STARDUST

Newsletter of the
Royal Astronomical Society of Canada
Edmonton Centre

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M 42 in Orion. Image by Franklin Loehde and SLOOH.
Ten minute exposure, edited with FilterStorm on an iPad mini 2

Inside this Issue

RASC Edmonton Centre Contact Information *see also http://edmontonrasc.com/contact/*

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On the web http://edmontonrasc.com
http://www.facebook.com
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http://www.youtube.com/user/edmontonrasc

Stardust submissions: Submit articles by email to the editor (see above). Please include the word **Stardust** in the subject. **Submission deadline** is the 2nd Sunday before the monthly meeting; see following page for dates. Any standard document format is acceptable (MSOffice, OpenOffice, LibreOffice, et al.) but **plain text is preferred**. Do not try to layout and format your article; your labour will only be discarded. Graphics may be submitted as separate files, and clearly identified; indicate captions and references to them within the text. Do not consider your article successfully submitted until you receive a confirmation email from the editor.

Upcoming Events, Meetings, and Deadlines

Regular Meetings are held monthly (see below) from September to June at 7:30pm in TELUS World of Science, 11211 – 142 St. **Admission is free**, and **everyone is welcome** to attend, member or not. Follow the signs from the main entrance. **Observers meetings** are held monthly (see below) at **Boston Pizza in The Mayfield Common**, NE of intersection of 170 Street and Stony Plain Road. Contact the observing_group @ edmontonrasc.com for details.	**Council meetings** are held monthly (see below) from September to May at 7:15 in room 1-033 of the CCIS* Building on the U of A campus. Any RASC Edmonton member may attend. * Centennial Centre for Interdisciplinary Science

MEETINGS

2017	Regular	Council	OBS	New Moon	Full Moon	Blackfoot
Jan	9	23	16	27	12	20,21
Feb	13	27	6	26	10	17,18,19
Mar	13	27	6	27	12	24,25
Apr	10	24	3	26	11	21,22
May	8	15 *	3 Wed	25	10	19,20,21
Jun	12	—	5	23	9	23,24
Jul	—	—	10	23	8	21,22
Aug	—	—	9 Wed	21	7	18,19
Sep	11	25	6 Wed	19	6	15,16
Oct	16 *	23	2	19	5	13,14
Nov	13	27	6	18	3	17,18
Dec	11	—	4	17	3	15,16

*** indicates date bumped by statutory holiday**

Edmonton Area Astronomy Discussions:	**astro@mailman. srv. ualberta. ca**
To subscribe, send a blank email to:	astro-request@mailman. srv. ualberta. ca
with the subject line:	`subscribe`

The above mailing list is completely independent and is not associated with RASC Edmonton Centre in any way.

President's Message *by Sharon Morsink*

Lakeland Provincial Park in Northeastern Alberta is the newest Dark Sky Preserve. It was officially opened as a Dark Sky Preserve on Earth Day (April 22) this year. A group of Edmonton RASC members visited Lac La Biche for the opening ceremonies. They brought along their telescopes and hosted a public solar viewing event for the people of the town. As is usual, the sky was cloudy in the evening, but it looks like an excellent place for observing the night sky!

Designating parks as dark sky preserves will hopefully help educate people about the problems associated with light pollution, as well as halting the spread of wasteful light. The Alberta Provincial Parks service plans to make Lois Hole Provincial Park (Northwest of Edmonton) another Dark Sky Preserve. It's certainly exciting that there is interest in preserving the night sky.

Astronomy Day was celebrated on April 29 here in Edmonton. We hosted an event at the RASC Observatory at TELUS World of Science, inside TWOS, as well as sidewalk astronomy events in Edmonton and St Albert. This is one event that would work well at the Queen Elizabeth Planetarium once it is renovated. It would be an excellent location for our displays, for astronomy talks, and for telescope clinics. While the QEP may not be ready for the 2018 Astronomy Day celebration, we can certainly plan for events such as this taking place later in 2018 and in the future!

Clear Skies!
president@edmontonrasc.com

Dark Sky Lighting *by Tom Owen*

Edmonton's light pollution is a concern for all of us who love dark skies. But there are ways each of us can act locally to minimize it. The following modified article is taken from the International Dark Sky Association website: darksky.org. The Home Depot sells approved lighting fixtures.

Outdoor Lighting Basics

Modern society requires outdoor lighting for a variety of needs, including safety and commerce. IDA recognizes this but advocates that any required lighting be used wisely. To minimize the harmful effects of light pollution, lighting should

- Only be on when needed
- Only light the area that needs it
- Be no brighter than necessary
- Minimize blue light emissions
- Be fully shielded (pointing downward)

The illustration below provides an easy visual guide to understand the differences between unacceptable, unshielded light fixtures and those fully shielded fixtures that minimize skyglow, glare and light trespass.

Types of Light

Most people are familiar with incandescent or compact fluorescent bulbs for indoor lighting, but outdoor lighting usually makes use of different, more industrial, sources of light. Common light sources include low-pressure sodium ("LPS"), high-pressure sodium ("HPS"), metal halide and light emitting diodes ("LEDs").

LPS is very energy efficient, but emits only a narrow spectrum of pumpkin-colored light that some find to be undesirable. Yet, LPS is an excellent choice for lighting near astronomical observatories and in some environmentally sensitive areas.

HPS is commonly used for street lighting in many cities. Although it still emits an orange-colored light, its coloring is more "true to life" than that of LPS.

In areas where it's necessary to use white light, two common choices are metal halide and LEDs. One of the advantages of LED lighting is that it can be dimmed. Thus, instead of always lighting an empty street or parking lot at full brightness, LEDs can be turned down, or even off, when they aren't needed and then brought back to full brightness as necessary. This feature both saves on energy and reduces light pollution during the night.

Because of their reported long life and energy efficiency, LEDs are rapidly coming into widespread use, replacing the existing lighting in many cities. However, there are important issues to consider when making such a conversion. See our LED Practical Guide for more information.

Color Matters

It is crucial to have fully shielded lighting, but we now know that the color of light is also very important. Both LED and metal halide fixtures contain large amounts of blue light in their spectrum. Because blue light brightens the night sky more than any other color of light, it's important to minimize the amount emitted. Exposure to blue light at night has also been shown to harm human health and endanger wildlife. IDA recommends using lighting that has a color temperature of no more than 3000 Kelvins.

Lighting with lower color temperatures has less blue in its spectrum and is referred to as being "warm." Higher color temperature sources of light are rich in blue light. IDA recommends that only warm light sources be used for outdoor lighting. This includes LPS, HPS and low-color-temperature LEDs. In some areas, the white light of even a low-color-temperature LED can be a threat to the local nighttime environment. In those cases, LPS or narrow-spectrum LEDs are preferred choices.

Finding What You Need

IDA doesn't sell dark sky friendly lighting, but our Fixture Seal of Approval program makes it easy for you to find the right products. The FSA program certifies dark sky friendly outdoor lighting – these are fixtures that are fully shielded and have low color temperature.


Examples of Acceptable / Unacceptable Lighting Fixtures
Unacceptable / Discouraged
Fixtures that produce glare and light trespass
shield too small
ineffective
Unshielded Floodlights
or Poorly-shielded Floodlights
Unshielded Wallpacks
& Unshielded or
Poorly-shielded Wall
Mount Fixtures
shield
ineffective
exposed
polished
reflector
Drop-Lens & Sag-Lens Fixtures
w/ exposed bulb / refractor lens
Unshielded Bollards
Unshielded Streetlight
Unshielded Barn
Light
Louvered
'Marine' style
Fixtures
Unshielded
'Period' Style
Fixtures
Unshielded PAR
Floodlights
Drop-Lens Canopy
Fixtures
Acceptable
Fixtures that shield the light source to minimize glare and light trespass
and to facilitate better vision at night
flat lens
Full Cutoff Fixtures
Fully Shielded
Wallpack & Wall
Mount Fixtures
Fully Shielded Fixtures
Full Cutoff Streetlight
Fully Shielded
Barn Light
Fully Shielded
Walkway
Bollards
Fully Shielded
Decorative
Fixtures
bulb shielded
in opaque top
Fully Shielded
'Period' Style
Fixtures
bulb shielded
in opaque top
Shielded / Properly-aimed
PAR Floodlights
Flush Mounted or Side
Shielded Under Canopy
Fixtures

A Truly Celestial Marathon *by Warren Finlay*

Some amateur astronomers like epic challenges. Whether it's completing the Herschel 2500 list, completing a Messier marathon, or tracking down all the Palomar globular clusters, there's something about a big challenge that supercharges life. That's also partly why more than half a million people run a marathon every year. The human psyche is at its best when pursuing a difficult objective, offering a Harry Potter-like spell that keeps life's Dementors away. New challenges are particularly effective in this regard. And have I got a new challenge for you! But first some background.

About 40 years ago, a few amateur astronomers figured out that with careful planning and a lot of practice, it was possible to observe all 110 of the Messier objects in a single night. This is of course now known as a Messier marathon. The first successful attempts were made by two Americans, Gerry Rattley and Rick Hull, on the same night in 1985. Since then, a hundred or so people around the world give it a try every year with a few succeeding most years.

Now fast forward to 2016. A runner stands on a lava field on Maui, Hawaii, shielding his eyes as he carefully watches the last bits of the sun's orb sink into the horizon. Assured that the sun has completely set, he heads off running at a pace befitting a marathon. He will run on and off all night, repeating an out-and-back route of about 10 km several times. Waiting for him beside the start/finish line of each lap are his telescope (a 10" manual Dobsonian with 1X red dot finder) and binoculars, ready to be aimed at each of the Messier objects. His plan: complete both a running marathon (42.195 km) and observe 110 deep-sky objects between sunset and sunrise. Nobody has tried this before. He doesn't know if it can be done. But he has spent months training: over 600 km of running, and more than 50 hours of practice finding his chosen night sky objects, honing his physical stamina and observational acumen. He will try.

Recipe for a Bimarathon

Ingredients

42.2 kilometer of running
One telescope
Binoculars
One spectacularly clear night
110 of the best deep-sky objects,
including the Running Man Nebula
Optional: one herd of goats

Instructions: Combine ingredients between sunset and sunrise. Mix for about 12 hours, but this will vary depending on fitness and observing ability.

After 45 minutes of running, it's now dark and the runner finishes his first leg and quickly transitions to his telescope. He methodically finds and observes 37 Messier objects. In a fitting tribute to his plan of running a marathon that night, he also observes a beautiful nebula called the Running Man Nebula (NGC 1973-75-77) that is not on the Messier list. Checking his watch he finds he's ahead of schedule, so he observes another 7 bonus deep-sky objects in case clouds cause him to miss some

Messier objects later in the night. Within an hour of finishing his last run, he is off running again. Nearly immediately his left knee begins hurting and protests violently over the next hour as he plods up and down an undulating narrow road that bisects a lava field. The pain gets so bad his knee buckles occasionally, forcing him to break stride and walk briefly. But he knows he has to keep running, or he will not finish in time. Excruciating pain jolts him as he accelerates back up to running speed. The hills are so painful he has to walk some of them. He doesn't think he will finish this marathon. But he keeps running through the black night that surrounds him.

Stumbling back to his telescope, he finds and observes another 20 Messier objects. Then he has to wait. The Earth must rotate for a few hours before more Messier objects will come into his view. At the pace he's been running, he can afford a rest. He stretches his legs, doing some physiotherapy exercises for his knee. After downing some high calorie food and some water, he reclines in the driver's seat of his car and tries to catch a nap. His observing buddy is still working his way through the assigned list of telescope objects. Headlights from an arriving car blast the parking lot with obtrusive light. Two revelers hop out, and one of them starts playing a ukulele, the sound of nearby surf playing to its own different rhythm. Sleep eludes our running man. Top 40 tunes emanate from the new arrivals' car stereo. Giving up on his nap, and anxious to see if his knee has mended, the intrepid marathoner heads off ahead of schedule for a 50 minute run. His knee is no better, but no worse. Despite the pain, his physiotherapist told him he wouldn't damage his knee, so he keeps going. Running in the dark, his other senses are heightened. Strong smells left by feral goats assault his nose when he runs through gullies. He hears Hawaiian owls calling and is glad he's not prey for them.

When he returns to his telescope, he observes 13 more Messiers plus the prettiest object of the night: Omega Centauri, a glittering star cluster that is the remains of an old galaxy. It makes him feel small. Shortly after 2 am, he is off running again. He is supposed to run 70 minutes. He doesn't think his knee will allow it. He tries mental coping techniques to manage the pain. Looking at his GPS, he starts estimating how long it will take to finish the marathon distance. He realizes that if he can just get through this running session, he will only have 4 km left to run. He might actually do this.

And then he sees 3 pairs of eyes close to the ground blocking the road ahead. As he continues running toward the eyes, his headlight starts to show body shapes. Three feral goat kids appear in his light and take off, running ahead of him down the road. They are immediately joined by a herd of adult goats. One of the kid goats isn't as fast and bleats loudly, afraid he's about to be eaten. Roadside fences block the herd's escape from the road, so they wheel around and are soon thundering back down the road straight at our runner. He keeps running, staying as far to the right as he can on the narrow road. The goats stay to his left and run past him going the opposite direction. Who knew that goats follow right-hand traffic rules.

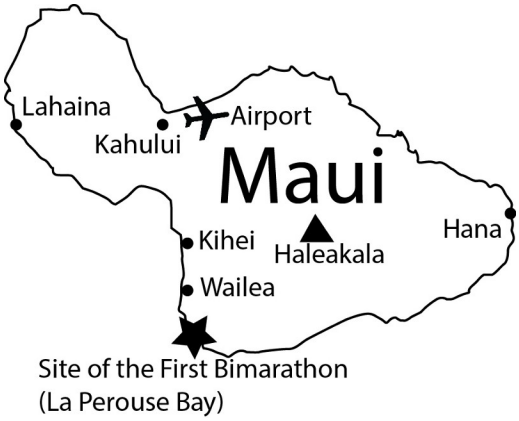
He manages to finish his running session. After some quick stretches, and a drink of water, he's back at the telescope. He finds 29 more Messier objects. The Milky Way stretches in an amazing arc across the eastern sky. He takes some long exposure photos of the scene while waiting for more Messiers to rise.

At 5 am he begins his last session with his telescope, and passes the 110 deep-sky object milestone. There is no time to celebrate though. The first signs of dawn are starting to show as he heads off on his final run. At 6:09am his GPS reads 42.2 km. He stops running, with a half hour to spare before sunrise. And now he knows it can be done. With a contented nod to the setting Jupiter, he celebrates as the sun rises.

Finlay at his telescope in Maui near the end of his March 9/10, 2016 bimarathon. The Milky Way arcs across the eastern sky.

The above text is an account of the first “bimarathon”, successfully completed by me on March 9/10, 2016 near La Perouse Bay, Maui. To verify and support my bimarathon, I was joined by fellow amateur astronomer, Luca Vanzella, who himself successfully observed the same list of deep sky objects that night and kindly guarded my gear while I completed my running sessions. The final tally of observed deep sky objects included all the Messiers except M 30, for which the Running Man Nebula was substituted, plus NGC 457, NGC 663, NGC 752, the Double Cluster, Stock 2, Omega Centauri, and NGC 3384.

Less than six months prior, on a cool autumn day I stood at the base of the Athabasca Glacier in the Canadian Rockies with my wife along with fellow amateur astronomers Luca Vanzella, Alister Ling and Kent Martens. We were there as volunteers to show tour guests a few deep-sky objects in our telescopes. It was threatening to be a cold night at the eyepiece, and my wife joked that we should keep warm by running laps between views through the telescope. That remark was the seed that led to the crazy idea of the bimarathon. Five months of planning and training, and the deed was done.



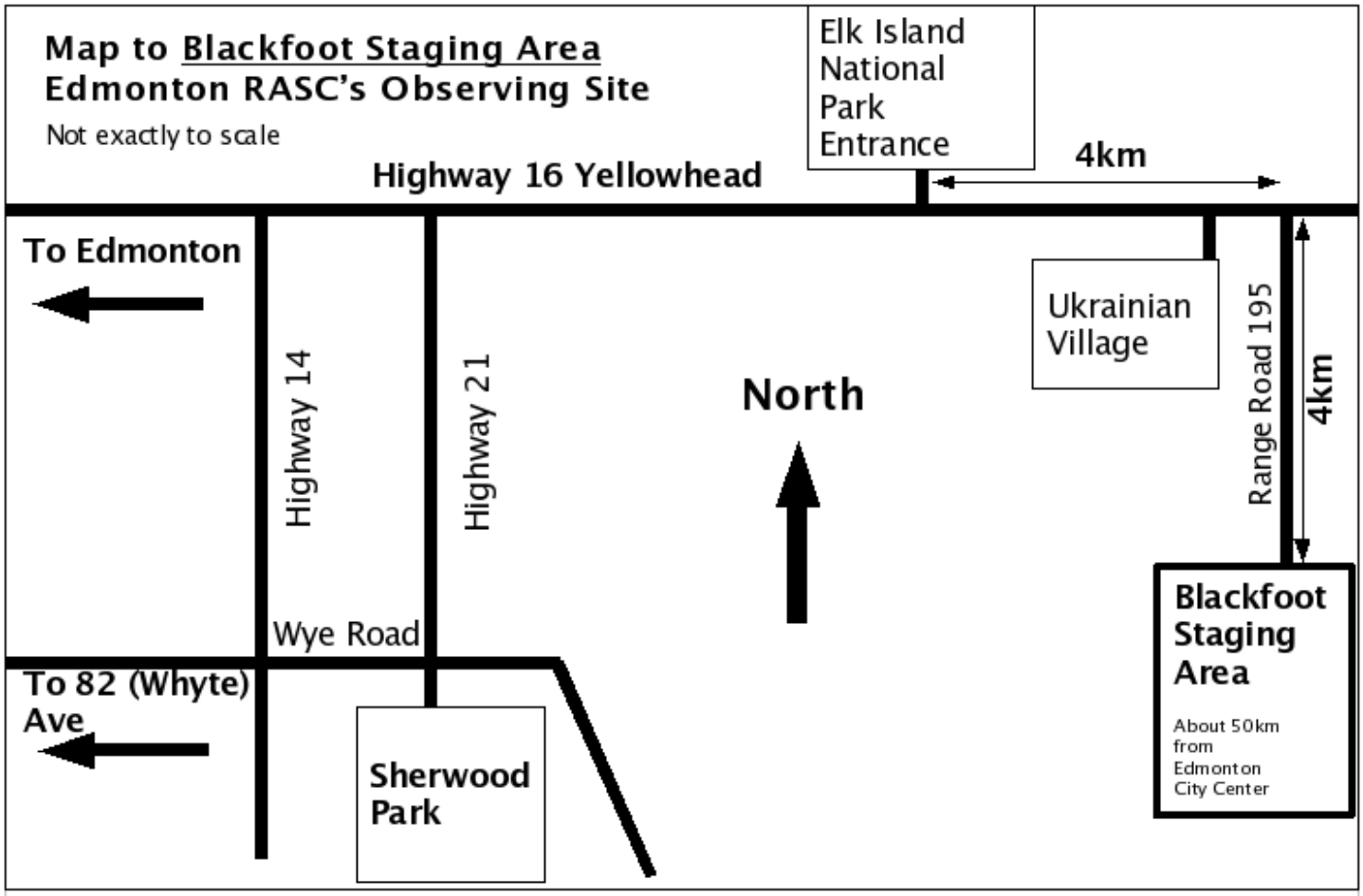
So now that it’s been proven possible, you have a truly unusual new challenge to try. It’s a fairly extreme test of physical and mental stamina. To date only one person has done it, so you’re in rarified company. I give some tips for a successful bimarathon at the website warrenfinlay.com/bimarathon.html, some of which are copied below.

As far as challenges go, the bimarathon requires an interesting combination of skills. Well-honed astronomy skills can make up a lot of time in the night, allowing runners with average or even slower marathon times to finish before sunrise. Faster runners can get away with a little less astronomy experience, but with 110 objects to find, a lot of time can be wasted searching for wayward Messiers. With only one completed bimarathon on record, the optimal combination of running and astronomy skills remains to be determined. Why not give it a try? Be sure to get your attempt listed in the Bimarathon Hall of Fame (see the aforementioned website). And once you’ve managed to finish a bimarathon, the sky’s the limit . . .

Tips for Completing a Bimarathon (from warrenfinlay.com/bimarathon.html)

- For observing the Messier deep-sky objects as part of a bimarathon, see *The Year-Round Messier Marathon Field Guide* by Harvard Pennington, or *The Observing Guide to the Messier Marathon: A Handbook and Atlas* by Don Machholz
- Use astronomy software such as SkySafari or Astroplanner to determine which objects are best viewed at what times of the night for your location and dates, and carefully plan the order in which you will observe your objects. For the Messier objects, the Messier marathon books noted above give suggestions for search sequence.
- Lights at night prevent seeing deep-sky objects, so choose a rural location with minimal light pollution. Also be sure to choose a spot that doesn't have nearby streetlights, car lights, building lights or other light trespass.
- You will be pressed for time, so be sure your astronomy observing skills are well honed. Practice finding all your target objects as often as you can in preparation for your bimarathon. Transferring quickly from running to observing will save you valuable time. I chose Hawaii partly because I wouldn’t need to waste time taking warm clothing on and off during the transitions.
- On most nights of the year and at most locations, you cannot observe all of the Messier objects in a single night. Instead, switch out the non-observable Messiers with objects selected from those listed in the 2nd edition of the *Concise Catalog of Deep-sky Objects* published by Springer. The Royal Astronomical Society of Canada’s *Observer’s Handbook* and the online Astronomial League are also good sources for filling out your own list of 110 deep-sky objects.

How to See and Shoot the Total Solar Eclipse
Workshop: See website for details


Map to Blackfoot Staging Area
Edmonton RASC's Observing Site
Not exactly to scale
Elk Island National Park Entrance
4km
Highway 16 Yellowhead
To Edmonton
Highway 14
Highway 21
North
Ukrainian Village
Range Road 195
4km
Wye Road
To 82 (Whyte) Ave
Sherwood Park
Blackfoot Staging Area
About 50km from Edmonton City Center