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Winter 2024

HORIZON

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

Melotte 15
Centre of the Heart Nebula in Cassiopeia
Image by François Thériault

Ha - 27 x 300 s = 2 h 15 min
OIII - 40 x 300 s = 3 h 20 min
SII - 39 x 300 s = 3 h 15 min

Taken at the Genesis Observatory (my backyard) with Mallincam VRC-8, Ritchey-Chretien 200 mm, using a ZWO ASI1600 mm and 5nm Ha / OIII / SII filters

New Brunswick Eclipse 2024
Map by Fred Espenak (EclipseWise)

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Centre News

Business Meetings

April 20, June 15, September 21 and October 19 (Annual Meeting)

Centre Meetings TBD

What's Up for Spring
by Curt Nason

The Sun reaches the Vernal Equinox in Pisces at 00:06 on March 20. If you haven't heard, there is a total solar eclipse in New Brunswick on April 8.

Moon New Moon dates are March 10, **April 8**, and May 8. There is a deep penumbral lunar eclipse on March 25 from 01:53 to 06:33. Try viewing around 03:30. The Moon passes near Antares and M45 each month.

Mercury has its best evening apparition in late March, reaching greatest E elongation on March 24, inferior conjunction April 11, greatest W elongation May 9, and brightening later as it moves sunward. It will be about 6˚ above the Sun during totality on April 8, perhaps visible in binoculars.

Venus rides low in morning twilight, with a challenging close conjunction with Saturn on March 22 rising half an hour before sunrise. It will be lost in twilight for the rest of spring.

Mars becomes visible in the morning sky in March and has a colourful meet-up with Saturn between April 10-12 an hour before sunrise. It slides past Neptune on April 29.

As **Jupiter** moves closer to the Sun the opportunities for observing its moon action and Red Spot become limited. The Moon passes by on March 13 and April 10. Watch Jupiter fade into twilight over April on its way to conjunction an May 18.

Saturn emerges into the morning sky in late March, leading Mars across the sky after their April conjunction and appearing equally bright. The Moon makes a close Visit on May 4 and a better one on May 31.

Uranus is in conjunction on May 13.

Neptune is in conjunction March 17.

Comet 12P/Pons Brooks should be around magnitude 7 in early March, brightening a bit as it reaches perihelion in mid-April. Perhaps, if it has another of its famous outbursts in early April, it might be a binocular sight during totality.

C/2021 S3 Panstarrs should be within reach of moderate telescopes, and in mid-March it might be seen with binoculars.

Meteor Showers The Lyrids peak May 22 and the Eta Aquariids on May 5.

Zodiacal Light might be seen in a dark western sky an hour after sunset during the first week of March and of April.

Double Stars – Then and Now – Xi Ursae Majoris

by Len Larkin

One cool spring night, in a deserted UNBSJ parking lot decades ago, I was successful in finding and observing for my first time the double star Xi Ursae Majoris, a tight double for small telescopes. It was not a clean split according to the log—I speculate it was a figure-8 shape—but the little department store 60 mm refractor at 130x acquitted itself well. Now, it's probably not the first double you would search out in Ursa Major, but you may know it already as one of the stars in the *Leaps of the Gazelle* asterism. Its star name, Alula Australis, apparently derives from Arabian for "first leap."

System	Mag A	Mag B	Separation	PA
Xi Uma	4.3	4.8	2.3"	145˚

SAO Catalog # 62484
Coordinates: RA11h, 18m; Dec.+31˚ 32'

And here's the icing on the cake for Xi UMa. It was discovered as a double in 1780, then through years of regular observations was identified in 1804 as being an orbiting binary system, the first ever discovered! And the astronomer who did this? William Herschel.

Now, Mr. Herschel wasn't always alone during his observations. He was using the best telescopes at the time and that probably lured the occasional guest observer. Well, my sessions sometimes also had a guest or two but not the night I observed Xi...or so I thought. I was quietly sitting at the eyepiece, lost in the view, when a rustling in the nearby bush got my attention. Then I spied a dark thing moving out of the bush. Oh, just a small cat, black and white, coming towards me...wait a minute, the white is mainly a big line on its back...and extends to the tail. Holy moly, it's a skunk! It just kept coming (their eyesight is poor and I was quiet). Well, it must have mistaken me for a bush and was it gonna get a surprise when... correction...was I gonna get a surprise when it realized it's mistake! It was getting a bit too close so I did a subtle scratching of feet on the gravel. It stopped, arched up....we both held our breath (at least I know that I did!), then it made a right angle turn and continued on its way. Hooo boy!

Scented sketch by Bet O'Toole

Let's jump 60 years ahead of Herschel to see if Captain Smyth had observed Xi. In his Bedford Catalog I found the captain had made 10 observations of this system between 1830 and 1843, with his measurements of position angle (PA) varying from 207 to 143 degrees and separation of 1.8 to 2.3 arcseconds. Using these and other astronomer's observations Smyth estimated an orbital period of 65 years, a respectable match to John Herschel's (William's son) and Felix Savary's accurate orbit calculations (in 1830) of 59 years (current value is 59.9 years).

So the summer of 2021, on my back deck, I observed this system on two nights in June. Not realizing the history wrapped around these stars, my notes are rather lean. I did get a clean split at 170x in my 100 mm refractor; satisfying but no surprise. And as you recall, 130x showed it's multi-star personality in my 60 mm refractor years ago and I have read it is even possible at 100x.

Now a problem that I have with double stars is picking the brightest of two close stars if they are 0.5 mag difference or less. That's my limit, I can't do it. The Xi UMa stars are at that limit but I needed to determine which was the A star. Then I noticed a slightly brighter diffraction ring around the northern star, so I estimated the PA of the B star at 140 and 160 degrees on those nights (close to the 149 degrees listed for 2021). That's not bad but getting even better accuracy would improve the chances of observing such small changes in appearance over a few years. I've cobbled together a measuring eyepiece which I used throughout the

2023 observing season, and it is a big improvement in accuracy and consistency.

Certainly, Xi UMa is again on my viewing list for another visit this summer. And estimating the PA this year, although tricky until you've done it a bit, is a great place to start, as we observers will see these stars located in the same part of the orbit as did Herschel in 1780 and Captain Smyth in 1840. So I recommend having a look with any instrument you have. Also, since the star separation is widening to about 3 arc-sec by 2030, these upcoming years will be a chance to see what is the smallest telescope aperture you can use to still view the system as double. Who knows, maybe this year or the next will be the one to coax the 50 mm aperture stop (on my refractor) into displaying these storied suns waiting in the first leap of the gazelle.

Addendum: I enjoyed Alan Hindle's review of the Peterson Field Guide along with the atlas comparisons (Autumn 2023 issue). Alan also mentioned Sissy Haas's Double Stars book (well-respected). I don't own that but have a new, lesser-known atlas/info book by Agnes Clarke, ***Discovering Double Stars*** (https://discovering-astronomy.eu/discovering_doubles.html). It's the ring-bound colour version. There's lots of space to add notes and I find it easy to use. Just flip open a suitable month page and there's the chart and star info. It has 950 doubles with 700 available to us Northerners. Great one-stop book for a grab-n-go 'scope.

The 3 Leaps of the Gazelle
Alula Australis is lower left
(Stellarium)

Parting Gifts
by Yolanda Kippers

Last year we lost two RASC members who provided us with hours of reading pleasure, imparting their knowledge of and enthusiasm for our beloved night skies. The amateur astronomy community mourns the deaths of these two individuals.

Terence Dickinson died last February. He had written several books on astronomy that remain his enduring gift. It's thought that his *NightWatch* is #1 on many amateur astronomers' suggestion list: "If you read only one book (related to astronomy) this is the best."

However, it was his *The Backyard Astronomer's* Guide (3rd edition, 2008) that I received as a Christmas gift in 2009. At that time I got bogged down by the technicalities of telescopes and lenses and the book eventually got relegated to the shelf.

Just as I was planning to get back to it, the 4th edition (2021) was released. Provided the opportunity of a fresh start, I promptly purchased the updated version. This time I did read it and I did not get bogged down; although I do admit to skipping through most of the technical computer stuff.

This is also a great book. The writing is clear and concise; the visuals helpful and well placed. It covers just about everything you may need to know about basic astronomy. I gave my older version of the book to my neighbour. The verdict: "It's a really great book." Thank you, Mr. Dickinson.

Our second loss was Blake Nancarrow who died in September. A Toronto RASC member, Blake was a double star aficionado and computer software expert. He frequently wrote articles for the SkyNews magazine and the RASC Journal. As National Observation Committee chair, he signed my Observe the Universe certificate in 2021. Thank you, Mr. Nancarrow.

Both of these amateur astronomers, members of RASC, have left us lasting gifts. Terry and Blake were gifts. I never met them but I feel like I've lost two friends. We came from the stars; we return to the stars. Ad Astra, my friends.

April 8, 2024 Total Solar Eclipse Where Will it Be & What Can You See?

by Alan Hindle

On April 8th, 2024 there's going to be a total eclipse of the Sun visible from much of New Brunswick. This one has the potential to be spectacular! I saw the Great American Eclipse, as they call it, in 2017. Weather permitting, this one will be just as good, if not better.

Safety First. I'm an amateur astronomer and a member of the Royal Astronomical Society of Canada. RASC is where astronomy lives in Canada. Observing the Sun is one of my favourite things to do. Our Sun is a very dynamic and fascinating object; it's our star. I have trained myself through advice, research and practice how to do it safely, and I have the proper equipment to do it safely.

I am also a retired welder and boilermaker. I have been unfortunate enough through my career to have experienced 'arc-flash' or 'welder's flash'. That happens when you're unlucky enough to accidentally look directly at the bright light from a welding arc without eye protection in place, from a close distance, for just a split-second. That is extremely intense light, much like looking directly at the Sun. This sort of thing usually requires a trip to the Emergency Room or your local eye doctor for assessment and treatment. All eye injuries are unpleasant. Temporary injuries caused by intense light can linger for days or weeks. Permanent eye injury can change your life.

Looking directly at the Sun without proper eye protection is hazardous. When eclipse day comes you are ultimately responsible to protect yourself. Use proper eye protection when directly viewing the Sun during the partial phases of the eclipse. Solar eclipse glasses conforming to ISO 12312-2 are the best choice for most people. It is only during the brief totality phase that it is safe to look directly at the Sun with the naked eye, because you can't actually see the bright surface of the Sun. During the totality phase you're seeing the Moon and the Sun's corona surrounding it. I'll tell you more about the Sun's corona later.

Where will the Sun be in the sky during totality? That may sound like a foolish question but it really isn't. The position of the Sun changes over time, and not just as it moves across the sky during the course of the day. It's rises higher in the sky in summer and it's lower in the winter. The Sun rises earlier and sets later in summer. That's why we have four seasons like we do.

It can be worthwhile to know where to stand or sit ahead of time to watch the eclipse, and a wee bit of planning doesn't hurt. That way you can avoid having a building or a big tree in your way when you're deciding on a viewing location.

The eclipse is on April 8, and totality is at 4:33 pm in Perth-Andover (that's local time, and give or take a minute or so on either side for the start and finish of totality). At that specific time the Sun and Moon will be at roughly 240 degrees (southwest) on the compass. Every iPhone has a compass app factory installed, I believe. Hold the phone flat and level for the best accuracy. And really, a rough alignment is enough to get you pointed in the right direction.

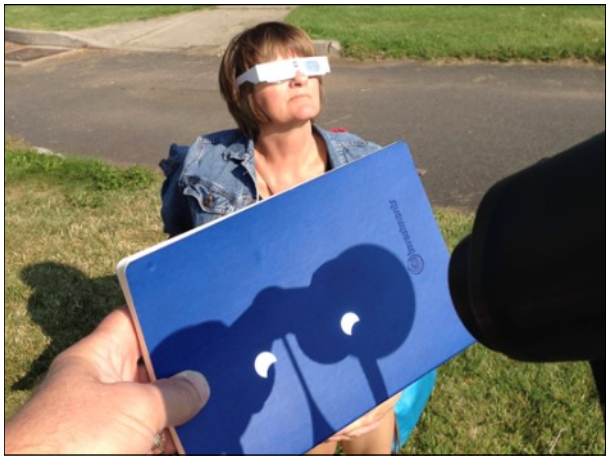
At the time of totality the Sun and Moon will be approximately 35 degrees above the horizon. By comparison, on January 23rd, the Sun reached a maximum elevation of only 24 degrees above the horizon, at about 12:42 pm. The Sun will rise higher in the sky every day from now until the start of summer. Now you know ahead of time in which direction the big show will be.

What can you see? We're all hoping for the best weather but let's start with the worst-case scenario, which is possible. If it is overcast, and even worse if it's raining too, it will be truly disappointing. Springtime weather is the real wild card here and out of our control.

If it is overcast the eclipse is going to happen anyways, there's no postponing this event. It will get as dark as night in the afternoon for about five minutes. Streetlights and security lights may come on. And that will be about it, to be honest. If it's partly cloudy early in the day don't give up hope. You may still get a glimpse or a shortened version of totality as clouds move across the sky. That would be better by far than it being totally socked in. It may even clear up in time to see it all.

Let's talk safety in the scenario of a cloudy sky. Intermittent clouds or a thin layer of cloud can obscure the Sun to the point where you can see it through the veil, but not clearly. In such a scenario you may be tempted to stare at the Sun through the cloud cover without your eclipse glasses on during the partial phases of the eclipse. While the intensity of the Sun may be dimmed to the point where it is not uncomfortable to look at, it is still not advisable to stare at it for extended periods of time. Extended viewing of the Sun through variable cloud cover without eye protection risks exposure to light more intense than you realize or expect, especially if there is a gap or thinning of the cloud layer. This can lead to an eye injury without you feeling any pain or other effects until hours later. Please use your eclipse glasses or view the Sun with an indirect method such as projection viewing. A pinhole camera can also be used.

NEVER observe the partial phases of the eclipse directly by holding binoculars in front of your solar eclipse glasses. A magnified view of the Sun is much more concentrated and intense light than eclipse glasses were designed for. Doing so would be an extremely high risk of eye injury, with permanent eye damage possible. If you will be around small children do the safest thing and leave your binoculars in the house. Children who are too young to understand the dangers present must be closely monitored and prevented from looking at the Sun without eye protection.



This is my wife and I safely viewing the partial phase of the solar eclipse before totality in 2017. Solar eclipse viewing glasses and indirect projection viewing through tripod-mounted binoculars are safe ways to view the Sun. Be vigilant to avoid starting a fire or overheating your binoculars when doing this.

When my wife and I saw the total solar eclipse in 2017 we were in Oregon, USA and the viewing conditions were ideal; warm weather with clear skies. It was amazing! It was truly a natural spectacle to behold! Totality lasted for just under two minutes where we were. We drove for two days to be there two days early and it was worth every little bit of effort for us.

One bonus this time is that many people in New Brunswick can view the eclipse from their own home without needing to travel at all! That is also true for parts of Ontario, Quebec, Prince Edward Island and Newfoundland. Another bonus for us is that the duration of totality is longer here in 2024 than in Oregon in 2017.

The last few minutes before totality is when the fun really starts. The daylight takes on an eerie quality, like twilight in a hurry, but different. It will get dark surprisingly quickly. The street lamps may come on and the air will cool noticeably. It's a unique experience.

On any other day the Sun typically appears to be a big, bright, featureless disc in the sky. During a solar eclipse, when the Moon completely covers the face of the Sun we see something normally invisible to us. The Sun/Moon combo suddenly shows fine strands of light projecting outward in all directions! That's the Sun's corona, the outermost part of the Sun's atmosphere. Nobody can say what it will look like exactly this time because it is constantly changing.

Normally, the Sun's corona is virtually impossible to observe from the surface of the Earth. Highly specialized space-based solar observatories are the best way for scientists to observe and study the corona of the Sun. During totality the corona is presented for all of us to see with the naked eye! That's amazing! It's quite beautiful to see and somewhat mesmerizing.

The image above is a simulated view of the eclipse showing the corona projecting out around the Moon. This image is a screenshot from the SkySafari mobile app on my iPad. I use this app often and I highly recommend it for learning and observing the night sky.

Everyone has a phone in their pocket, purse or hand these days. Most people will want to take a picture of the eclipse with that phone or with a DSLR or DSLM camera. But beware. If you are not experienced with astrophotography or taking pictures in very low light you may spoil the event for yourself. Don't focus your attention exclusively on snapping the perfect picture. Watch the eclipse with your own eyes and drink it all in. Look at the night sky in the daytime!

Three minutes is about how long totality will last in the Village of Southern Victoria (Perth-Andover). Three minutes is a very long time if you're holding your breath. During totality three minutes will pass by in what seems like thirty seconds! Totality will end far sooner than you want or expect. There are no do-overs. If you are fiddling with a camera or some device in the dark and trying to adjust settings on the fly you may regret it in the end because you risk not seeing the best part of a 'once-in-a-lifetime' event. But that's just my opinion.

In 2017 I could see and identify Venus and Mars in the sky during totality. The reasons why I could see them and pick them out is because I knew where to look, and I knew what those planets look like because I had observed them many times before with my naked eye or through my telescope or binoculars at night. Each planet has a distinct and unique appearance that you come to recognize with experience.

The 2024 eclipse of the Sun will be escorted above and below by the two brightest planets in the solar system. Jupiter will be shining brightly above the Sun and Venus below.

Jupiter is the largest of all the planets and it appears tinted yellow to the naked eye. You can see it now in the night sky. If you look to the southwest on a clear night over the next few weeks Jupiter will be shining brightly to the right (west) of Orion, the most famous of all the winter constellations.

During February, look to the southeast before sunrise on a clear morning and Venus will be quite bright; brighter than any star. It's even bright enough to see as the sky turns blue but it can be challenging to find. As February comes to a close the Sun and Venus will appear closer together in the sky and the extreme brightness of the rising Sun will hide Venus in its glare.

The changing positions and interactions of the Sun, Moon and the planets against the background stars is just one of the many interesting things to observe and learn through astronomy.

For more information about astronomy in Canada and the 2024 eclipse visit the Royal Astronomical Society of Canada online at the National Office at:

https://rasc.ca/eclipse2024

Check out our RASC New Brunswick Centre online at:

https://rascnb.ca/2024-solar-eclipse/

If you're near the Village of Southern Victoria we can be found online at:

https://vilsv.ca/things-to-do/special-events/eclipse-2024

Solar image by Robert R. Gaudet in Pennfield

Book Report
by Yolanda Kippers

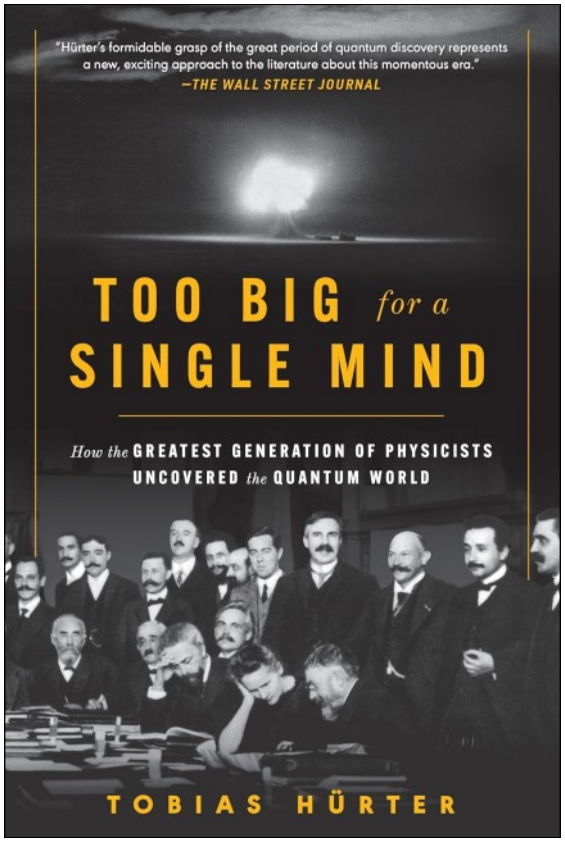
Too Big for a Single Mind: How the Greatest Generation of Physicists Uncovered the Quantum World.

By: Tobias Hürter
Translated by: David Shaw
Published by: The Experiment, New York, 2021
ISBN: 978-1-891011-17-7

As the title suggests, this is a work of non-fiction. However, by using the present tense and casting a slew of interesting characters, Hürter has managed to make this read like a thriller novel. In his research, the author used letters and correspondence, diaries and memoirs, and accounts of conferences and interviews.

It starts in 1903 when the Curies are hosting a party celebrating Marie receiving her doctorate. Ernest Rutherford is at the party; the guests are flushed with alcohol. Chapter by chapter, new characters are introduced: Max Planck, already a senior player; Albert Einstein, still a young man; and those not yet born when the story begins.

Beginning during the aftermath of the Franco-Prussian wars and the establishment of newly aligned European states, the stage is set for the lead-up to the Great War. Politics and nationalism are the milieu in which these scientists work. History unfolds: the Titanic sinks in 1912 (Marconi is offered free passage but declines), the Great War of 1914-18, the flu pandemic in 1918. There is disruption and chaos in most of Europe. Even Niels Bohr in neutral Denmark is affected by isolation. This history affected the science which in turn will affect history.



Stock Photo

The early-to-mid 1920s are dangerous and difficult times in which to live, work and study, especially in Germany. Millions had already lost their lives to the Great War and the pandemic. Now, because of war reparations there is massive unemployment and little food and millions more starve to death. There is little interest in science. Students go hungry and lectures are cancelled (Max Born goes back to his research). Niels Bohr brings butter to Einstein on a visit from Denmark. By June of 1922 there have been 354 political assassinations by right-wing extremists. It is dangerous to speak out and dangerous to be a Jew. Einstein avoids public appearances. The physics professor, Philipp Lenard, praises the imprisoned Adolf Hitler. Bohr works with some success to build political bridges to include German scientists at European conferences.

This is a human story. Just as in a novel, new characters are introduced as the plot develops; the plot being the uncovering of the mystery of the quantum world. There is a vast cast of characters: some are physicists, some are mathematicians, some are both, and some are philosophers. All are brilliant. A non-fiction such as this could have been a dry account of chapters dedicated to each scientist and his or her work. However, Hürter seems to have achieved greater clarity by using a story-line approach. His characters interact as they meet in cafes and bars, at conferences and as guests in each other's homes. It is through their conversations and correspondence that the reader learns about their ideas, theories, experiments and problems. Friendships and rivalries develop. The reader wants to know what happens next.

The characters are generally portrayed as likeable, though perhaps flawed. There are introverts and extroverts; they come from various backgrounds. There is even a real prince. They are not all always in good health, suffering from allergies, stomach ail-

ments, TB, alcoholism, and mental disorders (Carl Jung, one of the fathers of psychiatry, makes an appearance). Some of them die of their illness or by suicide, accident, war or old age.

Their love affairs rival those of the Olympian gods. Einstein is married twice and has many affairs, and Marie has an affair with Paul Langevin. Schrödinger is a ladies' man; he has many affairs, even with the wives of his friends, while his wife has many affairs of her own. Bohr seems to be happily married.

In general, life starts to improve after the mid -20s until the Stock Market Crash in 1929. Then, in 1933 Hitler becomes Reich Chancellor of Germany, turning the country into a Nazi state. Almost immediately, freedom of the press and of assembly are abolished. Jews are forbidden to hold public offices so many Jewish scientists and teachers lose their positions. Books are burned by the thousands. People start to leave Germany: Einstein never returns from America, Sigmund Freud goes to England, Lise Meitner is smuggled out of the country and goes to Sweden, Schrödinger (who is not Jewish) is forced to say he is a Nazi but is not trusted by the regime and loses his job anyway. He escapes in time and finally settles in Dublin. Max Planck is old and tired and initially tries to accommodate the regime; later he attempts to talk to Hitler to save science only to be forced to take Nazi training. He is later criticized for not doing enough and dies in 1947. Heisenberg, though not a Nazi, is a true German and stays in Germany. He and Bohr are never able to return to their former father-son-like relationship. History affects science.

Throughout, Hürter continues with the development of the quantum theories. The scientists are not all in agreement, yet none can work in isolation in what Hürter calls the "law of conservation of genius." Brilliant experimentalists make terrible theorists, and vice versa. Tensions are building. Even as we know how the story ends, we wonder what will happen next.

In the final chapters the tension builds. Otto Hahn (in Germany) asks his colleague, Lise Meitner, for help; she and her nephew figure it out and take it to Bohr in Copenhagen. There is huge significance to their findings. Bohr sails to America to tell Einstein, who is not interested on working on it, so Bohr works with Wheeler and further progress is made just as war breaks out in Europe. The implications are so great (Hahn knows how to split the atom; Germany has access to the uranium in the Belgian Congo and they have Heisenberg) that the pacifist Einstein feels the need to warn Roosevelt, a decision he later regrets. Science affects history.

The book ends with the arrest and incarceration of Heisenberg and Hahn. Two brilliant minds that found themselves in the wrong place at the wrong time. Germany failed because it did not support its scientists. Of course, the real story does not end with the ending of the book. The great scientists in this book carried on with their work in uncovering the quantum world. They will be joined by others as their great work continues.

This is an enjoyable book. It is informative as well as entertaining. I hope there is a sequel.

Orbit: Around the Centre
Where will you watch the eclipse?

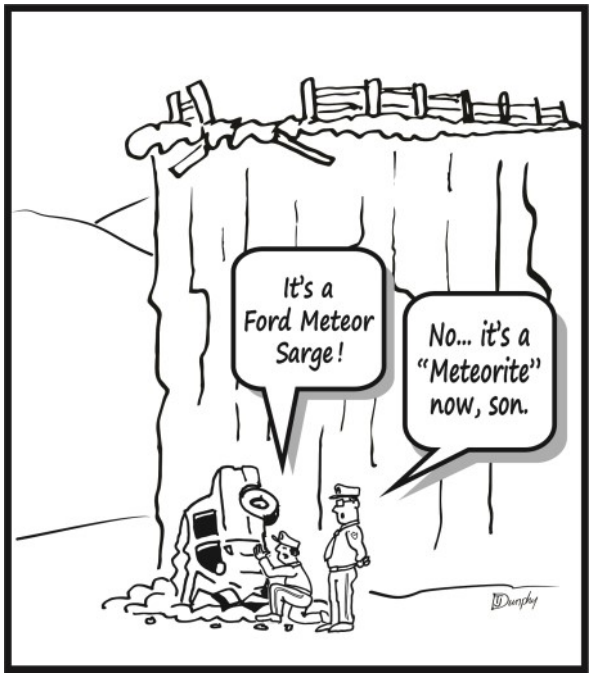
Gerry Allain

Solar eclipse day, I am going to see it in Rogersville. My son wants to come as well. My wife Paulette is going to ask for the day off to attend. Should be a good time with other RASCALs. We will go just before lunch, eat there and stay the afternoon until done.

Curt Nason

I had thought about doing outreach for 20 seconds of totality in hometown McAdam, but then I asked my brother if he would host a family event in Nackawic, where there will be 2 minutes, 52 seconds of shadowy fun.

Ted's Toon
by Ted Dunphy



An All Sky Camera Build
by Trevor Johnson

Last fall I happened to be looking at some astronomy videos on YouTube when I came across one about an All Sky Camera. It seemed interesting as it combined three of my favourite things: computers, astronomy and photography!

For anyone who does not know what an All Sky Camera is, it is basically a short focal length camera that you point directly up at the sky. If your lens has a wide enough field of view (180 degrees) you should be able to see the sky from horizon to horizon. Now, why in the world would you want to do that? There are a couple of good uses. One person's video that I watched used his to monitor the night sky so that he could tell if it was a good night to set up his telescope. Another purpose would be for monitoring the night sky for “objects.” Substitute objects with meteors or UFOs, depending on your beliefs.

After I watched the video I decided to make one. Since Christmas was coming I thought the best thing was to ask Santa for all the bits and pieces that I would need. Considering I am not 5 or 6, but 56, it was amazing that he came through.

So what did I get? I got a:

- Raspberry Pi 4 Model B with 4GB memory and power supply
- acrylic dome to protect the camera, so that I could leave it out all the time
- short fisheye lens with a field of view of 180 degrees
- weather proof box to put all the pieces in
- 32GB microSD card
- 12mp Raspberry Pi camera sensor.

The first step for me, before I even start to figure out how to put everything in the case, is to set up the Pi and get the All Sky software installed. I discovered that it is pretty easy to get the basic environment up and running. You will probably spend a lot more time tweaking the settings once you have it running.

Step 1 - Install the Raspberry PI OS

- Download the installer from: https://www.raspberrypi.com/software/ (I used the Windows version).
- Run the installer and follow the instructions to install. I am going to control the Pi remotely so I chose to use a headless version. This means you need to add your Wi-Fi settings so that when you boot the Pi it will be able to connect to your network and be accessible. If you don't want to do that then you will need to add a monitor and keyboard to your gear.
- When the installer is finished you are prompted to remove the MicroSD card from the computer. You can now insert the micro SD card into the Pi and power it up.

Step 2 - Install the All Sky software

I am using the system created by Thomas Jacquin. The instructions for his build can be found at https://www.instructables.com/Wireless-All-Sky-Camera/ and the software can be found on GitHub at https://github.com/thomasjacquin/allsky. The instructions on the GitHub site are excellent and easy to follow.

Being eager I didn't read ahead, but I should have. It was nothing major but I discovered that if I had actually connected the camera to the Pi before I started the install it would detect it automatically instead of me having to go through the settings afterwards to configure it. The solution was simple. Reflash the microSD card and start the install again. It didn't take very long at all. It was probably faster than me trying to figure out the configuration settings.

The installation of the software is done through a Windows command prompt using SSH. I am not going to try to recreate the excellent instructions on the GitHub page so if you want to check that out, go ahead, and I'll wait for you!

Step 3 - Setting up and testing the system

Once the software was installed I rebooted the Pi and waited a few minutes for everything to get started. Then I connected to the web interface on the Pi to see what the software was doing.

The camera was properly detected and all the default settings seemed to have worked. The image was really fuzzy, of course, as I hadn't the chance to focus the camera yet. That is the next step, and it can take a long time. The default settings had the live image update every 90 seconds. That meant it could take up to three minutes to see if my focus adjustment was getting better. It took a while but I finally got close enough to see how well this lens and camera combination was going to work.

If I can't speed up the refresh rate I might try installing a basic webcam software package so that I can display a real time image. That should make it much easier and faster to get the lens focused. Once done you shouldn't have to do it again. Lenses for these cameras can be relatively inexpensive so you could change them out depending on the task at hand.

Here is a one of the first images that I got with the basic setup. It's clear enough that you can easily pick out the Big Dipper. On close inspection there are some short star trails so I am going to have to shorten the maximum exposure time.

In the next issue I'll complete the build, talk about the adjustments I needed to make, and add some examples of what you can get from this little package.

TSE on 0932 Nov. 30

New Brunswick's Last TSE

by Curt Nason

When was the last total eclipse in New Brunswick? On 1972 July 10 the Moon's shadow entered northern NB with the southern limit running west of Campbellton, through Miramichi and skimming the east coast, with Caraquet on the centreline. What about the rest of NB?

This year's totality covers the central half of NB. Impressive, but on 932 November 30 the Moon's shadow included about ⅔ of the province, omitting Campbellton, Bathurst and (tantalizingly) Miramichi, plus the southwestern corner. That southwestern corner and Grand Manan were compensated, almost exclusively, on 1232 October 15; and again on 1569 September 10. That second one ran farther north, from south of McAdam through Piskahegan and bisecting Saint John.

Much of the northern section omitted from totality in 932 was rewarded on 1203 May 12 with the southern edge exiting through Neguac. Also missing out was the northwestern corner of wilderness. But, on 1379 May 16, everywhere north of a line from Woodstock to Buctouche was treated to totality.

A seventh NB total eclipse almost eluded my search. On 1780 October 27 the northern edge ran down eastern Maine and just touched the St, Croix River border at Woodland, Maine, but it did catch the southwest corner of Grand Manan Island.

Thanks go to Fred Espenak's eclipse maps (Google Maps) on eclipsewise.com.

Double Star Astroverse
Caroline Herschel (1750-1848)
A Star in the Shadows
by Bet O'Toole

Herschel had a sister named Caroline,
Whose mother kept her strictly in line,
No education, she vowed,
Would ever be allowed,
Household chores would keep her daughter confined.

Brother William in Bath disagreed,
So Caroline joined him and was joyfully freed,
To answer her yearning,
He encouraged her learning,
And her creativity and intellect took seed.

In astronomy they made a great pair,
Herschel's discoveries she recorded with care,
Plus old catalogues she re-constructed,
With many mistakes she redacted,
She also sang in Herschel's concertos with flair.

She discovered 8 comets and 14 nebulae too,
One named Caroline's Rose, an honour of which she was due,
The first female scientist to be paid,
(What a scandal that must have made!),
As her inroads for women astronomers grew.

She was RAS's first woman to get a medal of gold,
(It was a record of 168 years she would hold),
But though Moon's crater has her name,
Few people know of her fame,
As one of the brightest stars of astronomy, truth be told.

Double Star Astroverse
William Herschel (1738-1822)
Tenacious Trailblazer
by Len Larkin

The skies with open arms welcomed Herschel,
Who gathered up double stars by the bushel,
Not just for amusement you see,
But to study them intrinsically,
And their motions he found to be non-inertial.

Trained in keyboard, violin and oboe,
But called by the stars, he had to forego,
As speculum must be well-ground,
Good optics make observing sound,
And ensured Herr Herschel's lists to grow.

Herschel's test showed pro 'scopes lagged behind,
Astronomers Royal were of the same mind,
With their instruments second class,
Greenwich wanted “good glass”,
Like in Herschel's optics – oh, what a find!

Georgium Sidus, a new planet in space,
Herschel gave the name, others said replace,
The potty-joke folk still pain us,
With the way they pronounce your-A-nus,
While UR-an-us smiles an aqua-blue face.

Binaries and moons have gravity to bind them,
Sir William built better 'scopes to help find 'em,
A growing, extensive NGC,
To catalogue clusters and nebulae,
We still observe these, we know they defined him.
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More Images by François Thériault at Genesis Observatory

NGC 1499 - California Nebula in Perseus
Ha - 24 x 300 s = 2 h
OIII - 21 x 300 s = 1 h 45 min
SII - 20 x 300 s = 1 h 40 min
Total ~5.5 hours
Skywatcher Evostar 100 ED

NGC 7635 - Bubble Nebula in Cassiopeia
Ha - 47 x 300s = 3 h 55 min
OIII - 33x 300s = 2 h 45 min
SII - 33 x 300s = 2 h 45 min
Mallincam VRC-8, Ritchey-Chretien 200 mm, using a ZWO ASI1600 mm and 5nm Ha / OIII / SII filters

RASC NB Outreach Events and Handouts

Year	# of Events	People At Events	Live Feed	Youth	Star Finders English	Star Finders French	Moon Guides English	Moon Guides French	Volunteer Hours
2014	104	4843			1716	241	1378	199	
2015	114	7262			2106	244	2568	156	
2016	219	9498			1984	115	2290	87	988
2017	248	9951	8441		2276	162	2262	131	1937
2018	187	7289	37,922	>1300	1788	170	1635	79	1355
2019	240	7036	46,675	2997	1320	216	1520	213	1950
2020	171	1859	161,688	954	817	22	636	125	1079
2021	131	731	60,240	565	108	0	46	0	1160
2022	173	12,952	63,122	10,192	586	60	472	106	1809
2023	168	23,419	9787	20,612	556	223	452	110	1789

Types of Outreach Events

Year	Presenta-tion	Night Observing	Day Ob-serving	Youth Group	School Talks	Exhibi-tion	Observ./ Planet'm
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	86	43	5	8	29	0	0
2021	65	48	6	1	11	0	0
2022	72	52	6	4	34	4	0
2023	60	13	8	14	69	4	0