

Saskatoon Skies

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

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Royal Astronomical Society of Canada
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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

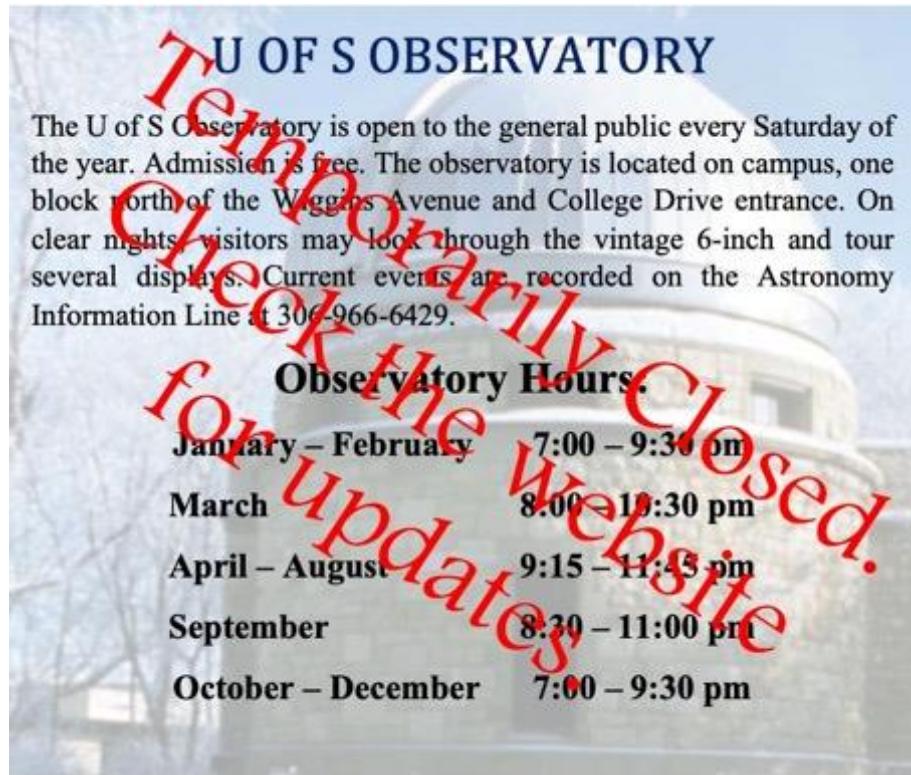
Web Posting – Gord Sarty

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.



Comet NEOWISE and aurora taken by Tara Magee



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

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



*Star trails by Tammy Vallee March 14, 2021 at the Big River Bible Camp.
Total of 587 for 1hr 40mins exposure time*

RASC CALENDAR OF EVENTS & MEETING INFO

April 10	Observer's Group - Sleaford Observatory	Larry Scott
April 19	RASC General Meeting - 7:00pm (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: <http://www.usask.ca/rasc/activities.html>

April RASC General Meeting for all members and guests

Join us on April 19, 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)

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:

Colin Chatfield & Tara Magee - “The Upcoming Sky”

Daryl Janzen - “Discovery of SN 2021gmj and other great stuff” - The robotic telescope at Sleaford made its first supernova discovery a few weeks ago. Daryl will give an update on what else this telescope is doing.

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.

SERVICE AWARDS

Rick Huziak

Congratulations Saskatoon Centre Service Award Winners!

We are very pleased to announce that four members of the Saskatoon Centre were awarded medals for their service to the Centre and to the National society. Brief citations were announced in the April 2021 *RASC National Bulletin*. The full citations as submitted are given below. I am sure everyone in the Centre appreciates the hard work and dedication that these members have contributed to the Centre over a very long time! Tune in to the April meeting for a virtual presentation!

Ronald (Ron) Waldron (Saskatoon Centre) for the Service Award

Ron has been a member of the Saskatoon Centre since 1970. At that time, he was working as a tour guide at the University of Saskatchewan Observatory. In 1985, Ron left the Centre to pursue a career in teaching and start a family then rejoined in 2002. Besides his enthusiasm in teaching as a science specialist, Ron also helped establish and coordinate the Saskatoon Public School Board's Space Club and Mars Colony program for 10 years. In 1981, he left teaching to intern as a planetarium operator, programmer and producer at the Manitoba Planetarium in Winnipeg, then returned to Saskatoon to run the school board's STARLAB inflatable planetarium program. This he did up to his retirement in 2012 having put stars in the eyes of countless students and trained over 250 teachers in its use. Even in retirement Ron continues to be invited into schools to present star shows inside the travelling planetarium.

Ron's continued to contribute to the astronomical education of young people (outside of professional time) through more than 200 evening star talks and telescope viewing presentations he offered to teachers and students attending school camps held at the Brightwater Eco-Centre south of Saskatoon. Ron was even consulted in the lighting design

of the million-dollar new generation building for the camp and was instrumental in equipping it with a high-quality telescope.

Ron has held the positions of President and Vice-president (currently, and in two past terms) and has always participated in the long-term planning and welfare of the Saskatoon Centre. In retirement, Ron flies to Manitoba where he acts as aurora tour guide at the Churchill Northern Studies Centre in Churchill, MB for fly-in visitors during aurora season. He continues this aurora tour-guiding role with the Road Scholar worldwide organization on Hurtigruten cruise ships off the coast of Norway.

We are proud to nominate Ron for this award for his exceptional service and commitment to our Centre, and to education in astronomy and space science in schools and to the public around the world.

Leslie (Les) Dickson (Saskatoon Centre) for the Service Award

Les has been a member of the Saskatoon Centre since 1997. Les's contribution to the Centre has been invaluable. Les was a founder of, and has served on, the Saskatchewan Summer Star Party Committee every year since its inception in 1997 has held the position of rotating chair for the committee several times. Les has also served as President of the Centre for three terms and is on our Board of Directors. He is also a founder and builder of the Sleaford Observatory, helping to find the site and participate in the physical building. Les is always present at Centre-sponsored public star-nights and events, almost never missing an opportunity to participate. At the inter-Centre level, Les has represented the Saskatoon Centre at Edmonton's Beaver Hills Dar-sky Preserve celebrations. Les has also been the Centre's National Council Representative for many years, attending at least a dozen General Assemblies on our behalf.

We are proud to nominate Les for this award for his exceptional service and commitment to our Centre.

Ellen Dickson (Saskatoon Centre) for the Service Award

Ellen has been active with the Saskatoon Centre since 1997 and became an associate member in 2013. Ellen's contribution to the Centre has been invaluable. Ellen was a founder of, and has served on, the Saskatchewan Summer Star Party Committee every year since its inception in 1997. Ellen is always present at Centre-sponsored public star-nights and events, almost never missing an opportunity to participate. At the inter-centre level, Ellen has represented the Saskatoon Centre at Edmonton's Beaver Hills Dark-sky Preserve

celebrations. Ellen has also attended at least a dozen General Assemblies as an ambassador for the Saskatoon Centre.

We are proud to nominate Ellen for this award for her exceptional service and commitment to our Centre.

Darrell Chatfield (Saskatoon Centre) for the Service Award

Darrell has been a member of the Saskatoon Centre since 1996. Darrell's contribution to the Centre has been invaluable. Darrell was a founder of, and has served on, the Saskatchewan Summer Star Party Committee every year since its inception in 1997. Darrell is always present at Centre-sponsored public star-nights and events, almost never missing an opportunity to participate. Darrell is also a founder and builder of the Sleaford Observatory and has provided yearly care, maintenance and planning for the observatory's upkeep. Darrell is also a fine observer, earning both the Herschel 400 and Herschel 400 II certificates from the Astronomical League, and the Messier and FNGC certificates from the RASC. Darrell has also tutored many new observers with his broad observational skills. Darrell has held the positions of Vice-president and Librarian at the Centre.

We are proud to nominate Darrell for this award for his exceptional service and commitment to our Centre.



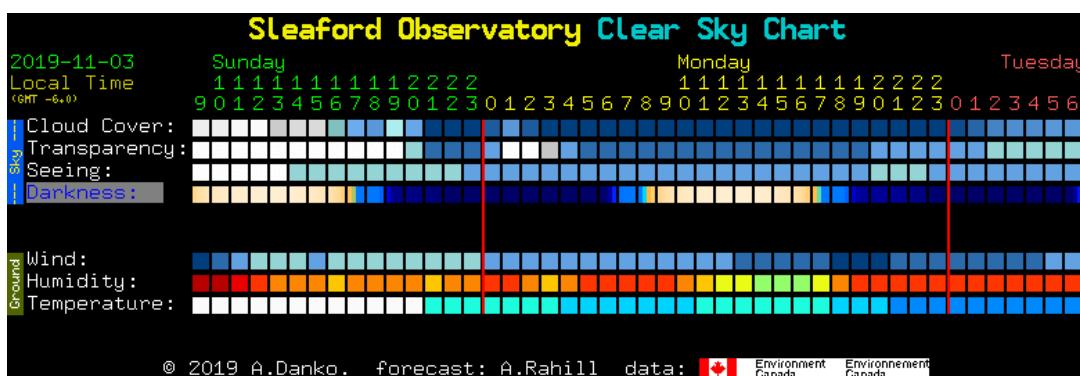
The early morning Spring sky heralded the return of the galactic core of the Milky Way as well as the Summer Triangle in this image by Tim Yaworski

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

NATIONAL COUNCIL UPDATE

Les Dickson

Below is a summary of a selection of the major items discussed from the National Council meeting held on March 7, 2021.

Exit Interviews with Departing Members

National office has been contacting members who did not renew their memberships. Some reasons were: the Society not able to meet their needs due to the COVID-19 situation (missing face-to-face contact); lack of engagement with the centres they had joined. None cited financial reasons.

Astronomy Day 2021

Astronomy Day is May 15, 2021. International Astronomy Day is celebrated twice a year: close to the first quarter moon of spring and fall — on May 15 and October 9, this year. Note that this event is not listed on our Centre's activities page.

2024 Total Eclipse Task Force

Randy Attwood is coordinator of this event for the RASC. The objective is for safe observing and to promote the RASC and *SkyNews*. The Society has reached out to various organizations such as CASCA (Canadian Astronomical Society - Société D'Astronomie), FAAQ (Fédération des astronomes amateurs du Québec), the Canadian Space Agency and the Canadian Association of Science Centres to encourage coordination and cooperation. They hope to also involve municipalities and medical organizations. The Society will be developing a website as a source of information and will list observing sessions.

The NOVA program

Ed Mittzi of the Hamilton Centre, with input from other centres, is updating the New Observers to Visual Astronomy (NOVA) program. The program includes videos and printed materials in 8 modules with topics on telescopes and other equipment and astronomical objects. More information on using binoculars in astronomy will be included.

Volunteer Screening Policy

Processes for the screening of volunteers at RASC-sponsored events are normally dictated by local police. The Society is looking at formulating an overarching policy that won't conflict with local requirements and can provide guidance to centres.

Insurance and Liability for Non-members at RASC events

It was stated that "Liability covers [the] Society, not [an] individual. [The] event is covered, not the people." Phil Groff (Executive Director) thought that liability for non-members

should be fine as long as it is an RASC event, but he will take it up with the Society's insurer. This subject will be included in the Agenda for the next Council meeting. This brings to mind the question of liability for star parties that are nominally run by a Centre but include non-members as volunteers; something for us to look into. It was noted that the insurance industry is adapting to the COVID-19 situation. As long as local COVID-19 protocols are being followed, insurance should back us. Centres should have a policy in place for members for due diligence.

Society News

Membership reached a high of 5200 but slipped back to 5150 while awaiting renewals. The Society will likely realize a moderate financial surplus for the last fiscal year. The Society is looking for a new home for the office by December 2021 as the current building will be demolished to make way for a new development. There is as of yet no centre willing to host the 2022 GA.

Saskatoon Centre Report to National Council

The Saskatoon Centre will have to submit a report to National Council by May 15. This is separate from the report we file each year with National that goes into the Society's Annual Report. Centres have to submit a report to the Council about once every two years.

The next NC meeting is June 6, 2021. There will also be NC meetings at the General Assembly, June 25-27, 2021

SERVICE AWARD THANK YOU!

Darrell Chatfield

I just wanted to thank Rick, Donna-Lee, and Ron for putting my name forward for a service award. It was a total surprise when Tenho emailed me and said "congratulations on winning the award". I emailed him back to ask... "Who won?", since I hadn't read ALL of the latest national newsletter, where the latest Service award recipients were listed along with a short paragraph about each person.

My first reaction was that I thought other people were more worthy of this award than me. But I was humbled by the idea that the club thought I have used whatever talents I have for the betterment of our group.

Thank you to all of you for supporting me all these years. I hope to continue in service to the RASC for years to come. And congratulations to my fellow recipients! Thank you again!



International Dark Sky Week is April 5-12. Check this [website](#) for more info.

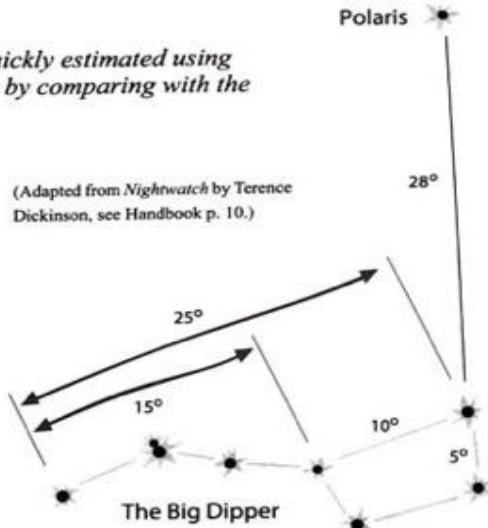
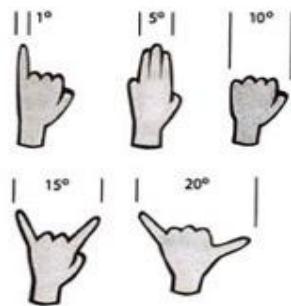
APRIL NIGHT SKY EVENTS AND INFO

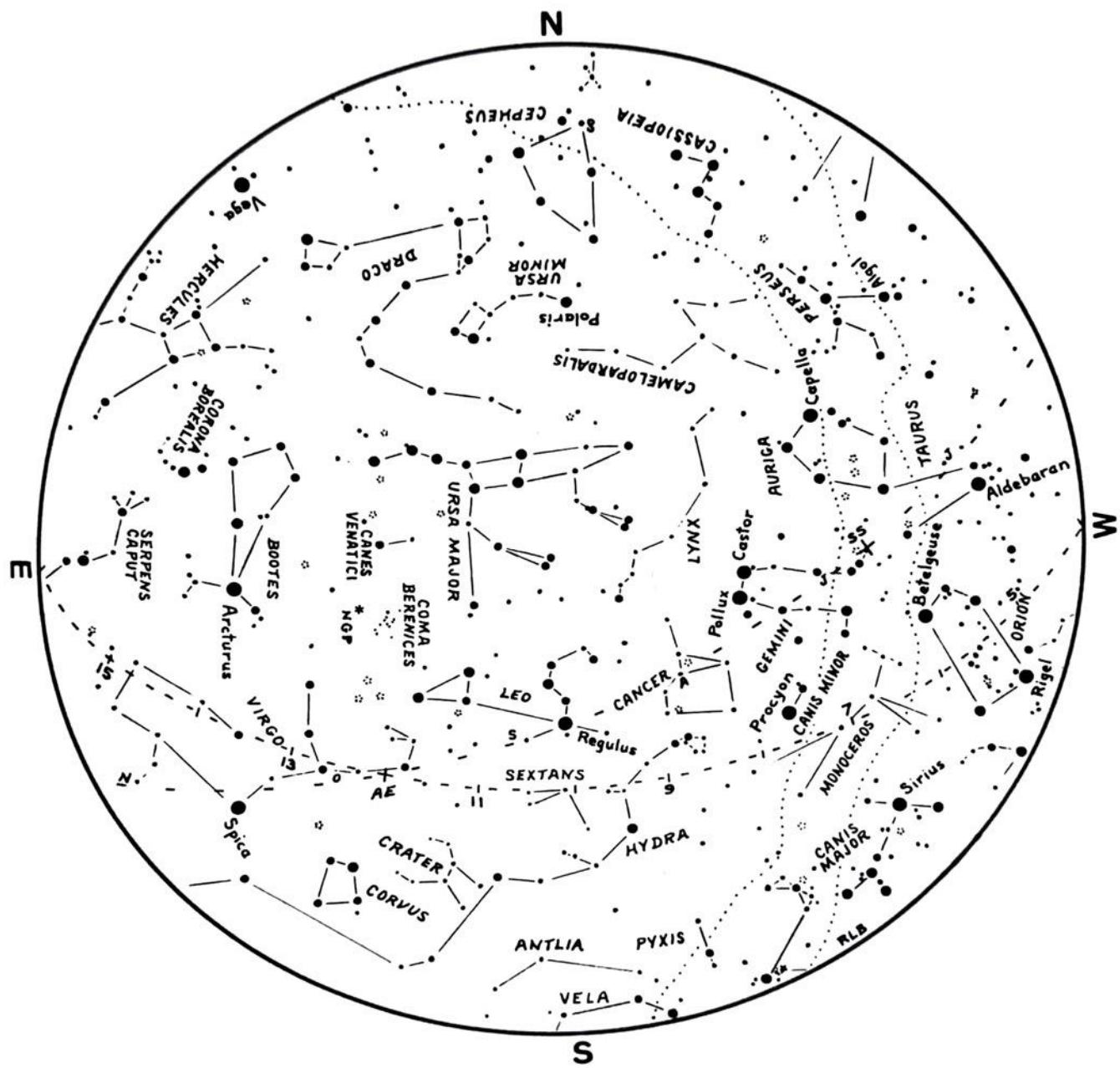
Images on the next few pages taken with permission from the 2020 Observer's Handbook. It can be obtained by joining the RASC here <http://rasc.ca/join> or ordered from <https://secure.rasc.ca/Portal/Shop/RASC/Store/StoreMain.aspx?Category=CURRPUB>

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.)





Time (UT)				APRIL EVENTS	Jupiter's Satellites	
	d	h	m		West	East
Thu.	1					
Fri.	2	18	18	Algol at minimum		
Sat.	3			Mercury at greatest heliocentric lat. S		
		16	23	Double shadow transit on Jupiter		
Sun.	4	10	02	Last quarter		
Mon.	5	15	07	Algol at minimum		
Tue.	6	8		Saturn 4° N of Moon		
Wed.	7	4	15	Double shadow transit on Jupiter		
		5	42	Double shadow transit on Jupiter		
		7		Jupiter 4° N of Moon		
		7		Ceres in conjunction with the Sun		
Thu.	8	11	56	Algol at minimum		
Fri.	9					
Sat.	10	19	01	Double shadow transit on Jupiter		
Sun.	11	8	45	Algol at minimum		
Mon.	12	2	30	New Moon (lunation 1216)		
Tue.	13	2		Juno stationary		
Wed.	14	5	34	Algol at minimum		
		8	21	Double shadow transit on Jupiter		
		18		Moon at apogee (406 119 km)		
Thu.	15					
Fri.	16					
Sat.	17	2	23	Algol at minimum		
		12		Mars 0.1° N of Moon, occultation†		
Sun.	18	0		Moon 0.9° N of M35		
Mon.	19	2		Mercury in superior conjunction		
		23	12	Algol at minimum		
Tue.	20	6	59	First quarter		
Wed.	21					
Thu.	22			Mercury at ascending node		
		12		Lyrid meteors peak		
		18		Vesta stationary		
		20	01	Algol at minimum		
Fri.	23					
Sat.	24					
Sun.	25	16	50	Algol at minimum		
Mon.	26					
Tue.	27			Mercury at perihelion		
		3	31	Full Moon		
		7		Mars 0.5° N of M35		
		15		Moon at perigee (357 378 km) Large tides		
Wed.	28	13	39	Algol at minimum		
Thu.	29					
Fri.	30	20		Uranus in conjunction with the Sun		

†Most of C and E Africa, S parts of Middle East, India, SE Asia, Indonesia, most of Philippines

MINUTES OF MARCH MEETINGS

Rick Huziak

Minutes of the Executive Meeting - RASC Saskatoon Centre

March 15, 2021 - 7:00 pm Online (ZOOM)

Recorded by Richard Huziak, Secretary

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

1. Call to order – Ron Waldron.

2. **Call for additional announcements/items** to add to agenda – February Minute adoption & Centre Incorporation status added. (See Minute items below.)
3. **Committee Reports** – are there any committee reports at this time? No requests.

4. Old business

- **Bylaws current status and update** – Ron Waldron. Jim Gorkoff is not ready to present bylaws until April.
- **Update on Sleaford 16-inch telescope refurbishment at the U of S** – Daryl Janzen: Telescope has been brought in from Sleaford to Room 7 at U of S. Yannis may start on the telescope week of March 21.
- **Rebuilding and modernizing our local website** – Michael Dolan – Current website is good, but needs cleanup.
- **Adoption of February Executive Meeting** minutes as published in the March 2021 newsletter. **Moved:** Mark de Jong. **Second:** Donna-Lee May. **Carried.**

5. New business:

- **Treasurer's Report** – Donna-Lee May – Budgets requested (per last meeting request.)

- **Phone Line at Sleaford** – Donna-Lee May/Darrell Chatfield – Phone is for safety. Will post legal and GPS description on the webpage and by the phone at Sleaford for use in emergency situations. Voice-over-Internet phone (VOIP) might be installed for Internet. Ethernet & a router/Wi-Fi booster would be needed. Mark de Jong points out emergency phones are landlines because they work during power outages and that safety & Internet are two separate topics. Donna-Lee will locate the Insurance Policy and Ron Waldron will see if we are required to have a phone (& what kind.)
- **Status of Saskatoon Centre “Incorporated”** lapsed registration – Ron Waldron states Jim Gorkoff has renewed, but we should have a “certificate” for this.
- **Can we improve our online attendance at meetings** (because Internet access is easier than meeting in-person)? – Ron Waldron. Discussion. The percentage of participants to total membership was deemed not to be unusual between comparative organizations.

6. Call to adjourn. Moved: Les Dickson. **Seconded** - Mark de Jong. **Carried.**

Minutes of the Annual General Meeting - RASC Saskatoon Centre
March 15, 2021 - 8:00 pm Online (ZOOM)
Recorded by Richard Huziak, Secretary
17 attendees at beginning of meeting; 16 at end

1. 8:00 PM - Sharing / Networking Time – all members
2. **Call to order.** 8:17 PM – Ron Waldron
3. **Call out to new members/guests:** None attending
4. Adoption of February General Meeting minutes as published in the March 2021 newsletter. **Moved:** unrecorded. **Seconded:** unrecorded. **CARRIED.**
5. **Treasurer’s Report** – Rick Huziak for Donna-Lee May – No report.

6. Committee Reports

- **SSSP** – Les Dickson – Describes issues around a small and regular SSSP. Looks like a regular SSSP will occur.

7. Highlights of the Executive Meeting - Ron Waldron - 16" telescope has been moved to the U of S for repair.

8. Program:

ASTRO-Jeopardy Game: Your hosts: **Ron Waldron & Mike Dolan**
2021 Jeopardy Champion is Rick Huziak

9. Adjournment Moved: Mike Dolan. **Seconded:** Cam McLellan. **Carried.** 9:37 PM

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

The committee prepared a participation survey that was sent to over 500 past attendees asking for their help in planning SSSP for this year. It was critical that we get a good idea on the number of people who would likely attend given the expected limitations due to COVID-19 and the number of people who would want to camp in the Meadows. The latter issue was important as it would be used to convince the Park that we could fill the Meadows campground sufficiently that we could again turn off the lights, enforce dark sky rules and use it for observing rather than have us shunted over to the Dark Sky campground for our observing while having no dark sky rules in effect in the Meadows.

Fortunately, we received over 150 responses, with over 100 indicating they planned to attend. Also, since 86 respondents wanted to camp in the Meadows, we will be able to use the Meadows campground (sites #31 to #143) for camping and observing as we have done in previous years.

One major change, due to COVID-based restrictions which would likely still be in place, there will be no indoor and limited outdoor programming. There will be no presentations or banquet in the Resort's Wapiti Room. Any presentations would be held in the outdoor Amphitheatre, if allowed, and/or at the Meadows. A BBQ may be possible but that depends on restrictions present at the time. Vendors have also told us that they will be present. This is a one-time only limit on our usual programming. We hope to be back to normal next year.

We are planning to open registration and start taking camping reservations on April 17th. Check our website at <https://sssp.saskatoon.rasc.ca/> for updates.

EQUIPMENT FOR SALE

Heavy Duty LINHOF camera/binocular tripod. It has aluminum legs with quick release clamps. It can extend up to 7 feet. ¼" standard threaded shoe (same brand that carried the famous Questar telescopes).

\$85

Please email Darrell Chatfield at novachat@sasktel.net or call 306-222-0515.



Asteroid Vesta near Galaxy NGC 3507 and edge-on NGC 3501 by Tenho Tuomi on March 21

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>