

Saskatoon Skies

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

Vol. 46, No. 03

March 2015



Member and astrophotographer Dale Boan took this photo of Northern Lights on Monday, February 16th from Maymont, Sk. A nice albeit slightly annoyed rancher chose not to kick him out of his pasture



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To view *Saskatoon Skies* in colour, see
our Website:

<http://www.usask.ca/rasc/newsletters.html>

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MEMBERSHIP? JOIN TODAY!

Regular: \$82.00 /year

Youth: \$43.00 /year

Family: \$77/year

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. If you do not want to join at this time, ask to get onto our FREE 3-month Temporary Membership list. You will receive regular mailings of our Saskatoon Skies newsletter and will be invited to participate in Centre activities. Members are encouraged to renew early to avoid disruption in publications. Renew through the National Office at <http://www.rasc.ca/join-us>

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)
- use of the Centre library
- borrow the Centre's Data Projector to give astronomy outreach presentations – contact Les Dickson at astrochem@sasktel.net
- rent the Centre's Telescopes <http://homepage.usask.ca/ges125/rasc/telescopes.html>
- discounts to Sky & Telescope Magazine*
- free, no-cost, no-obligation, 3-month temporary membership if you don't want to join right now!

*New subscription or renewal of Sky & Telescope? Send new info or renewal notice, plus credit card # to Norma Jensen, 128 – 4th Street East, Saskatoon, SK S7H 1H8, or email her at norj@sasktel.net.

U OF S OBSERVATORY

The U of S Observatory is open to the general public every Saturday of the year. Admission is free. The observatory is located on campus, one block north of the Wiggins Avenue and College Drive entrance. On clear nights, visitors may look through the vintage 6-inch and tour several displays. Current events are recorded on the Astronomy Information Line at 966-6429.

Observatory Hours:

January-February	7:30-9:30 pm
March	8:30-10:30 pm
April	9:30-11:30 pm
May-July	10:00-11:30 pm
August	9:30-11:30 pm
September	8:30-10:30 pm
October-December	7:30-9:30 pm

SASKATOON CENTRE'S MAIN OFFICERS:

President – James Gorkoff, 306-644-1343

Secretary – Tenho Tuomi, 306-858-2453

Vice-President – Jim Goodridge, 306-370-8530

Treasurer – Norma Jensen, 306-244-7360

Bottle Drive & Canadian Tire \$ By Jim Goodridge

If you cannot make it to a meeting but would like to contribute your Canadian Tire money please call me at 306-370-8530

Newsletter Editor – Ron Waldron
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 rmwaldron@shaw.ca in msword or text format. Images: .jpg please, no larger than 1 – 1.5 MB, sent by e-mail as attached files. **Deadline for submission of all articles for an upcoming issue is the first Friday of the month!**

A separate by-mail subscription to Saskatoon Skies is available for \$15.00 per year. 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 call the editor 306-382-9428 for rates. Members can advertise non-commercial items free of charge.

LIGHT POLLUTION
ABATEMENT
WEBSITE AT:
www.ras.sk.ca/lpc/lpc.htm

RASC CALENDAR OF EVENTS

Feb 16	Executive & General Meeting	J. Goodridge
Feb 21	Observer's Group at Sleaford	Larry Scott
March 7	Observer's Group at Sleaford	Larry Scott
March 21	Messier Marathon at Sleaford	Larry Scott
March 28	Earth Hour at Circle Centre Mall	J. Goodridge
April 18	Observer's Group at Sleaford	Larry Scott
April 24	Astronomy Week Observing at Lakewood Civic Centre	J. Goodridge
April 25	Astronomy Week Daytime Observing at Farmer's Market & Evening Presentation and Observing at Beaver Creek	J. Goodridge

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



March RASC General Meeting

for all members and guests
Room 175 Physics Bldg
University of Saskatchewan

on

Monday, March 16th at 8:00 PM

Darrell Chatfield presents

William Herschel (1738-1822)



the preeminent visual observer of his time and also one of the top telescope makers. Along with his sister Caroline, Herschel observed and catalogued over 2500 objects. These objects along with observations by his son John Herschel, who added about another 2500 objects, form the basis for the NGC catalog.

There will be an Executive Meeting at 7:00 PM

Minutes of the Executive & General Meetings – January, 2015

President Jim Goodridge opened the Executive meeting at 7 PM.

Moved by Les Dickson and Darrell Chatfield that the minutes of January 19 Executive meeting be adopted as circulated. Carried.

Note about wrong February meeting date in the minutes.

Committee Reports:

Observing Co-ordinator Report by Norma Jensen – Snow blower broke down.

Moved by Norma Jensen and Ron Waldron that up to \$2500 be spent for a new snow blower for Sleaford. Carried. (This has to be voted on at the General Meeting)

Newsletter Report by Ron Waldron:

- Next deadline March 6.
- Ron announced that he will be stepping down as editor in October and invites someone to work with him on the September and October newsletters to take over the job.

Fundraising Report by Jim Goodridge – Giving up on the Sobeys' gift cards.

Sleaford Site Report by Darrel Chatfield:

- Shed door working well now.
- Old observatory not taken down yet.

Events:

- Earth Hour, March 28 at the Centre Mall.
- Astronomy week, April 24 at the Lakewood Civic Centre, April 25 solar observing at the Farmer's Market during the day, and Beaver Creek in the evening.

SSSP Update by Les Dickson:

- SSSP on August 12 to 16.
- Speakers have been arraigned.
- Registration opens March 12.

National Report by Jim Goodridge:

We are looking into teaming up with the Calgary Centre for a 2017 Solar Eclipse tour.

Saskatchewan Light Pollution abatement Committee by Rick Huziak:

- Still working on getting light pollution abatement into city by-laws.

Other Business:

Lorin Briand announced that Wayne Schlapkohl has agreed to be on the board of directors for the Alsask Radio Observatory.

We agreed to provide a letter of support for the Alsask Radio Observatory project.

Ron Waldron mentioned a request for astronomy observing at the June 6 Children's Festival.

Tim May talked about what has been done on the focusing problems of the Sleaford 16" Meade telescope, and what still needs to be done.

Moved by Ron Waldron and Darrell Chatfield that up to \$500 be spent on repairs for the 16" Meade. Carried.

Executive Meeting adjourned at 7:45 PM.

The General Meeting opened at 8:13 PM.

Moved by Ron Waldron and Jim Young that the Financial Statements for 2014 be accepted. Carried.

Moved by Norma Jensen and Les Dickson that up to \$2500 be spent for a new snow blower for Sleaford. Carried.

Notes were exchanged about recent observations of the Venus/Mercury pair and Comet Lovejoy.

At 8:26 PM Lorin Briand gave a power point presentation of the Alsask Radio Observatory Project – An Update on a Radical Idea, and took many questions from the audience.

The meeting adjourned at 9:35 PM.

RASC Saskatoon Centre Financial Report October 1, 2013, to September 30, 2014

by Norma Jensen, Treasurer	Current Year Sept 30, 2014	Previous Year Sept 30, 2013
Revenue		
Membership fees	\$ 2,224.15	\$ 2,721.35
Public Education	-	-
Retail Sales	437.00	1,135.94
Donations	461.02	529.00
Fundraising		
Star Party	15,860.56	19,447.57
Dinners, Raffles, etc.	-	63.00
Telescope Rentals	70.00	135.00
Advertising	-	-
Sobeys gift program	-	240.00
Interest	431.90	159.49
Total Revenue for the Year	<u>\$ 19,484.63</u>	<u>\$ 24,331.35</u>
Expenses		
Public Education / LPAC	\$ 484.44	\$ 363.4
Taxes & Licences	-	65.00
Saskatchewan Summer Star Party	14,331.64	16,398.40
Utilities	1,126.57	576.22
Insurance	1,565.00	1,627.00
Repairs & Maintenance	1,129.20	683.40
Office Supplies & Postage; Newsletter	915.20	692.01
Retail Sales	471.07	918.07
Depreciation	1,292.85	1,282.46
Total Expenses for the Year	<u>\$ 21,351.97</u>	<u>\$ 22,606.01</u>
Net Surplus (Deficit) for the Year	<u>\$ (1,821.34)</u>	<u>\$ 1,725.34</u>

Assets				
Cash – on hand	\$ -			
– in bank	3,042.03			
– less outstanding cheques	(1,803.79)			
Total Cash	\$ 1,238.24	\$ 1,238.24	\$ 7,079.48	
Term Deposits		29,151.30	34,678.67	
Raffle Fund		30.14	430.14	
Fixed Assets				
Equipment		24,564.14	24,363.73	
Other Assets - Retail Inventory		502.00	481.00	
Total Assets	\$ 55,485.82	\$ 55,485.82	\$ 67,033.02	
Liabilities - Accounts Payable		-	\$ 9,715.86	
Surplus (Deficit)				
Balance Forward	\$ 57,314.16			
Current Year Surplus (Deficit)	(1,831.34)			
Balance end of Year	<u>55,485.82</u>	55,485.82		
Total Liabilities and Surplus	\$ 55,485.82	\$ 55,485.82	\$ 67,033.02	

Science or Sensation (Part 1) – Vance Petriew Regina Centre

Editor's Note:

This article by Vance Petriew of the Regina Centre is the first of two articles. Part II will appear when it is finished. Thanks to Rick Huziak for securing Vance's permission to print this article here as well as in the Regina Centre's.

Astronomy is something I've enjoyed for many years and I derive great pleasure out of helping people learn about the night sky. It feels good when you can show someone the rings of Saturn for the first time, or give them their first real close-up of the lunar surface. It's also very rewarding to watch a new person's face light up when they finally grasp some astronomical concept that they had never thought of before. Many amateur astronomers enjoy this aspect of the hobby and often volunteer at local events to share their interest in astronomy with the general public.

One of the most influential instruments of all time has been the Hubble telescope which has set the bar high with its dramatic imagery and intriguing discoveries. Many of the images provide us with some wonderful eye-candy to get our imaginations soaring. To put it bluntly, they are Sensational!

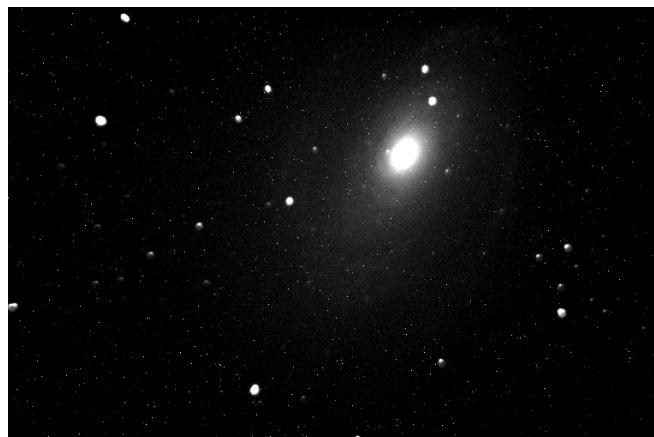
On the flip side, why do the professional astronomers want to take such a pretty picture of the sky? Do they like taking pretty pictures or is there some ulterior motive? Well as it turns out, professional astronomers request time on large telescopes by submitting a proposal explaining some scientific research that they plan to do with their telescope time. To put it bluntly, they want to do Science.

Amateur astronomers, on the other hand, don't have to ask permission to get telescope time. They've purchased their telescopes up front to give them the freedom to image whatever they want when the skies are clear. Without a doubt, the majority of the amateur astronomers start off in astrophotography taking pretty pictures. This is a natural place to start as the brightest things in the sky are the easiest to image. Of course, Astronomy magazines are full of pretty pictures that display a host of detail, color and Sensation. Learning to do astrophotography is fun and can create a feeling of great reward and accomplishment when done well. But how many amateur astrophotographers think about their imaging like professional astronomers do? Professional astronomers want to take measurements to try and learn something new every time they book time on a telescope. For sure, they love

the pretty pictures too, but it's really the science that they find interesting and motivating. Bit by bit, the professionals are contributing to the greater knowledge of astronomy with each imaging session they do and each scientific paper they write. I'm sure they feel very privileged to be contributing to greater pool of science in this way.

As I thought about this idea of Science vs. Sensation, I came up with idea of finding a target in the sky that can accomplish both Science and Sensation at the same time. In other words, what part of the sky can I image that can take both a pretty picture and do real Science, too? Since my Celestron CPC-800 is not a large telescope, it limits me to the brighter objects in the sky. I went looking online to see if I could find something of interest but nothing caught my eye. I then decided to go looking on my own and found exactly what I was looking for right away: M81.

At our last astronomy club meeting in February of 2015, I gave a presentation about how I created the Asteroid 2004 BL86 video from start to finish. In the first half of the presentation I talked about two main topics: calibrating images and stacking images. Now I'm no expert at this by any stretch of the imagination but I have some experience with this from doing science. So here's some examples of what's possible using an 8-inch telescope and some astronomical imaging software. The software I use is called Maxim DL but there are other software programs out there that work well, too.



Here is a 3 minute uncalibrated exposure of M81 using my SBIG ST7-XME camera. This is what I see as the images come off the camera. CCD imaging sensors are generally quite noisy as you can see in the above image. Reducing the temperature of the CCD sensor is one way to help minimize the noise. My CCD sensor was cooled to -30 degrees Celsius for these images to help keep thermal noise low.



This is M81 after it has been calibrated using Bias and Dark frames. This eliminates the little white dots. Flat-field calibration frames have also been applied, making the spiral arms slightly more visible as the pixels are adjusted to create a mostly flat background.

Looking at the picture above, it doesn't look like much compared to what we see in the magazines. The stars are not round and there is very little detail visible in the galaxy. Part of the problem with the above image is that it has not been stretched to show the faint details like pretty pictures normally do.

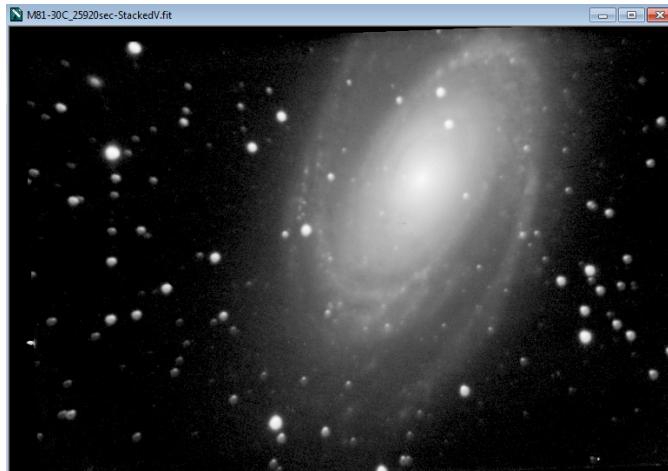


In this image, I've stretched out the pixel values so that some of the fainter details can be seen. This is starting to look a little better but as we can see, the background sky has been stretched to the point where some of the brighter pixels are starting to show, giving it a speckled look. The general shape of the galaxy is visible and some of the knots in the spiral arms are starting to show up. However, this is only a 3 minute exposure. What we need is more imaging time so that the fainter galaxy details can be recorded by the camera.

So how do we get more imaging time? Consider this: a digital image can be thought of as a big spreadsheet with numbers in each cell. Each cell in the spreadsheet corresponds to one pixel in the camera. The value in each cell represents how many electrons were counted/stored by the light passing through each pixel. So in reality, the CCD image is a grid of integers. The nice thing about numbers is that they can be added together. This is what happens when images are stacked on top of each other. The values of each pixel in each image grid are added together using simple addition.



The above image is a stack of sixteen 3-minute exposures which added together, gives an effective exposure time of 48 minutes. This is looking much better as we can start to see a lot more definition in the spiral arm structure. The outer edges of the galaxy are starting to glow as the thinner parts of the galaxy are starting to be captured by the camera.



So this is my attempt at showing a Sensational image of M81 using my 8-inch telescope and CCD camera. The above image has an effective exposure length of 432 minutes or 7.2 hours. Notice how the outer edges of the galaxy extend even further than the 48 minute image. There is some mottling visible within the disk and the dust lanes close to the core are also faintly visible. While there is lots of detail in the above image, it has not been processed to pull out any of the finer details like is normally seen in pretty pictures. What's also interesting to note is that the details in this long exposure were also recorded in the first 3 minute image I showed. The problem was that the Signal-to-Noise ratio (SNR) was too small to make the details visible. By stacking images, we improved the SNR to the point where we could see the details.

The last picture below is the next step in creating a pretty picture. There are many techniques that can be used to process the image and because I'm not interested in this part as much as the science, I haven't spent much time learning how to process images well. There are a couple things I do know and one of them is that you can't enhance something if there isn't enough signal there to play with. Therefore, the goal is to always create lots of signal which I did by exposing for 7.2 hours. The second thing I know is that there is some art and finesse involved in creating a picture that is aesthetically appealing to the eye, which is the goal of most pretty picture astrophotographers. They want lots of color, contrast and detail to be shown as is pleasingly possible. It is not uncommon to spend a couple hours trying to improve the image through processing. As a recent presenter at the SSSP expressed, it's far too common that astrophotographers over-process their images and create artifacts and distortions and bring the picture further away from realism. Nevertheless, image processing can produce some pleasing results if not overdone. The image below has a simple unsharp mask applied to it to help enhance the contrast in the light/dark regions within the disk.



I am happy enough with above image of M81 and I can see there is lots of room for improvement. If Sensation is what you are looking for when you start down the path of astrophotography, then I hope this article has given you some incentive to give it a try.

The cool part to me is that this is only half of the story of what's going on. I left a clue in this article that maybe you spotted that hints at what's coming next. Nevertheless, stay tuned in for Part 2 of this article where I'll explore the Science side of imaging.

Observing Clubs and Certificates

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. Jeffrey, D. Chatfield, B.
Christie, K. Noesgaard,
M. Stephens, B. Hydomako, T. Tuomi, L.
Scott, G. Charpentier, B. Johnson, M.
Clancy, L. Dickson, B. Burlingham, K.
Houston, Norma Jensen*

Ron Waldron	105
Wade Selvig	75
Garry Stone	57
Bernice Friesen	45
Wayne Schlapkohl	43
Barb Wright	40
Ellen Dickson	34
Jeff Swick	24
Graham Hartridge	9

Chatfield BINOCULAR CERTIFICATE

Certified at 35 to 40 Objects:

*M. Stephens, T. Tuomi, M. Clancy,
R. Huziak, K. Maher*

Jim Goodridge	12
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FINEST NGC CLUB

Certified at 110 Objects:

*R. Huziak, D. Jeffrey, G. Sarty,
D. Chatfield, T. Tuomi*

Larry Scott	Done!	110
Scott Alexander		97
Norma Jensen		72
Sandy Ferguson		23
Kathleen Houston		23
George Charpentier		13
Mike Clancy		7

EXPLORE the UNIVERSE

Certified at 55 to 110 Objects:

*M. Clancy, T. Tuomi, K. Maher,
B. Gratias*

Wayne Schlapkohl	Done	55
Jim Goodridge		35
Sharon Dice		31

Isabel Williamson Lunar

Observing Certificate

Certified at 140 Objects:

T. Tuomi

Norma Jensen	133
Jeff Swick	29

HERSCHEL 400 CLUB

Certified at 400 Objects:

*D. Jeffrey, R. Huziak, D. Chatfield, T.
Tuomi*

Gordon Sarty	251
Scott Alexander	117
Sandy Ferguson	18
Larry Scott	20

HERSCHEL 400-II CLUB

Darrell Chatfield	Done!	400
Tenho Tuomi	New!	343
Rick Huziak		246

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 on the National website.

On-line Messier and Finest NGC lists, charts and logbooks: <http://www.rasc.ca/observing>

On-line Herschel 400 List: <http://www.astroleague.org/al/obsclubs/herschel/hers400.html>

Binocular List is at: http://homepage.usask.ca/%7Eges125/rasc/Chatfield_Binocular_List.pdf

"Isabel Williamson Lunar Observing Program Guide:

<http://www.rasc.ca/observing/williamson-lunar-observing-certificate>

Program details can be found at: <http://www.rasc.ca/williamson/index.shtml>