

Saskatoon Skies

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

Volume 51, Number 11

December 2020



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)
- 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 – 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

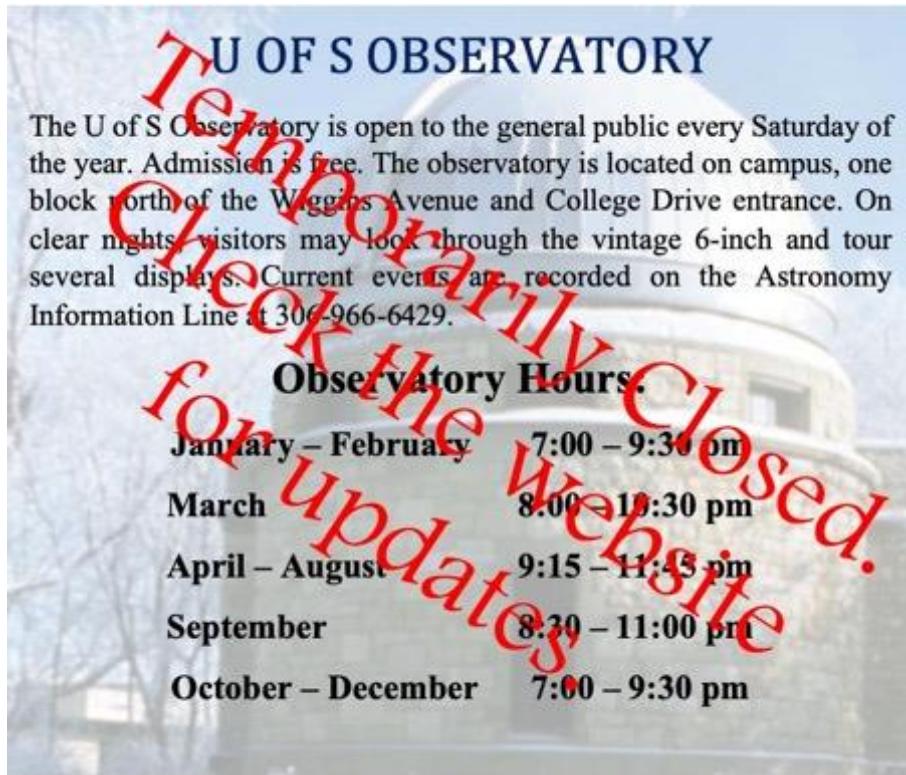
Saskatoon Skies is published monthly by the Saskatoon Centre of the RASC. Distribution is approximately 100 copies per issue. Saskatoon Skies welcomes unsolicited articles, sketches, photographs, cartoons, and other astronomy or space science material. Submissions should be sent by e-mail to the editor 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.



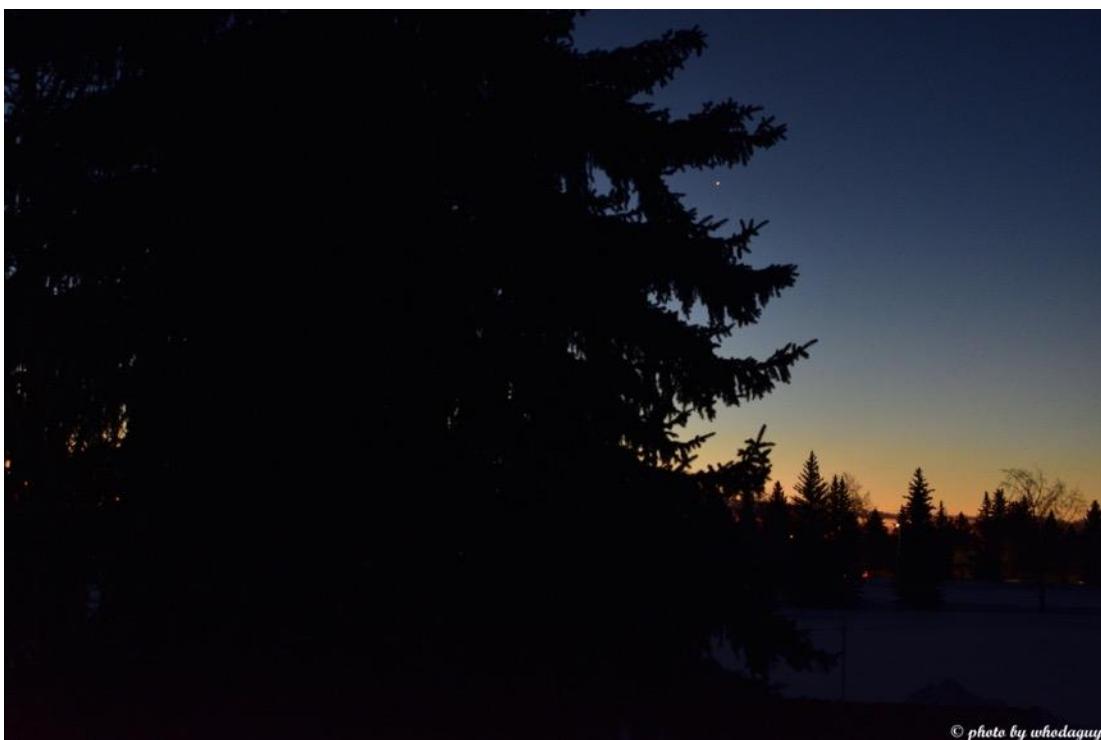
© photo by whedaguy

Morning Moon in Gemini taken by Mike Dolan



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

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



© photo by whodaguy

Venus at dawn taken by Mike Dolan

RASC CALENDAR OF EVENTS & MEETING INFO

Dec 12	Observer's Group (weather permitting)	Larry Scott
Dec 14	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>

December RASC General Meeting for all members and guests

**Join us on December 14, 2020 at 7:00PM (no Executive meeting)
Webinar (info below)**

7:00pm - Main Program - (see President's Message below for details)

NOTE: links to register to attend the webinar will be emailed out. 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.

There will also be a vote to amend the terms of the President and Vice President positions from two-year to one-year terms.

PRESIDENT'S MESSAGE

Ron Waldron

What a tumultuous year 2020 has been for us all. I know that for each of us it has presented many new and unique challenges. We will, of course, get through this ... It is just a matter of time.

Thank you to our past president, Daryl Janzen for leading us safely through the most difficult part of this journey by organizing and promoting our online meetings. He continues to work in the background setting up our Zoom meetings at least until June of next year.

Thank you also to Michael Dolan for agreeing to be my right arm and support as the incoming Vice President, moving up to president next October. As the incoming president for the upcoming year, I feel it important to share with members the goals I/we intend to work on and achieve during my term as your president.

There are three basic goals:

1. Completion of all repairs to make the 16-inch telescope at Sleaford operational.
2. Facilitate and promote exchange of information among members and personal wellness during Covid-19 using Zoom software.
3. Reach out to our inactive members and grow our online meeting attendance using the same Zoom software.

These goals are important and achievable. With regard to the last two, there are several advantages to meeting online, not the least of which is the ability to attend in the comfort of your own home with your favorite beverage beside you, perhaps off-camera for some. Yes, the personal contact is missing and staring at your computer screen will never replace the live presentation, but it does allow us to continue during these unprecedented times.

Finally, I trust you will make every effort to join us on **Monday, December 14th** for our annual Christmas get together which will now be an hour (or so) of sharing our personal experiences in astronomy. Each and every one in attendance will be given a time to share how they got started in the hobby and a few personal memories they have experienced. I know we all have stories and although you are not required to share (you can opt to just listen), but please consider getting involved. Try to keep your comments and thoughts to under 5 minutes so we all have an opportunity to share. Oh, and Tim Yaworski wants us to add the “fun” component by inviting you to wear your favorite Xmas sweater, hat or apparel for the meeting. It truly will be fun. See you there!

SPEAKERS FOR MEETINGS

Rick Huziak

On-line meetings present additional challenges for finding speakers, because potential speakers would need to have access to a computer and figure out presentation methods on programs like Zoom, Slack or Teams. After the initial challenge of installing the program on your computer, the rest is not actually too hard. Preparing a program for presentation becomes the same as doing a PowerPoint, or just talking into the camera to your audience on the computer screen.

That aside, we always need speakers for our meetings, so please think about presenting on-line during the next year, or in person, hopefully, thereafter. Topics can include anything astronomy or space related: your observing program, imaging, out-reach, a visit to another Centre or an astronomical observatory or a tour of a NASA facility, building your observatory, effects of light pollution on your efforts or just something that you are interested in telling others! Talks can be any length from 5 minutes to 40 minutes. As I usually point out, we have about 88 astronomically-interested members so I'd think we could do about 88 presentations, but it doesn't work that way, and each month we scramble to find speakers. But changes to on-line meetings have given us the opportunity to invite outside speakers to present on-line: speakers from other RASC Centres, universities and, indeed, from around the astronomical world! Although this is tempting, one danger is that we start presenting things similar to what can already be found on YouTube.

With this in mind, remaining with speakers who are within or closer to our Centre keeps the meeting more relevant to the building our Centre. Reaching out further, on occasion, allows us to expand our horizons to learn about other Centres or the National RASC. But reaching out presents another issue: Why would others agree to talk to our Centre unless we can reciprocate and provide a speaker for their Centre? So, keep in mind that if you can create a presentation for our local club, we can also leverage that talk to another club and form mutually beneficial relationships.

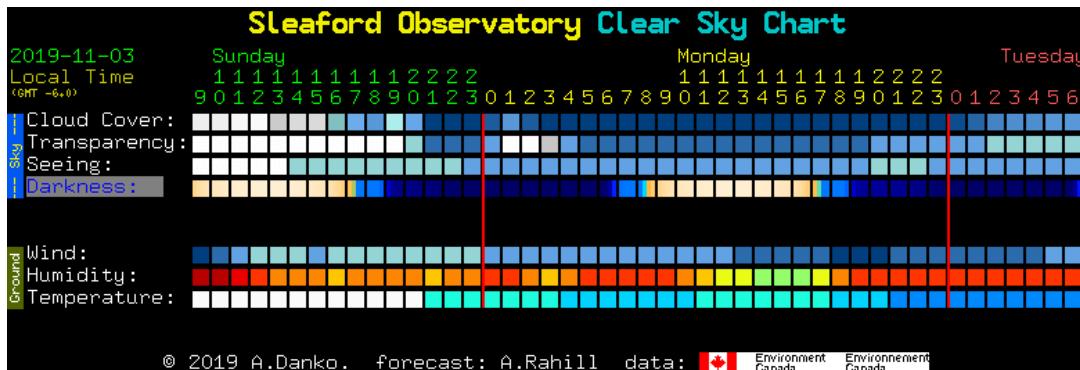
If you just can't present, then please "attend" our on-line meetings! Our actual virtual meeting attendance tends to be lower than our previous in-person meetings, even though we have the ability to reach a larger audience on-line. This seeming contradiction just emphasizes that like-minded people really prefer to meet in person and that it is important to exchange ideas that way. But until we can, stay safe, stay distant, and please think about helping out one way or another during the virtual phase of our cub meetings!

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



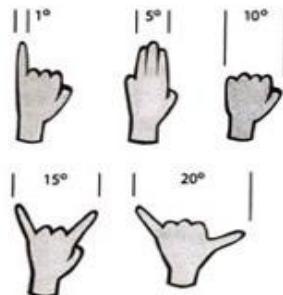
*Aurora panorama taken in March 2020 by Tara Magee northeast of Saskatoon.
Canon 90D, ISO 1600, 20 sec exp, f/2.8*

DECEMBER NIGHT SKY EVENTS AND INFO

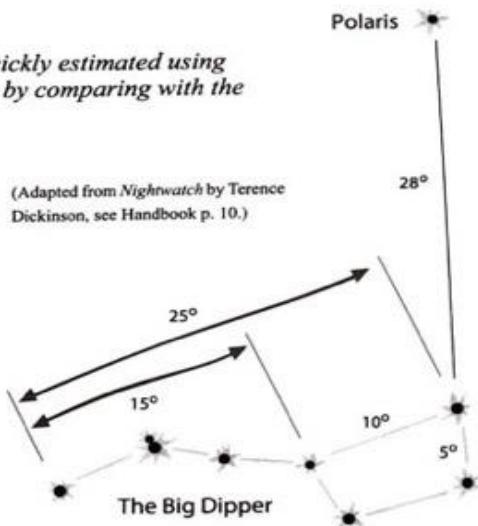
Images on the next few pages taken with permission from the 2020 Observer's Handbook. It can be obtained by joining the RASC here <http://rasc.ca/join> or ordered from <https://secure.rasc.ca/Portal/Shop/RASC/StoreMain.aspx?Category=CURRPUB>

HANDY SKY MEASURES

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.)



THE SKY FOR DECEMBER

		Mercury	Venus	Mars	Jupiter	Saturn	Uranus	Neptune	Sun
RA	1	15h 45m	14h 38m	1h 02m	19h 52m	20h 01m	2h 20m	23h 17m	16h 29m
	11	16h 50m	15h 27m	1h 11m	20h 00m	20h 05m	2h 19m	23h 17m	17h 13m
	21	17h 59m	16h 19m	1h 23m	20h 09m	20h 10m	2h 18m	23h 18m	17h 57m
Dec	1	-19° 16'	-13° 41'	+6° 33'	-21° 26'	-20° 53'	+13° 29'	-5° 48'	-21° 47'
	11	-23° 04'	-17° 22'	+7° 51'	-21° 03'	-20° 42'	+13° 23'	-5° 47'	-22° 59'
	21	-24° 57'	-20° 18'	+9° 23'	-20° 37'	-20° 30'	+13° 19'	-5° 44'	-23° 26'
Dist	1	1.37	1.43	0.64	5.73	10.61	18.93	29.76	0.986
	11	1.44	1.48	0.72	5.83	10.72	19.03	29.93	0.985
	21	1.45	1.52	0.80	5.92	10.82	19.16	30.10	0.984
Mag	1	-0.8	-3.9	-1.1	-2.0	0.6	5.7	7.9	
	11	-1.0	-3.9	-0.8	-2.0	0.6	5.7	7.9	
	21	-1.3	-3.9	-0.5	-2.0	0.6	5.7	7.9	
Size	1	4.9"	11.7"	14.6"	34.4"	15.7"	3.7"	2.3"	32' 26"
	11	4.7"	11.3"	13.0"	33.8"	15.5"	3.7"	2.2"	32' 29"
	21	4.6"	11.0"	11.7"	33.3"	15.4"	3.7"	2.2"	32' 31"

Moon: On December 0 at 0h UT*, Sun's selenographic longitude is 87.99° and increases 12.2° each day thereafter.

Greatest N declination on the 3rd (+24.8°) and 30th (+24.8°)

Greatest S declination on the 16th (-24.9°)

Libration in longitude: E limb most exposed on the 19th (+6.5°)

W limb most exposed on the 6th (-6.3°)

Libration in latitude: N limb most exposed on the 21st (+6.9°)

S limb most exposed on the 8th (-6.8°)

Total solar eclipse on Dec. 14, visible from southern South America, Antarctica, southwestern Africa, the Pacific Ocean, and the south Atlantic Ocean.

Mercury: Too close to the Sun to be seen throughout December. Achieves superior conjunction on the 20th.

Venus: A great year for observing the second planet draws to a close with Venus receding to a less-prominent position far to the south and ever-lessening elongation from the Sun, but still with a separation of 20° on the 31st. On the 12th, the Moon makes a close pass, and a daylight occultation might be seen with difficulty in the far W and NW of North America.

Mars: While still a standout object in the evening sky, the red planet continues its fall from prominence. It diminishes in angular size from 15" to 11" while losing over half of its brilliance, fading from mag. -1.1 on the 1st to mag. -0.2 on the 31st. The waxing gibbous Moon passes by 6° to the south on the 23rd. Meridian transit times at Greenwich on the 1st, 11th, 21st—20:19, 19:49, 19:22 UT*.

Jupiter: Achieves conjunction with Saturn on the 21st, the first celestial meetup of the two giant planets since 2000. They will be within 1° of each other from the 12th through the 29th. At their closest on the 21st, they will be just 0.1° apart, **their closest conjunction since 1623**, with Jupiter at mag. -2.0 outshining Saturn by a factor of 10. Both planets will be 30° east of the Sun, leaving a narrow window for observation in early evening twilight. The thin crescent Moon passes 3° below both objects on the evening of the 16th in the Western Hemisphere.

Saturn: Achieves conjunction with Jupiter on the 21st. They will be within 1° of each other from the 12th through the 29th. At their closest on the 21st, they will be just 0.1° apart, with Saturn at mag. +0.6, the fainter object by a factor of 10. Both planets will be 30° east of the Sun, leaving a narrow window for observation in early evening twilight. The thin crescent Moon passes 3° below both objects on the evening of the 16th in the Western Hemisphere.

Uranus: In the evening sky among the stars of Aries, setting in the overnight hours. Meridian transit times at Greenwich on the 1st, 11th, 21st, 31st—21:36, 20:56, 20:16, 19:36 UT*.

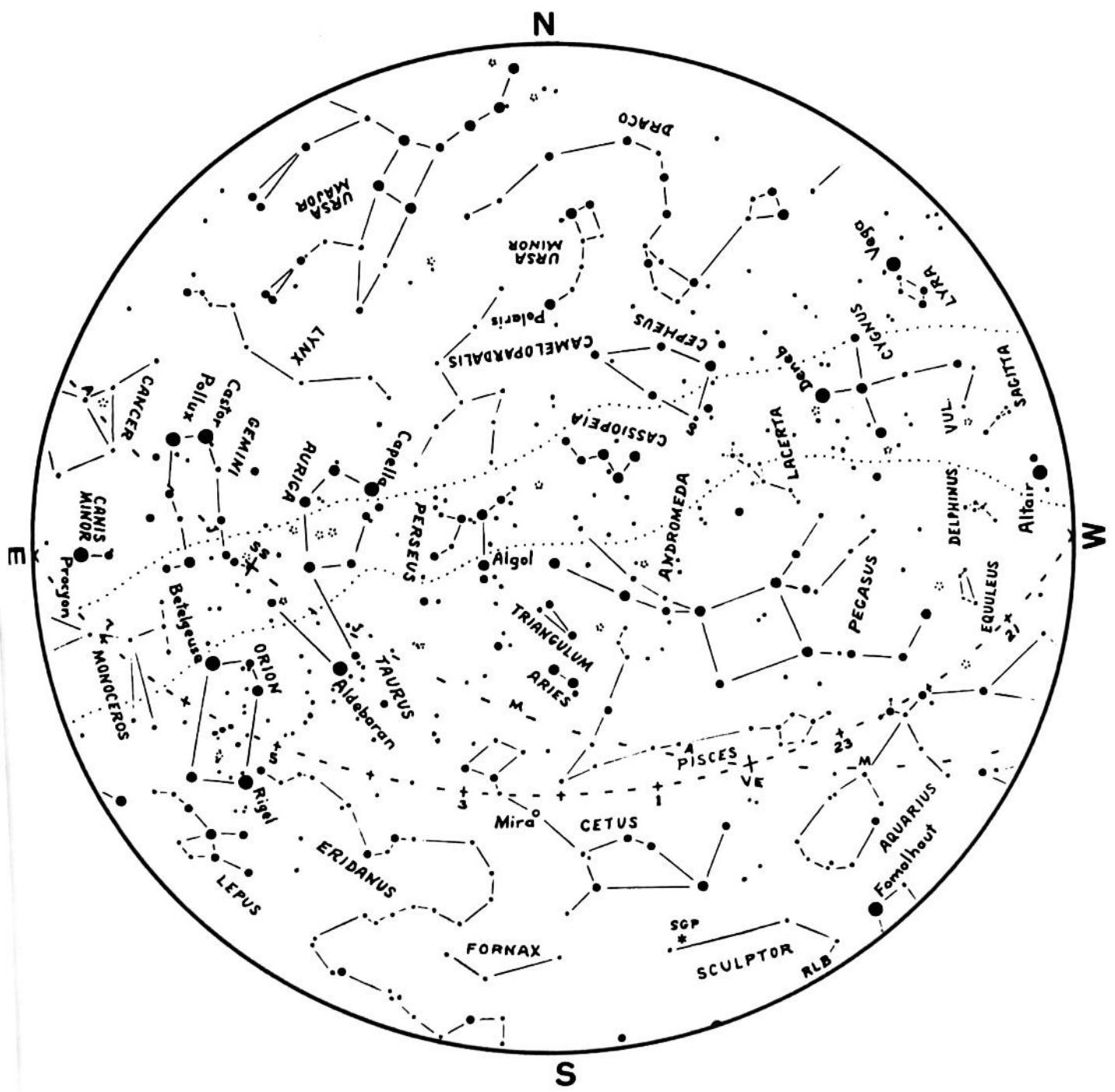
Neptune: In the SW evening sky in Aquarius, setting before midnight local time. Meridian transit times at Greenwich on the 1st, 11th, 21st, 31st—18:34, 17:55, 17:16, 16:37 UT*.

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

Time (UT) d h m			DECEMBER EVENTS	Jupiter's Satellites West East	
Tue. 1					
Wed. 2			Mars at ascending node		
	8		Moon 0.2° N of M35		
Thu. 3	8 00		Algol at minimum		
Fri. 4					
Sat. 5			Mercury at descending node		
Sun. 6	4 49		Algol at minimum		
Mon. 7	22		Vesta 0.5° S of Moon, occultation†		
Tue. 8	0 37		Last quarter		
Wed. 9	1 38		Algol at minimum		
Thu. 10					
Fri. 11	22 27		Algol at minimum		
Sat. 12	21		Venus 0.8° S of Moon, occultation‡		
	21		Moon at perigee (361 773 km)		
Sun. 13					
Mon. 14	12		Geminid meteors peak		
	16 16		New Moon (lunation 1212)		
	19 16		Total Solar Eclipse (p. 134)		
Tue. 15			Algol at minimum		
Wed. 16			Mercury at aphelion		
Thu. 17	4		Jupiter 3° N of Moon		
	5		Saturn 3° N of Moon		
	16 05		Algol at minimum		
Fri. 18					
Sat. 19					
Sun. 20	4		Mercury in superior conjunction		
	12 54		Algol at minimum		
Mon. 21	10 02		Solstice		
	14		Jupiter 0.1° S of Saturn		
	23 41		First quarter		
Tue. 22	9		Ursid meteors peak		
Wed. 23	9 43		Algol at minimum		
Thu. 24	17		Moon at apogee (405 011 km)		
	23		Uranus 3° N of Moon		
Fri. 25					
Sat. 26	6 32		Algol at minimum		
Sun. 27					
Mon. 28					
Tue. 29	3 21		Algol at minimum		
	15		Moon 0.2° N of M35		
Wed. 30	3 28		Full Moon		
Thu. 31					

†Most of E & N Europe, Russia (except NE), China (except SW), Japan, N Philippines, Micronesia

‡Easternmost Russia, Hawaii, W North America



MINUTES OF NOVEMBER MEETINGS

Rick Huziak

Minutes of the Executive Meeting, November 16, 7:00 pm, Online (ZOOM)

Present: Darrell Chatfield, Donna-Lee May, Ron Waldron, Les Dickson, Rick Huziak, Mike Dolan, James Gorkoff, Colin Chatfield, Ike Thiessen, Tim Yaworski, George Charpentier

1. Call to order by Chairperson Mike Dolan at 7:05 PM.
2. Adoption of Executive meeting minutes as published in the November 2020 newsletter. **Motion to adopt minutes as published:** Daryl Janzen, Second: Donna-Lee May – **CARRIED** unanimously.
3. Call for announcements/items to add to agenda.

4. Old business:

- Current slate of officers to be presented / voted upon at the Annual General Meeting. The list was published in the November 2020 newsletter.
- Update on request from Larry Scott re: snowblower maintenance, Sleaford yard maintenance replacement. Mini Tune in Saskatoon fixed the snow blower at Sleaford for \$66. Cam intends to take over Sleaford maintenance (if elected.)

5. New business:

- **Annual Financial Statement** ending Sept. 30 presented by Jim Gorkoff. Discussion ensued:
 - Donna-Lee May suggests not to renew terms until the new treasurer comes on board.
 - Note: Donations can be done on-line or directly to the Centre. - Suggestion that thank-you letters will be sent out for donations.

Motion to Accept Financial Statement: Ron Waldron (as a Director) Seconded by Daryl Janzen. **CARRIED.**

- Should future online Executive and General meetings be on separate links and only the general meeting link posted in the newsletter? Following discussion, the executive rejected separation of meetings. **Motion:** Ron Waldron: **All future on-line meetings be done with a single link & a waiting room.** Second: Mike Dolan. **CARRIED.**

- Darrell Chatfield – grass cutting and snow blowing at Sleaford can be done by the RM for \$125/hr (from town) or can grade during road clearing for \$62.50/hr. Can be done on-call. Defer to discussion with Larry S. or Cam M.
- **Telescope Rental report** – Ike Thiessen (see below)

6. Call to adjourn Executive meeting 7:59 pm – Mike Dolan. CARRIED.

RASC Telescope Rental Activity Report Nov 16, 2020
Ike Thiessen

There has been increased interest and rental on the 3- Meade 8" scopes. These units have been and will be handled at my home, garage, enabling handling of units without going into observatory storage room with Covid restrictions. A desirable upgrade would be 1 or 2 more 90° viewfinders.

Rentals:

- June 23/19, Karnjit Parmar – 8" Meade Skywatcher #3 with Lens kit; June 11, 2020 return to Ike at 334 Begg Cres. Paid 12 months @ \$10 cash delivered to Norma Jensen - \$120.
- Ted Harbridge: Meade 8' with Lens kit taken out June 15 - still out.
- Ward Wurtz: 6" Dob 1 month, July, returned, purchased his own Dob - \$10.
- Tom Regier: Meade 8" with 90° viewfinder - July 16 - still out.
- John Thuringer: Meade 8" - will be returning it this month (Nov. 2020).

Minutes of the Annual General Meeting, November 16, 8:00 pm, Online (ZOOM)

19 members on-line at beginning of meeting

1. Call to order by meeting Chairperson Mike Dolan 8:03 PM.
2. **Adoption of October General Meeting minutes** as published in the November 2020 newsletter.
 - Correction required on second last minute: *Mike Rooney* should be corrected to *Mike Dolan*.

Motion to adopt Minutes with correction. Ron Waldron. **Second** Mike Dolan. **CARRIED.**

3. Vote on National Executive Positions for 2020/2021 – discussion on first five positions (Executive). **Motion to Close Nominations** – Ron Waldron, Second Les Dickson. **CARRIED.** See list of elected position below.
4. Mike Dolan called upon elected president to chair remainder of the meeting. Ron Waldron (new President) takes over meeting.
5. Vote on remainder of slate as presented:

Support Positions

Motion to Open Nominations for Support Positions: – Ron Waldron. Discussion followed.
Motion to Close Nominations for Support Positions: Mike Dolan, Second: Les Dickson. **CARRIED.**

Financial Board of Directors

Board is appointed by the Executive, so are acclaimed.

Motion to Open Nominations to rest of slate– Ron Waldron.

Committees

Motion to Close Nominations for Support Positions: Ron Waldron, Second: George Charpentier. **CARRIED.**

The Slate (as shown below) is DECLARED.

6. Ron Waldron expresses some goals including repair of 16" telescope. Other goals will follow.
7. **Plans for December 14 meeting** in lieu of annual Christmas Potluck:
 - **Sharing Activity** - Each online member will be encouraged to think of one or more unforgettable experiences in amateur astronomy that helped to steer them to pursuing it as a hobby. Festive dress is encouraged! (2 min. time limit)
 - **A Bylaw change is proposed in the November Newsletter to have President and Vice-president to be reduced from 2-year terms to 1-year terms.** Vote will take place in December.
8. **Rick Huziak announced speakers for:**
 - January: Murray Paulson (Edmonton) – *Videoing the 2020 Mars Opposition*

- February: Tim Yaworski – *The National Astrophotography Certificate Program*. Other speakers are requested by Rick Huziak.

9. Annual Financial Statement

- presented by Donna-Lee May on behalf of Jim Gorkoff (temporarily absent).
- Statement **accepted** on behalf of the membership: Donna-Lee May.

10. Auditor:

- **Motion to dispense with appointment of the auditor for the ensuing year.**
Jim Gorkoff; Seconded: Ron Waldron. **CARRIED.**

11. Speaker:

- **Colin Chatfield – Track the Sky**

12. Q&A/Discussion

13. Adjournment: Meeting concluded 9:38 PM.

National Executive Positions 2020-2021

(Voted, accepted or acclaimed)

President - Ron Waldron

Vice-president - Mike Dolan

National Council Rep. - Les Dickson

Secretary - Rick Huziak

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

Support Positions

Past-President – Daryl Janzen

Librarian/Archivist – vacant

Activities Coordinator - Tim Yaworski

Newsletter - Colin Chatfield

Web Master - Gordon Sarty

Sleaford Maintenance Coordinators - Darrell Chatfield, Rick Huziak

Observers Group Coordinator - Larry Scott, Cam McLelland

Speaker Coordinator - Rick Huziak

Membership Coordinator - Mark DeJong

Telescope Rental Coordinator - Ike Thiessen

Meeting Room Coordinator – Daryl Janzen

Photographer - George Charpentier, Mike Dolan

Social Media Coordinator - Colin Chatfield, Tim Yaworski
Observing Certificate Coordinator - Darrell Chatfield

Board of Directors

- Les Dickson
- Norma Jensen
- Ron Waldron
- Tenho Tuomi

Committees (as of November 16, 2020)

Saskatchewan Summer Star Party

- Chair – Les Dickson
- George Charpentier
- Darrell Chatfield
- Ellen Dickson
- Rick Huziak
- Andrew Kostiuk
- Donna-Lee May
- Greg Fusick

Light Pollution Abatement

- Chair – Richard Huziak
- Members – vacant

Sleaford Joint Site Member (RASC)

- Les Dickson Member (RASC) - Darrell Chatfield
(Note: U of S appoints their own members: Daryl Janzen, Sasha Koustov)

Constitution Committee Members

- Jim Gorkoff,
- Les Dickson
- Donna-Lee May

BOOKS FOR SALE

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

“Deep-Sky Observers Handbook”	Volume 1-5	Enslow-Lutterworth	\$40.00
“International Encyclopedia of Astronomy”	1987	Patrick Moore	Color \$10.00
“Backyard Astronomers Guide”	T. Dickinson & Alan Dyer	2008	Color \$25.00
“Atlas of Deep Sky Splendors”	1978	H. Verhenberg	(50.00) B & W \$22.00
“Amateur Astronomers Catalog of 500 Deep Sky Objects”	Vol 1	1980	B & W R. Morales \$15.00
“Observing the Constellations”	1989	J. Sanford	Color charts \$10.00

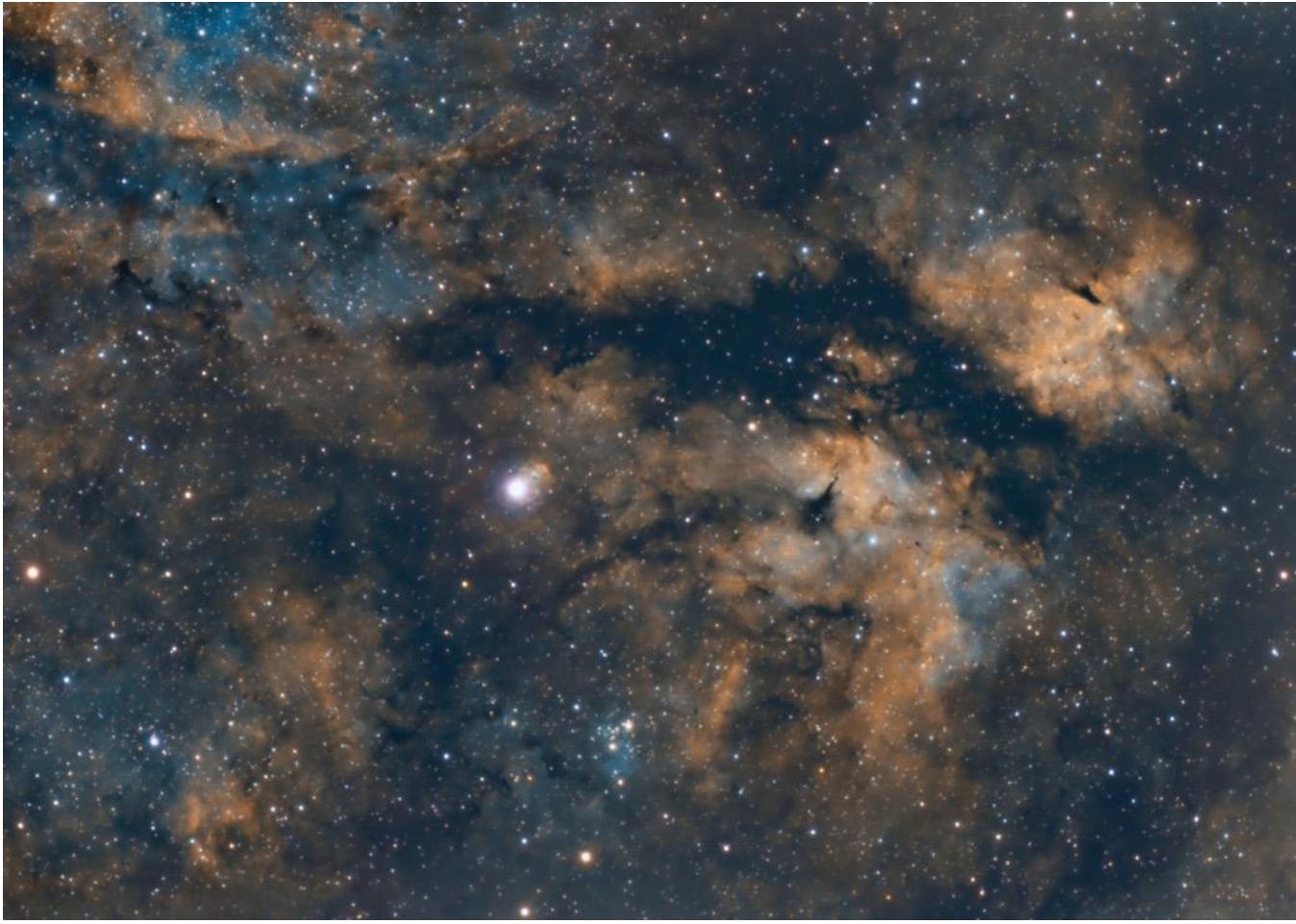
EQUIPMENT FOR SALE

Nigel West has the following for sale:

1. Meade AR 5 refractor with GSO focuser. Very good visual scope \$200
2. Meade 8 inch Schmidt Newtonian with GSO focuser. \$200
3. iOptron ZEQ 25 Centre balanced mount and tripod \$400
4. Orion short tube 80 refractor in carry case. Never used. I was going to use it as a guide scope. Sells for \$110 US. Asking \$50

“The focusers alone now cost \$135 US, so basically the scopes are free! I did imaging with the mount for a couple of years, although probably better for visual, as they are a bit delicate.”

For more information on the above items, contact Nigel at nigel.west@usask.ca.



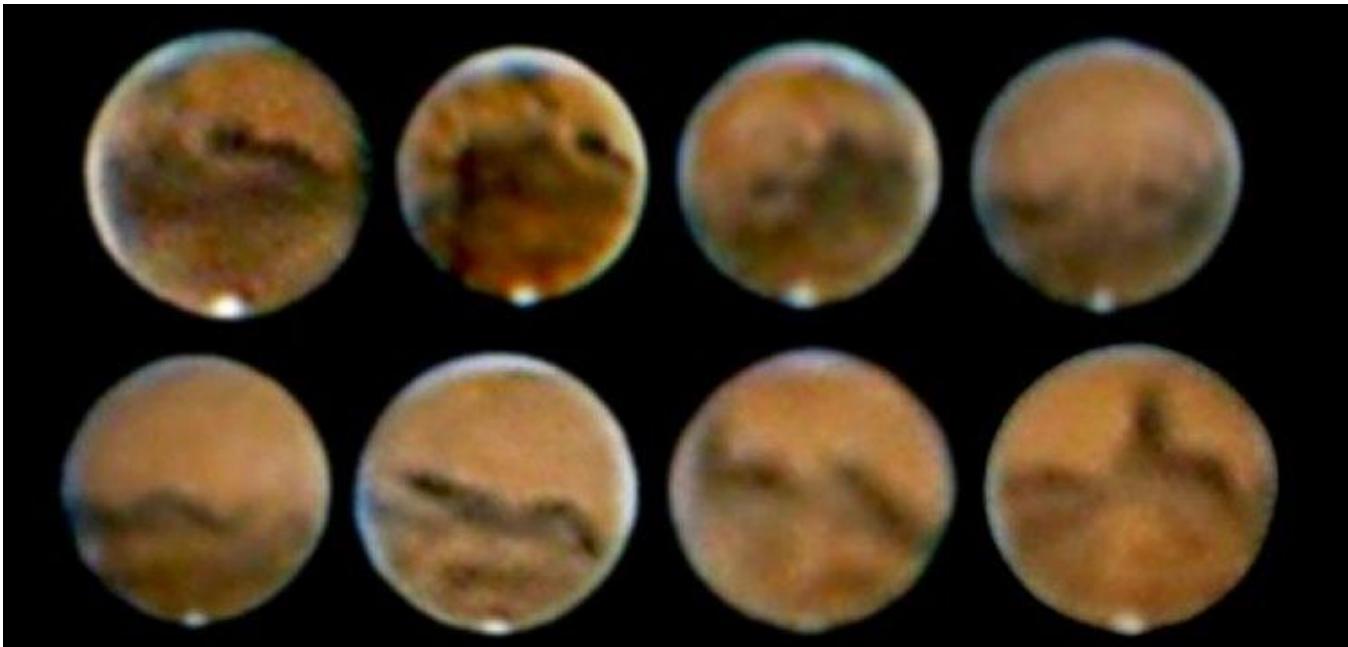
Here is my Sadr star region in SHO Hubble palette. I used my Williams Optics RedCat, ZWO 183MM Pro & Antila narrow band filters. Ha 3.5Nm- 2hours, Olll 3.5Nm-4.1 hours, Sll 3.5Nm-6.3 hours data.

Taken by Stan Noble from his observatory “Far Point Station” in Aneriod

NOVEMBER PICTURES

Tenho Tuomi

I took about thirty pictures of Mars during this year's opposition. I selected eight of them to show Mars through its rotation, about every 45 degrees or 1/8 of turn, to make myself a map of Mars. Pictures are 90 second videos, 60 frames per second at ISO 1600, taken with a Canon T5i camera using eyepiece projection on a 12" telescope, converted to .avi with PIPP, and stacked and enhanced in RegiStax 6.



I took six pictures of comets in November. The brightest of them was comet C/2020 M3 (ATLAS) in Orion on November 14, 20x60sec exposures at ISO 6400 with a Canon T5i camera and Orion XT12 telescope on a Byers 812 mount.



On November 13 there was a nice triangle in the morning sky made by the Moon, Venus and Spica.



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>