Vol. 24 Issue 2

Spring 2023

HORIZON

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

M81 (Bode's Galaxy), and M82 (Cigar Galaxy), are located in Ursa Major and are ~ 12 million light years away.

Composed of 167 frames taken over two sessions: 30 x Ha (5 min), 35 red, 30 green, 42 blue @ 3 min each, and 30 luminescence frames at 45 s each for a total time of 9h 23.5 min, plus associated calibration frames.

Both Images by Carl Fleck in Upper Coverdale

Abell 1367 (Leo Cluster) at 368 million light years, composed of 216 frames taken over three sessions: 40 x Ha (5min), 70 red, 64 green, 86 blue @ 3 min each and 34 luminescence frames at 45 s each for a total time of 14h 42.5 min, plus associated calibration frames.

Camera: ZWO ASI1600 MM Pro
Filter wheel: EFW (LRGB, Ha)
Telescope: Skywatcher Evostar 80ED
Equatorial mount: Vixen SXD2
Image processing with APP and PS

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Centre News and Outlook

Meetings

Since February we have had two Zoom meetings on a Tuesday evening, with average attendance, and two on a Wednesday with below-average attendance. The date for the June meeting will be determined later, but it will not be on a Wednesday evening. That must be traditional bowling or Bingo night.

Star Parties 2023

Kouchibouguac: June 17-18
Mount Carleton: Aug 18-19
Fundy: September 8-9
Kouchibouguac Fall Fest: Sept 22-23

Public Observing

Saint Martins OHW: July 20 (21)

Irving Nature Park

Perseids: August 11 (12)
Fall Astronomy Day: Sept 22 (23)
Partial Solar Eclipse: Oct 14
International Observe the Moon Night: October 21 (22)

Orbit: Around the Centre

What is your favourite deep sky object?

Yolanda Kippers

My favourite deep sky object to observe would be the group of three Messier Objects in Auriga – M37-36-38. In October 2017, after having joined the club earlier that year, I was yet to get a handle (except for the Big Dipper) on the constellations. I was finding it difficult to orient myself – the seasons were changing and I was out at different times of the night. It was a different show each observing session.

By the middle of October I was getting fairly comfortable with Auriga and Perseus (Cassiopeia was easy enough), but my notes reflect that I was still struggling with Andromeda and Pegasus. During the early morning hours of October 28 I was out on my deck observing this part of the sky, putting the characters in order.

After determining who was what and where, I started scanning the area with my binos (10x50s). Everything was new and overwhelming. I felt inadequate. Then I came across a faint fuzzy spot. Probably nothing, I thought – just my imagination. I kept looking at it and it seemed to be consistent. I was afraid to stray too far from the site; afraid I would not find it back. I held myself very still, memorizing my postural position. After carefully letting go, I went back to that position and, yes, it was still there! But where was "there"?

That was my next dilemma. I carefully put down my binos without moving my head or eyes and then slowly determined that I was looking at Auriga. I hoped! Then I picked up my binos again, and again I found a fuzzy little patch.

Feeling quite pleased, I went in to consult my star atlas. Yes, there was a Messier object in Auriga. But then I saw, almost to my dismay, that there were three. Which one did I see? It wasn't until three days later that conditions were suitable to try again. This time I found all three. My records do not indicate how long this took. I cannot imagine that they popped right out, but I do not recall that finding them was particularly difficult either.

M37-36-38 were the first Messier objects that I found on my own. To this day I have no idea which one I found that first night. It may be possible that without realizing it I had looked at more than just the one, thinking them the same. I'll never know. But because they were the first, they hold a special place in my heart. Any time I observe the night sky and I can see Auriga, I check on my three friends ... if only for a few seconds.

Preparing for the 2024 Eclipse in Miramichi

Mary King

On April 4, In preparation for the solar eclipse of 2024, RASC NB members Yves St -Germain and Mary King presented copies of *The Backyard Astronomer's Guide* (4th Edition) by Terence Dickinson and Alan Dyer, to officials at the public libraries in Miramichi.

"We are happy to receive the books," said Chatham librarian Jennifer Wilcox. "After they are processed for the library, they will be featured on our Facebook page as a New Arrival, and put on the shelves for circulation."

Miramichi (Chatham) librarian Jennifer Wilcox receiving astronomy book from RASC NB member Yves St-Germain

"We are looking forward to supporting this remarkable solar event in our region," said Newcastle librarian Kelsey Pettis.

Miramichi (Newcastle) librarian Kelsey Pettis receiving astronomy book from RASC NB member Yves St-Germain

The Miramichi community is on the Path of Totality for the 2024 Solar Eclipse, with Miramichi predicted to receive 3 minutes, 8 seconds of darkness.

The *Backyard Astronomer's Guide* is considered an essential reference for the amateur astronomer, and the fourth edition includes all new photographs and star charts.

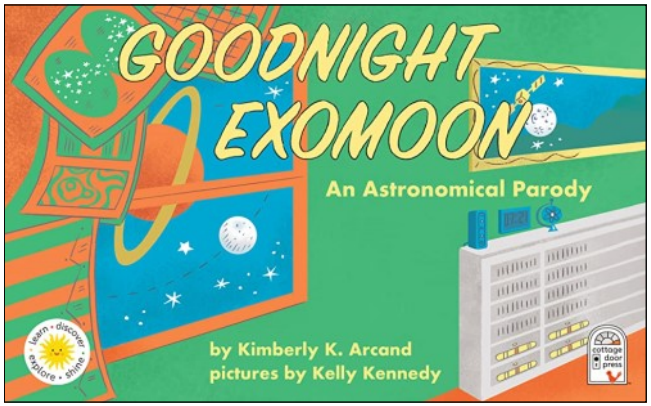
Book Review of *Goodnight Exomoon: An Astronomical Parody*

Rosanna Armstrong

While researching a fun fact that involved delving into projects of the Chandra X-ray Center, located in the Smithsonian Astrophysical Observatory in Cambridge, Massachusetts. I discovered that one of the main scientists, Kimberly K. Arcand, who is a data visualizer and science communicator for NASA's Chandra X-ray Observatory satellite, had written a book *Goodnight Exomoon* based on the classic *Goodnight Moon*, written by Margaret Wise Brown.

Goodnight Moon was first published in 1947 but the popularity of the book didn't really surge until 1953, perhaps since this was before Facebook and Tiktok it took a few years for 'I told a friend and they told a friend' to take effect. Margaret Brown Wise was a prolific children's writer who is often categorized as an iconoclast. She cared nothing for plot as truly no five year old does either, and was fixated on words, sounds and a child's view of the world. She once argued "that a child enjoys a keenness and awareness that will likely be subdued out of him later in life." Thus her books became appealing classics with children and their young-at-heart parents and grandparents. *Goodnight Moon* was illustrated by an avant-garde young painter, Clement Hurd, who used bold colours and a unique perspective.

Kimberly's own toddlers loved *Goodnight Moon* but in truth she began to dread the constant re-reading of it. Since her job is to translate binary coded astronomical data into awe-inspiring images and models of objects in space, a form of storytelling, she began to mentally riff on *Goodnight Moon* giving it an astronomy edge. Eventually, when her children were teenagers and also once exomoons were discovered, not just theorized possibilities, she decided to bring her parody of *Goodnight Moon* to print. It was published in July 2020.



Kimberly stays true to the flow of words on each page. There are a few extra syllables at times; "And there were three little bears sitting on chairs" ~ "And there were three little astronomers sitting with monitors"; but the flow, textures and sounds of the words remain appealing to all. Kimberly's book offers up many moments to encourage curiosity and questions. It is an excellent beginner's STEM reader. The artwork by Kelly Kennedy remains true to the original without being a copy. The palate is the same and your eye flows comfortably across the pages.

Two details I found, like little secrets to be discovered. In the original green room there is a book open on a shelf, *A Runaway Bunny*, written by Margaret and illustrated by Hurd; another well known classic. I still have my sister's copy. Also, on the nightstand, there is a copy of *Goodnight Moon* itself. There are also clocks showing different times on several pages throughout the book.

In Kimberly's version there are two clocks on the wall on the matching pages. The bottom clock will always show the same time as the one in the original, the top clock will be three hours different, reflecting the time of where the illustrator, Kelly Kennedy, lives. That's a detail that will delight young readers and old ones too, like me.

Children are quick to spot these little secrets and also quick to 'correct' adults if something seems amiss. Once a small boy objected to a line that Margaret had written: "The stars come out." “Stars are always there, they don't come out,” the boy explained. Brown conceded the point.

I think *Goodnight Exomoon: An Astronomical Parody* may become a classic too. Both books are worth many re-reads with your favourite small person.

Double Stars Then and Now—Gamma1 Leonis

Len Larkin

In the spring of 1983, at a quiet parking lot at UNBSJ, my 60 mm refractor was locked onto a star in Leo – Gamma1. After some lower magnification, I chose an eyepiece for 130x. From my notes, "Very nice, easy to view. Secondary just outside primary diffraction ring." A couple of years later in March, 1985, light from this same double bounced around inside my 200 mm Newtonian before reaching my eye. It was an easy split but no colour was noticed.

Gamma 1 Leonis (Algieba)
Position Angle = 127˚ Separation = 4.7"
Mag1= 2.4 Mag2 = 3.6 Distance = 40 pc
Spectral types: K0 III, G7 III
SAO # 81298
RA=10h20m Dec=19˚50'

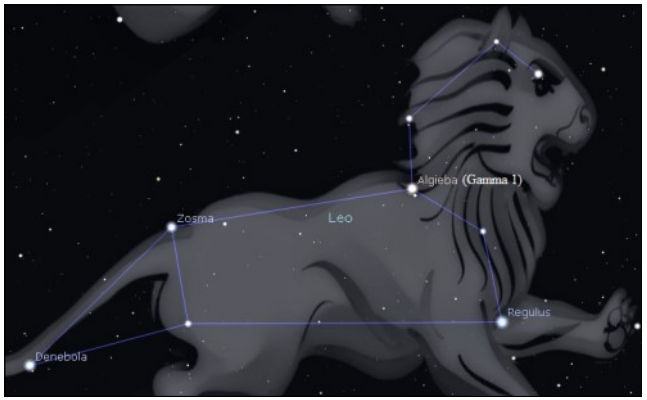
May 14, 2021 found me on my back deck soaking up photons from Gamma using the 100 mm refractor but my notes were brief, just recording the star colours as Orange/Blue. A week later; same place, same scope except that it had an aperture stop making it perform like a 50 mm instrument. That set-up, also at 130x, showed a bit of dark space between the two stars and star colours of Yellow/Blue. The primary is listed as Yellow by Webb (1849) and bright Orange by Smyth (1836) but they agree on the secondary as Greenish Yellow. Ah, colour judgement – always challenging! Was there any point of bumping it up to 180x? Well, that turned out to be a good idea as there was also a gossamer diffraction ring noticeable at that magnification. I then removed the aperture stop; the dark gap widened but the rings were badly disturbed by seeing in the 100 mm view. Looks like the little 50 mm aperture operating at a focal ratio of F/18 can work some magic.

While searching out info on this double the next day, I came across an object that I certainly wasn't expecting – an exoplanet! Gamma 1 Leonis b, discovered in 2009, is a gas giant exoplanet that orbits about 1 AU from the K-type primary star of Gamma1 Leonis. Exoplanets have not yet been imaged directly by amateur telescopes, as far as I know, but one can still use their imagination.

Further to that, let's start with an easy double star trick. If you multiply the observed separation (4.7") of the two stars by the system distance from us (40 parsecs) you get the physical separation between them (188 AU). It's only a rough guide as I don't understand the orbital elements well enough to show the true orbit, but it's fine just to show scale. So if you scaled this system at 10 mm/AU, you could represent the exoplanet 10 mm from the primary sun with the secondary 1880 mm (1.88 metres) distant.

That reminds me of a time in the mid-80s when I, Dave Driscoll and another observer took my 150 mm refractor out to a quiet back road in Grand Bay for observing. It may be helpful if you visualize this set-up: a long white telescope tube (on a very tall tripod) towering almost 3 metres above the ground. We were observing for a while in a pull-off spot when another car turned in with it's lights on us. It was a police car and the officer was quickly turning us back into day observers with the high beams, flashing lights (and possibly even a searchlight) wiping out our dark adaptation. After he asked a couple of questions, I remember Dave asking him if he could PU-LEASE shut those lights off! He did so, a bit apologetically, as he finally realized what we were doing. Initially, he thought he saw a stolen car being stripped of parts. With concerns allayed, he took a turn at the 150x eyepiece and seemed quite impressed by the crisp view.

So on two nights, separated by decades, each of us was investigating one thing and finding another. I delved into the double star Gamma Leo and found out that it had an exoplanet (a super Jupiter type planet). The officer was checking out a "suspicious tow truck with a white boom" and found a telescope, a gaggle of astronomers and a superb view of the real Jupiter!



Centre Outreach

As you can see in the tables to the right our outreach stats have changed, with increases in school events and attendees, especially youth. For the second year we have given online Science Week presentations for the four Anglophone school districts. This year Gerry Allain and Curt Nason gave a total of eight talks (Gerry did one of his in French) with an attendance of 810 classes. We assume 20 students and one teacher per class. Nearly half of the attendees watched recordings of the talks during the week, as there were two or more presentations for most time slots. In addition, Chris Curwin continues to give school presentations and live feeds, and the Sunday Night Astronomy Show with Mike Powell, Paul Owen and Rosanna Armstrong.

Solar observing class at KVHS on May 18
Photo by Mrs. C. Logan - Astronomy Teacher

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	96	20,023	5877	18,689	40	90	246		3731

Types of Outreach Event

Year	Presentation	Night Observing	Day Observing	Youth Group	School Talks	Exhibition	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	29	5	3	7	51	1	

TALES AND ADVENTURES IN REFRACTOR COLLIMATION

François Thériault

Looking back to all that has occurred to me since that eventful day, I am scarcely able to believe in the reality of my adventures. They were truly so wonderful that even now I am bewildered when I think of them.

Jules Verne
A Journey to the Center of the Earth (1864)

Introduction: Collimation in the exercise of aligning the optics in a telescope. Most of us that have owned a Dobsonian or Newtonian telescope have had at one point or another to do the "collimation." The more experienced amateur astronomers will remember the dreaded Cheshire eyepiece. Nowadays, the process can easily be done with a laser collimator.

But what about refractors? These lens-type telescopes have a sealed tube and you never have to touch the collimation – right? That is wrong Jim! Most APO refractor telescopes do have collimation screws and yes, they do have to be adjusted from time to time.

The issue: A while back I purchased a used refractor, a nice Explore Scientific 80ED CF. A high end refractor. Unfortunately, looking through the scope, stars looked like squashed bugs on my windshield after an afternoon drive on a country road. The telescope was almost unusable in this present condition.

I suffered through it for a couple of years, wondering if I had made a mistake purchasing it. Performance was just not there, but on the other hand it really was a good price at the time. We all have been there at one time or another.

I started looking for causes and possible solutions. First, I looked at the diagonal to see if there was a problem with it. Yes, even diagonals can go out of collimation and can be adjusted. But this is for a different topic.

In order to eliminate factors, I switched eyepieces and even switched diagonals. Still the problem persisted. Clearly the issues were not because of these components. I finally reached the sad conclusion that the telescope itself was the cause of the poor performance.

I then took to researching on the Internet. Lots of articles, guides, instructions and even videos on how to do collimation on reflector telescopes like Dobs and Newts, but very little information on refractors. I only managed to find one video by Explore Scientific on refractor collimation. It offered some help on process, but did not go into the alignment issues.

I dug into it, examining the operation of the scope and eventually found the problem, or I should say problems. It did turn out to be a multi-faceted issue. In this article, I will embark on laying out the methodology I used to fix these issues.

What you will need: The tools you will need to do refractor collimation are as follows:
First and most important – LOTS OF PATIENCE.

- ruler, preferably one with a metric scale
- set of Allen wrenches to fit the hardware on your scope; most likely metric
- set of calipers. I used a digital version. Picked it up on sale last year at Canadian Tire. Never know when you will need one – right? After all, it was too good of a price to pass up!
- Cheshire eyepiece
- printed alignment target, explained below
- blow duster (for cleaning).
- microfibre cloth (for cleaning).
- distilled water (for cleaning).

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Part 1—The Alignment

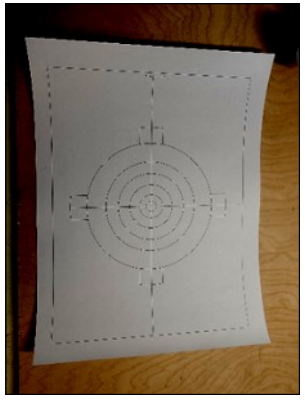
Three issues need to be dealt with to do a proper alignment and collimation of the refractor telescope. These are:
1. Is the collimator instrument collimated itself?
2. Is the telescope focuser aligned with the optical axis of the telescope?
3. Is the lens cell collimated?

The first topic might come as a surprise to many. What is he talking about? Is the collimator in proper collimation? A couple of years back I picked up a $20 laser collimator on eBay. Nice instrument, but did not seem to perform well for collimation of my Dobsonian. It was always off by a bit. Turns out that the collimator was out of alignment. I needed to re-adjust it.

Collimating the Collimator: Any collimator will have 3 adjustment screws around its perimeter. In my case, they were hidden below what looked like black silicone that hid the screw head. After removing the silicone, I was in business.

We now have to align the collimator with a target. To produce our target, we first measure the telescope dew shield diameter. In producing this "collimation target" we will draw out and print a series of concentric rings with the largest ring being the diameter of your telescope dew shield. Add to this a set of two perpendicular lines pointing to the middle of the circles to serve as crosshairs.

This target can be produced on your computer with a drafting program if you have access to one. Free versions are available online. A simpler method is to use an old-fashioned compass and a ruler. The British will call it dividers and a scale. Most of us have such a set tucked away in the cupboards from when the children were in school. If not, you can pick one up for cheap at Walmart.

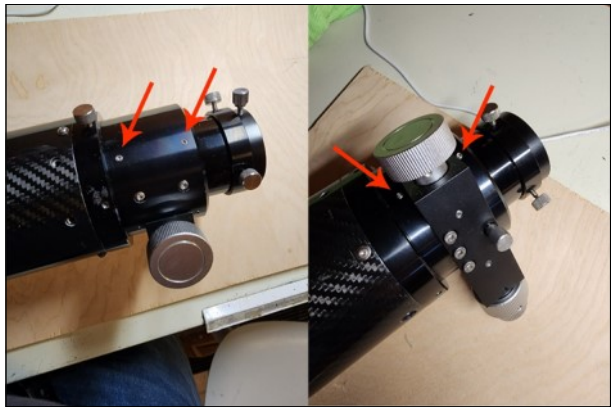


With the target complete, tape it to the front of the dew shield. I prefer to cut out the target with "wings" to allow for precise placement on the front of the scope. I also cut out the centre of the target by folding it in quarters and snipping the centre point. This gives me a black dot in the middle to aim for while looking down the scope during collimation. But I get ahead of myself.

Tape the target to the front of the scope on the retracted dew shield. Insert the laser collimator in the eyepiece holder, then slowly rotate the collimator. If the laser light describes a circle on the target the collimator is out of adjustment. Simply tweak the collimation screws on the laser until the light stays in one spot on the target when you rotate it. The collimator is now ready.

Align the focuser: To align the focuser assembly, leave the laser in your eyepiece holder. Note where the laser falls on the target. Is it in the centre? In my case, the laser was off-centre, indicating that the focuser was not lined up with the telescope's optical axis.

Focuser Alignment:
First step is to try to adjust the focuser assembly by tightening and loosening the tensioning screws on the side of the focuser. These are a series of 4 to 8 adjustment grub screws positioned on the left and right hand side of the focuser, front and back.

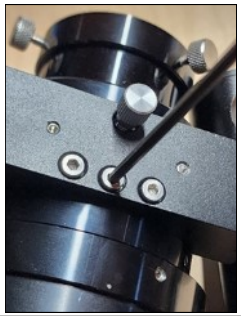


Check the alignment target; if the laser is now in the centre, the focuser alignment is done. In my case, however, the focuser was so far out and the tensioning screws were so

tight, the draw-tube was actually binding. The only way to correct this was to dismantle the focuser – of course.

Focuser Removal and Disassembly: First step is to remove the focuser from the telescope tube. A series of small screws around the perimeter of the tube will hold the focuser in place. While you remove them, keep these screws safe! I used the front lens cap as a dish to receive the screws.

Without this dish to secure the screws, you will certainly drop one of these small screws or a small washer on the floor, and you will spend ½ hour on your hands and knees cursing and looking for a microscopic screw that you cannot find because your bifocals will not work on something that small. Eventually, you will find it where it rolled under a piece of furniture 15 feet way from where you were working. How did it get there? Once all these screws are found and collected, you will invariably knock the holding dish on the floor, with all the screws and washers back on the floor while getting up off your knees, thus repeating the process.



Back to the telescope, you next remove the focuser shaft assembly. Next, loosen the tensioning screws around the perimeter of the focuser body. This will allow the removal of the drawtube.

With the drawtube out, we can now see the side bearings. These 8 bearings keep the drawtube straight and tight along the course of travel through the focuser. If any of these are too tight, or not tight enough, the drawtube will be misaligned, such was the case for me.

Check the condition of the bearings and make sure their operation is smooth. Then,

re-insert the drawtube inside the focuser body. I needed to find a frame of reference for both the focuser body and the drawtube to work along the same axis. To do this, I placed both onto a flat hard surface. With both components resting on the common hard surface, they were now in reference and square with each other.

Next, I very carefully re-tightened the tensioning screws around the perimeter of the focuser. Be careful to not overtighten. At this point, they should only be finger tight. They will be used later to adjust the axis of the drawtube.

Flip the focuser over. Make sure that all 8 rollers are in contact with the drawtube. Check for looseness in the drawtube operation. There should be only minimal play, or none at all, in the drawtube travel at this point.

Rack in the drawtube and check for square as it travels inwards, both on the sides and from the front / back. In my case, I could check a shoulder on the drawtube against the top flange of the focuser body and confirmed that the alignment was good.

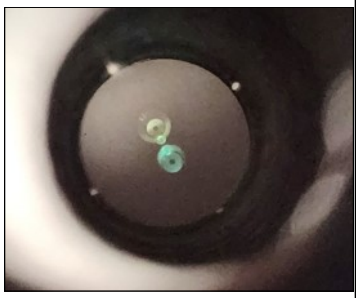
Finally, reassemble the shaft in the focuser and reinstall the entire focuser assembly on the telescope tube. Check alignment with the target with the laser. Adjust the tensioning screws to ensure the laser points directly to the centre of the target. The focuser is now aligned with the optical axis of the telescope. That is half of the problem solved!

Part 2—The Collimation

The second part was not so easy. Not knowing what I was dealing with, I first checked the collimation of the front lens cell. This was done using a Cheshire eyepiece and a diffuse source of light. I had to modify the Cheshire eyepiece I owned, however. Most of these come with crosshairs. In refractor collimation, the crosshairs get in the way. So, I simply removed them using needle-nose pliers.

As for the diffuse source of light, I used a desk lamp that had a diffuser on it. Alternatively, a pocket flashlight with a couple of layers of toilet paper on the flashlight lens would work just as well.

In checking the collimation of the lens, here is what I found: These two circles in the centre should be overlapping each other. They being apart only meant that the lens assembly was severely out of collimation. With a heavy sigh, I reached the conclusion that it was time for major surgery.



I proceeded to remove the lens cell assembly from the tube. Again, careful with those tiny screws. First, remove the dew shield. It should come off easily with a couple of screws around the perimeter.

With the lens cell exposed, do a visual inspection of the lens cell to see if there are any issues. In my case there was major offset of the lens cell. Note the gap at the bottom versus the gap at the top in the following picture. Not surprising it was out of collimation.

I proceeded with the removal of the lens cell from the telescope tube completely. It was too far out of alignment to try to adjust. With the lens cell removed, the collimation screws were readily accessible. These screws are normally arranged in three groups of 2 to 3 screws along the perimeter of the lens cell at 120° intervals. One is the locking screw – usually the one that is recessed in furthest. The adjustment screws are the other ones, usually they will stick out the most.

A good way to tell which is which is to look at the back of the lens cell. The ones sticking out through the back are the locking screws. The adjusting screw will butt up against the lens cell flange. Next, in order to “level the field” so to speak, I backed out all the locking screws until their tips were flush with the back of the lens cell. I had to make sure the front of the lens cell was roughly parallel with the back to have the lens line up with the optical axis of the telescope.

I measured the adjusting screws to have 12 mm of travel. I wanted to give myself about ¼ of the length of the screw as back-adjustment, should I need it through the collimation process. That meant I need a gap of about 3 mm all sides of the lens cell. I simply took a pad of note paper and removed pages until I had about 3 mm thick, when measured with the calipers.

By placing this paper pad as a shim between the cell and the back flange as I tightened the locking screw, I was able to achieve consistency around the perimeter of the lens cell. I visually checked uniformity and then measured the gap with calipers. The measurements confirmed a 2.7 mm gap on all sides.

Cleaning: While I had the lens cell disassembled, I took the opportunity to clean both front and back surfaces of the lens. This process is not very complicated.

Use Q-tips soaked in distilled water to gently lift dirt from the lenses. Be careful not to press down too much and scratch the glass surface. For stubborn spots or dried gunk on the lens, you can use rubbing alcohol with a Q-tip. I usually ty to get 75-90%. Rinse with distilled water and dry off with a microfibre cloth. Careful to not press down on the cloth; try to lift up the moisture instead of pushing down on the cloth.

Blow off any remaining dust with a squeeze-bulb dust-blower (puffer). I had one of these left over from my photographic film days.

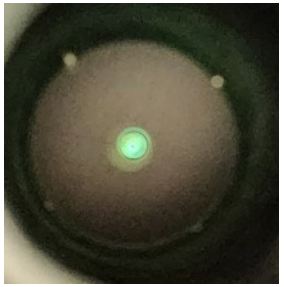
Lens cell re-assembly: Time to get the lens cell remounted onto the telescope tube. Are you not glad that you carefully set these tiny screws aside?

Once done, check the collimation with the Cheshire eyepiece. If needed, adjust the collimation screws as follows. First back out the locking screw, about 1/16 to 1/8 of a turn will do it. Only small adjustments are required at this point.

With the locking screw allowing movement in the adjusting screws, tighten these by the same amount you loosened the locking screws. Re-check the collimation. Redo the same process again, if needed. This is where the patience comes in.

A lot of the adjustments you make will go in the wrong direction, making the collimation worse. Simply reverse the sequence and try another adjustment screw until things move in the right direction. You may have to loosen the opposite adjustment screws to get the collimation correct. Or it may be that you are working on a pair of screws in a push-pull arrangement, but it will eventually line up. Ensure all screws are tight when done.

Here is the final result of my collimation:



I would call this good-to-go.

Reassemble the dew shield and the telescope is ready for use.

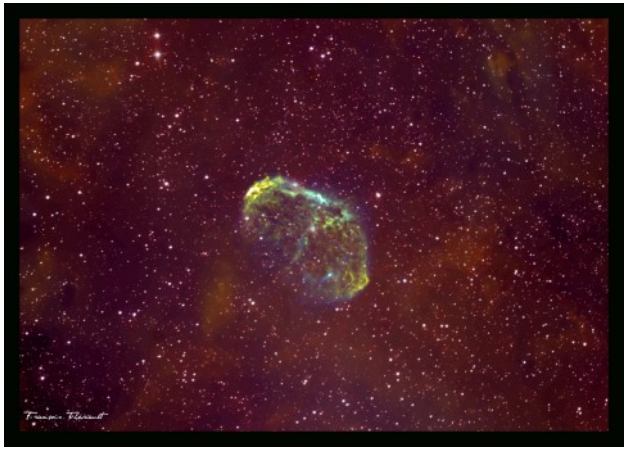
Final Step: The final step is to do a star collimation. This is really the gold standard when it comes to collimation. This process is simply to aim at a bright star such as Capella, Sirius or Regulus. In order to do this, you will need a tracking mount to follow the star as you do the adjustments.

Alternatively, you can do an artificial star collimation. There is plenty of information on the Internet on how to make an artificial star for yourself and use it to collimate (mostly Dobs). I found that the artificial star collimation has to be done at dusk or later to see the faint "star" through the telescope. This method has the advantage that the artificial star does not move, so the process can be done with the telescope stationary.

Once centred on the star, de-focus the scope until you start seeing rings in the middle of the de-focused star. If the rings are all concentric, that's it – you're done. The collimation is good. If the centre of the rings is offset when compared to the perimeter, then you need to do a final collimation.

Simply follow the same procedure as with the Cheshire eyepiece explained above. Loosen the locking screw and turn the adjustment screws to get all circles in the eyepiece to line up. Again, once done the adjustments, ensure that all screws are tight. Collimation complete!

Conclusion: I will admit that the task was daunting. It involved dismantling and re-assembling a delicate instrument, which is sort of intimidating. However, when you consider that the telescope's performance was severely handicapped by these problems, I do not regret undertaking it. The process is really is worth it in the end, knowing that I now have a nice usable scope once again.



A recent image by François of the Crescent Nebula (NGC 6888) in Cygnus.

If he used his newly-collimated refractor the daunting task was well worth the effort.

A rare photo of President June MacDonald and her laptop getting along with each other.

Surreptitiously taken by Emma.

What's Up for Summer

Curt Nason

The highlights for the months of June to August occur at the beginning and end of that span: Mars in the Beehive and Saturn at opposition, plus the Perseids peaking on August 13 with a waning crescent Moon.

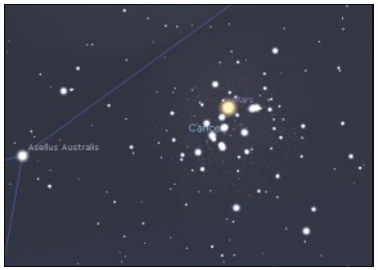
Sun Solar Cycle 25 continues to delight observers with its activity. Summer Solstice occurs just before noon (11:58) on June 21.

Moon New Moon dates are June 18, July 17 and August 16.

Mercury brightens over the first two weeks of June, making the best opportunity to pick it out of morning twilight low in the northeast. It is at superior conjunction July 1, within the Beehive Cluster July 15, and passes very near Regulus July 28. Mercury reaches greatest eastern elongation August 9-10.

Venus chases Mars through Cancer and Gemini and into Leo before falling back in July without catching it. They are within 5˚ (quasi-conjunction) for a few weeks, and form a scenic trio with the Moon on the solstice. Venus is at inferior conjunction and nearly 8˚ south of the Sun on August 13.

Mars is a 1.6 magnitude garnet gem within the Beehive Cluster on June 1-2, and it has a close conjunction with slightly brighter Regulus July 10. Throughout August it edges sunward, heading toward conjunction in mid-November.



Jupiter dominates the morning sky over this period, rising by midnight after the first week of August. It is below the third quarter Moon on August 8, providing a good opportunity to see it naked eye after sunrise.

Saturn begins retrograde motion after June 18 and reaches opposition on August 27. The rings will be open about 8˚.

Uranus spends the summer in the morning sky in Aries, rising near midnight near the end of August and reaching its first stationary point August 29.

Neptune reaches its first stationary point in Pisces on July 1.

Comet C/2020 V2 ZTF is currently the most promising comet during the summer, expected to be around magnitude 10 as it nears closest approach in September.

Meteor Showers: The South Delta Aquariids peak around July 29 with a waxing gibbous Moon. This is a good year for the Perseids, peaking on the morning of August 13 three days before a new Moon.

Atmospheric: Keep an eye out for noctiluscent clouds through June and into July, and monitor the SpaceWeather website for aurorae as the Sun nears maximum activity.

Stellar Nursery Rhymes

Yolanda Kippers

Hey, cheera cheera, Herc plays the Lyra;
and Vulpecula chases the Swan.
The Little Bear laughs to see such sport,
As the Charmer sets with the dawn.

Little Ursa Minor, boasts no big shiner,
Hanging high in the sky.
He may be quite small
In the centre of all,
Saying, "What a good Bear am I."

Little Miss 'Quila
Flew on the heels'a,
Some Serpents are driven away.
Along comes a Dolphin
To glide along side them.
All night – 'till night turns to day.

Shep and Herc climbed up the hill,
Carrying a pail of water.
Shep fell down and broke that Crown;
And Herc came tumbling after.