SKYNEWS

The Pleiades (M45), by Brock Johnston, imaged on January 31st and February 1st, 2022.

A Meeting to Mark Time

One of the more disorientating experiences of the Pandemic has been the disruption of regular life events that marked the passage of time. Weekly observing sessions up at the Victoria Centre Observatory are on hiatus, with rare and sporadic observing nights returning in their stead. Astronomy star parties, which aspired to be everything that amateur astronomer

experience is all about, were all cancelled. The public outreach events, many of them annual events at various festivals, which connected us with the local community, were also taken from us. For the first couple months of this year, we were even without our RASC calendars to keep track of the days and weeks as they disappeared into our past.

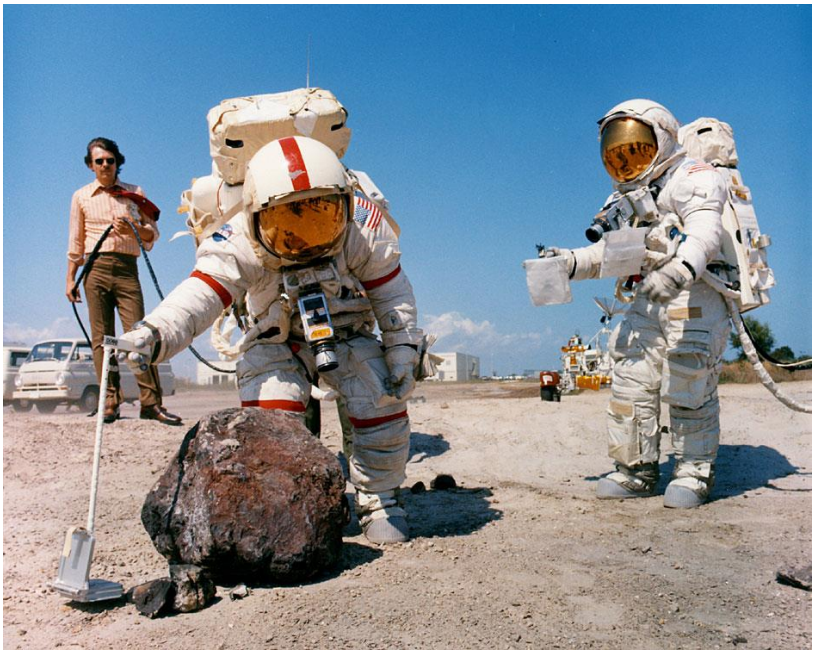
We still have Astro Café on Mondays, thanks to the RASCals who stepped up and hosted those amateur astronomy meetings online and without the usual pause during the summer. Our centre's four special interest groups, an initiative founded during the Pandemic, do hold regularly scheduled online meetings that help keep our centre members both connected and continuing to challenge themselves as amateur astronomers. *SkyNews* continues to publish editions to mark the months of the year, also without the usual summer break. The RASC Victoria Centre Secretary continues to document the minutes of our council meetings, usually held every second month. Our treasurer is obliged to keep an eye on the calendar, as well as our society's bank account, to ensure we file our data on time, both with RASC National and the Canada Revenue Agency.

Another of our scheduled events is the RASC Victoria Centre Annual General Meeting. Once an event that was also an awards dinner, it too has been relegated to being an online meeting. Just as Astro Café now has one meeting a month designated as the Centre's monthly meeting, since the closure of public gatherings one of those monthly meetings is also used for the annual general meeting, as was the case on February 21st.

Originally scheduled to start at 7:30pm, it was decided to push the start time back by half an hour to have some measure of mercy on our guest speaker, who was giving his presentation from three time zones away. Doug Welch gave a talk on *The Life and Times of the Sky Quality Meter (SQM)*, a timely presentation given that RASC Victoria is in the early days of the process of redoing our *Sky Brightness Survey*, to measure light pollution across Southern Vancouver Island.

With our guest speaker presentation finished for the evening, it was time to get down to business. We easily surpassed our necessary quorum threshold of twenty-five members, allowing us to proceed. The meeting began with the approval of the annual general meeting minutes from last year and once unanimously accepted, Barbara Lane gave her annual by Secretary's Report to the Centre, summarizing a year of amateur astronomy. We also remembered those we lost along the way: Mike Krempotic and Roy Watson. Then came the time for the Treasurer's Report, which is the administrative reason for this meeting being required by the *Societies Act* in the first place. Treasurer, Deborah Crawford gave her review of accounts and it was approved after a short discussion. The administrative portion of the evening concluded with a report from RASC National by Bill Weir.

With the routine administration out of the way, it was time for the awards portion of the evening. RASC Victoria Centre President, Randy Enkin presented the following observing certificates: Brian Barber (Explore the Universe) Jill Sinkwich (Explore the Moon), Christine Purse (Explore the Moon), Chris Purse (Explore the Universe and Explore the Moon), and Pedro Aloise (Explore the Universe and Explore the Moon). Our Centre President then went on to dispense the yearly service certificates and awards. Barbara Lane received a *Certificate of Appreciation* for her work as secretary since 2019 and hosting duties for Astro Café. Chris Purse also received a *Certificate of Appreciation* for hosting duty above and beyond the call of duty for Astro Café throughout the Pandemic. John McDonald received a *Certificate of Appreciation* for hosting Astro Café and leading the Astrophotography Special Interest Group.



The *Ernie Pfannenschmidt Award for Telescope Making* was bestowed to Cameron Burton and Lisa Meister, for the mammoth effort of the relocation and restoration of Bill Almond's observatory. The *Award of Excellence in Astrophotography* was received by Alec Lee for his photo of the Milky Way, shot from Metchosin. The *Award of Excellence in Astro Imaging* went to Dave Payne for his image of NGC 6960, the Western Veil in NB False RGB. David Lee was awarded a *Certificate of Outstanding Service* for the establishment of the Special Interest Groups, his work supporting FDAO Star Parties, and leadership in the *Sky Brightness Survey*. The *Newton/Ball Award* was conferred to Bruce Lane (*Ed: that's me!*), in recognition for his six years as centre treasurer and work as the editor of *SkyNews* (*SkyNews: that's me!*) since December 2018.

After the awards and certificates were announced, it was time to sort out the Victoria Centre Council elections, with the filling of vacant posts. As is the custom, the Past President Reg Dunkley was in charge of the process. The new members elected to council were: David Payne as 1st Vice President, Gary Sedun as 2nd Vice President, and Jill Sinkwich as Secretary. New *Members at Large* appointed to council are Jeff Pivnick and Marjie Welchframe. Sherry Buttnor has stepped down as our second representative to RASC National (we get two because we're bigger than the average centre) and we'll be looking around for a replacement. For a complete list of the RASC Victoria Centre Council members, please refer to the list on the last page of *SkyNews*.

The meeting was adjourned and that was that. Being an online meeting, via *Zoom*, there was no dinner other than what those taking part hopefully made for themselves or had delivered to their address. For me that amounted to some reheated leftovers beforehand, although I may have had a bottled beverage on hand for the meeting itself. While there was less of the dressing up than what occurred at the in-person annual general meetings of the past, we were at least fortunate in that everyone taking part wore clothes. In these uncertain times, it's difficult to know if we'll once again be having our AGM online or if it will be in a dining hall, but regardless we'll see you all next year.

Bruce Lane

Test Shot of M42, from the Victoria Centre Observatory by John McDonald; February 11th, 2022

Editorial Remarks

Here at the RASC Victoria Centre, we have the rest of a new year to look forward to, with a new council, newly arrived RASC calendars, and a world that seems to be changing before our eyes at the speed of Twitter. We take shelter in the memories of better times and hold onto the dream of a better future somewhere ahead in the distance. The night sky is for the most part, other than the trespasses of comets and artificial satellites, the same night sky that filled with wonder the first members of RASC Victoria when they looked up at it over a century ago. The light pollution in Greater Victoria is certainly a lot worse than it was back then, but there was every bit or more turmoil experienced by the RASCals of our amateur astronomy group in those early years.

While we're currently in the midst of some cold and dreary weather that is less than ideal for astronomical activities, it's a good time to catch up on some reading or familiarize yourself with some star charts. Our best astronomy sessions are often those we do the most preparations for and there's no better time for long term preparations than a cloudy night. Just be ready to get outside and make the most of the night sky when the opportunity presents itself. If you find yourself unsatisfied when there's just a meager portion of the sky clear enough to see the stars, it's best to approach the evening with a *glass half full* attitude. You need to learn to be less picky when you live on the *Wet Coast* in the springtime. If you have optics, *use your stuff*. If you're having trouble finding motivation, RASC Victoria has Special Interest Groups you can join to help direct your focus and RASC also has numerous observing and imaging certificates you can explore. In this issue of *SkyNews*, we'll have more recaps from our Centre's activities, a short article on the International Space Station, and more photos from the 50th anniversary of the Apollo missions, as well as all the astrophotography and articles you've come to expect from the *Victoria Centre SkyNews*.

Bruce Lane: SkyNews Editor

M81 and M82 Crop, by Dan Posey; February 28th, 2022.

President's Message for March

What is it that links our community together? Every year, we recognize a few members of the Victoria Centre and present them awards of appreciation and excellence. We announced the recipients at the Annual General Meeting. I had the pleasure last week of driving around Victoria handing out their framed certificates. I enjoyed seeing these stellar members of our community in their home settings. It is one of the great privileges of being president. Everyone was proud and delighted, and often surprised at the recognition. We are far greater than the sum of our parts. These members have gone an extra length to make our community stronger and more active. Thank-you!

We have a wide range of backgrounds and interests. We spend our time with a variety of aspects spanning the range of amateur astronomy. I particularly like the feeling of connection with people around the world and throughout time. Some are interested to produce the best image of an astronomical object. Some are keen to know their way around the constellations.

There is a huge hunger for astronomical knowledge out there in the bigger public. This was made very clear this last week with front page articles and television features about our friend and astro-buddy Sid Sidhu; on the occasion of having an asteroid named after him. Sid has been central to our public outreach and society *in-reach* activities over a period of decades!

What is it that links our community together is that the wonders of the sky fill us with awe and with pleasure.

Look Up,

Randy Enkin,
President@Victoria.RASC.ca

Astro Café: Continues Online

The weekly social gathering of amateur astronomers on Monday nights, known as Astro Café, has been continuing online. As with many groups, we're trying to find ways to still function as an astronomy society, without meeting in person. Members are posting their astrophotography, short articles, as well as links to astronomy stories from the Internet. Sadly, you'll have to make your own coffee and the only cookies are those your browser picks up when you visit our website. You can access the *Virtual Astro Café* at: https://www.victoria.rasc.ca/astronomy-cafe/

The first Astro Café of February, was hosted by Chris Purse, who made an announcement about the *IAU Small Bodies Nomenclature* naming Asteroid (10109) Sidhu, after Sid Sidhu. Randy Enkin talked about the upcoming annual general meeting and gave a talk on Doug Gies' paper on *The Transformative Journey of HD 93521*; David Lee discussed upcoming Special Interest Meetings and the lunar occultation of the star Zubelnelgenubi, happening at the end of the month; Reg Dunkley gave a detailed update on the status of the Victoria Centre Observatory; and Chris Gainor talked about the James Webb Space Telescope and his *History of Hubble* book.

For the Valentine's Day edition of Astro Café, Chris Purse started off with a series of announcements. There are still a few calendars available. There were also a few issues with the return to in-person Astro Café, with the portable classroom we used now being used as a full time day care. The Fairfield Gonzales Community want us to relocate, but thankfully it's to a new room at the same facility and possibly on a different night, which would of course also require us to get all our stuff out of the portable classroom we used to host the event at.

Also on February 14th, during the pre-meeting open discussion, Michel Michaud gave a brief update about the construction of his observatory in *La Belle Province*. Twenty-year RASC member, Jill Sinkwich formally introduced herself and announced that she will be standing for election as the RASC Victoria Centre Secretary. Duane Weaver gave a novice amateur astronomer's perspective on black holes and quantum gravity, based on his recent attendance of a RASC Toronto speaker series that featured Dr. Saeed Rastgoo. Dave Robinson showed some images

The Rosette Nebula around NGC 2244 Starless, by Brock Johnston. Imaged Nov 16, 2021 and Feb 13th, 2022

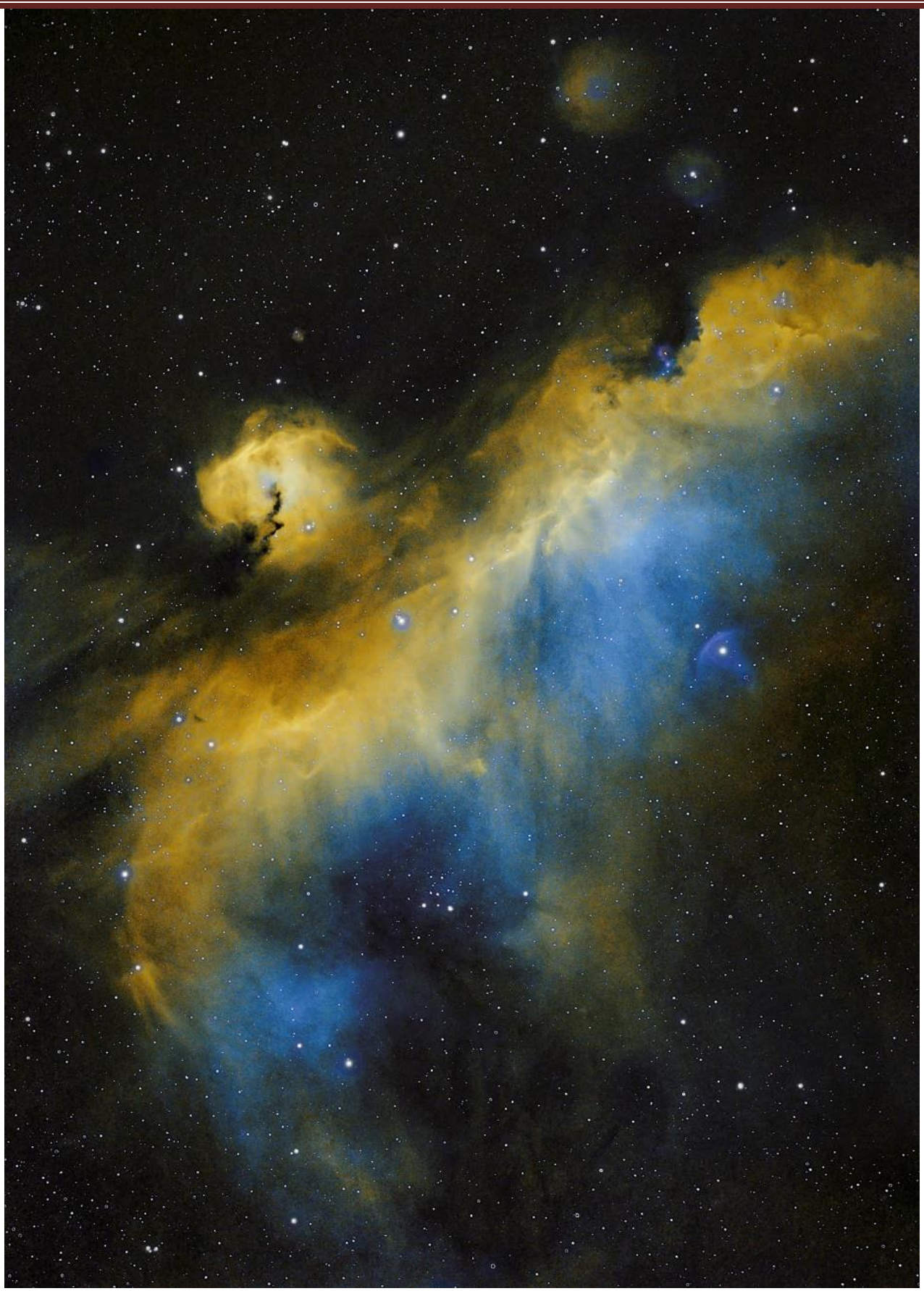
from RASC Edmonton; Chris Gainor gave another update on the James Webb Space Telescope; Lauri gave some updates for FDAO events, including the tentative possibility of in-person public outreach events up at the Hill starting on May 7th, and thanked everyone for their patience, for the long wait for their 2022 RASC Observer's Calendars. David Lee talked about the Makers SIG meeting and gave another reminder about the upcoming lunar occultation; Randy talked about next week's Victoria Centre AGM; Brock Johnson showed his images of the Pleiades, the Orion Nebula, and Rosette Nebula; Bill Weir discussed a Black History event; and Lauri gave a report about the goings on at RASC National.

The third Astro Café did triple duty as our weekly get together, monthly meeting, and annual general meeting, which has been covered in detail in the lead article of this month's issue of *SkyNews*. The last Astro Café of the month was again hosted by Chris Purse, who discussed the possibility of in-person Astro Café as early as sometime in April. We'll still be at the Fairfield-Gonzales Centre, but moved into a new space; most likely the Youth Drop-In Facility. Presentations kicked off with Marjie Welchframe giving another in her series of talks of *Women in Astronomy*, this time talking about PhD Student McGill Lisa Dang. Jeff Pivnick gave a review of an online presentation by Erin Gibbons, he watched via RASC Montreal Centre: *Perseverance First Year on Mars*. John McDonald gave a talk on *Changes at Ross Place & Orion*

Nebula from VCO; Nathan Hellner-Mestelman talked about *Cosmic Generation*, an international youth astronomy initiative he's been working on for the last month, together with the Denver Astronomical Society; and David Lee talked about upcoming SIG meetings and gave a summary of the lunar occultation of the star Zubelnelgenubi and his imaging session of the event. Mike Webb showed some of his own photos of the lunar occultation; Lauri talked about RASC Centres getting involved in the promotion of the Canadian Space Agency's Artemis Mission and the RASC National General Assembly; Dave Robinson showed more astrophotography from RASC Edmonton; Chris Gainor gave an update on the JWST and the Artemis Mission; and Bill talked about recently gaining possession of the equatorial tracking platform for the 20" Dobsonian reflector at the Centre of the Universe, both built by Guy Walton.

Bruce Lane

Reappearance of Zubenelgenubi, during Occultation of the Moon, by David Lee; February 22nd, 2022



Seagull Nebula, by Lucky Budd; imaged on February 17th and 22nd, 2022

Special Interest Groups

Getting Started in Astronomy

The beginner group have been busy preparing their contributions for our constellation exploration. The cool weather prompted some discussions on how to keep warm. For more information on this group, please contact David Lee at *david@victoria.rasc.ca*

Astrophotography

The Astrophotography SIG is now led by David Payne. There has been lots of discussion about processing, especially with the *stretch routine* that David Payne has been collaboratively developing for use in PixInsight. Weather is improving, so new images are being presented. For more information about this group, please contact David Payne at *vp@victoria.rasc.ca*.

Electronically Assisted Astronomy

The EAA group continues to talk about techniques and equipment that can support electronically assisted observing. The Centre is now part of a RASC National initiative to use EAA as an alternative during the transition to less restricted public outreach. For more information on this group, please contact David Lee at *david@victoria.rasc.ca*

Makers

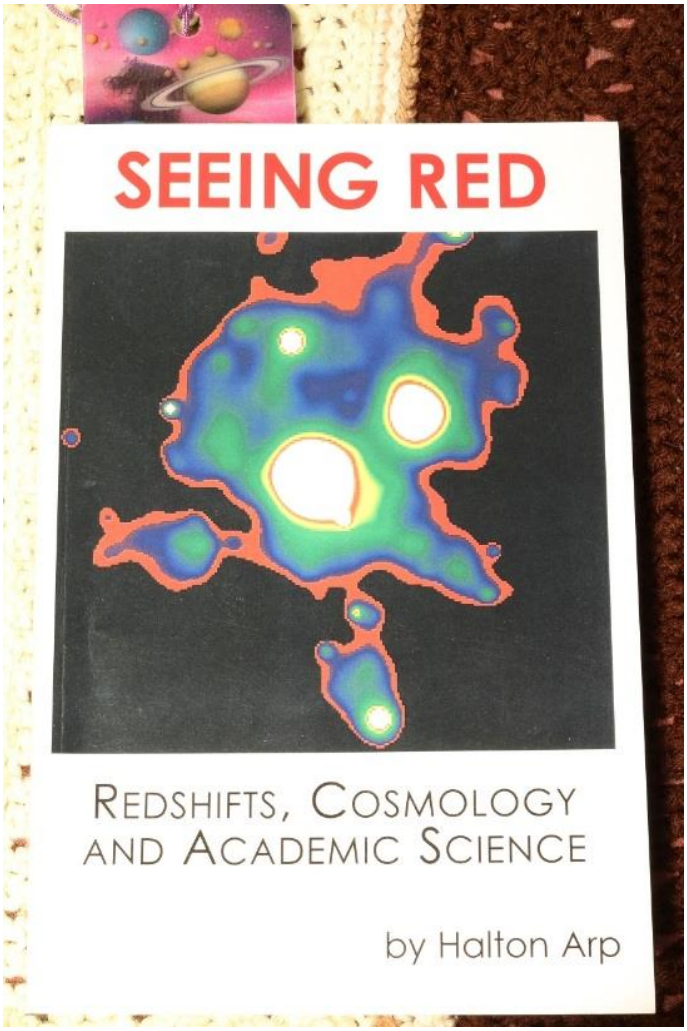
The Makers SIG continues to focus on member projects. There may be opportunities to collaborate with EAA initiatives and the *Sky Brightness Survey*. Members are also building observatories, so there is a lot of discussion around configuration and structures. For more information about this group, please contact Jim Cliffe at *jim@victora.rasc.ca*.

David Lee

From the Library

The RASC Victoria Centre Library is housed in the Astronomy Department's faculty lounge, located on the 4th floor of the Elliott Building, at the University of Victoria. It contains over 500 titles, curated by Alex Schmid, our RASC Victoria Centre Librarian. Alex is currently running our library in the same way the Greater Victoria Public Library runs its shut-in branch, driving around to do deliveries and pickups for our membership to provide access to books from the collection. For more information and to make a book delivery request, please contact Alex Schmidt at: *librarian@victoria.rasc.ca*

Our library covers many aspects of astronomy: observing, astrophotography, telescope construction, space exploration, astrophysics, and much more. Normally, the library is opened up during the social gatherings in the faculty lounge, after our monthly meetings, with coffee, juice, and cookies provided by our Centre. In the past I've been doing book reviews of the contents of our Centre's library, but until the resumption of our monthly meetings at the University of Victoria, I'll mostly be doing reviews of the astronomy books from my personal library, ones that can be purchased online or better yet at your local bookstore. This month, we're again splitting the difference with a book from my personal library that is also part of the RASC Centre Library.



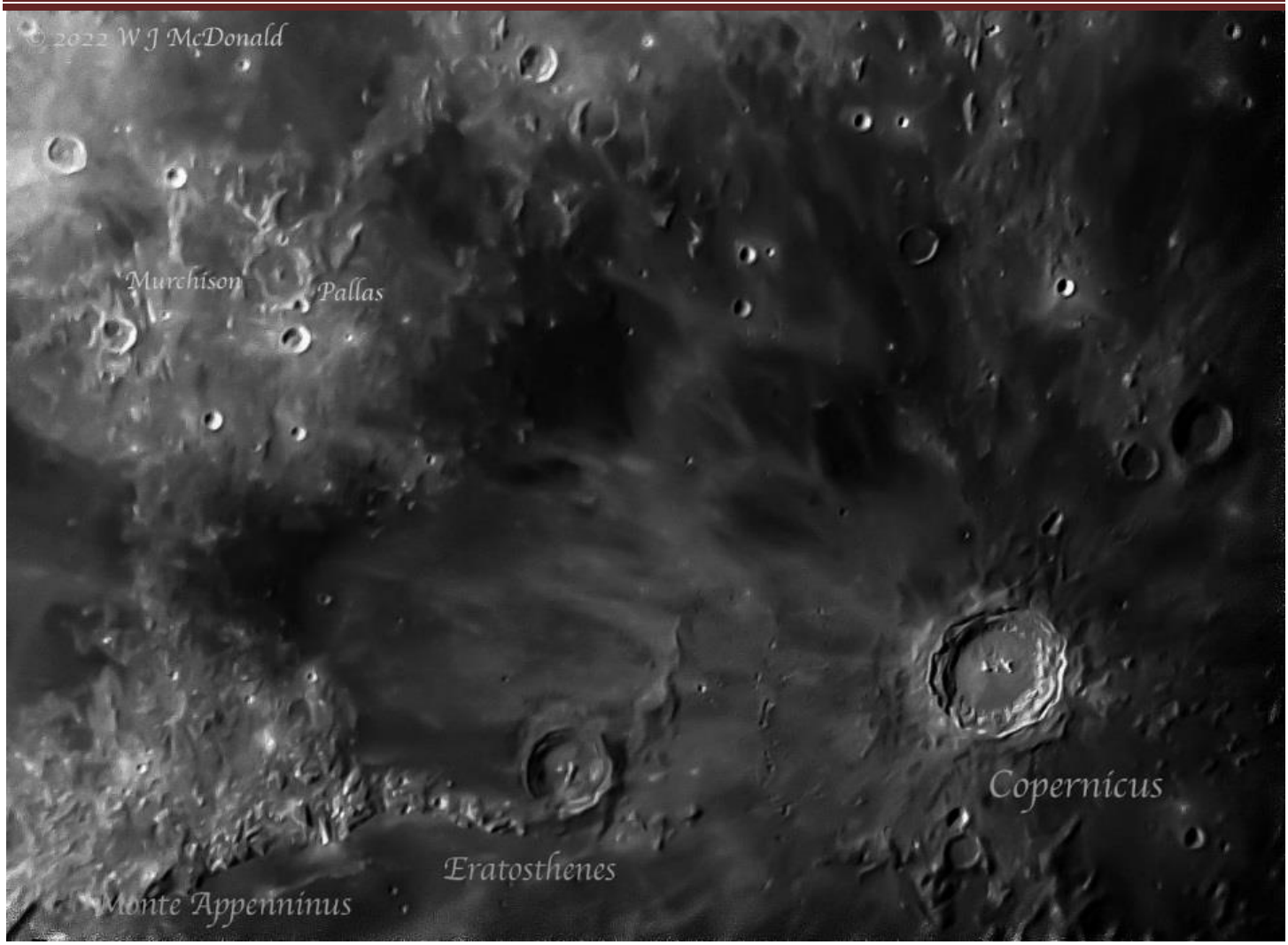
This month we're taking a closer look at *Seeing Red: Redshifts, Cosmology, and Academic Science*, by Halton Arp. Halton Arp spent nearly thirty years as an award winning astronomer at the Mount Wilson and Palomar observatories, but all that came to an end after he saw problems in the belief that all red shifting was due to velocity, with some redshifting needing to be attributed to galactic emissions. This was especially clear to him when confronted with the newly discovered quasars and X-ray surveys showing high redshifting quasars in ancient low redshifting galaxies.

After the discovery of the connection between galactic redshifting and velocity by Vesto Slipher, once a critical mass of high profile personalities from the astronomy community took to the idea, for most it became an indisputable fact. For a few rebels in the scientific community, like Halton Arp, it was anything but. He made a case for non-velocity red shifting that was largely ignored by the scientific community and had a great deal of trouble getting his work published. Even in Edwin Hubble's final speech to the Royal Society he admitted that redshifting could have non-velocity causes.

The more Arp argued his point the more he was ostracized by the astronomy community, until they took away his observing privileges at the largest telescopes in the world that had been built in America. Other astronomers, like Margaret Burbridge and Vera Rubin faced similar roadblocks when they wanted telescope time to look into this further. In some ways, it's an honour to be kicked out of the Hale observatories clique and follow in the footsteps of such great revolutionary minds like Fritz Zwicky. In coming up against the closed doors of academia he likely also ruffled his share of feathers by calling out the closed mindedness in the scientific community; a windmill many scientists before him had spent a considerable amount of their efforts jousting against. He retired from the American astronomy academia after they had all but excommunicated him and went to Germany to work at the Max Planck Institute for Astrophysics. He died in 2013, fighting for his views on physics and astronomy until the bitter end.

Halton Arp's biggest problem with the state of astronomy was that he felt it that data was being forced to fit into theories, with data that didn't support favoured theories dismissed as irrelevant. Given the state of cosmology, called out by some as having become the *Theory of Theories*, there's certainly a case for re-examining that which we hold sacred in astronomy to see if some of the giants, whose shoulders modern cosmologists stand on today, built on foundations that were less than solid. Because scientific rebels took a stand, we no longer view cosmology through the lens of an island galactic universe; no longer place the Earth at the centre of our solar system; and have dispensed with the idea that the Moon and planets are perfectly smooth spheres, owing to their position closer to Heaven. Certainly not all new hypothesis have panned out, such as the idea that the *canals* of Mars were caused by migrating wildlife, but there are things like dark matter that seem to be almost universally accepted despite still being a hypothetical construct. At some point, dark matter could still meet the same fate as the tachyon in the scientific community, if it can't be discovered and experimented on outside of computer generated simulations. We could just as easily also witness the actual discovery of dark matter or some equally ground breaking moment in cosmology. The next big thing in Physics could also likely be just sitting there in the data, waiting for a fresh set of eyes to see something everyone else missed. *Seeing Red* is a controversial but worthwhile read and it's available at the RASC Centre Library or by order from your local bookstore.

Bruce Lane



Copernicus region, by John McDonald, February 11th, 2022

Hill and Dale (Observing on the Island)

February saw what was (hopefully) the last gasp of winter, with the month starting with snow and then another light dusting snow on Family Day. There were some cold, clear nights to be had, for those dressed up warm enough to enjoy views of the night sky. There was a lunar occultation of the star Zubenelgenubi in the wee hours of February 22nd that a few people managed to either stay up for or wake up early enough to have a look at. Bill Weir went up to the Pearson Observatory on February 24th and on the following evening Rascals headed up to the Victoria Centre Observatory for an observing session. The Technical Committee were up at the VCO earlier in the month, February 11th, to work on fine tuning our new telescopes and John McDonald took the opportunity to do some imaging (*seen above)*. Other members took advantage of clear nights when they could, either doing individual observing and imaging, or working on projects for their Special Interest Groups.

The current restrictions up on Observatory Hill, with four observers allowed at the VCO and another two set up at the Plaskett Telescope parking lot, are the norm for the foreseeable future. Those taking part are further required to give an affirmation that they are full vaccinated. Pandemic health restrictions are subject to change though, so if you're on the VCO observer's email list, watch for continuing updates.

A reminder that although the VCO belongs to and is for the use of the members of the RASC Victoria Centre. In the *Before Times*, MiCs (Members in Charge) ran both weekly scheduled and unscheduled sessions to take advantage of the weather, but for the foreseeable future observing sessions will be a lot less scheduled and less frequent. The VCO is located on National Research Council property. This means that all visitors to our observatory must be on our observer list and registered with the NRC. To get on the list, just contact Chris Purse (Membership Coordinator) at *membership@rasc.victoria.ca* and we'll see you up there on the Hill one of these nights.

Bruce Lane

Future Uncertain: the International Space Station

The day after the closing ceremonies of the Winter Olympics in China, Russia invaded Ukraine openly and many of the World's governments and citizenry were outraged. This outrage extends to many of the citizens of Russia and Belarus. During the ensuing sanctions and what appears to be a full diplomatic regression back to the worst super power relations during the Cold War, Roscosmos announced it would no longer provide rocket engines or technical support for those engines, and no more rides to the International Space Station. Roscosmos has repeated threatened to put an end to its taxi and freight service to the space station, in what seems to be a policy to leverage more money from NASA and similar organizations. There were tensions before, such as when Russia invaded Ukraine in 2014, while pretending its troops weren't involved in the war they were fighting. That invasion was also timed after the Olympics, this time the ones hosted in Sochi. The head of Roscosmos, Dmitry Rogozin, was sanctioned in 2014 for his role as Deputy Prime Minister and head of the Russian defence industry, during that earlier invasion of Ukraine. Despite a series of international incidents he caused during his time as Deputy Prime Minister, Putin put him in charge of the Russian space program, where international cooperation is a thing that is supposed to happen. This is the same oligarch who told America in 2014 that it would be using a trampoline to send astronauts to the ISS. Rogozin isn't even allowed to travel to NASA facilities in the United States or ESA properties in the European Union. The future this time looks even bleaker, in terms of cooperation in space going forward. After threatening to maroon American astronaut Mark Vande Hei, the Russian space agency finally agreed to bring him back to Earth, during the next crew rotation, with the astronaut having already broken the US record for most days in space.

For Space X, it's the opportunity they've been waiting for and the timing is about as good as they could have asked for to upscale their operations. United Launch Alliance, Northrop Grumman, Blue Origin, and others are much more dependent on Russian engines to power their rockets. United Launch Alliance is a conglomeration of aerospace and tech giants (Boeing Defense, Lockheed Martin Space, and Space and Security) banding together to fight up and coming space corporations like Space X. In addition to a lot of threats from Russia, 2014 spurred America to focus more on their domestic rocket engine industry. This resulted in Blue Origin winning a contract to build rocket engines for United Launch Alliance, but they're already five years late in delivering them. What remains to be seen now is if instead of having the decommissioning date of the ISS

continually kicked down the road, we see that date moved up again if Russia pulls out of the joint space program. If Russia does abandon the ISS, it's expected that they'll throw their lot in with China's space program, but while there is a great deal of cooperation between the two autocratic nations it's difficult to see the ultranationalist Russian government wanting Russia to be reduced to the status of a Chinese client state. If the end of the ISS is moved up, it's also possible that the rockets and engines currently being built in the US will be deployed just in time to only see service in the last couple years of the space station's operation, provided that they're operational in time for even that window of opportunity.

The ISS was initially only supposed to have been used until 2015, but that date was extended to 2020 and further to 2024. There are now plans to continue using the space station until 2028. The biggest problems with the further continuation of the ISS are the aging foundational modules and station infrastructure. Technology has rapidly advanced beyond even when the first modules were launching in 1998, let alone when that technology was first developed. As new systems are added, with it comes an increased power demand, and that's likely going to be a problem for this space station to still be operational in 2028 without a serious upgrade to its solar panels and electrical systems. In comparison to this hodgepodge of generational technology stitched together in low earth orbit, our very own Victoria Centre Observatory, with its changing instruments and capabilities, seems a very orderly and down to earth progression of adding and replacement.

The ISS has long struggled with internet speeds of 10 Mbit/second download and 3 Mbit/second upload from the station (an upload speed comparable to the notoriously poor internet speed provided to cruise ship customers). This was upgraded in 2019 to 600 Mbit/s internet connection, something that can be difficult to acquire in parts of Greater Victoria, even when providers aren't *throttling* our internet speed. The transition from Microsoft Windows to Linux in 2013, has not only improved the station's ability to function, but possibly even saved lives with the improved reliability of its computer systems. One can only imagine the horrors of the crew if the station's older computers crashed due to the forced upgrade to Windows 10 that consigned our own Victoria Centre Observatory computer to a premature end.

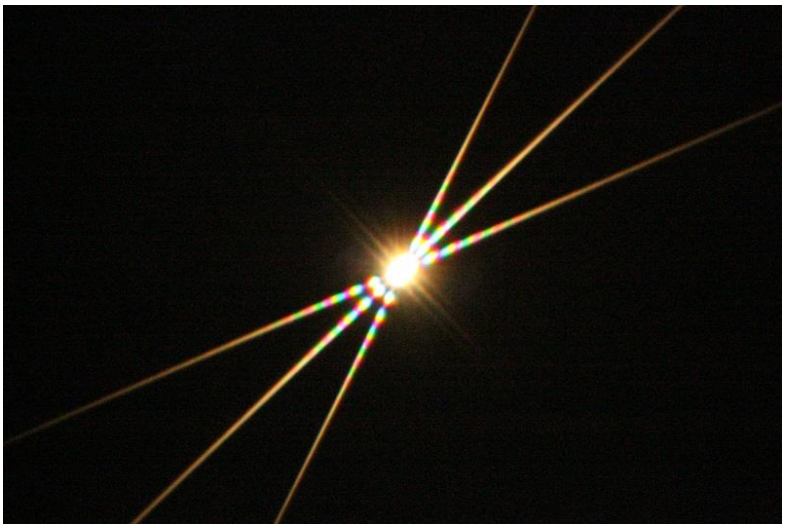
Unlike MIR, which had a Russo-American corporation ready to take over the operation of the space station, there hasn't been the same private sector interest in taking over the ISS, perhaps in part because of how far past its *best before date* the station will be used for. The MIR privatised model could have started a new kind of space race, but instead the venture was crushed by pressure from NASA to de-orbit MIR, fearing that the Russians wouldn't fully commit to the ISS if they were still supporting their old station. This need will

be met by the proposed Axiom modules that are scheduled to begin delivery to the space station in 2024. Three of the Axiom modules will connect to the ISS and two more are planned to link to what becomes the Axiom Space Station, when the rest of the ISS is jettisoned into an orbital burn. This Axiom Space Station is slated for commercial use, to help kick start the kind of private ventures in space that MIR was never allowed to explore.

If this fracture between Russia and the West does spell the end of the planned extended lifespan of the International Space Station, some good still may come of it. Humans have been tethered to low earth orbit since 1972 and governments have been happier to take the cheaper option of ferrying astronauts up and down from the space station, compared to the much more daunting challenges and cost of humans returning to the Moon or going to Mars. We could be seeing amazing technological advances from a new space race in the near future and once again these triumphs will likely be made for all the wrong reasons.

Bruce Lane

Astronomical Term of the Month: Bahtinov Mask



The Bahtinov mask is a focusing tool for astrophotography designed to give amateur astronomers the best focus possible with their optics when imaging deep space objects. It's a thin disc of plastic or metal, sized for the aperture of the telescope it's used for. There are slots cut out of it in three sections, with the parallel slots in each section going in different directions, forming a diffraction grid. The mask attaches to the front of the telescope, similar to how you would mount a solar filter.

By pointing the telescope at a bright star, you then adjust the focus until you see something like the image (*seen left*) I took a few years ago up at the Victoria Centre Observatory, while using the 14" aperture Meade Schmidt Cassegrain telescope. Getting that middle line as perfectly centred in the "X" formed by the other two lines means that you're focused and ready to start imaging. The best way to observe this is with the "Live View" or similar screen viewing feature of your digital camera. Once you do get your telescope focused for imaging, it's a good time to engage the focus lock, if your telescope has one.

Some of you have been seeing similar images shown of a star viewed through a Bahtinov mask, with the recent news of the James Webb Space Telescope achieving focus, although their focusing mask shows a couple extra focusing "spikes". There are also Bahtinov masks that are made for attaching to camera lenses, as autofocus is generally a poor tool for stars and it's very easy to make mistakes without a focusing tool. Manually focusing to "infinity" won't even provide you with the correct focus. With larger camera lenses it's a good idea to use carpenter's tape to lock the lenses focus to the right setting for the evening, especially when the lens is pointed at a higher angle and gravity can sometimes have its way with older lenses.

This elegant but simple solution, to the problem of amateur astronomers trying to get pin point star focus, was invented by Pavel Bahtinov in 2005. This concept was initially only widely used in Russia, mostly due to the language barrier between astronomy hobbyists, until Dennis Sakva posted about it on the *Cloudy Nights* astronomy forum. An amateur astronomer and astrophotographer himself, Bahtinov didn't patent his focusing mask, deciding as the inventor to allow *free use* because he wanted it to be as widely available as possible for the use of other amateur astronomers. That and he didn't want to spend all his spare time and money defending a patent on a product that was very simple to make. The invention

of this mask came during the awkward transition between film and digital imaging. Bahtinov continued using film, preferring to work with sensitive Kodak Tech-Pan film, even after digital cameras were available to him because he wasn't seeing a lot of early improvements using the new cameras. What finally won him over to digital cameras was the ability to create composite images, during a solar eclipse, shooting the outer and inner heliosphere. Pavel Bahtinov also developed an autoguiding system for telescope mounts, in the mid-1990s, using a photomultiplier cell. He didn't get the same level of recognition for that work though, due to Boris Putygin independently developing his own autoguiding system and publishing his work in the *Earth and Universe* journal, before Bahtinov could publish his own work. In recent years, Pavel Bahtinov has continued his passion of innovating equipment for amateur astronomers and currently hard at work developing a new focuser design. He images using a large TAL-3 Maksutov-Cassegrain on a rebuilt NPZ mount, driven by microcontrollers. It's cobbled together from factory parts into something that's very much his own composite creation. Apart from modifications over the years, it's also the same setup he used to image during his nights of astrophotography when he was still shooting with film.

The Bahtinov mask is an improvement over earlier designs, some of them developed over a century ago. There are people making them with 3D printers and other imagers are cobbling together their own DIY focusing mask variants with kitchen colanders on the end of their optics. Kitchen colanders form an "X" when focused, but you should always be on the lookout for any bits of stray noodle or other food that might lead you astray in your attempts to achieve the best deep space focus for astrophotography.

Bruce Lane

In Closing

It's getting warmer and the days are getting longer, as we've already reached the tipping point of Daylight Saving's Time and with it having to stay up a bit longer every night to get some quality darkness to work with. It will still be a while before you put that winter coat away for the season though, as it gets cold at night standing around under the clear skies. If you go outside, dressed for weather at least 7-10º Celsius colder than you'd normally be dressed for at night, you'll be able to stay comfortable behind your optics. Even in the summer, I wear long underwear when I go out with my telescope. It's a lot easier to put on upper body layers of clothing, as it gets colder, than get into long underwear once you're already outside; especially if you're not at home.

The protests demanding the removal of our elected government in our nation's capital and across the country have all but ended, but the same anti-science movement is still protesting across Western Canada, including the Inner Harbour of Victoria. It seems we don't get much of a breather between unwanted events these days before the next one happens. This time it was the long predicted, third invasion of Ukraine by Russia, with Putin expanding on the brutal invasions of 2014, both in scale and in their atrocities. We're all getting a front row seat to what the 1930s might have been like in Europe if there had been 24 hour news networks, social media, and the Internet. Reactions that would have taken weeks back then happen in minutes now, including the flood of misinformation, much of it by same bad actors that have been undermining Western democracies during elections and encouraging conspiracy theories about the Pandemic. Mask mandates and other health regulations are ending across Canada, despite a large number of infected individuals that are still out there, and the fact that many provincial governments have been cutting back on testing and tracing. It's another

transition to springtime, but it's difficult to say if it's also a transition to the end of the Pandemic, without addressing the continued problems of vaccine nationalism and unnecessary travel to help spread new variants; especially with cases on the rise globally. Having so many Canadians deciding to not get their third vaccination dose will likely end up continuing to cause stress to our healthcare system, more than it already has, without that much needed boost to our immune systems. With this transition, it's up to the choices of individual citizens and the competency of our elected governments, to decide whether this is actually the beginning of the end of this pandemic or just a break until the next series of lockdowns are announced by our public health authorities, in an attempt to keep our hospital ICU wards from being overwhelmed again.

With the election of a new RASC Victoria Centre Council, it's time to navigate this time of uncertainty and decide on what kinds of observing events and public outreach we do going forward. Most of the Council have remained at their posts, for their standard two year terms, but not all of these two year terms are synched up with each other and other council members have been at their post for much longer. With the addition of three new members of the Executive there are new voices to bring their perspective and experience to our council. There is also an observing event to look forward to. On the morning of March 28th, we have a planetary conjunction; with the Moon, Venus, Mars, and Saturn all visible within 7º of each other. This will be happening a few days before the New Moon, which will help astrophotographers balance the light of the Moon from excessively overpowering the planetary details in the early morning sky, when they try to get everything in the same image.

Bruce Lane: SkyNews Editor

Photography Credits

Cover: The Pleiades (M45), by Brock Johnston, imaged Jan 31 and Feb1, 2022. Shot with an Askar FRA 400 telescope, an ASI 2600MC Pro, with no filter, and 3:25 total exposure time at gain 0, with 41 x 300s subs. It was processed in Siril and GIMP.

Page 2: Apollo 16 Training, John Young (left) prepares to collect a sample with the Contact Soil Sampler. This photo gives us a rare view of the top of John's RCU and Hasselblad. The tech on the left side of the picture is holding what may be John's cooling water hose (black). Behind John, we can see the shadow of another tech handling John's air hose and comms cable. Charlie Duke's three cables/hoses go out the picture to the right. March 2, 1972. Scan by J. L. Pickering. Courtesy of NASA.

Page 3: M42, Feb 11, 2022; by John McDonald. A first light image of M42 with the new QHY600 camera. Test of the new OHY600 camera's capability at the VCO carried out by David Lee, Reg Dunkley, and W J McDonald. Seeing fair. OGS 12.5" scope on Paramount ME mount, with field flattener. Exposure: Lights 3x250s for RGB and L filters, 20 Bias, 5 Darks, and 5 Flats for each filter. Processing in PixInsite with some enhancement in Photoshop.

Page 4: Crop of Bruce Lane (*SkyNews* Editor) at 2013 RASCal Star Party in Metchosin, by Chris Gainor

Page 4: M81 and M82 Crop, by Dan Posey, Feb 28, 2022. 1h15m, TOA130 (TOA35 reducer) Canon Ra iso 1600, bias/flat calib.

Page 5: Randy Enkin (RASC Victoria President) with Sextant, Feb 20, 2021, by Eva Bild.

Page 5: Composite of Certificate and Award Winners from the 2022 AGM, by Randy Enkin

Page 6: Photograph and Design of Astro Cafe Mug, by Joe Carr

Page 6: Apollo 16 Training, Ken (left), John, and Charlie pose with a '*boilerplate*' Command Module aboard the "Retriever" ship doing training. March 22, 1972. Scan by J.L. Pickering. Courtesy of NASA.

Page 7: The Rosette Nebula around NGC 2244 Starless, by Brock Johnston. This image of the Rosette Nebula, nebulosity surrounding the cluster NGC 2244, was captured on Nov 16, 2021 and Feb 13th, 2022. Shot with Askar FRA 400 telescope, an ASI 2600MC Pro, using an IDAS NBZ filter, with 1:50 total exposure time, with 22 x 300s subs in November and 68 in February. It was processed in Siril, Starnet, and GIMP.

Page 8: Reappearance of Zubenelgenubi, during Occultation of the Moon, by David Lee; Feb 22, 2022

Page 9: Seagull Nebula, by Lucky Budd; imaged Feb 17 and 22, from Victoria backyard. 8" Edge HD SCT on an Alt-Az Evolution mount, with an idas NBZ filter and asi294mc pro camera. Stacked in Astro Pixel Processor and first time using an SHO colour pallet.

Page 10: Apollo 16 Preparations, bottom to top: John Young, Ken Mattingly, and Charlie Duke during suit-up for the Countdown Demonstration Test. Photo filed March 31, 1972. Scan by Ed Hengeveld. Courtesy of NASA.

Page 11: Posed Book, “Seeing Red”, taken in Editor’s home on March 21, 2022, by Bruce Lane

Page 12: Apollo 16 Training, Ken Mattingly (right) and John Young (?) in the Command Module. March 14, 1972. Scan by Ed Hengeveld. Courtesy of NASA.

Page 13: Copernicus region, Feb 11, 2022 at the Victoria Centre Observatory; by John McDonald. A small section of the moon in the Copernicus region. This image was the result of a test of the new OHY600 camera capability for capturing video in small format carried out by David Lee, Reg Dunkley and W J McDonald. Seeing fair. OGS 12.5" scope on Paramount ME mount with field flattener and QHY600 camera operating in video mode at a resolution of 1600x1200 px. Filter was luminance only. Used 30% of 1000 frames processed in Astrostakkert, Registax and Photoshop.

Page 14: Apollo 16 Preparations, John Young (right), Ken Mattingly, and Charlie Duke leave the suit-up room, probably headed for the elevator and certainly headed for the transfer van that will take them to the pad, for the Countdown Demonstration Test. Photo filed March 31 1972. Scan by Ed Hengeveld. Courtesy of NASA.

Page 15: Apollo 16 Preparations: Apollo 16 Saturn V on the pad at night during a Countdown Demonstration Test. Photo dated March 31, 1972. Scan by J.L Pickering. Courtesy of NASA.

Page 16: View of Focused Star through Bahtinov Mask, by Bruce Lane, photo taken Sep 8, 2016 at the Victoria Centre Observatory, using the old 14” aperture Meade SCT (now in the service of RASC Prince George).

Page 17: Spring Chickens under Red Light (Ameraucana and Buff Orpington chickens), by Bruce Lane, Mar 19, 2022.

Page 20: Apollo 16 Preparations, Ken Mattingly makes notes in his flight checklist while undergoing spacesuit pressure checks for the Countdown Demonstration Test. Photo filed March 31, 1972. Scan by Ed Hengeveld. Courtesy of NASA.

Call for Article and Photo Submissions for the April Issue

SkyNews is looking for submissions of astronomy photos and articles for the April issue of our Victoria Centre’s magazine. Send your submissions to editor@victoria.rasc.ca

RASC Victoria Centre Council 2022

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