

Saskatoon Skies

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

Volume 51, Number 05

May 2020



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

WEBSITE: <http://www.usask.ca/rasc/>

E-MAIL: sk_centre@rasc.ca

FACEBOOK: [RASC Saskatoon Centre](#)

INSTAGRAM: [@RASCYXE](#)

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

In This Issue:	
Membership Information / Officers of the Centre	2
Newsletter Info	3
U of S Observatory / Light Abatement Info	4
Calendar of Events / Notice of Meeting	5-6
Book Drive / Clear Sky Chart / Weather Info	6
45 year Astronomy Apprenticeship	7-8
Speakers for Meetings	9
May Night Sky Events and Info / The Story of Avro Canada	9-12
Minutes of April Meeting	13-14
Comet Update / Saskatchewan Summer Star Party	15-16
News from National Office / Books for Sale	17-18
Observing Clubs and Certificates	19-20

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)
- SkyNews Magazine (bimonthly)
- 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

SASKATOON CENTRE'S MAIN OFFICERS:

President – Daryl Janzen

Vice-President – Jim Goodridge

Secretary – Rina Rast

Treasurer – Norma Jensen

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

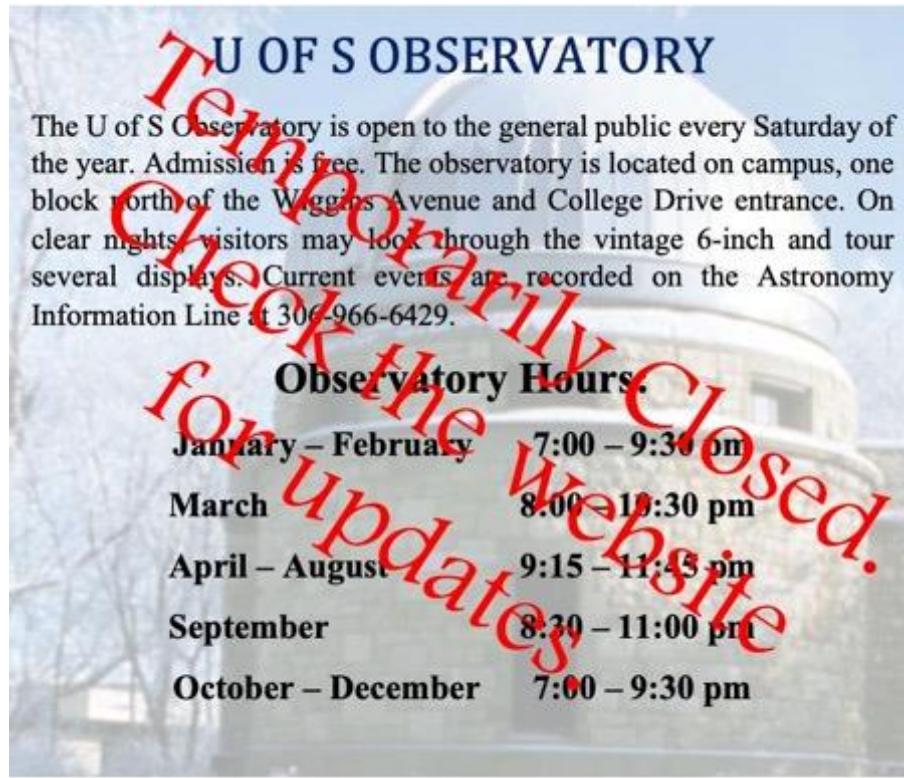
Newsletter Editor – Colin Chatfield
Copy & Collate – Les & Ellen Dickson
Labels & Temps – Mark de Jong
Web Posting – Gord Sarty

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@sasktel.net 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@sasktel.net for rates. Members can advertise non-commercial items for free.



M51 taken by Rina Rast and Brennan Rodgers



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

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



Saskatchewan Light Abatement Committee -

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



www.darksky.org

RASC CALENDAR OF EVENTS

May RASC General Meeting for all members and guests

Join us on May 25, 2020 at 7:00PM (please note the earlier meeting times)
Webinar (info below)

6:00pm - **RASC Executive Meeting** (Members may attend the executive meeting as observers if they wish)

A Zoom registration link will be emailed to members. After that, the procedure to register and join the meeting is the same as for the webinar (explained below).

7:00pm - Main Program

Speakers include:

- **Philip Groff, Executive Director RASC: *Greetings from the RASC National Office!*** Phil comes to us from National Office in Toronto. In Phil's words, "I've made a commitment to visit each Centre during my first year as Executive Director. The goal is to give a short talk to introduce myself, give a few updates from the National Office, and mainly just to reopen dialogue between the Centres and RASC National.



NOTE: a link to register to attend the webinar will be emailed out, 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.

May 23	Observer's Group (weather permitting)	Larry Scott
May 25	RASC General Meeting - 7:00pm	Daryl Janzen

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

BOOK DRIVE

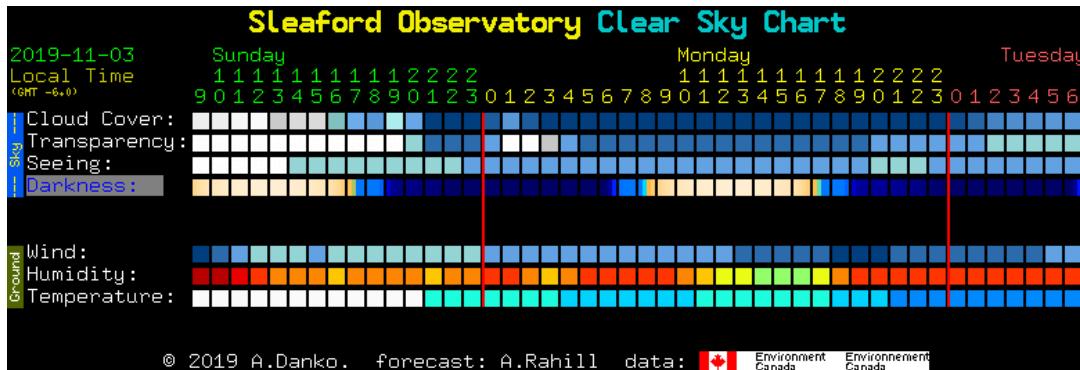
Astronomy-related book donations are being accepted to the RASC Saskatoon Centre Library at the U of S Observatory during its regular Saturday evening open house, April - August 9:15-11:45pm (please note that the observatory is currently closed indefinitely due to COVID-19).

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

MY 45 YEAR ASTRONOMY APPRENTICESHIP

Tim Yaworski

When I joined the RASC about five years ago, I picked up a baton that I dropped about 40 years earlier.

When I was 13 I was bitten by the bug of astronomy and started by getting a Tasco refractor with an alt/az mount and a staggering 450x magnification. Needless to say, dealing with that scope frustrated the hell out of me.

Luckily I was able to connect with a local group of enthusiastic astronomers. These were members of RASC Vancouver Centre who started a small satellite club meeting monthly in a country community hall near the town where I lived.

After a couple of years I drifted away from astronomy, lured away by the siren song of photography. A part of me still held fond memories of dark skies and the wonder of the stars.

As marriage, career and children took priority I shared what little information I remembered from my nights with the Maple Ridge Amateur Astronomers Society with my kids whenever I had the chance.

Fast forward four decades later and now we were empty-nesters. My daughter gave me the gift of a membership to the Saskatoon Centre for my birthday. “Time to go have some fun, dad”.

I am the first to admit that I am far from being an experienced astronomer, my forte is more in the lines of “artistic astro-photographer” but my goal was to now to become better-rounded in my knowledge and understanding of the sky. The members of our centre have been a wealth of information and help in this journey.

Through my work at London Drugs I have been able to take my passion with astrophotography and spread that joy in person to 2000+ people over that last four years. This has however curtailed my progress on improving my abilities as an astronomer.

With the sudden change of how we interact with people due to the current COVID-19 pandemic, my way of connecting with people has morphed into a social media on-line model, teaching me technical skills I never thought I would need.

Because of this online exposure, I was approached by Eric Wickham from RASC National to be part of a new marketing and communications committee. I was asked if I

would be interested in creating some video content for the society's online efforts as people were now more home-bound and looking for new diversions.

I said yes.

Specifically, I started to create a series of short videos for people who were interested in getting started in the world of astronomy. The goal of the "#astronomytime" videos is to become a "100 level" course on getting involved in this hobby.



For me, this is a gift from above. It is forcing me to focus on learning what I need to know and passing that on to others. The challenge for me is to keep moving forward and building up my knowledge and in turn achieve the goal I joined the club for in the first place.

This is where I need **YOUR** help.

My questions for you are simple? What did you wish you knew more about when you started in astronomy? What words of wisdom would you share with others? What topics would you like to see covered in this introductory videos series? Any input and suggestions you would like to share with me is greatly appreciated. If you can think of something please drop me a line at tim@timkip.com.

Here are links to the videos that have been published so far:

<https://youtu.be/Bzt2TodxJnk>
<https://youtu.be/Jy2OSSJ4jeg>
<https://youtu.be/X0fOdQK4k9A>
<https://youtu.be/fAYkJD3ZSV0>
https://youtu.be/8QGCJ_Omsg4

SPEAKERS FOR MEETINGS

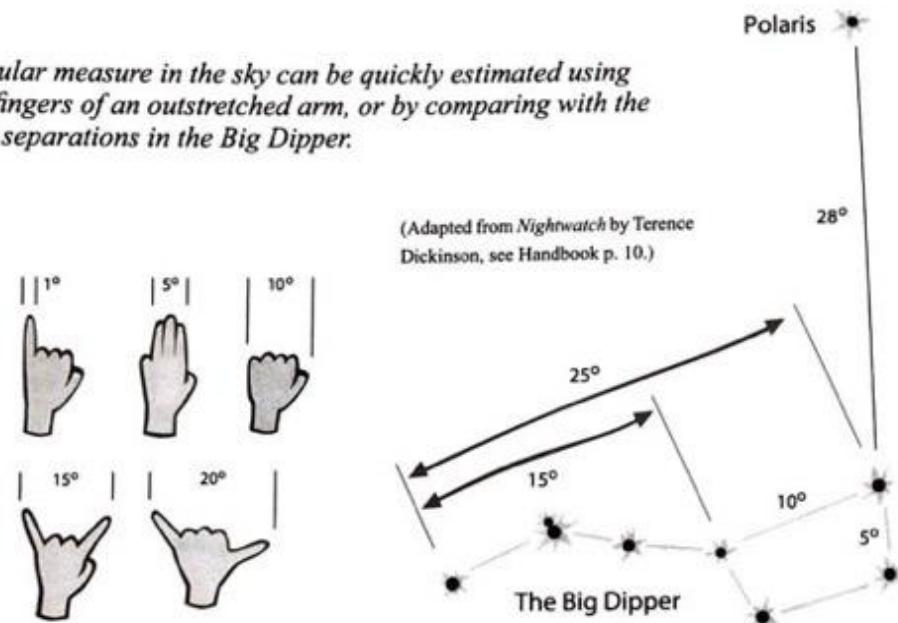
Rick Huziak

Getting speakers for each general meeting is harder than pulling teeth - plain and simple. Going forward, we have only three speakers lined up until the end of the season. Daryl Janzen will talk about U of S telescopes, and then possibly later in the spring, Gord Sarty will talk about his Space MRI. But with three other main talks and three minor talks to fill the agenda with, it is highly likely that you will be listening to talks about my favourite variable stars or the latest light pollution crisis ... again. So, please volunteer to give a talk about your favourite astronomy topic or experience. It doesn't have to be long and everyone has some sort of interest in the sky. As a matter of fact, there is an entire universe out there to talk about! So, be it 5 minutes or 55 minutes. I'd love to hear from you.

MAY 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/StoreMain.aspx?Category=CURRPUB>

HANDY SKY MEASURES



RASC OBSERVER'S HANDBOOK 2020

THE SKY FOR MAY

		Mercury	Venus	Mars	Jupiter	Saturn	Uranus	Neptune	Sun
RA	1	2h 17m	5h 10m	21h 37m	19h 55m	20h 15m	2h 18m	23h 25m	2h 34m
	11	3h 41m	5h 22m	22h 04m	19h 56m	20h 16m	2h 20m	23h 26m	3h 12m
	21	5h 05m	5h 17m	22h 31m	19h 56m	20h 15m	2h 22m	23h 26m	3h 52m
Dec	1	+12° 53'	+27° 45'	-15° 55'	-20° 57'	-19° 54'	+13° 17'	-4° 56'	+15° 04'
	11	+20° 35'	+27° 34'	-13° 50'	-20° 55'	-19° 54'	+13° 29'	-4° 51'	+17° 52'
	21	+24° 58'	+26° 23'	-11° 37'	-20° 57'	-19° 56'	+13° 39'	-4° 46'	+20° 11'
Dist	1	1.33	0.43	1.23	4.84	9.81	20.81	30.56	1.008
	11	1.28	0.37	1.16	4.69	9.65	20.78	30.42	1.010
	21	1.11	0.32	1.08	4.55	9.50	20.73	30.27	1.012
Mag	1	-1.8	-4.7	0.4	-2.3	0.6	5.9	7.9	
	11	-1.6	-4.7	0.3	-2.4	0.5	5.9	7.9	
	21	-0.7	-4.4	0.1	-2.5	0.5	5.9	7.9	
Size	1	5.1"	38.9"	7.6"	40.7"	17.0"	3.4"	2.2"	31' 45"
	11	5.2"	45.6"	8.1"	42.0"	17.2"	3.4"	2.2"	31' 40"
	21	6.0"	52.7"	8.6"	43.3"	17.5"	3.4"	2.2"	31' 36"

Moon: On May 0 at 0h UT*, Sun's selenographic longitude is 356.52° and increases 12.2° each day thereafter.

Greatest N declination on the 26th (+24.0°)

Greatest S declination on the 11th (-24.0°)

Libration in longitude: E limb most exposed on the 12th (+6.9°)

W limb most exposed on the 27th (-5.9°)

Libration in latitude: N limb most exposed on the 18th (+6.7°)

S limb most exposed on the 4th (-6.6°)

Mercury: At superior conjunction on the 4th, it remains too close to the Sun to be seen until mid-month, when it may be acquired with difficulty very low in evening twilight. Passes within 1° of brilliant Venus on the 21–22, with both planets towering well north of the northern-most part of the ecliptic near the star El Nath. The conjunction is short-lived as both planets are moving in opposite directions relative to the Sun. The thin crescent Moon joins the scene on the 23–24, and all three bodies might be visible in a wide-field pair of binoculars depending on the observer's longitude.

Venus: Begins the month prominently placed in the evening sky some 37° removed from the Sun, but that elongation is beginning to diminish rapidly as the inner planet approaches. So too is its phase, as the inner planet shows an ever-thinner sliver of its day side as it makes its pass between Sun and Earth. Its crescent phase may be seen in early twilight with the unaided eye by people with exceptional visual acuity. It reaches its first stationary point on the 13th and begins retrograde motion thereafter, appearing to fall into the Sun from night to night. On the 21–22, Venus is in conjunction with Mercury, the two inner planets separated by under 1° at their closest approach at 08 UT on the 22nd. By month end, Venus is within 5° of the Sun, and while viewing its large but razor-thin crescent is not quite impossible, it is recommended for experts only.

Mars: After crossing the border from Capricornus into Aquarius early in the month, the brightening Red Planet achieves mag. 0.0 by the 31st. The Moon passes 3° to its south on the 14–15.

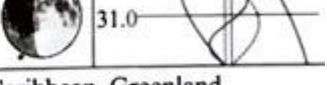
Jupiter: Slows to its first stationary point on the 14th, after which it will spend the next four months in retrograde motion among the stars of Sagittarius as seen from Earth. Nearby, Saturn will be commencing its own retrograde loop, which is more modest in angular motion due to its greater distance from the observer. The separation between the two giant planets will have diminished to less than 5° in mid-May, but then will gradually increase to about 8° in September when both resume prograde motion and begin to close in toward their December conjunction. The waning gibbous Moon passes to the south of both on the 12th. Meridian transit times at Greenwich on the 1st, 11th, 21st—05:18, 04:40, 04:00 UT*.

Saturn: Reaches its first stationary point on the 11th and begins its retrograde motion which will continue until late September. On the morning of the 12th for the Western Hemisphere, the Moon will pass 3° S. of the two giants. The three bodies will make a superb sight in a pair of low-power binoculars, with observers on the west coast of North America favoured to see the tightest grouping of the trio. Meridian transit times at Greenwich on the 1st, 11th, 21st—05:38, 04:59, 04:20 UT*.

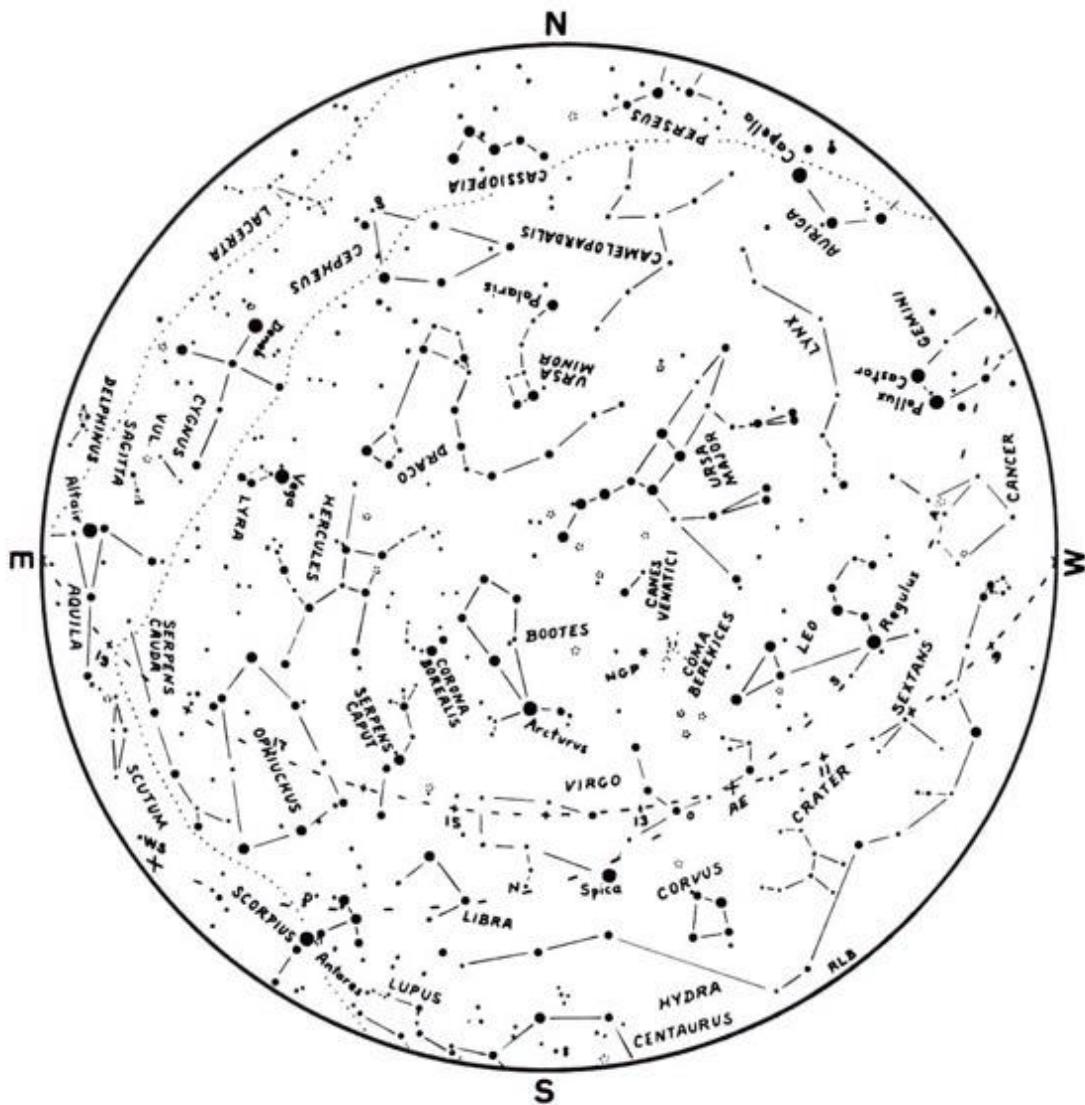
Uranus: Reappears in morning twilight late in the month.

Neptune: In the morning sky among the late rising stars of Aquarius.

*See p.94, the bold-faced sentences of the first paragraph.

	Time (UT) d h m	MAY EVENTS	Jupiter's Satellites West	East
Fri.	1			
Sat.	2 6 45	Algol at minimum		1.0
Sun.	3			2.0
Mon.	4 22	Mercury in superior conjunction		3.0
Tue.	5 3 34	Mercury at ascending node Algol at minimum		4.0
Wed.	6 3 8	Moon at perigee (359 654 km) η -Aquariid meteors peak		5.0
Thu.	7 10 45	Full Moon		6.0
Fri.	8 0 23	Algol at minimum		7.0
Sat.	9			8.0
Sun.	10 21 12	Mercury at perihelion Algol at minimum		9.0
Mon.	11 9 11	Saturn stationary Pallas stationary		10.0
Tue.	12 10 18	Jupiter 2° N of Moon Saturn 3° N of Moon		11.0
Wed.	13 10 18 01	Venus stationary Algol at minimum		12.0
Thu.	14 14 03 18	Last quarter Jupiter stationary		13.0
Fri.	15 2	Mars 3° N of Moon		14.0
Sat.	16 14 50	Algol at minimum		15.0
Sun.	17			16.0
Mon.	18 8	Moon at apogee (405 583 km)		17.0
Tue.	19 11 39	Algol at minimum		18.0
Wed.	20	Mercury at greatest heliocentric lat. N		19.0
Thu.	21			20.0
Fri.	22 7 8 28	Mercury 0.9° S of Venus Algol at minimum		21.0
	17 39	New Moon (lunation 1205)		22.0
Sat.	23			23.0
Sun.	24 3 11	Venus 4° N of Moon Mercury 3° N of Moon		24.0
	15	Vesta 0.6° S of Moon, occultation†		25.0
Mon.	25 5 17	Algol at minimum		26.0
Tue.	26			27.0
Wed.	27 14	Juno stationary		28.0
Thu.	28 2 06 8 48	Algol at minimum Double shadow transit on Jupiter		29.0
Fri.	29			30.0
Sat.	30 3 30 22 55	First quarter Algol at minimum		31.0
Sun.	31			

†Most of N. America (except W coast, Alaska, NW Canada), N Caribbean, Greenland, most of Europe (except S), W Russia, N Middle East



TOUCH THE SKY: THE STORY OF AVRO CANADA

This exhibit is closed temporarily, but I'll leave the info in case it opens again.

A pioneer in aircraft manufacturing, Avro Canada Ltd. was most recognized for its Avro Arrow aircraft—a model intended to serve the Royal Canadian Air Forces. Highly debated in government for its cost and national defence implications, Prime Minister Diefenbaker abruptly cancelled the production of the Avro Arrow in 1959. Curated by the Diefenbaker Canada Centre, this exhibit tells the story of Avro Canada's creation and its impact in the world of aeronautics and technology.

<https://diefenbaker.usask.ca/exhibits/Current-exhibits.php#TouchtheSkyTheStoryofAvroCanada>

MINUTES OF APRIL MEETING

Rina Rast

Minutes of the Executive Meeting, April 20, 2020

Attendees: Daryl Janzen, Les Dickson, Rick Huziak, Donna-Lee May, Jim Gorkoff, Rina Rast, Darrel Chatfield, Jim Goodridge, Patricia Gakis

Meeting called to order by Daryl Janzen at 6:06 PM.

Approval of minutes published in March 2020 issue. Motion by Les Dickson, seconded by Darrel Chatfield, passed as all were in favour.

Reports:

Treasurer's Report (Jim Gorkoff):

Overall we are in the positives, up from last year.

Membership fees appear to go down and donations seemed to go up compared to the previous years, but this is simply because donations had inadvertently been lumped with membership.

Secretary's Report:

Reviewed the 2019 activity report prepared by Rina for National.

National Rep Report (Les Dickson):

National is putting together a manual on how to run a center, should have a draft together for the GA in June, which will be virtual.

Public outreach is looking for a representative from the Prairies.

National will consider membership renewals on a case-by-case basis for those affected by COVID-19 and are asking for donations to an emergency fund.

Discussion amongst National Council on whether RASC should make a statement on Starlink; decision was to not choose one side or another at this point.

Note from RASC President Christopher Gainor in the April 2020 uplink: RASC has survived a pandemic before and we will continue to do our best to follow precautions and make it through this one as well.

Update on green laser pointers (Les Dickson):

Should have the procedures in place by the time of the GA. In short: before using a green laser pointer, one should have membership card proving training and you should also have

a spotter with the same certification with you. You also need to make sure you have liability coverage from National before using the pointer.

Sleaford robotic telescope update/access for members (Daryl):

Daryl obtained permission to make 2 trips out to Sleaford to set up the robotic telescope. We will continue to use the policy put in place by Larry Scott in his emails to members.

Discussion of meeting plans going forward:

We will continue having virtual meetings, we are looking for volunteers comfortable with presenting virtually.

Motion to adjourn at 6:57 PM by Jim, passed as all in favour.

Minutes of the General Meeting, April 20, 2020:

Motion to adopt meeting minutes published in March 2020 issue, all in favour.

Discussion of the use of green laser pointers; the center is working on a way to provide training for the use of the lasers and until that is done, abstain from using them.

Recap of the other topics covered in the executive meeting.

Presentation by National's Youth Outreach Coordinator Jenna Hinds on the RASC robotic telescope, followed by a Q&A period.

Announcements:

Speakers needed for upcoming virtual meetings! Contact Rick if you are willing to volunteer.

SSSP is currently “up in the air” due to complications from COVID-19, but is not yet off the books.

Deadline for the next newsletter is May 1, 2020.

Next virtual meeting: May 18, 2020.

Discussion regarding the possibility of streaming future meetings from Phys 175, as well as the possibility of recording these meetings (discussion to be continued).

Motion to adjourn at 8:29 PM, all in favour.

COMET UPDATE

Tenho Tuomi (Photos by Tenho)

We have three comets at about the same brightness and distance from us in the same part of the sky.

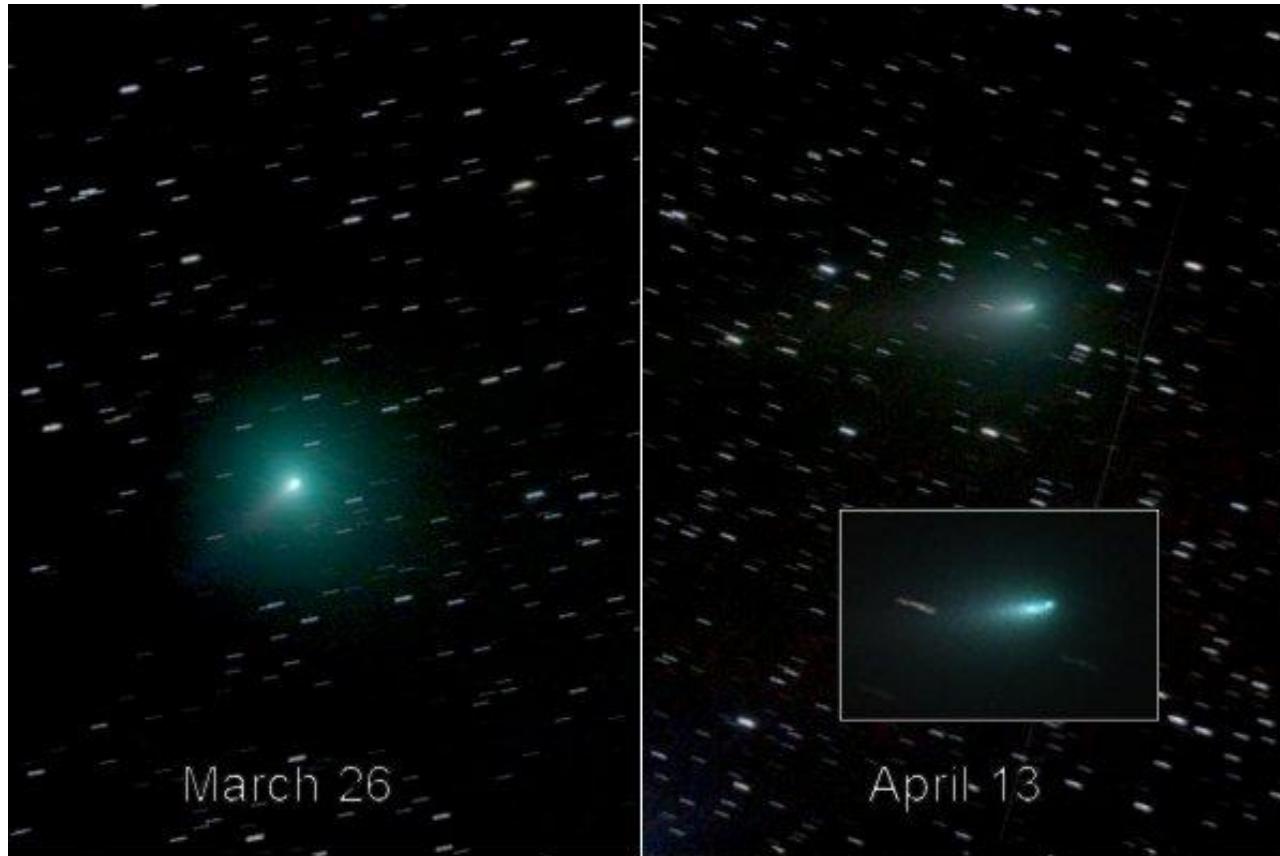
Comet C/2017 T2 (PANSTARRS) discovered in May, 2017 has been slow in coming. It is staying furthest away, never closer than 1.5 au from earth. It will reach perihelion on May 4 at 1.6 au from the sun.

Comet C/2019 Y1 (ATLAS) discovered in December 2019 reached perihelion in March at .8 au, and will be closest to the earth on May 3 at 1.1 au.

Comet C/2019 Y4 (ATLAS) discovered in December 2019 caused a lot of excitement when it brightened quickly at the end of March, but it started fading when its nucleus broke up at the beginning of April. It will pass within .78 au of earth on May 23 and within .25 au of the sun on May 30 when it becomes a southern hemisphere comet, if it survives the breakup.



C/2017 T2 (PANSTARRS), C/2019 Y1 (ATLAS), C/2019 Y4 (ATLAS) on April 23 & 24



C/2019 YI (ATLAS) from March 26, and then April 13 after the breakup of the nucleus, with inset showing an enlargement of the nucleus in two pieces

SASKATCHEWAN SUMMER STAR PARTY 2020

Planning Update - Les Dickson



Due to the pandemic, we felt it was prudent to cancel SSSP 2020. The decision was based on two major issues:

- 1) the threat to the health of attendees and the possibility of spreading infection to a large number of people, and
- 2) the restrictions on the size of public gatherings and social distancing meant that all of the day-time programming would have to be cancelled. We will be planning to hold the next SSSP from August 4th to 9th, 2021.

NEWS AND UPDATES FROM NATIONAL OFFICE

Les Dickson

The most recent National Council (NC) meeting was held by teleconference on April 19. Below is a summary of a few significant developments.

- There was a great deal of discussion on Green Laser Pointers (GLP) and how to use them properly within the new regulations set out by Transport Canada. The requirements for training and certification, insurance and reporting appear now to be more strict than first appeared. Any use of a GLP for outreach and education is limited to RASC-approved events. Note that a single person, even if certified, cannot use a GLP even for outreach and education purposes because a second certified person is required as an aircraft spotter. The use of GLP for personal use, such as a replacement for a finder, is prohibited by law. To me, it looks like the use of GLP is more bother than it is worth. Extra-bright flashlights have been used with good results. I have information on that if anyone wishes it.
- There was some heated discussion on whether the RASC should take and publish an official position on the proliferation of low-orbit communication satellites such as the Starlink constellation. It was noted that the RASC does not traditionally take an advocacy role and is not part of its mission statement. There was no resolution of this issue at this meeting.
- The Outreach and Education Committee is preparing a set of guidelines regarding security checks, especially for giving talks at schools to children or vulnerable people without parents or guardians present.
- The situation at *SkyNews* appears to be improving and it is currently revenue neutral rather than losing money.
- National will consider on case-by-case basis those affected by COVID-19 situation i.e. loss of income and being unable to renew because of it. An emergency fund has been set up to help and is receiving donations from other members. Contact National if you have concerns about renewing your memberships.
- National is buying a new software package that will be cheaper and easier to maintain than the current system. As a result, the current listservs will disappear to be replaced with a new website. The society will be moving to GMAIL servers from EXCHANGE servers and will move to GDRIVE from DROPBOX for file exchange and group work. The main website will reflect these changes in a few months.
- National Office will have to move out of its existing building as it will be demolished sometime soon to make way for new real estate developments. The timeline not known yet.

- The Centre Manual is on track to be presented for approval at the Annual General Meeting (AGM) in June. This manual is intended to be a guide on how to operate an RASC Centre.
- The Board of Directors (BOD) has submitted a set of proposed amendments to Bylaw #1 (the society's "constitution"), most of which are administrative and housekeeping. The sections on "Mediation and Arbitration" and "Dispute Resolution Mechanism" are being removed as the RASC already has policies dealing with disputes that can arise between members, directors, officers, committee members and volunteers.
- The Annual General Meeting is scheduled for Sunday June 7, 2020 and will take place virtually via ZOOM. The General Assembly meeting has been cancelled due to COVID-19 restrictions, but some events are being re-organized and will take place virtually as well.

BOOKS FOR SALE

All books are in either new, or like new condition. Retail price in brackets. Please email or text me if you want a particular book and I will bring it to the next meeting or arrange to meet you. All books being sold by Darrell Chatfield. Contact him at novachat@sasktel.net or 306-222-0515.

“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
“Turn Left at Orion”	2000	Dan Davis	B. & W. (29.99) \$15.00
“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



Milky Way panorama taken April 25, 2020 by Tara Magee

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-	94
Goldkuhle	
Wade Selvig	75
Wayne Schlakohl	43
Ellen Dickson	34
Graham Hartridge	9

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

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

EXPLORE the UNIVERSE

Certified at 55 to 110

Objects: *T. Tuomi,*

Wayne Schlakohl	55
Jim Goodridge	35

HERSCHEL 400-II CLUB

Darrell Chatfield	400
Tenho Tuomi	378
Rick Huziak	246

Chatfield BINOCULAR

CERTIFICATE

Certified at 35 to 40 Objects:

T. Tuomi, R. Huziak

Jim Goodridge	12
---------------	----

Isabel Williamson Lunar

Observing Certificate

Certified at 140 Objects:

T. Tuomi, N. Jensen

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.astrolueague.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>