

Vol. 21 Issue 4
Summer 2020

H O R I Z O N

LA SOCIÉTÉ ROYALE D'ASTRONOMIE DU CANADA
New Brunswick Centre du Nouveau-Brunswick
THE ROYAL ASTRONOMICAL SOCIETY OF CANADA



All EYES on NEOWISE



Comet C/2020 F3 NEOWISE

photo by Emile Cormier

Captured on the evening of 21 July from the pristine skies at Kouchibouguac National Park.

50 mm f/1.4 prime lens, ZWO ASI071 camera, equatorial mount. Stack of 50 x 60 second frames.

Note the dust tail, which had broadened as the comet rounded the Sun. Many people reported that as appearing yellow when the comet first appeared in our morning sky. The gas or ion tail, which points away from the Sun, has a blue tinge characteristic of carbon monoxide gas, one of many gases commonly seen in comets.

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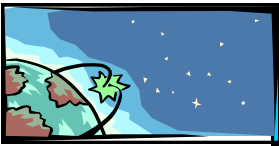
RASC NB Outreach Events and Handouts

Year	# of Events	People (Live Feed *)	Youth	Star Finders English	Star Finders French	Moon Guides English	Moon Guides French	Get Start Astro	Volun Hours
2012	75	4658		2188	229	1852	137		
2013	102	4119		1602	8	1513	120		
2014	104	4843		1716	241	1378	199		
2015	114	7262		2106	244	2568	156	819	
2016	219	9498		1984	115	2290	87	514	988
2017	248	18,453		2276	162	2262	131	340	1944
2018	187	45,246	> 1300	1781	170	1628	79	180	1340
2019	240	53,711	2997	1320	216	1520	213	58	1950
2020	119	146,338	871	781	22	598	125	14	938

* Includes people viewing live feeds on Facebook and YouTube.

Types of Outreach Events

Year	Presenta-tion	Night Observing	Day Ob-serving	Youth Group	School Talks	Exhibi-tion	Observ./ Planet'm
2012	12	24	2	12	17	8	0
2013	24	24	3	12	32	7	0
2014	23	21	20	17	12	8	3
2015	22	33	23	7	15	13	1
2016	31	55	39	19	54	11	10
2017	61	89	22	19	50	6	1
2018	50	80	13	18	20	5	1
2019	73	94	10	22	36	5	0
2020	58	26	1	7	27	0	0



ORBIT around the Centre

Did Comet NEOWISE live up to your expectations?

Emma MacPhee: I observed Comet NEOWISE from my balcony four evenings, with binoculars while it was going through our night sky under the Big Dipper. Three of us decided to go observe out of city lights, from the old Irving on Homestead Road.

I was surprised to see a few persons at the site, all planning to view the comet. We helped out the folks there to locate it. An elderly lady was there with her camera, not on a tripod, looking from left to right, trying to locate it.

I asked her if she was trying to take a photo of NEOWISE, of course yes... she expected it to light up like a lightbulb. She did not get a photo, but I offered a view from my telescope... well, she was very pleased and told us we made an old lady very ☺ happy. Then I thought, why not offer Jupiter and Saturn, since she was very respectful of distancing and not touching the equipment.

Happy? I don't have the vocabulary to explain it... we all know the feeling. Hopefully returning to public observing soon

Francis Casey: I had the opportunity to view comet NEOWISE on two separate nights, July 15th and July 24th, from Spruce Lake in West Saint John (photo below by Francis Casey). Both evenings the weather and viewing conditions were great, except for some annoying bugs.

On the first night I observed with my friend Dave Driscoll and his daughter Kendra. We each took some photos and we each took great pleasure in seeing a comet again. It had been many years. NEOWISE was a little hard to find, but once located it became easily visible but not particularly bright. I would describe it as a "nice" comet but definitely not "Great" visually. On my second viewing night it had become very much dimmer and almost unseeable by eye.

The greatest comet I ever saw, was GREAT Comet Bennett of 1970...yes, I am old! I was in high school at the time, and on a clear April night I took my Polaroid instant camera loaded with 3200 speed black and white film, up onto the roof of my parents' home at about 03:30. I propped it up angled toward the comet, pressed my lockable shutter cable, and took a 20 second shot. Perhaps the best and most memorable astrophoto I have ever taken. Alas, it has disappeared over the many years since then. I can, however, still vividly remember looking up at that beautiful, big bright comet, and wondering what other astronomical wonders I would see in the future as my interest in astronomy grew.



ORBIT around the Centre (continued)

Yolanda Kippers: Was Comet NEOWISE what I expected? Well, what did I expect? I don't know. Years ago I imagined a comet as a ball of light with a tail streaming behind, that could be seen as actually moving across the sky. Slower than a shooting star but something that you would notice as moving. I have long since learned that this is not the case. However, I did not know what to expect from NEOWISE in terms of visibility for the novice observer.

I knew it was coming and roughly where I should look to see it, but the night skies were not generous to stargazers in early July; therefore, I was not able to source out an appropriate vantage point for viewing ahead of time. Preparedness is everything. July 15 was a clear evening so I set out to find my first comet. Long-story-short: I spent three hours at two sites near my home scanning the lower right area of Ursa Major with my binoculars (9x63's) but there were some trees to the right. What did I think I would see? Was that little thing a comet? What about that speck? How would I know? Finally, I had to give it up.

When I saw the posted pictures the following day, I knew I had not seen the comet. It was unmistakable. I would have known. It had to have been behind the trees.

On July 18th I joined a few fellow club mem-

bers at a site near St. Martins. The evening remained cloudy until 23:00 when suddenly the sky cleared for approximately 45 minutes. There, for all to see, was Comet NEOWISE; obvious even to my naked eye. It did not disappoint. It was a beautiful sight through my binoculars as it was artfully positioned between and slightly above Kappa UMa and Talitha. Another small star was visible through the lower part of the tail. This vision, of the comet with the three stars, is imprinted on my memory. My very first view of a comet was better than expected.

Then, on July 21st, and again on the 24th, I was able to see NEOWISE over the Kennebecasis River near my home. Each time I was able to share with a different group of friends, all suitably impressed. Both times the comet was visible to the naked eye and the tail was visible with binoculars. On the 21st it was near Tania Borealis; by the 24th it had moved to a position below Psi UMa.

After another five nights of overcast skies, on the 29th, I was able to find the comet again. By now it had moved to a position approximately a fist-width below Cor Caroli and about the same distance from the Coma Berenices star cluster. It appeared as a light fuzzy object with maybe a faint hint of a tail. Seeing the tail may have been just wishful thinking on my part.

Over the course of another three evenings (July 31st, Aug. 1st and 3rd) I was able to follow the progression of Comet NEOWISE as it moved by the Coma Berenices star cluster. Although it was smaller and less distinct, I

was still fairly confident I was seeing the comet.

Due to unsuitable sky conditions, it wasn't until the 6th that I was able to see it again; this time it was near Alpha CrB. By now it was even fainter and I was unsure of myself. Maybe it was something else, not the comet at all. So I was reassured when two nights later, and again on the following night, I was able to observe the small patch of light as it became increasingly fainter but following its expected path.

In total I was able to see Comet NEOWISE on nine separate occasions, each time hoping for one more chance. Since that last sighting on Aug. 9th the sky gods have not been cooperative so I do not expect to see it again. However, there is still a lot to find and see out there. As the traditional spiritual folk song goes, you gotta keep your "Eyes On the Prize." Listen to Bruce Springsteen belt it out and you will be lifted to the skies.



NEOWISE photo by Francis Casey

ORBIT around the Centre (continued)

Don Kelly: I was impressed with Comet NEOWISE. My daughter Rebecca was home from Calgary. We got up at 04:00 from July 9th through to the 16th. It was an impressive morning comet with its tail mostly straight up.

Barb, Becky and I travelled to Louisbourg Cape Breton (or as June says, "God's country") where we watched it on seven evenings. I need to count some of these evenings as public outreach as I showed friends and family the comet. Then we returned to Oromocto where I carried out another 14 evening viewings from behind Freeman's Convenience Store in Oromocto West.

Tonight's viewing (August 17) was the weakest one yet but I found it under the feet of Boötes. I have been using my 20x80 SkyMaster binoculars as of late. Tonight's sighting was the 26th sighting of the comet, thanks to some exceptionally good weather with clear skies.

While it impressed me, no comet has impressed me more than comet Hyakutake where my journal sketches show considerable movement of the coma in a matter of 10-20 minutes. On a scale of 1 to 10, that would put NEOWISE at perhaps a 5.

I am looking forward to the next comet, perhaps a surprise comet.

Curt Nason: My only disappointment related to the comet was an unusual spell of inclement weather in Saint John just as it became visible, with early morning clouds or fog for the first few weeks of July. I made my first attempt on the evening of July 9; the sky was clear except for a stretch of slow-moving cloud right where the comet was expected.

The next opportunity wasn't until six evenings later, and I set up with binoculars at a site a short drive from home that has a remarkably good view from west to northeast. With the stars of the Big Dipper just poking through twilight, I located the front feet of Ursa Major (the northernmost pair of stars in the Three Leaps of the Gazelle) with 15x63 binos, estimated the comet's distance from there toward Capella, and found it shortly after 22:00. It sported a one-degree dust tail, which lengthened to about six degrees as twilight faded. Back home at 23:30, I spotted the comet with 10x30 binos between the hospital and its stack, and then naked eye.

The next window was the morning of July 21 at the Rockwood golf course, when the main target was Mercury. That was accomplished, but the comet was behind some trees. At home that evening I shared views with family and neighbours through my Dob, binos and naked eye. Later I observed it with a comet (Swan Band) filter attached to a 32 mm eyepiece. The coma was bright green, with the tail being a more subtle hue, and even without the filter I could detect green in the coma. The comet filter isolates the diatomic carbon (C₂) lines at 511 and 514 nm and the 501 nm line of ionized oxygen (OIII).



A beautiful image of Comet NEOWISE taken by Robert Gaudet in St. George on 21 July. This image has appeared in the Telegraph-Journal and the Bathurst Northern Light newspapers.

C/2020 F3 NEOWISE certainly met my expectations, especially after the early break-up and fade-out of C/2019 Y4 ATLAS and C/2020 F8 SWAN in spring. I was fortunate to catch one view of each, and SWAN just barely. I had seen three other comets naked eye since 2010, including C/2011 L4 PANSTARRS which had a nice tail but was somewhat dimmer than NEOWISE. Great Comet McNaught in January 2007 was brighter than NEOWISE but it was visible here for only a week and low in the west, so NEOWISE has attracted more attention. McNaught was seen naked eye in daylight by some people on its last day here; I needed binoculars due to a milky blue sky from a receding cloud band. Mind you, I did not see NEOWISE at its best as it had faded by more than a magnitude by my first view on July 15.

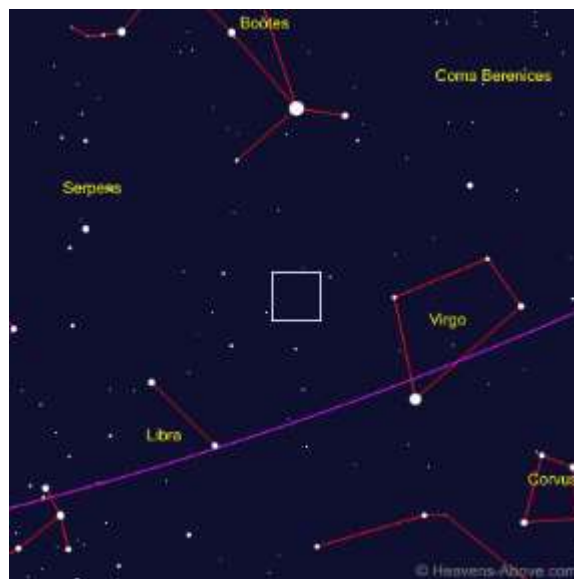
Comet Collecting Guide - by Curt Nason

Locating comets uses the same skills and tools as for deep sky objects (DSOs) such as galaxies and globular clusters, with a few differences that add to the challenge. Those DSOs are always in the same place relative to stars so, with practice, you learn how to star hop there. Also, they have defined shapes and their brightness varies only with sky conditions. Comets are in a different star field daily or weekly, requiring a new star hop each time you try to find it, and they are transient so you might have only a few days or weeks to locate them.

In terms of visibility, comets come in three flavours: naked eye, binocular and telescopic. Comets that are visible readily with the naked eye are a once-a-decade phenomenon, on average, but a handful might be visible each decade after locating them first with binoculars. One or two binocular comets appear annually, and a handful are usually within range of an 8-inch telescope. As expected, larger aperture binocular and telescopes lead to greater success, and a dark sky makes a huge difference in finding a comet or seeing more detail, like a tail.

If you plan to make collecting comets an observing project, then lower your expectations of what a comet should look like and be satisfied with spotting an amorphous smudge of light; anything more is a bonus. Spotting the smudge or teasing detail from it requires a few tools and tricks.

First, what comet prey is available and within range of your equipment and observing site? Websites and planetarium programs give that information. Heavens-Above, Skyhound, and aerith.net (Seiichi Yoshida's Home Page) are a few popular websites that have a comet section which includes a map and expected magnitude. The Comet Chasing section of Skyhound is updated monthly, aerith.net weekly. My preference is Heavens-Above, which gives a wide-field constellation map (60° square) and an expanded inset map that is 2° square if the comet is dimmer than magnitude 10 (mag 10), 5° if brighter, and 10° if it is at or near naked eye visibility. The 5° map has stars to mag 10, the 2° map goes down to mag 12. There are several comets I would not have seen if I didn't have my telescope pointed in exactly the right location based in the inset map.



*C/2020 F3 NEOWISE 26 Aug 22:20
Wide Field, stars to mag 5 (Heavens Above)*

Comet magnitudes can be tricky as there are several methods that may be used to estimate them, and different websites might get the information from different sources. Like galaxies and globular clusters, comets are extended objects and some tend to have low surface brightness. A mag 9 edge-on galaxy is easier to see than a mag 9 face-on spiral, and just because you can see a mag 9 star in your binos does not mean you will see a mag 9 galaxy. You also should consider the altitude of the comet, as the thicker layer of atmosphere at low altitudes will dim the object. I will tackle a mag 10.5 comet from my yard, especially in winter when darker sites are less accessible, but if I don't see it I am not surprised. If I do see one from a darker site, I will also try it from home to know my limits.

Having chosen an observing site based on a comet's location and brightness, I will print or try to memorize the surrounding star field. For easy binocular comets the wide-field map is sufficient as you can just scan the general area. Familiarity with the constellations is helpful, especially if you can picture the mythological figure (e.g., the comet is near the knee of Hercules).

For telescopic comets and for those near the limit of my 15x63 binos I use both the wide-field and inset maps of Heavens-Above, looking for unique star patterns in the inset. You can select the date and time, so if the star field is bland maybe there will be an easier field in a few days.

One thing to remember is that website maps are north up and east left; not so much a problem for wide-field maps, but for inset maps you might have to mentally or physically turn the top toward north if you are verifying the field stars in your finder or eyepiece. You also have to mentally adjust for the inverted or mirror image in your finder or eyepiece. Planetarium programs can help, as they offer local horizon views with stars at least as bright as your binocular limit, and you can flip the map vertically and horizontally to suit your telescope equipment. I use Stellarium and Dave Lane's Earth Centered Universe (ECU), both of which allow comet downloads.



*C/2020 F3 NEOWISE 26 Aug 22:20
Inset map, 5° square, stars to mag 10
(Heavens Above)*

If I recognize the inset star field in binoculars I will concentrate on the comet's location, using averted vision and staring, if necessary, to tease it out of the background. Successful or not I will then try to locate the field in my 8x50 finder, which gives a dimmer, wider and inverted view. Sometimes that takes a while, but if I locate it then I centre and go to the eyepiece, where I have to mentally adjust for the field of view as stars are farther apart. Your finder and telescope might not have the same view orientation; more mental juggling.

To search for comets I use a medium focal length eyepiece, in the 12–25 mm range, and if it is a wide-field type then that is a bonus. My usual choices are a William Optics SWAN 15 mm and a Tele Vue 19 mm Panoptic, which give about the same field of view at 80x and 63x, respectively, in my Dob. By slowly scanning the field you might be lucky and see a smudge. If not, check your position in the finder and return to start again. If that doesn't work after a few tries then narrow in on the exact location if you can, which generally requires alternating views among the map, finder and eyepiece. If you verify you are in the right area and you still can't see the comet, don't give up. The comet is probably there, hiding and snickering at you. If the sky conditions are good then try these standard tricks for observing

Dark adaptation: Maybe checking maps, even with a red light, has degraded your night vision. Close your eyes for while, or cover your head to block stray light.

Averted vision: If you know the exact loca-

tion relative to a nearby star (hopefully a faint star), look to either side of the comet or above and below it to make use of your eye's light-sensitive rod cells. With practice you will learn your sweet spot where a faint object is brightest. For me it is below centre, so I look just above the comet's location.

Scope jiggle: Our eyes are sensitive to peripheral movement. Is that a smudge you see or just the background? Look around a bit to see if it is in many locations or just one. Tap the scope or carefully nudge it a little back and forth. Does the smudge move as an object in your averted vision? If so, chances are it is real and likely the comet.

Staring: Concentrate on the spot and keep looking at it with averted vision while jiggling. The dim light might build up enough to pop into view occasionally.

Magnification: Increasing magnification will dim the background and increase contrast by spreading the comet's light over a greater part of your eye.

Comet filter: If the comet is faint due to low surface brightness of an expanded coma, the Swan filter might bring out enough light from C₂ to tease the comet out of the reduced background light.

If you are successful in landing a faint comet, it is a good idea to verify there were no DSOs in the immediate area of similar brightness. DSOs usually have a defined border, whereas comets will blend into the background, but you can be fooled. I have been.

Perseid Meteor Shower Report - by Chris Weadick

I was watching the Perseid meteor shower on August 11th with Tasha. The clouds broke for a few hours and I counted 14, and Tasha was out for an extra hour before me and had a count of 25. We saw 5 really nice ones that streamed about 1/3 of the way across the sky leaving sparkling trails behind them. We did not see the fireball reported in Moncton area though... I had my fingers crossed.



*Tasha Weadick in the Tailgate Observatory
Is Chris hiding under the blanket?*

We started the night standing there looking up—too hard on the back and neck. The lawn chairs were "somewhere in the garage" so I moved the truck to the end of the driveway and put the gate down and tarp up. I have a couple of storage boxes so we took the lids off and angled them on the boxes for a back rest... worked awesome! Still going to pick up a mattress to sit on though; the steel box is made out of hard steel. But, a few blankets under us and one camp blanket on top and we were good for the night.

A beautiful red 3rd quarter Moon brought a close to our evening as the clouds started to roll in. We could not get great pix as I only had my cell with me. Our snap camera is hiding in Tasha's room and I was in too much pain to go back into the house to drag out the DSLR, and I didn't want to miss any of the meteors.



Annual Meeting 2020

The RASC NB Inc. Annual Meeting is scheduled for Saturday, October 17. Whereas Moncton High School is unlikely to be available due to pandemic measures, an alternative location is being pursued. Our By-Law does not allow for remote attendance and a revision to permit this is being considered as an agenda item. An in-person quorum of 12 is required to conduct business. Also, a series of presentations via an online medium is being considered.

This is also an election year and you should have received an email from Chris Weadick of the Nominating Committee seeking nominations for all Council positions (five Executive and four Councillors). Nominations close after August 31. Nominations might not be the proper term as most candidates volunteer themselves. National Council Representative is another elected position; it is not a voting position at Council meetings but the position can be held by a Council member. Please consider volunteering a small amount of your time to help steer our Centre toward a bright future.

On Page 2 you will see a list of committees and positions that support Centre activities. Committee Chairs and other positions are to be approved or confirmed at the Annual Meeting. If you want to lend your time and expertise to a committee or a position please inform the President or Nominating Committee. Note that we do not include contact information in the newsletter.

What's Up.doc

- by Curt Nason

For the next three months, meteorological autumn, the main course for observers will be a close opposition of Mars, with views of Jupiter and Saturn edging together for a winter solstice rendezvous.

Mercury spends September moving away from the evening Sun, but never gets high due to the shallow angle of the ecliptic. It reaches greatest eastern elongation on October 1 and inferior conjunction on October 25. The best views occur when it pops up in the morning sky in early November with a still fairly steep ecliptic, reaching greatest western elongation on November 10.

Venus reigns from on high over the morning sky, thanks to the steep angle of the ecliptic on autumn mornings, but it will gradually dim somewhat as it moves sunward. It will be about half a degree from Regulus on October 2 and 3.

Earth is at autumnal equinox at 10:31 on September 22. We resume Standard Time on November 1.

Mars is already attracting the attention of nighthawks, and by September 24 it will be as bright as Jupiter. It is stationary on September 9, beginning two months of retrograde motion that will take it 15 degrees across Pisces. Mars is closest to Earth on October 6, at a distance of 62.1 million kilometres and offering a generous 22.5" disc for

telescope observers. One week later, at opposition, its diameter will be 22.4". Look for its south polar ice cap breaking up as the dry ice sublimates, the impressive dark features of Syrtis Major, and the Hellas Basin. Hopefully there will be no global dust storm this time. The Moon passes one degree or less below Mars on the nights of September 5 and October 2.

Jupiter is stationary on September 12, resuming prograde motion and closing the gap with Saturn to nearly two degrees by the end of November. Check the What's Up calendar on our Centre website and Facebook page for transits, shadow transits, eclipses and occultations of Jupiter's moons, plus transits of the Red Spot, all converted to Atlantic time.

Saturn turns tail to run away from Jupiter when it is stationary on September 29, but resistance is futile. They are destined to meet up at the winter solstice. The last time they were together was in May/June 2000, just before our Centre was approved. The near first quarter Moon visits the gas giants on September 25/26, October 22 and November 18/19. By the end of November Jupiter and Saturn are setting around 20:00.

Uranus is now rising around 22:30 and it is at opposition on October 31 in southern Aries. It will be at magnitude 5.7 and show a 3.8" disc in a telescope.

Neptune reaches opposition on September 11 in Aquarius, at magnitude 7.8 with a 2.4" disc. It is stationary on November 29, resuming normal prograde motion.

All-planet day or night

At least once a year I try to observe all eight planets in one calendar day or from one sunset to sunrise, or both. Usually I try for all with binoculars, and use the telescope to enjoy details on Mars, Jupiter and Saturn and to verify Uranus and Neptune by seeing their disc. The most opportune time this autumn is the second or third week of November, when wild-card Mercury is near its best and there is no full Moon to wash out the sky for Uranus and Neptune.

For a bonus, add a dwarf planet. **Ceres** will be around magnitude 9 in Aquarius, about 15 degrees below Neptune. Finder charts for Uranus, Neptune and Ceres are in the Observer's Handbook, but more convenient charts are online. The Sky & Telescope website has PDF charts for the two planets, and Heavens-Above has the wide-field and inset charts for asteroids, including Ceres. Give the All Planet Challenge a try, and consider writing a report about it for the Autumn 2020 issue of Horizon.

Comets

C/2020 F3 NEOWISE should remain visible with a telescope to mid-September.

Comet **88P/Howell** is reportedly brighter than magnitude 10, running from Zubenelgenubi in Libra to Antares in Scorpius over the next month. It reaches perihelion in late September.

New Moon dates are September 17, October 16 and November 15.