NOVA
NEWSLETTER OF THE VANCOUVER CENTRE RASC
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Manning Park Dark Sky Event Beginner's Weekend

by Suzanna Nagy

E.C. Manning Park is a British Columbia provincial park drawing over one million visitors annually. Located in the Cascade Coastal Mountain Range and covering over 71,000 hectares, the park was declared in 1941 in memory of the then Provincial Chief Forester killed in a plane crash. He was a dedicated conservationist who spent his life working for the preservation of the Canadian natural heritage.

Andrew Krysa and Robert Conrad's lecture

With the opening of the Hope-Princeton Highway in 1949, it made Manning Park accessible to all, being just a two-hour easy and scenic drive from Vancouver. The ski resort within Manning Park first opened in the late 1950s and has expanded on numerous occasions. Winter activities include cross-country skiing, downhill skiing, and snowshoeing. Summer activities include camping, hiking, mountain biking, canoeing, kayaking, birdwatching, and fishing.

Most recently, the Manning Park Resort has been under another expansion with a new chairlift and new chalets. Another one of their goals has been to create additional events to draw visitors to the park and resort during the off-season months.

This brings us to their new Dark Sky event. Manning Park Resort is 66 km from the town of Hope and 66 km from the town of Princeton. The resort being right in the middle and nestled in a valley, it is blessed with amazing dark skies. With an invitation to RASC Vancouver to assist with lectures and telescopes, 2018 was their very first Dark Sky event

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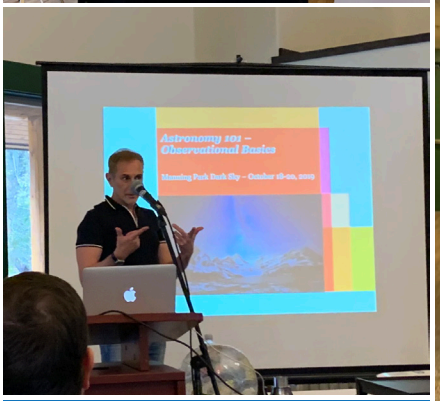
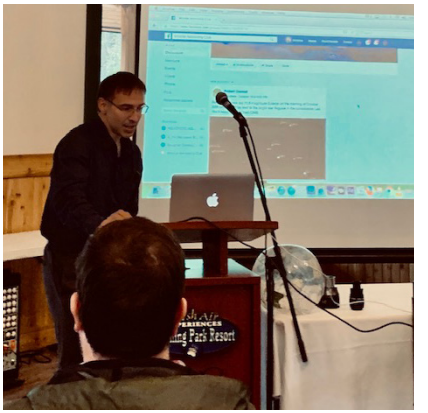
NOVEMBER 14 SFU
Dr. Jess McIver of UBC: "Cosmic Collisions," the latest from LIGO (Laser Interferometer Gravitational-Wave Observatory). Room SWH10041.

DECEMBER 12 SFU
Our Annual General Meeting. See Meetup for more information. Room SWH10041.

JANUARY 9 SFU
Speaker and room TBA. See Meetup for updates.

Manning Park Dark Sky Weekend





Photos by Hayley Miller

Donations Needed for Radio Telescope Project

RASC Vancouver has started a project to setup a radio telescope and we are asking for donations of surplus equipment such as the following:

- Laptops (maybe you have one from your latest upgrade or want a new one and need an excuse). The laptops will be used, with radio astronomy software, for a portable setup at RASC Vancouver events.
- Antennae and large dish antennae.
- Cabling.
- Radio receivers.
- Ham radio equipment.

You never know what will be useful since we are just starting out. If you have equipment to donate, email Ken Arthurs, our Director of Telescopes, at telescopes@rasc-vancouver.com.

The Sept/Oct edition of NOVA has an article that describes our initial forays into radio astronomy. ✸

President's Message

by Leigh Cummings

It seems I am always leaving writing my president's message until the last minute. Poor Gordon, our Nova editor, has had to send me reminders every time. Luckily for him, as my term as President is coming to an end in December, this will be my last President's Message he will be waiting for.

Having once again procrastinated to the last possible minute, I find myself writing on Remembrance Day. My father was a veteran of the Second World War, having joined up with the Rocky Mountain Rangers at the ripe old age of 24. After basic training, they were sent to defend Prince Rupert from the Japanese. The Rocky Mountain Rangers were a rough and tumble bunch of miners, loggers and farmers' sons that proved to make good fighters whether an enemy was available or not. It is said the mayor of Prince Rupert once lamented that he wished the Japanese would come to give these guys someone else to fight.

After Prince Rupert, and a stint helping Hollywood make a war movie called *Commandos Strike at Dawn*, my father's regiment teamed up with an American division to drive the Japanese from Kiska

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About RASC

The RASC Vancouver Centre meets at 7:30 PM on the second Thursday of every month at SFU's Burnaby campus (see map on page 4). Guests are always welcome. In addition, the Centre has an observing site where star parties are regularly scheduled.

Membership is currently $89.00 per year ($52.00 for persons under 21 years of age; family memberships also available) and can be obtained online, at a meeting, or by writing to the Treasurer at the address below. Annual membership includes the invaluable Observer's Handbook, six issues of the RASC Journal, and, of course, access to all of the club events and projects.

For more information regarding the Centre and its activities, please contact our P.R. Director.

NOVA, the newsletter of the Vancouver Centre, RASC, is published on odd-numbered months. Opinions expressed herein are not necessarily those of the Vancouver Centre.

Material on any aspect of astronomy should be e-mailed to the editor or mailed to the address below.

Remember, you are always welcome to attend meetings of Council, held on the first Thursday of every month at 7:30pm in the Trottier Studio in the Chemistry wing of the Shrum Science Centre at SFU. Please contact a council member for directions.

2019 Vancouver Centre Officers

President	Leigh Cummings president@rasc-vancouver.com
Vice-President	Gordon Farrell vp@rasc-vancouver.com
Secretary	Olivier Eymere secretary@rasc-vancouver.com
Treasurer	Phil Lobo treasurer@rasc-vancouver.com
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Past President	Suzanna Nagy
At Large	Howard Trottier, Bill Burnyeat
Honourary President	J. Karl Miller

Library

The centre has a large library of books, magazines and old NOVAs for your enjoyment. Please take advantage of this club service and visit often to check out the new purchases. Suggestions for future library acquisitions are appreciated.

On the Internet

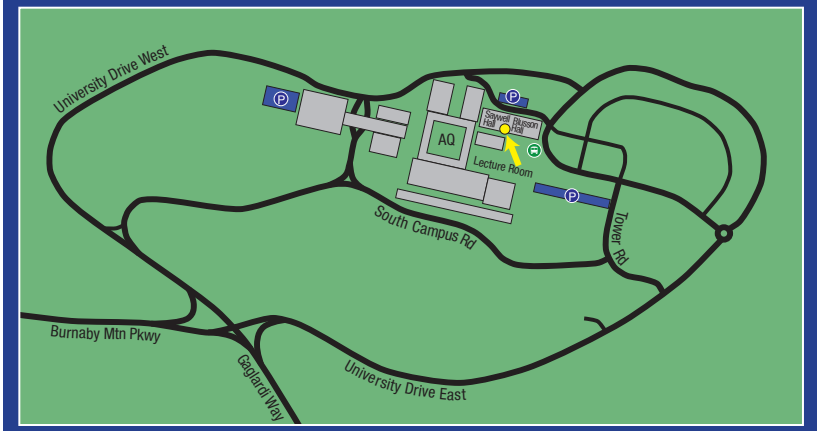
http://rasc-vancouver.com or
http://www.rasc.ca/vancouver
http://astronomy.meetup.com/131/
http://www.facebook.com/RASC.Van

@RASCVancouver

Mailing Address

RASC Vancouver Centre
PO Box 89608
9000 University High Street
Burnaby, B.C.
V5A 4Y0

Map to Meeting Site



Our Sept. and Nov. meetings are in room SWH10041 of Saywell Hall, about halfway down the main corridor as indicated by the arrow on the map.

Pay parking is available at several locations located around campus (indicated as "P" on the map).

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in the Aleutian Islands of Alaska. The Canadian contingent got off light as the Japanese had already evacuated Kiska before the Canadian force arrived to liberate it. The only Canadian losses were due to "friendly" fire and booby traps. Still, that brought the realities of war to light.

On May 25, 1944, my father's regiment embarked for England where they trained for what he felt was an eternity. That all changed on June 8th when the Rocky Mountain Rangers' men were sent to Normandy to replace the losses of D-Day. My father served the rest of the war in northern Europe as a sergeant with the Canadian Scottish Regiment of Victoria, B.C.

That was a long-winded way to get my astronomical subject. Many people ask, "Why was D-Day on June 6th?" It was actually originally scheduled for June 5th but the weather forced the Allied command to postpone for 24 hours. Why June 5th, and why am I writing about it?

As it turns out, the date was based on Astronomy (no, not astrology). Because of the landing craft defences that the German forces had lined the beaches with, the Allied planners decided they needed a low tide landing which was completely against the military manuals of the day. The idea was that the first ashore would dispose of the defences, allowing landing craft to approach closer with the rising tide. Hence the planners wanted a spring low tide at dawn.

The planners also wanted para-troopers to land behind enemy lines to disrupt the reinforcement of the German defences. For them to have a chance of success, they needed a full Moon.

To get all these factors to line up, the military planners had to turn to Astronomers to do the math and give the planners a selection of windows for the invasion. The month of May was first choice, however, the military equipment needed for a landing was not available, so June became the next choice. The German defence forces were caught by surprise, both because they expected any invasion to happen during a high tide and they thought the force-4 winds predicted for the June 5 – 7 window would prevent a landing. Even with surprise on the Allies' side, it was never a sure thing that they would succeed. The use of my father's regiment to fill the losses of that day attests to the price the Canadian Army alone paid, and they were just at one beach head.

The fact I was born after the war makes it obvious that my father survived his ordeal. Although he lived with the pain of his wounds and partial loss of hearing for the rest of his 82 years, I only remember him as a big, kind, gentle man who always loved to go fishing or to help a stranger. If he suffered the memories of the war, he did so in silence, only relating humorous moments to me. He never held animosity for the enemy he fought either. He once told me that no soldier goes to war thinking they are on the wrong side. He felt they were all the sons and daughters of someone, and their loss as grievous as anyone else's.

The only times I remember him angry was when he would encounter a person being a bully, or when another war was on the news. He would turn to me and just say "fools."

I will just say thanks, Dad, even though he never wanted thanks. He just wanted us to change the world into the peaceful home it should be. ✸

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and it was such a huge success that the resort has made the event annual.

I had the pleasure of attending the 2nd annual 2019 Dark Sky event and specifically the Beginner's Weekend from Friday, October 18 to Sunday, October 20 (please see separate article herein on the Advanced Weekend of October 26–27).

RASC volunteers at the "Ask an Astronomer" table

The weekend started on Friday evening with a lecture by Robert Conrad and Andrew Krysa entitled, "Beginner Astronomy 101: Pre-Mission prep."

The lecture was to be followed by stargazing with RASC telescopes but unfortunately the weather didn't cooperate and so the stargazing was cancelled, replaced with Plan B—an astronomy-themed Trivia Contest. We RASC volunteers participated in the Trivia Contest but didn't submit our scores. We just wanted to see how we did as compared to the guests who had just attended the Astronomy 101 lecture. I'm happy to say that we "nailed it" but many of the teams came very close to our score as well.

Saturday morning was filled with activities for the children and a lecture by Terry McComas on First Telescopes. There was also an "Ask an Astronomer" booth set up in the lobby of the resort and I was pleased to see that our volunteers were swamped with questions from the participants, some even bringing down their telescopes so that issues could be fixed or explained. I couldn't believe that one lady had an equatorial mount where one of the components had been factory installed upside down. No wonder the poor thing couldn't do anything with

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Membership has its Privileges!

Are you tired of looking at the same objects again and again (planets, moon, etc.)? Is your telescope collecting dust because it's hard to locate deep sky objects? Would you like to bring your observing to a stellar level? Robert Conrad, our new observing director, revived the Vancouver RASC observing group and invites you to join by sending him an email at observing@rasc-vancouver.com. Some of the benefits of belonging to this group include:

- Hands on training on how to operate the SFU Trottier observatory
- Weekly observing sessions at the observatory or at dark sky locations
- One-one-one coaching on how to locate thousands of objects in the night sky
- Attend small interactive seminars delivered by Robert on a range of topics including failsafe star-hopping, charting challenging objects and understanding the motions of the cosmos
- Learn to make your telescope dance by locating objects such as asteroids, nova, and supernovae
- Spectroscopy and imaging training from Howard Trottier and an opportunity to collaborate on observatory research projects
- Updates on observable sky events happening during the week like asteroid/comet/deep sky conjunctions
- Access to observing guides and lists that Robert created that took hundreds of hours to create and will help with planning observing sessions
- Knowledge and expertise from other observing group members
- Learn how to quickly and efficiently find and star-hop to deep sky objects using a range of binoculars and telescopes

Upcoming Events

December
12 – AGM

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her telescope and am happy to say that the issue was righted.

Saturday afternoon was also filled with lectures including Hayley Miller's "The Art of Space," musing about the role of space in popular culture, a 50th Anniversary Apollo lecture by Ted Stroman and Leigh Cummings, and Robert's and Andrew's "Beginner Astronomy 102," delving deeper from the Pre-Mission lecture the evening before.

Leigh Cummings at the solar telescope

Unfortunately, again, the evening stargazing and binocular walk had to be cancelled due to clouds and snow. Plan B was initiated with Robert and Andrew presenting a talk on Stellarium; there was a movie/documentary to enjoy;and finally, for the children, the resort pool was lit up with stars and filled with space-themed pool toys.

Sunday morning's activities included a walk with a naturalist and solar observing. We actually had a 30-minute sucker-hole with which to show guests the sun. At least there was one chance all weekend to look through a telescope.

Credit to the resort staff who ensured all activities were running smoothly and the RASC volunteers had everything we needed for the activities/lectures planned. Finally, an extra special thank you to the ten RASC volunteers who donated their time to drive up for the weekend and give of their enthusiasm and expertise. We were all rewarded by the resort with gas cards, accommodation, and food vouchers. Council for RASC rewarded our volunteers with dinner on both the Friday and Saturday evenings. So all expenses for our volunteers were covered 100%.


Saturday's RASC group dinner

For me, the most memorable of the weekend was the camaraderie between the RASC volunteers. Although I have known all of them for years, it is usually just for a council meeting, a lecture, or an evening star party. This weekend away really gave me the opportunity to get to know my fellow enthusiasts on a much more personal level. We ate, drank, played games, hosted activities, and even soaked in the hot tub together. We shared stories and experiences about not only astronomy but our personal lives and how we all found time to still share our dark-sky passions with others.

Having had lots of time for conversation with my fellow volunteers, I can state with absolute certainty that we all had an amazingly good time despite the poor weather. I am already looking forward to Dark Sky 2020 and hope that all of you reading this article will mark it in your calendars and join us. ✸

Manning Dark Sky – Intermediate Weekend

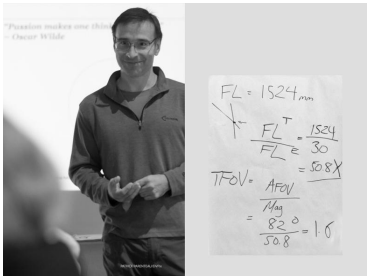
by Ken Jackson

The Intermediate Weekend began Friday, Oct. 25th with the skies nice and clear for our arrival at the resort around 4 pm. The kickoff activity for the weekend was an evening talk on RASC's *Explore the Universe* observing program. Halfway through the talk, Robyn Barker announced that it was snowing heavily so the planned observing session that night was cancelled, replaced again with Plan B—an astronomy-themed trivia contest but with different questions from the first weekend.

Astronomy-themed trivia contest

DSLR astrophotography workshop by Ken Jackson

Saturday morning featured another "Ask an Astronomer" session in the lobby of the Resort and my talk on the Environmental Impacts of Light Pollution and Light Pollution Abatement. The afternoon was filled with two hands-on workshops: my workshop on DSLR Astrophotography and Robert Conrad's workshop on locating astronomical objects using star hopping and Stellarium. The guests left the workshops with knowledge and inspired to put their new knowledge to work at night. As it was mostly cloudy during the day, a frequently-heard question was, "what's the latest forecast for tonight?"



A bit of math from Robert Conrad's workshop on locating astronomical objects

The "Clear Outside" weather app predicted clearing skies by 8 pm so at 7:30 pm a team of RASC volunteers (myself, Robert Conrad and Ben Purych) headed up to Cascade Lookout while others (Hayley Miller, Suzanna Nagy, and Harvey Dueck) headed to Lightning Lake to set up our scopes. We were able to set up with only about 25% of the sky obscured by clouds but, with great timing, the skies completely clouded over around 9 pm as the participants started to arrive.

At Lightning Lake, a few early guests got a glimpse of Saturn and guests that hung in experienced some clearing by 9:30 pm. Harvey Dueck was able to lead an improvised binocular walk by adjusting his targets those that were visible between the scattered clouds.

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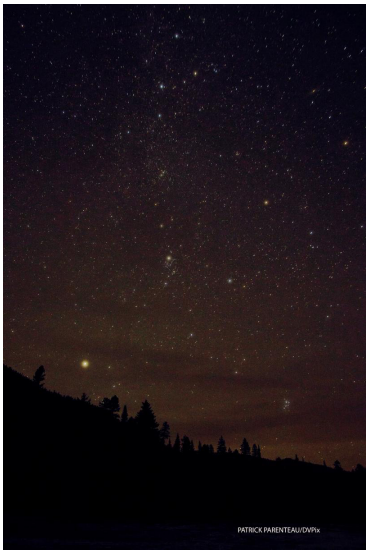
Telescopes set up at Cascade Lookout

Why Star-Hop? 14 Reasons

by Robert Conrad and Andrew Krysa

One of the biggest advantages of star hopping is that it presents you with an opportunity to learn the constellations up close and personal. If you think about a GOTO telescope that brings you to your object by simply hitting a button, in this case you don't even need to know where and in which constellation you're looking because it's done for you. In star-hopping, to find an object we need to first ask ourselves what and where is the brightest star in relation to the object that we want to find. So this requires you to know where to look for the constellation at a given time. For example, is it in the west, is it just rising, etc. And I should know this because once you get to learn the constellations then you know on a certain night where and when to look for a certain constellation. So with star hopping you really develop a feel or sense for where the constellations are at any given time, even those below the horizon and how they connect with each other. It's very rewarding when this becomes second nature to you. Star-hopping forces you not only to learn and identify constellations but also the stars within a constellation. So not only am I looking at Casseipeia but I'm looking at the star Delta Casseopaie which is the closest star to my intended object. So in this way you



Cassiopeia, Perseus, and the Pleiades rising over Cascade Lookout

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At Cascade Lookout, all the guests had to stick around because the buses stayed up at the lookout. Several guests brought up their own telescopes or camera equipment. Manning Resort staff fired up a couple of propane heaters and served hot chocolate which helped with the sub-zero temperatures and brisk wind.

Guests were rewarded as the cloud partially dissipated, providing views of the Milky Way and many astronomical objects including the Andromeda Galaxy, the Pleiades cluster, the globular cluster M15, the Dumbbell Nebula, the double-double in Lyra, the asteroid Vesta, and the Ring Nebula. At the end of the night, a few hardy guests pleaded to stay an extra ½ hour to pack in as much observing as possible.

The weekend concluded with solar observing on Sunday under mostly clear skies. Suzanna Nagy and I had solar scopes at Lightning Lake and about 30 guests stopped by for a look. Unfortunately, it was another day that contributed to this year's total of over 220 days with no sunspots and only a few small and faint prominences were briefly visible. Those of us who do solar observing are looking forward to increasing solar activity perhaps as early as spring 2020.

Solar observing at Lightning Lake on Sunday, Oct. 27

Acknowledgements

Patrick Parenteau deserves credit and thanks for the great photos included in this article. My personal thanks go to Toria Kindersley and Cole Davidson for hauling around my equipment and helping me set it up. The staff at Manning Park Resort again ensured all the activities ran smoothly and made it an easy and fun weekend for the RASC volunteers. ✸

become familiar also with most of the stars connected by the lines that you would see in a star atlas. This saves time by not always having to refer to books and resources. Another benefit to this is you also learn on a general level the deep-sky treasures that are unique to each constellation. Further to that, it gives you the ability to use binoculars to easily locate the brighter deep sky objects within a constellation. Because I know that M13, the brightest globular cluster in the northern hemisphere, is between the star Eta Herculi and Zeta Herculi I simply need to point my binoculars between those two stars and M13 will appear in your field of view.

Another advantage to star-hopping is that it allows you to discover, on your own, so many more wonders in the sky than a GOTO scope. A GOTO scope may have a database of 50,000+ objects but only a small fraction will be visible in your telescope. The telescope will take you to an object but there will be nothing that is visible through your scope. With star-hopping, you become more familiar with detailed star charts and as you navigate you have a better idea of whether an object will be visible based on your learned experience and the object's magnitude or brightness limit. The secret success of star hopping that a GOTO scope cannot give you is the ability to view many objects on your journey from your starting star to your destination. Each time I go to that same object I can take a different route from my starting star to my destination and discover and view different astronomical targets and objects along the way that you would otherwise miss. A GOTO scope robs you of this benefit because it quickly slews to the object and you can't view any of these objects as it is slewing. With star-hopping, you become very familiar with a particular route going from star X to object Y and if you do this enough you can start doing the route from memory and not even use the star charts any more and this also helps to preserve your night vision.

Another advantage of star-hopping is the money that you would spend on the electronics of a GOTO scope you could spend instead on better optics such as a larger mirror or better eyepieces because you can get to the objects you want to see now on your own. The big advantage is, at the end of the day, the goal of observational astronomy is to view faint objects and to view more of them better (brighter, clearer). So the more resources you can put towards bettering the optics of your telescope, the more rewarding and enjoyable your viewing will be which is important when you take into account that many of the objects you will be looking at will be very faint. And so again, you have to ask yourself the question: if you're willing to put in the effort to learn how to star-hop, why would you waste all your money on electronics that you don't need? Wouldn't you rather view the objects as brightly and in as much detail as you possibly can by putting the money you save into a bigger primary mirror, eyepieces, etc.?

One of the biggest advantages of star-hopping is that it provides you with the opportunity to enjoy the star-hop (journey) as much or even more than the destination or your target object. By star-hopping, you will start to enjoy the patterns of stars that you're using as your anchors or stepping stones along the way that a GOTO scope again robs you of. In many cases, few objects at the finish line have a real *Wow* factor; however, if you enjoy the journey and other objects along that path, you're not relying on having that *Wow* factor as much at the end. There have been many occasions where I have star-hopped and discovered tiny double or triple stars along the way that I have added to my list of observing objects. In some cases, I might stumble upon four or five of these objects en route to my target. These might be double stars that might be wonderfully contrasting colours, or they could be one big star and one tiny one in a binary, or planetary nebulae, carbon stars, etc.

This next advantage is, in its own right, its own research or a book in itself, and that is the neurological benefits of star-hopping that are never mentioned in any other books or publications. These include such benefits as improving short-term and long-term memory recall. Let's start with short-term memory. As you are star-hopping, you are continuously comparing what you see on the star chart to what you see in your eyepiece. I may look at my chart, recognize a pattern, then move my attention away from the chart to the telescope eyepiece where I must now recall that pattern and move my scope to that pattern. That is very much using short-term

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memory recall. If you do this enough times you can remember more from the chart so you don't have to look between the chart and the eyepiece as often. Your short-term memory becomes sharpened. Where long term memory comes in is when I take the same path each time that I star-hop from a particular star to my target then that blueprint becomes etched in my long-term memory so that I don't need to even refer to the chart after a while, any more. You may think that there are only mental benefits to star-hopping but there are also kinaesthetic motor eye/hand coordination benefits. You develop a dexterity that's similar to what a surgeon might possess. The idea here is that you are translating chart movement or navigating around the chart into your motor neurological synapses by moving your telescope, sometimes very delicately and precisely, based on your knowledge of the bearing and distance to your target that you learned from your star chart. You need to know how much to nudge your scope and in which direction because from the chart you see that it's a degree or two and then you have to translate that into muscle movement and the muscle then learns what it feels like to move a given distance on the sky as I'm looking through my eyepiece. Eye-hand coordination becomes heightened. It goes without saying that another benefit of star-hopping is the improvement to your concentration. This is a benefit in today's world where the ability to concentrate is much compromised by the myriad of electronic gadgets out there that vie for our attention but that only provide short bursts of attention span. We could all benefit these days from more things that get us to focus on something for longer than a few seconds. Part of this concentration stems from the need to focus on sometimes very faint stars, unrecognizable shapes or faint shapes and a path that may sometimes require more than one chart page and long periods of time to get to your destination.

It goes without saying that another important benefit of star-hopping is that it forces you to learn celestial motion, a benefit that a GOTO scope won't give you as a result of automatic slewing and tracking. Understanding the motions of the constellations and those objects within them is foundational to understanding astronomy. With a GOTO scope, you might not be so inclined to take to heart this movement because if the telescope is pointing to the object for you, you don't really have to take into account the constellations, where they are and how they are moving. The rewarding and gratifying experience of being able to know where things are in the sky and being able to predict when and where they will appear at what time of the night or the year is lost to you. Enough cannot be said of the satisfaction you get from being in touch and knowing intimately the celestial sphere and its motions. Have you ever been at a star party or event where it's your turn to look through an eyepiece at a planet and when you look, it's not there? It has drifted out of the eyepiece. And now, how do I move the telescope to get the planet back in the eyepiece? As previously discussed, understanding sky movement and the position of your object in relation to the meridian line (more on this later) will help you know exactly how to move your telescope in such a way as to get the object back into the eyepiece of your telescope. For example, let's say that you are viewing Jupiter somewhere between rising in the east and the meridian line (the imaginary line running north/south at which objects are at their highest point and afterwards begin to set) and you need to locate Jupiter. How would you now move the telescope? Since it is rising, I need to move my telescope to the right because it's working its way towards the west and a little upwards because Jupiter is still in the process of rising. The argument in favour of a GOTO scope might be that you don't need to do all this because it automatically tracks the object but, on the other hand, you never develop a feel or need to understand that kind of movement.

Star-hopping requires that you become intimate with knowing how to calculate and use your field of view that's specific to your telescope and eyepiece combination. This is because you will be very dependant on that field of view circle to navigate your way from your starting star to your target object. Also, when viewing objects such as asteroids that look quite similar to stars in a busy field of view, it helps to have this intimate understanding of field of view and magnification. Even when using a GOTO telescope, there will be many occasions where having this innate understanding will still be required to help differentiate between the

Manning Dark Sky Weekend

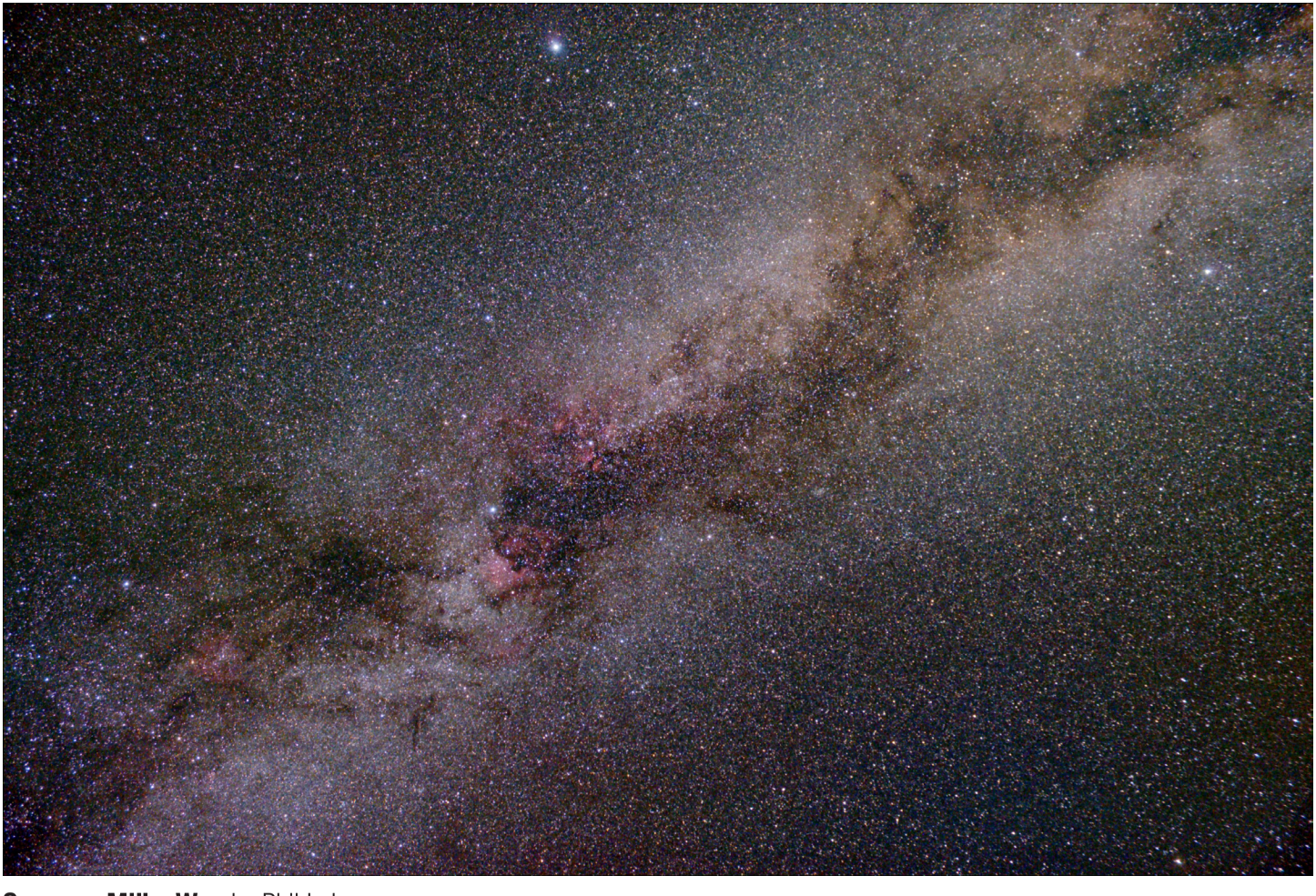
Photos by Marina Miller and Andrew Krysa

asteroid and the many other stars of similar magnitude.

Even if you own a GOTO telescope, there will be many occasions where you will still need some course-correction star-hopping to locate your target within your field of view. Also, there will be times where your telescope will slew to the object but overshoot it or undershoot it, at which point you will need to star-hop to locate the object. This might be a source of frustration for people who bought a GOTO scope with no intention of ever learning the constellations or star-hopping and could lead to leaving the hobby out of a sense of failure or dissatisfaction.

With a GOTO scope, no star charts are really required. However, with star-hopping you have no choice but to use star charts and in so doing become very familiar with them and the many objects that are contained within the charts. In this way, you become more able to use more and more detailed star charts and gain access to an almost infinite number of sky objects. Star-hopping also enhances your ability to recognize the difference between star magnitudes because, in many cases, at the same time as using star patterns to navigate, you're also using star magnitudes to help with that navigation. For example, you may, in the absence of recognizable patterns, use star brightness as your stepping stone. If you do not see any recognizable patterns that you can use to navigate, you might actually be looking at the chart for bright stars that you can use as stepping stones.

I think everyone would agree that patience and persistence are valuable traits and star-hopping gives us the opportunity to practice those traits. Especially as a beginner, patience and persistence at the end of the day will determine whether you continue with the hobby of astronomy or whether your telescope stays in the closet and collects dust. Some star hops can be quite challenging, especially when navigating through an area of few stars or the opposite, an area littered with many stars, and so may require multiple chart pages. And so it becomes a reward for the accomplishment of finding your object. Using a GOTO telescope obviously robs you of this benefit. The feeling of being more up close and personal with the cosmos, without the digital hand-holding we have grown accustomed to and dependent on, is irreplaceable. I recall one cold night near Whistler where I spent twelve dark, moonless hours feeling the movement of the constellations in my soul and in my eyes. Star-hopping through many of the constellations made it that much more personal and rewarding for me. ✸



Summer Milky Way by Phil Lobo

Vega (in Lyra) is at the top, Altair (in Aquila) is the right, and Deneb (in Cygnus) is roughly in the middle. Together, these three stars form the Summer Triangle. The red areas are hydrogen-alpha-emitting nebulae. The larger dust clouds are visible to the naked eye, while some smaller dust clouds are visible in binoculars. (18mm focal length, Canon 1000D, 8 frames at 180 seconds each)