minutes.) Colin Chatfield & Tara Magee will also help at one of the events.
 - **Club Certificate Program Coordinator:** Darrell Chatfield will remain standing with RASC National to be the certificate coordinator (after a query from National.)
7. **Congratulations** – Ron Waldron congratulated Richard Huziak being accepted as Canada's first and only nomination to honorary membership in the International Astronomical Union as an amateur representative.
8. **Highlights of the Executive Meeting** – Ron Waldron
 - working on the bylaws will resume in the fall
 - the Minute Book was received from Jim Gorkoff.
9. **Observing Coordinator:** Ron Waldron. Need a replacement for Larry Scott for Observing Coordinator. Also looking for two people to cut the lawn in August and September and to train these people.
10. **Program**
 - Colin Chatfield & Tara Magee - *The Upcoming Sky*
 - Ron Waldron – “*The Possibility of Life in the Universe*” . This digital presentation explores the possibility that there may be life elsewhere in the universe. Learn the basics of what created life on earth and if those conditions exist in other worlds.
11. End of Meeting discussion
12. **Adjournment:** 9:36 pm. **MOVED:** Ron Waldron. **SECONDED:** Colin Chatfield. **CARRIED.**

OBSERVERS GROUP COORDINATOR NEEDED

Larry Scott

The Saskatoon Centre of the RASC is seeking one or more volunteers to take over the Observers Group Coordinator/Yard Monkey position currently held by me (Larry Scott). This position has many perks - fresh air and exercise in beautiful surroundings; works in close proximity to many bird species, butterflies, racoons, deer and gophers; the appreciation of your fellow club members; free parking; and more! Below is a list of opportunities for energetic club members that need to be passed on or not as the club sees fit.

If possible I would continue doing this for years but I'm planning a move in a few years and simply won't be here. My hope is to give the club time to consider its options and that I can pass on some tips to whomever(?) comes next.

Observers Group Coordinator

- Set schedule for Observers Group based on dark skies(new moon) and not on a long weekend.
(Also Messier Marathon)
- Interpret weather reports to base a go/no go decision the day of Observers Group and notify club members.

Yard maintenance

- Mow grass or blow snow as required so yard is useful and combustibles near buildings are kept to a minimum.
- Care and feeding of snow blower and lawn mowers. ***Important***

Key Master

- Give tours of Sleaford to club members and hand out keys to the kingdom.

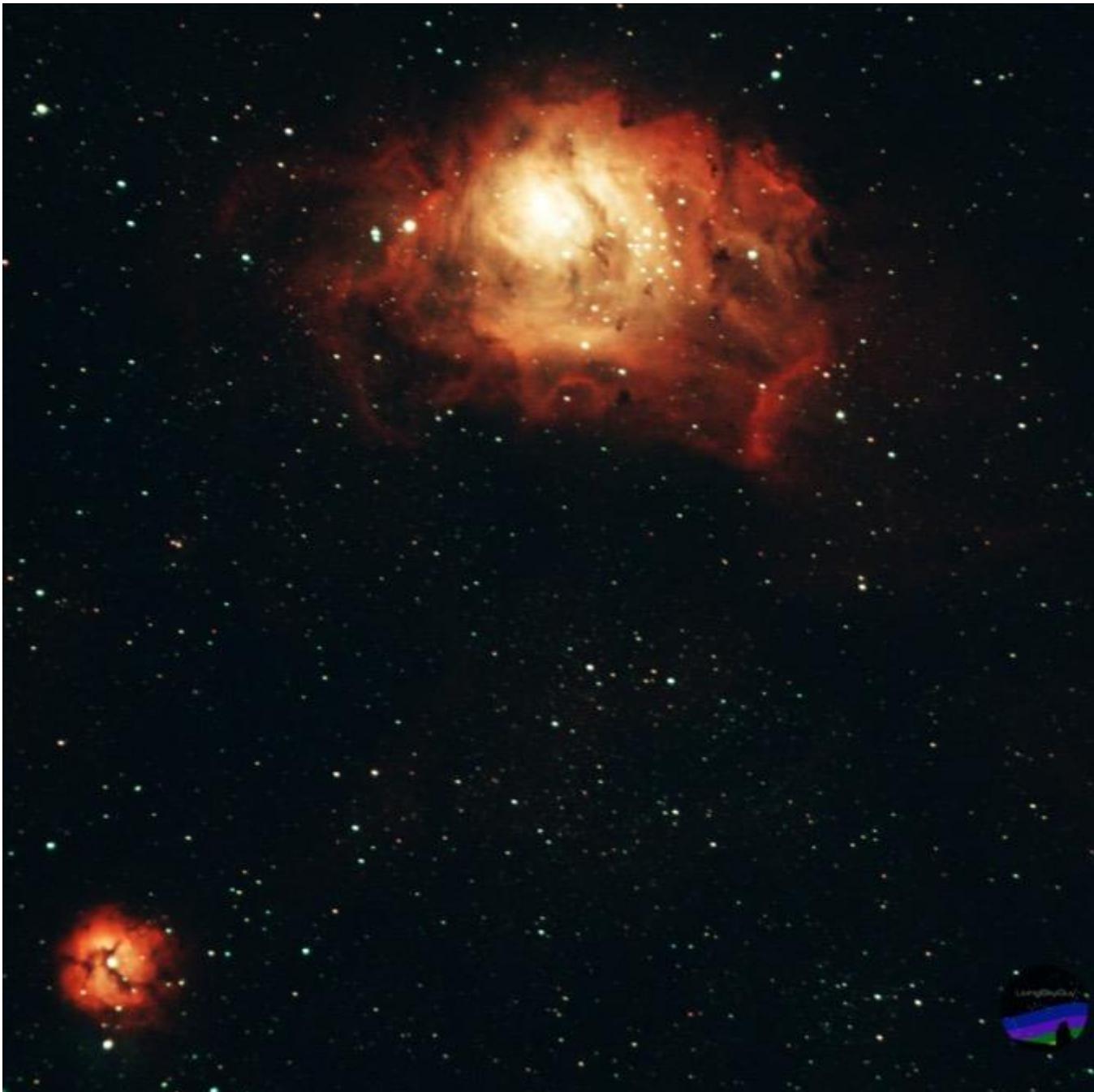
Sleaford Open House

- | | |
|----------------------|----------------------------|
| - Set a date | - Nag George for posters. |
| - Distribute posters | - Nag everyone to show up. |

Starting in 2006 I began hosting Observer's Group meetings and as the years went on I accumulated some other responsibilities as listed above. Not sure if everything will be picked up by the members but I am hoping someone will step up to host the Observers Group and assist with these other responsibilities. Cheers for now, hope to see some of you out at Sleaford before I'm gone.



Milky Way taken in 2019 by Tara Magee



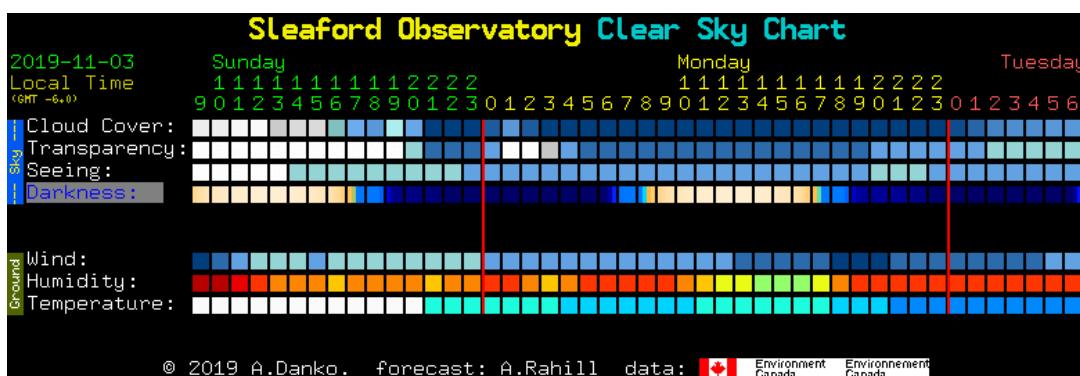
This preliminary capture of the Lagoon and Trifid Nebulas was Tim Yaworski's first target with his new one-shot colour CCD camera. The uncropped image was taken with a ZWO ASI533MC Pro camera mounted on a William Optics Zenithstar 61 refractor. The stack of four 300 second images were shot through the Optolong L-eXtreme dual band filter.

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



Milky Way over a favourite old house in June 2021 by Colin Chatfield

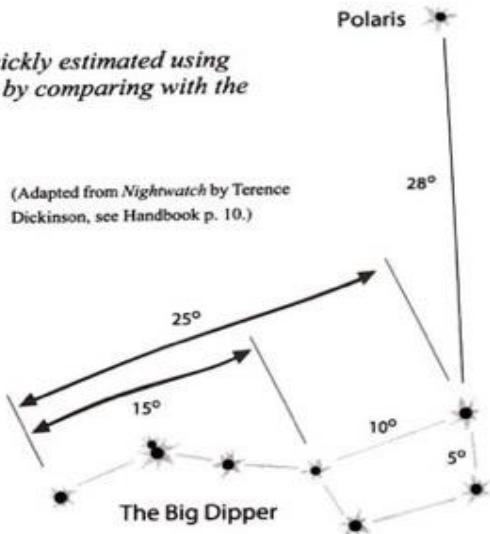
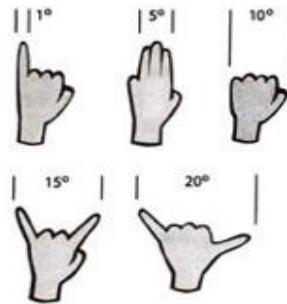
JULY & AUGUST NIGHT SKY EVENTS AND INFO

Images on the next few pages taken with permission from the 2021 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/StoreMain.aspx?Category=CURRPUB>

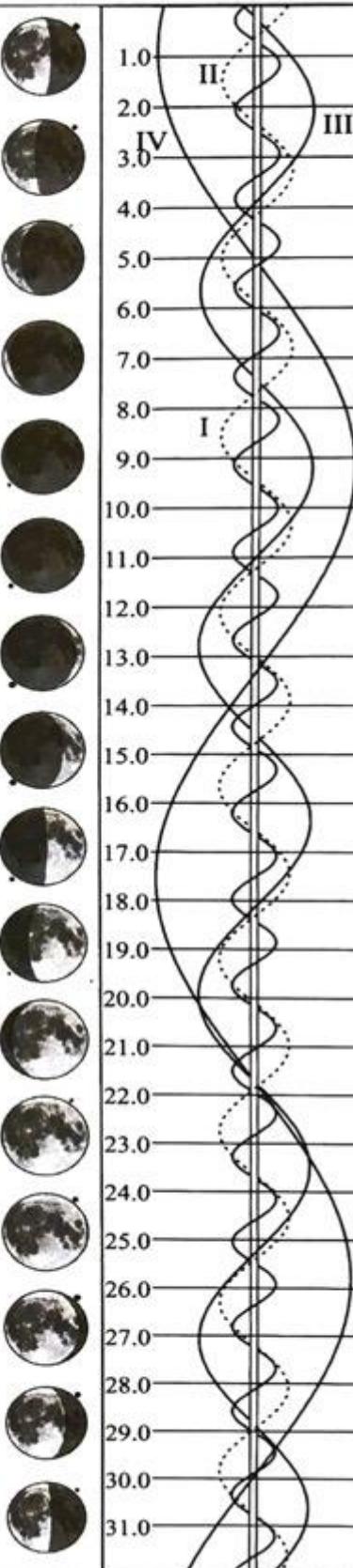
HANDY SKY MEASURES

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.)



Time (UT)				JULY EVENTS	Jupiter's Satellites	
	d	h	m		West	East
Thu.	1	21	10	Last quarter		
Fri.	2					
Sat.	3	12	26	Algol at minimum		
Sun.	4			Venus at greatest heliocentric lat. N		
		15		Uranus 2° N of Moon		
		20		Mercury greatest elongation W (22°)		
Mon.	5	15		Moon at apogee (405 341 km)		
		22		Earth at aphelion (152 100 527 km)		
Tue.	6	9	15	Algol at minimum		
Wed.	7					
Thu.	8	5		Mercury 4° S of Moon		
Fri.	9	6	04	Algol at minimum		
Sat.	10	1	16	New Moon (lunation 1219)		
Sun.	11					
Mon.	12	2	53	Algol at minimum		
		9		Venus 3° S of Moon		
		10		Mars 4° S of Moon		
Tue.	13		7	Mars at aphelion		
Wed.	14	23	42	Venus 0.5° N of Mars		
Thu.	15			Algol at minimum		
Fri.	16					
Sat.	17	10	10	First quarter		
		20	31	Algol at minimum		
		23		Pluto at opposition		
Sun.	18	20		Pallas stationary		
Mon.	19			Mercury at ascending node		
Tue.	20	17	20	Algol at minimum		
Wed.	21	10		Moon at perigee (364 520 km)		
		19		Venus 1.2° N of Regulus		
Thu.	22					
Fri.	23	14	09	Algol at minimum		
Sat.	24			Mercury at perihelion		
		2	37	Full Moon		
		17		Saturn 4° N of Moon		
Sun.	25					
Mon.	26	1		Jupiter 4° N of Moon		
		10	58	Algol at minimum		
Tue.	27					
Wed.	28					
Thu.	29	5		S. δ-Aquariid meteors peak		
		7	47	Algol at minimum		
		16		Mars 0.7° N of Regulus		
Fri.	30					
Sat.	31	13	16	Last quarter		



Time (UT) d h m				AUGUST EVENTS	Jupiter's Satellites West East	
Sun.	1	0		Uranus 1.8° N of Moon		
		4 36		Algol at minimum		IV
		14		Mercury in superior conjunction		2.0
Mon.	2	6		Saturn at opposition		I
		8		Moon at apogee (404 410 km)		3.0
Tue.	3			Mercury at greatest heliocentric lat. N		4.0
Wed.	4	1 25		Algol at minimum		5.0
Thu.	5	4		Juno stationary		6.0
Fri.	6	22 14		Algol at minimum		7.0
Sat.	7					8.0
Sun.	8	13 50		New Moon (lunation 1220)		9.0
Mon.	9	1 30		Double shadow transit on Jupiter		10.0
		19 03		Algol at minimum		11.0
Tue.	10					12.0
Wed.	11	7		Venus 4° S of Moon		13.0
Thu.	12	15 52		Algol at minimum		14.0
		19		Perseid meteors peak		15.0
Fri.	13					16.0
Sat.	14					17.0
Sun.	15	12 41		Algol at minimum		18.0
		15 19		First quarter		19.0
		15 31		Triple transit event on Jupiter (p. 234)		20.0
Mon.	16					21.0
Tue.	17	9		Moon at perigee (369 124 km)		22.0
Wed.	18	9 30		Algol at minimum		23.0
Thu.	19	4		Mercury 0.1° S of Mars		24.0
Fri.	20	0		Jupiter at opposition		25.0
		4		Uranus stationary		26.0
		22		Saturn 4° N of Moon		27.0
Sat.	21	6 19		Algol at minimum		28.0
Sun.	22	5		Jupiter 4° N of Moon		29.0
		12 02		Full Moon		30.0
Mon.	23					31.0
Tue.	24	3 08		Algol at minimum		
Wed.	25					
Thu.	26			Mercury at descending node		
		23 57		Algol at minimum		
Fri.	27					
Sat.	28	9		Uranus 1.5° N of Moon		
Sun.	29			Venus at descending node		
		20 46		Algol at minimum		
Mon.	30	2		Moon at apogee (404 100 km)		
		7 13		Last quarter		
Tue.	31					



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

SSSP 2021 UPDATE

Les Dickson

I expected the June newsletter to be the last chance to update planning for the Saskatchewan Summer Star Party. However, since we now have a July newsletter, here is the final + one update.

COVID-19 Updates: The Saskatchewan Summer Star Party will be following whatever provincial guidelines are in place at the time of the event. Although we are all anticipating some changes, please do not assume anything. All registrants will be expected to comply with the guidelines in place during the event, with the thanks of the organizing committee.

Early Registration Deadline: Early registration is in effect until July 5. Registration fees increase on July 6. Register early and save a little! Registration fees are lower this year because of reduced programming.

Shirt Order Deadline: The deadline for ordering t-shirts, golf shirts and hoodies is July 17. Detailed information about all merchandise (patches, pins and apparel) can be found under "Other" in the drop-down menu on the website, and on the register/order form.

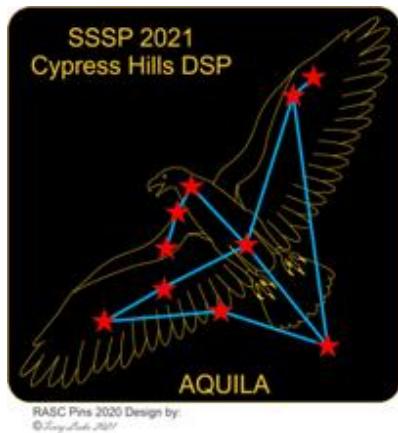
Programming: Because Covid restrictions are being slowly lifted, we are adding speakers and under-the-stars-clinics to our programming, all held outdoors this year at the Meadows Campground. Keep checking our website for updates over the next few days since we are still finalizing details! (We will not be having a barbecue, indoor talks, Straggler's potluck or other activities away the Meadows).

Astrophotography and Beyond! Contest: The Astrophotography and Beyond! Contest opens on July 5! The contest will be online only this year. There will be no physical display of the entries. Complete details and the link to the entry form are available on the website. There are more prizes this year! There will be a first and second prize for all judged categories and there will be a People's Choice Award for Star Party Art. *Early entry is strongly encouraged! Share your work with us!*

The Resort at Cypress Hills: For anything relating to accommodation, contact The Resort directly. For information about services (restaurant, bar, etc.) that will be offered during SSSP, check The Resort at Cypress Hills website or call them. The phone number is (306) 662-4477.

Camping: Check the homepage of the SSSP for the status of camping. We still have a few RV sites open in the Meadows and tent sites at the Dark-sky campground. If we do run out of sites, we have a camping waiting list!

For more information on the items above, visit our home page at <https://sssp.saskatoon.rasc.ca/>.





This was taken on April 16, 2021 by Tammy Vallee on her aunt's land 14 kms north of Sleaford. Saying goodbye to Orion. Aurora and the moon just after sunset with the glow of Saskatoon. Canon EOS 6D Mark II, F2.8, 8 sec, 1600 ISO, 14 mm Sigma

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

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-	94
Goldkuhle	
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

EXPLORE THE UNIVERSE

Certified at 55 to 110

Objects: *T. Tuomi,*

Wayne Schlakohl	55
Jim Goodridge	35

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

ISABEL WILLIAMSON

LUNAR OBSERVING CERTIFICATE

Certified at 140 Objects:

T. Tuomi, N. Jensen

EXPLORE THE MOON CERTIFICATE

T. Yaworski

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.astroligue.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.shtml>