SKYNEWS

Soul Nebula IC 1848, imaged October 11th, 2021, by Brock Johnston

The Lunacy of Eclipses

Lunar eclipses are one of the most dramatic and inclusive experiences available to amateur astronomers. You don't need any special optics or filters to see the Earth's shadow passing in front of the Moon. Binoculars or a telescope do make the experience that much better, but the apparent size of the Moon in the night sky, about half a degree, is more than enough for most people to enjoy the occasion. Light pollution isn't even an issue. We should have the opportunity to see a nice lunar eclipse, late on the evening of November 18th or very early in the morning of November 19th, depending on how you perceive time.

That same inclusiveness, will make this lunar eclipse problematic due to the Pandemic. Since we can't share eyepieces, we either need to do electronically assisted astronomy, by projecting images of the Moon onto a screen, or stay away from the public. That and we don't want to have a lot of crowds of people *breathing moistly* onto each other. For this occasion it's best to stay away from the popular spots, like Mount Tolmie, and find somewhere a bit more remote. Gathering in small groups or going out alone is the best policy during the fourth wave of the Pandemic.

The weather always has the last word about how good your lunar eclipse experience will be. I observed my first couple lunar eclipses as a RASC member on the waterfront, but on the second occasion had to relocate due to fog. Given that we do live on the *wet coast*, it's not a bad idea to go inland and up high enough to be out of where fog can ruin your evening. Wind, rain, and clouds can also certainly be an issue this time of year. The current weather forecast is less than promising, but success will come down to where the line between Thursday evening's bad weather ends and Friday morning's good weather begins.

We seem to have at least one decent lunar eclipse every couple of years, with a few spoiled opportunities in between. The last lunar eclipse we had a chance to see from Victoria was in May, which was problematic for observing, due to the thin margin between the eclipse, the setting moon, and the Sun rising. There were also some clouds on the horizon. This time the proximity of the Moon to the horizon won't be a problem for observers from RASC Victoria.

Technically, this will be a partial lunar eclipse (Ed. *You waited five paragraphs to bring this up!*), but it will be so close to a full eclipse that many won't notice the difference. This is sometimes called a *deep partial eclipse* and in this case all but a tiny sliver of the Moon will turn red. The less visually stunning penumbral phase of the eclipse starts at 10:02pm, on November 18th. The partial eclipse begins at 11:18pm and the *almost* total eclipse will reach its maximum by 1:02am on November 19th. By 2:47am the partial eclipse will have ended and the penumbral phase of the eclipse is over by 4:03am. My advice is to use charts or planetarium software to know where the Moon will be during the different phases, so you can choose an unobstructed location to see it from. If you're taking pictures, make sure to nail your focus before the darkening of the Moon or you could be in for some problems.

Bruce Lane

Editorial Remarks

Just like the Vancouver Canucks, the weather is all the talk these days and not much of it is good. We did manage to dodge a potentially disastrous weather bomb off the coast of Vancouver Island near the end of October. Had that record breaking low pressure area we had been located a few hundred kilometres to the east it things would have been very different. It likely would have laid waste to a lot of Greater Victoria and we'd still be picking up after the storm at the end of November. As amateur astronomers we're more at the mercy of the weather more than most hobbyists are, resulting in us all dabbling into meteorology to some degree. We range from focusing on the weather reports in the lead up to observing/imaging sessions, to having home weather stations. There are even reported to be a couple of retired meteorologists in our centre.

The world summit on climate change in Glasgow is over, but the biggest contingent there wasn't from any nation; it was from the oil and gas industry lobbyists. Due to the demands of the governments of India and China (a very late participant), the phasing out of burning coal for electricity was changed to vague language about reductions. Russia basically dismissed the conference outright and they weren't alone. This might not be the best time to buy waterfront property for long term residency.

In this issue of *SkyNews*, we'll have more recaps from our Centre's activities, three articles that deal with astrophotography, more images from the 50th anniversary of the Apollo 16 mission, as well as all the astrophotography and articles you've come to expect from the *Victoria Centre SkyNews*.

Bruce Lane: SkyNews Editor

President's Message for November

Everybody should have a good astro-project on the go. My current one concerns the timing of lunar eclipses.

Solar eclipse geography and timing is known with remarkable precision. So much so that people, including many members of our RASC community, are willing to plan long, difficult, and expensive trips to watch them. The timing and location of the earth's shadow, or umbra, across the Moon during a lunar eclipse is much more variable and poorly understood.

I was delighted to learn that as far back as 1687, Philippe de la Hire published that the Earth's shadow was larger than could be accounted for by an airless Earth, leading to lunar eclipses that start a few minutes earlier and end a few minutes later than expected. This was important work, because observing the timing of eclipses was, in principle, one way to measure longitude - as long as the expected timing was well established.

The problem arises from the complex nature of the earth's atmosphere that obscures, diffracts and refracts the sun's light on its way to the Moon. I first became aware of the role of amateur lunar crater eclipse timing just before the eclipse last May (which was clouded out), and I am certainly keen to try again on the upcoming lunar eclipse, starting around 23:19 PST on Thursday, November 18. If there are clear skies, I'll be out with my telescope, noting the time to the tenth of a minute that the earth's umbra darkens ("immersion") and then departs ("emersion") from various lunar craters. *Sky and Telescope* has been compiling these observations since 1956. Herald and Sinnott (2014) have analysed the compilation, extended back to 1842, with an amazing 22 539 observations. Their main conclusion is that the Earth is surrounded by a "*notional eclipse-forming layer*" that is 87km thick. It is a really surprising result, since even noctilucent clouds don't show up that high in the atmosphere.

Herald and Sinnott point out that amateur uninstrumented observations provide continuity with the early observations in their compilation and provide insight into the visual response of the human eye. To help with the observations, Thursday-Friday

November 18-19, I have annotated a picture of the full moon with the crater timings predicted by Fred Espenak (www.eclipsewise.com/oh/ec2021.html). I hope some of you will join me making these simple but useful observations.

Look Up,

Randy Enkin, President@Victoria.RASC.ca

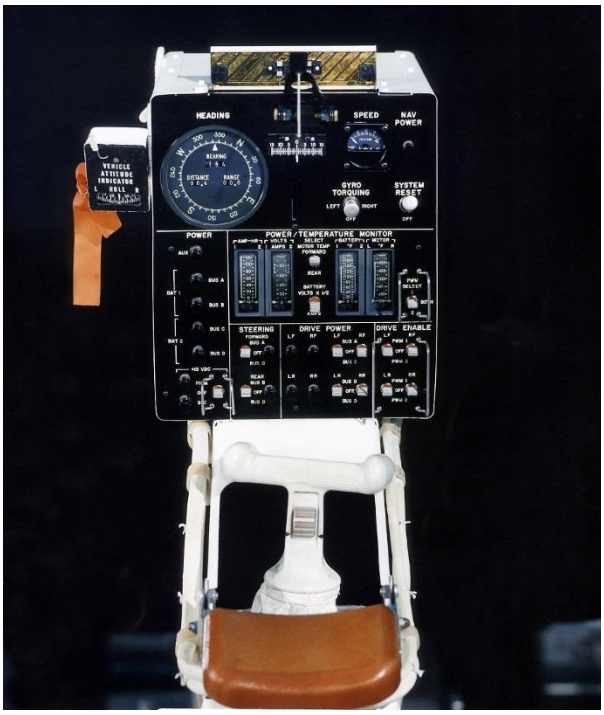
Moon on Dallas Road, Oct 8, 2021, by Randy Enkin

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 November started off with Nathan Hellner-Mestelman experimenting with post production of a Milky Way image, taken from Cattle Point, by removing all the stars and leaving just the galaxies. Marjie Welchframe continued her series on Women Astronomers, featuring Dr. Kim Venn and others; Dave Robinson showed some astrophotography from RASC Edmonton; David Lee gave an update on building an Astroberry Server; Chris Gainor discussed a recent TV interview he did about recent celebrities in space; Lauri Roche discussed the idea of redoing the *Sky Quality Map* for Greater Victoria; Reg Dunkley talked about the Firefly Alpha rocket launch; and some astrophotography was shown, by RASC Victoria members: Joe Carr, David Lee, and Brock Johnson.

The second Astro Cafe of the month did double duty as the monthly meeting. The guest speaker, Dr. Michelle Kunimoto, gave a lecture on *Finding Earth 2.0,* reviewing how exoplanets are discovered, the identification of possibly habitable planets, about her work on NASA's TESS mission, and what citizen scientists can do to pitch in. Nathan talked about his *Nerd Anomaly* cartoon that will be shown in *SkyNews (Ed. the other one)*; Randy talked about using the Centre's Sunspotter telescope, showed an aurora photo from the UVic Observatory website, and the Victoria Philharmonic Choir doing Hydn's Creation; Dave showed more RASC Edmonton images; David Lee gave a presentation on the 2010 Light Pollution Survey and preparations for doing another one was discussed; and Laurie gave an update on the FDAO Star Party/AGM (October 30th), with guest speaker Brenda Matthews giving a presentation about her work at ALMA, and about the possibility of opening the Centre of the Universe up for school groups and Saturday night public outreach sometime in the coming spring.



For the last Monday of the month, Marjie Welchframe gave another presentation in her series of Women Astronomers, this time focusing on Dr. Victoria Kaspi; Dorothy Paul gave a talk on *Astronomers Find a 'Break' in One of the Milky Way's Spiral Arms*; Randy mentioned the YouTube videos, *Triumph at Saturn*, about the Cassini Mission and discussed the dating the Viking settlement at L'Anse aux Meadows by the effects of a solar flare on tree rings; Reg talked about the recent record breaking weather bomb (Oct 24-25, 2021) off the coast of Vancouver Island; Dave showed more astrophotography from RASC Edmonton; David Lee discussed upcoming events and the goings on of the special interest groups; and Laurie talked more about the FDAO Star Party/AGM.

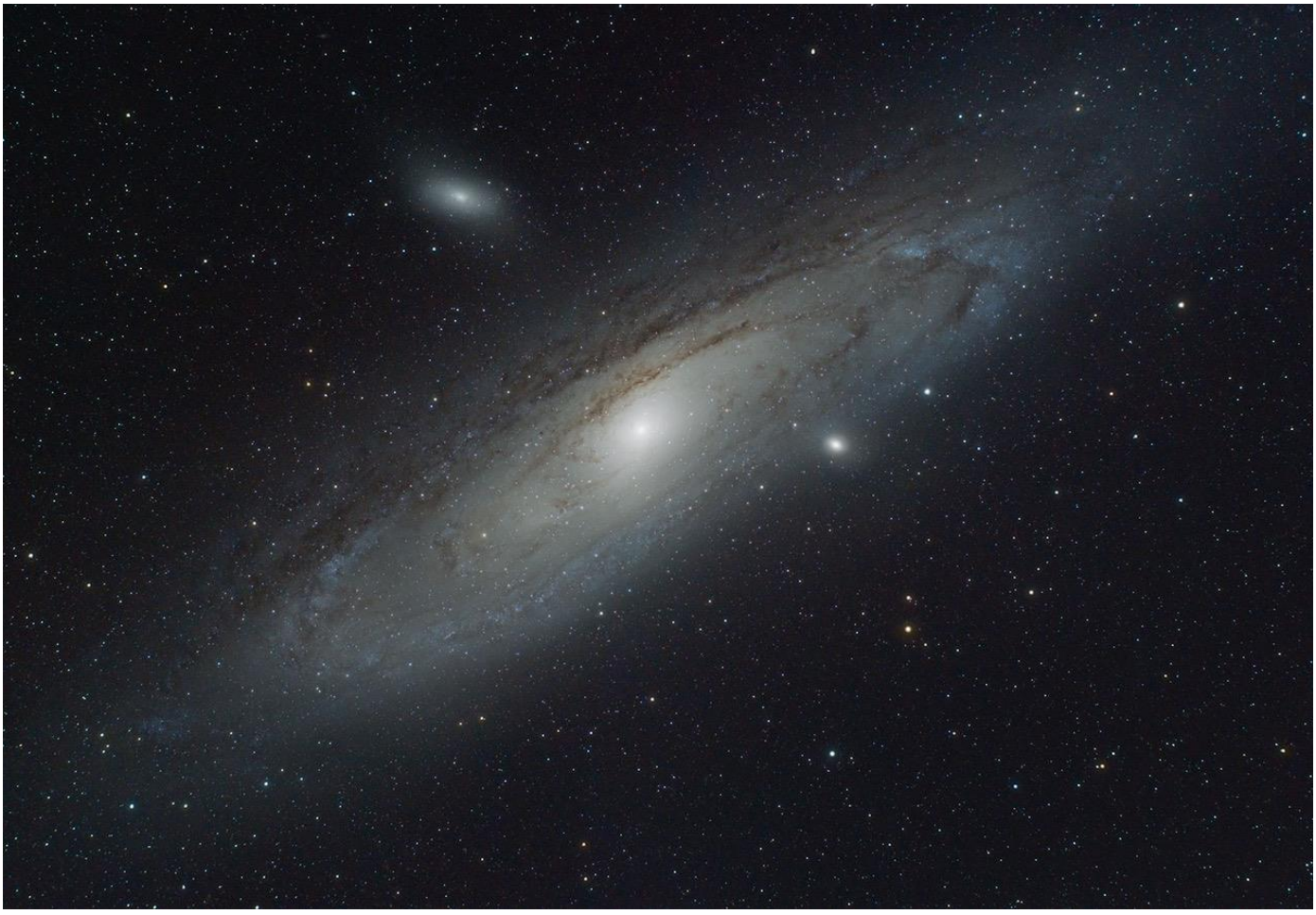
Bruce Lane

Comparing Images over Time

In early October of 2019, I stepped outside with a 70-200mm lens on a Nikon DSLR and pointed it towards where I knew the Andromeda Galaxy lay in the night sky. The camera was on a regular photography tripod and I shot nearly 40 frames. Each frame was 2 seconds long and pretty noisy at ISO 12800. I came inside and bought a piece of software on the Mac App Store –Starry Sky Stacker– to stack the images. As a lifelong photographer – both as an amateur and a professional– and with a long interest in astronomy I had always wanted to shoot some night sky images. The first result (*seen left*) wasn't very good, as you can see, but I could see where this journey could lead and I was absolutely hooked. A week or two later my wife and I had become members of the RASC and by the end of the month I had bought a Star Adventurer tracker mount. I worked that piece of gear hard and dived into the deep end of astrophotographic data gathering and processing. By the middle of 2020, I found myself buying an equatorial mount and graduating to more sophisticated software.

Two years on and Messier 31 is still a favourite "*milestone*" target for me. It helps me see how and if I'm improving each season. So, the second image (*seen below*) is from October 2021 and consists of 29, 3min frames for 87 mins of total integration. Dark, flat, dark flat, and bias frames were shot for calibration and pre- and post-processing was done in PixInsight (with additional post-processing in Lightroom and Photoshop). The telescope used was a William Optics Zenithstar 80mm apochromatic refractor that I bought back in 2008. It's mounted on an iOptron CEM25P, with a small guidescope and autoguiding camera, and the whole shebang is operated with an ASAIR Pro raspberry-pi computer. And the camera? Well, it's the same Nikon D850 that was used in that first shot 2 years ago.

Martin Gisborne



Special Interest Groups

Getting Started in Astronomy

The beginners group continues to meet and in the last session we added another constellation, this time Auriga. Lauri led a discussion and created a PowerPoint presentation based on her investigation and that of others in the beginners group. It was a big hit and we all enjoyed the eclectic nature of the information presented. In the coming month we will touch on Taurus and surrounding areas led by Brian Barber, with different volunteers leading discussion on constellations in subsequent months. The plan is to make these presentations available on the RASC Victoria website as a resource. For more information on this group, please contact David Lee at *david@victoria.rasc.ca*

Astrophotography

The astrophotography SIG has met and reviewed planetary imaging results of members. PixInsight scripting was also discussed, with a specific discussion on stretching images. The topic of removing stars from images to aid in processing is another subject for the group to tackle. For more information about this group, please contact John McDonald at *john@victoria.rasc.ca*.

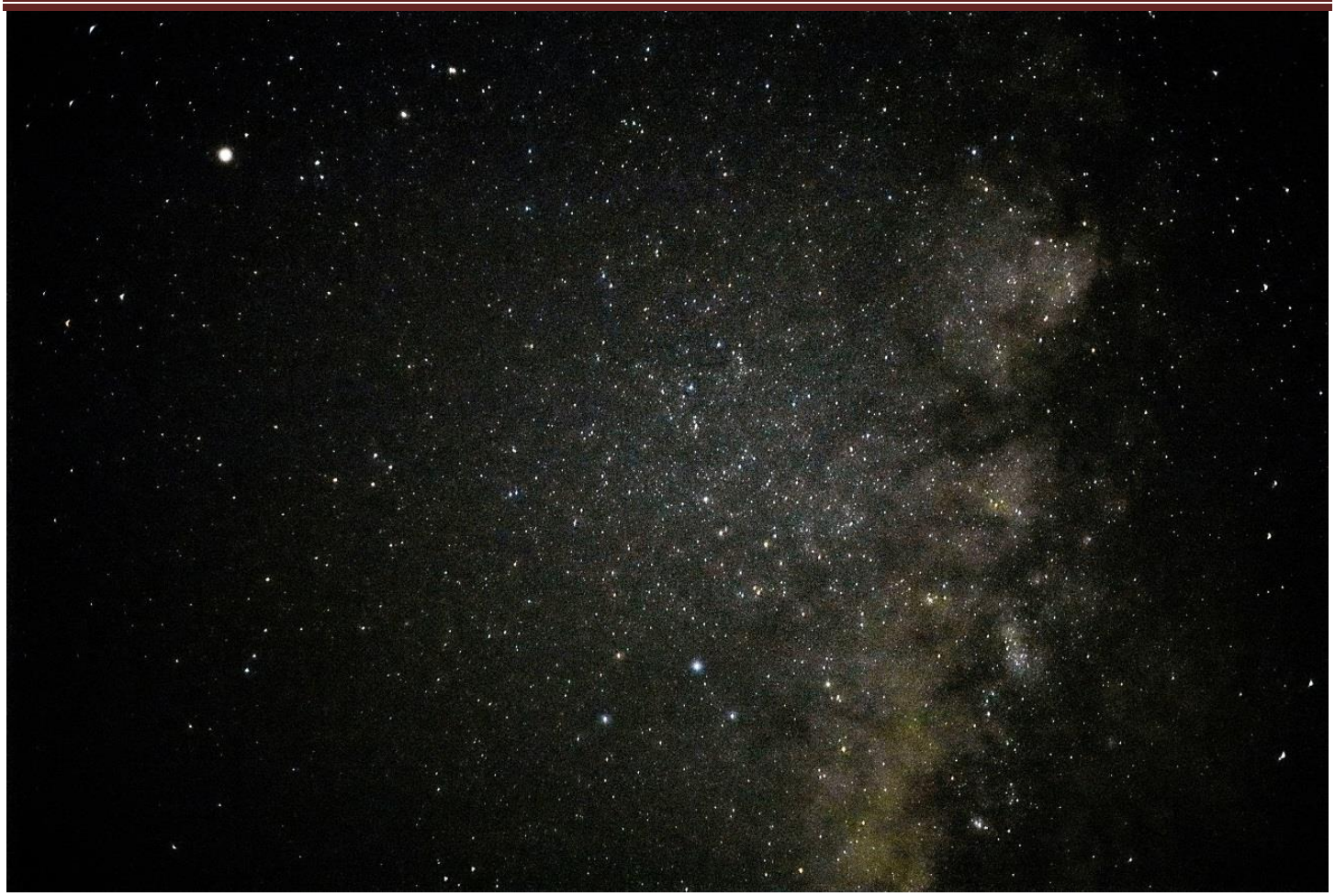
Electronically Assisted Astronomy

The EAA SIG meets with members discussing their current progress with building imaging rigs that can do both EAA and light imaging. The ASI Air Pro still features heavily in these types of configurations. David gave an update on the Astroberry alternative. For more information on this group, please contact David Lee at *david@victoria.rasc.ca*

Makers

The Makers SIG talked about their current projects. Randy showed us how his *ad hoc* motor controller was working. David gave a bit more detail about Raspberry Pi builds that can be used to provide autoguiding control using the INDI library and builds of PHD2 implemented on a Raspberry Pi. For more information about this group, please contact Jim Cliffe at *jim@victora.rasc.ca*.

David Lee



Milky Way towards Sagittarius and Scutum, September 2021, by Christopher Sulyma

Rascal at Sea

This image was taken while in the Philippine Sea on HMCS Winnipeg in September. While definitely not the greatest photo, it shows the Milky Way towards Sagittarius and Scutum (barely visible over the horizon while skirting the Tropic of Cancer), and was done as an experiment in astrophotography from a moving platform. This image was taken using a tripod-mounted Canon M50, with a 35mm lens at f/2.0. 35 images were stacked at 1/20 of a second exposure each (1.75s total integration time), at ISO 3200. That was actually the slowest shutter speed that I could achieve without streaking. In an earlier imaging session, I had managed 1/8th of a second shutter speed, but we were in substantially better seas. Unfortunately, that quick exposure necessitates a very open aperture and higher ISO than I'd otherwise like, which you can see in the graininess and increased streaking towards the edges of the image. Still, not bad for 2 meter seas and 30 knots of wind over the deck!

Christopher Sulyma

Apollo 16 Training, Technician works on John Young's EMU, November 2nd, 1971

From the Library

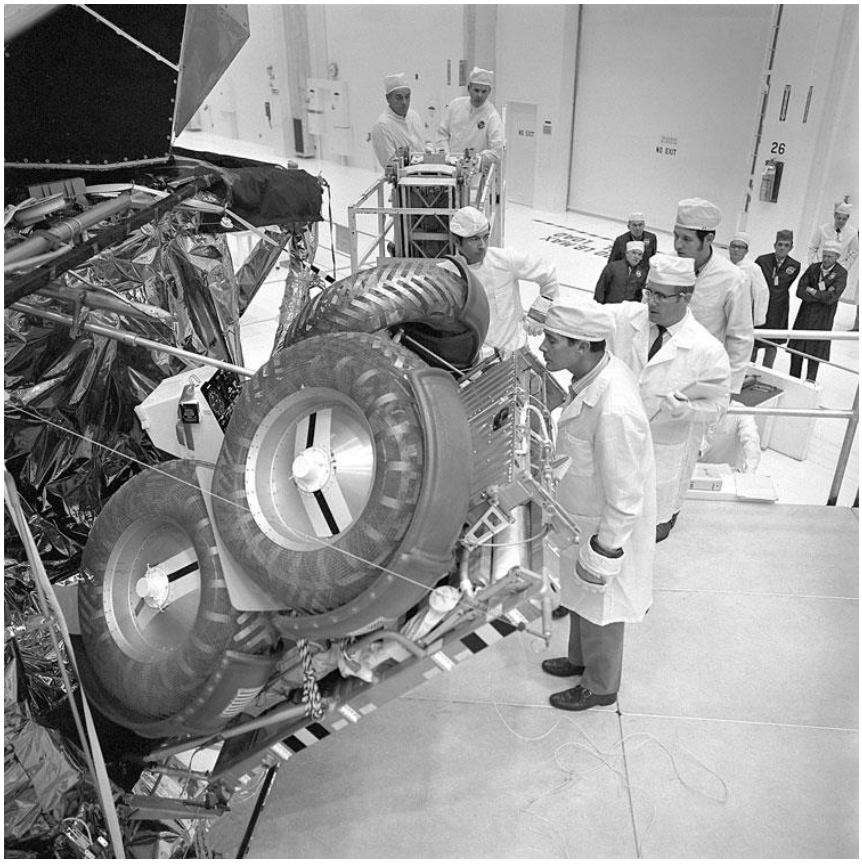
The RASC Victoria Centre Library is housed in the Astronomy Department's faculty lounge, located on the 4th floor of the Elliott Building, at the University of Victoria. It contains over 500 titles, curated by Alex Schmid, our RASC Victoria Centre Librarian. Alex is currently running our library in the 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 taking a closer look at *Kepler's Witch*, by James A Connor. The author of this work spent eighteen years as a Jesuit priest. James Connor has doctorates in literature and science, and degrees in theology, philosophy, creative writing, and geoscience. Suffice it to say, he's done *a bit* of research, read *a few* books, and taken *a few* courses over the course of his education. Beyond his status as an acclaimed essayist, published in many magazines and newspapers, James Connor has written a several books dealing with the intersection of religion with art and science. Two of his other well-known books are *The Last Judgement: Michelangelo and the Death of the Renaissance* (about how Copernicus inspired one of the greatest Renaissance artists) and *Pascal's Wager*.

After last month's review of Dava Sobel's book about Copernicus, the natural progression is to look at a book about the astronomer who best represented the next stage of evolving our understanding of our universe: Johannes Kepler. Other than their pursuit of knowledge, while maintaining their faith, despite their work not always endearing themselves to religious authorities, their experiences were very different. Copernicus was a lay administrator for the Catholic Church. Kepler was an educator who was eventually made the astronomer of the Holy Roman Emperor, despite being a Lutheran. After his early presentations rankled theologians, Copernicus' ground breaking work was published and widely distributed after his death. In contrast, Kepler was very much alive to be excommunicated and have his works added to the *Index of Prohibited Works*. He was hated by both the Lutheran and Catholic Church leaders. His lofty status as the Holy Roman Emperor's astronomer should have made Johannes Kepler a rich man, except that most of the salary owed to him wasn't actually paid out. It wasn't that the Holy Roman Emperor was broke, but that the imperial treasury was mostly diverted for the emperor's personal pursuits or into the wallets of some very corrupt individuals.

This book seeks to tell the life of Johannes Kepler, introducing the reader to the subject with the narrative of the witchcraft trial of his mother, during the Counter-Reformation. Like many accusations of being a terrorist made by one villager against the other in Afghanistan during the *War on Terror*, witch trials were often about settling old scores and about targeting well off people to try to steal their property. The fact that Kepler's mother was a wise woman, who made herbal cures for local townsfolk, certainly didn't make her any less of a target of the Church.



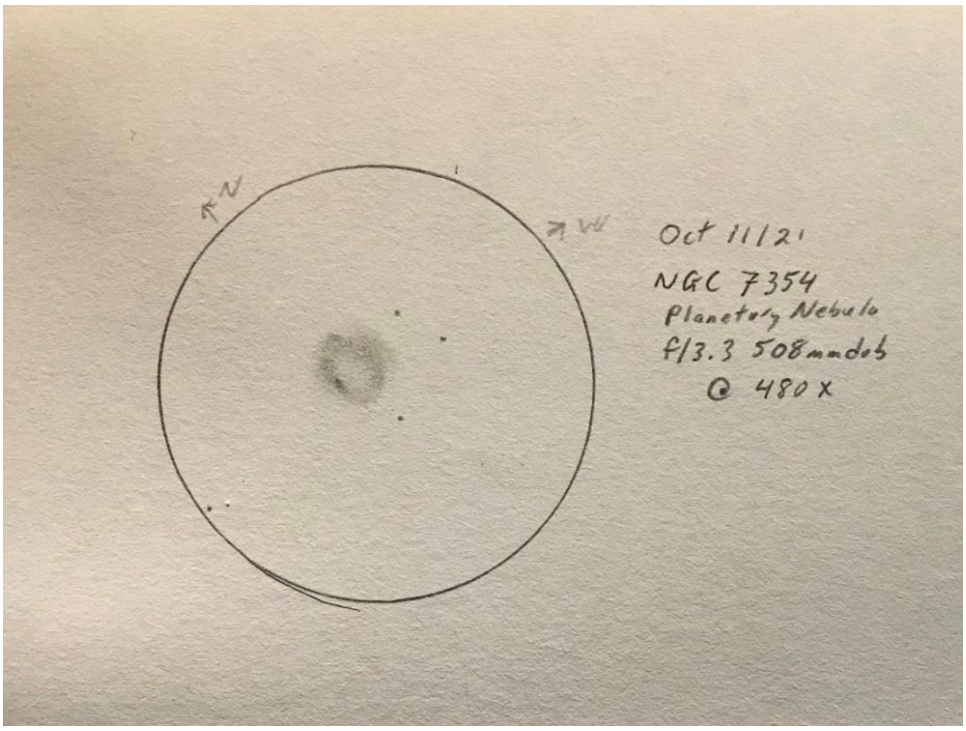
Johannes Kepler starts life out as a prematurely born and sickly child, who is partially crippled by small pox, unfortunate to be born a couple centuries before the invention of vaccination. One of the striking things about the character of Kepler is that he makes a point of keeping track of his enemies, but not his friends, He doesn't seem to have very many close friends, in part due to his argumentative nature and bad temper. The closest he had to a cohort was Tycho Brahe, with the two of them together comprising the original *Odd Couple*. They were opposites in almost every way, other than their dedication to astronomy, and Kepler's temper managed to severely damage that friendship too. Despite writing on numerous occasions to Galileo and singing his praises, something Galileo enjoyed, the other great astronomy observer of his time had little interest in Kepler and rebuffed him. Kepler's critical thinking against dogma is what allowed him to expand our knowledge of science, but it didn't go over well with the religious fundamentalism that marked the Counter-

Reformation and later the Thirty Years War. If it hadn't been for his friends in the Jesuit Order he would have likely been executed at some point, as the Jesuits long held out hope for the chance that he would convert to Catholicism. Johannes Jessenius, an anatomy professor who served as a go between during Kepler's various tiffs with Brahe, suffered a particularly gruesomely execution for his faith on the orders of the Holy Roman Emperor.

While this book supplies a biography of one of the most important astronomy minds in History and does a great job of providing the context of events going on around Johannes Kepler, it's a bit thin on the details of his scientific accomplishments. If you're looking for this book to teach you Kepler's *Laws of Planetary Motion*, you'll have to looking elsewhere. *Kepler's Witch* is an enjoyable historical biography and it's available by order from your local bookstore.

Bruce Lane

Hill and Dale (Observing on the Island)



October was certainly colder than we're used to. There were some high winds and rain, but a few decent nights to work with for amateur astronomers. Dan Posey ran a RASC imaging session at the Plaskett Telescope on October 8th. As the Pandemic prohibits a group of members gathering the observatory control room, Dan ran a live stream of the event. John McDonald did some imaging of the Deer Lick Group from the Victoria Centre Observatory (*seen next page*). Bill Weir ran a couple of sessions at the Pearson College observatory, made some sketches from observations using his Dobsonian reflector (*seen left*), and continued his low-tech telescope, Galileo emulation observing project.

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. 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

The Deer Lick Group, October 8th, 2021 at the Victoria Centre Observatory, by John McDonald.

Shooting the Moon (Originally Posted in the Jan 2019 issue of *SkyNews*)

Unlike other night sky subjects, the Moon doesn't require tracking to take pictures of it, although it will help you keep track of its movements. This is because the sunlight is reflected so brightly off of the surface that you'll be using a fast shutter speed to diminish the glare to get any detail of the surface. Unlike the planets, when you're photographing the Moon you won't need the magnifying power of a telescope to see surface detail. You can see a lot of detail with just a pair of binoculars or a telephoto lens, but you'll always see more with a telescope. Also, unlike the planets, you can take a decent picture of the Moon during the daytime. Your best choice of camera is a DSLR or planetary CCD camera, although you can also get a perfectly good picture with a point and shoot or smartphone camera.

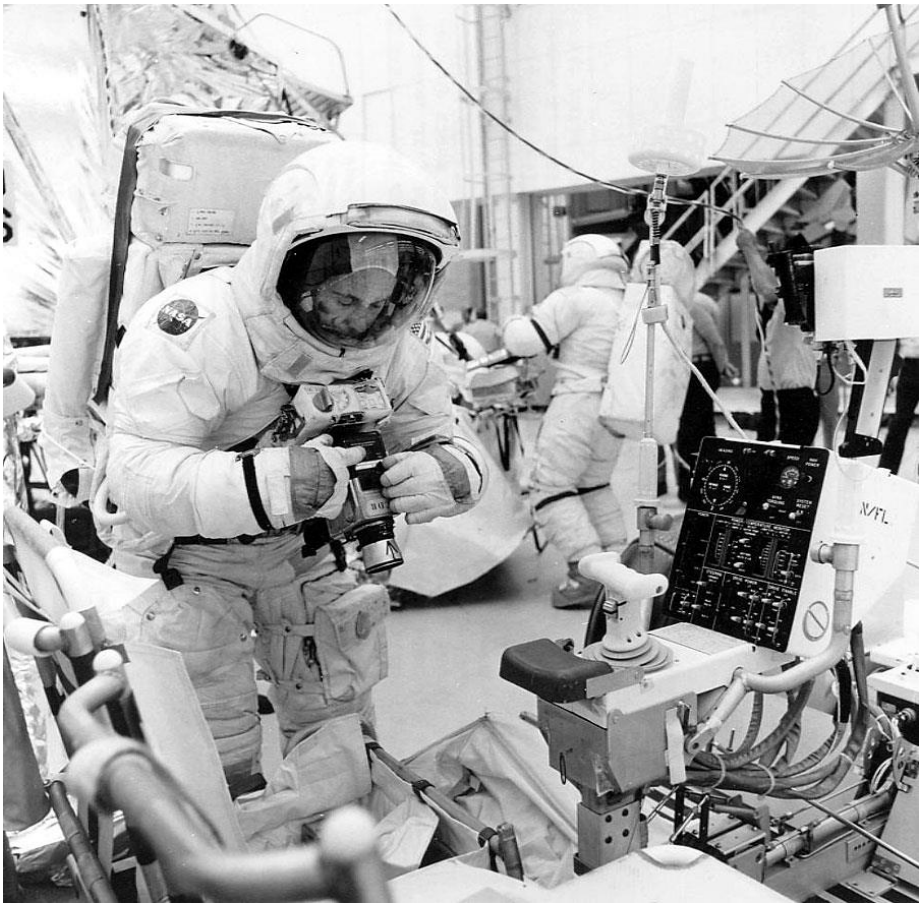
The most important thing is not to use automatic camera settings when taking a picture of the Moon! If you shoot on automatic camera settings, your camera will look at the dark night sky and assume it has to brighten things up a bit. The result is a picture of a bright, white blob against a grey night sky. Another important thing is to ensure you charged your battery before you head out and carry an extra one if you have it, because your batteries will be run down faster in the cold night air. It's never fun to show up somewhere to do photography with dead batteries.

If you know how to change your camera's metering, change it from evaluative metering (default on most DSLR's) to spot metering. That way when you do your metering, it will be based on the Moon and not the entire sky. If you don't know anything about metering you can still take a decent shot, but you might need to use the "*live view*" screen to make some adjustments.

I prefer to use ISO 100 with my DSLR, whenever I can. You can make a single frame shot as high as 400 to 800 ISO without much problem, but if your ISO is too high your pictures will have a grainy look that won't appear as good as one shot at a lower ISO. Depending on cloud cover, depth of field setting, your camera lens, and what phase the Moon is in, you'll probably want to use a shutter speed somewhere between 1/6 and 1/350 of a second. Whether it's your first or fifteenth time out taking pictures of the Moon, I recommend you take multiple pictures at different shutter speeds to find out what works best in the conditions you're shooting in, and what balance between detail and lighting you like best as a photographer. Since you've taken the time to go out and take pictures of the moon, why not take a few more shots and use it as an opportunity to learn more about how your camera works? For your depth of field, it depends on your composition. If you're just shooting the moon against the night sky, F8 or F11 will work fine. If you're shooting the moon as it rises over a hill, you might want to shoot at F16 to get more detail of the hill (which means you need lower your shutter speed to compensate for closing down the aperture of the lens). A very low depth of field can result in one part of the moon in good focus and the rest blurry. If you put it up too high, it will require you to drastically lower your shutter speed, to the point where you will definitely need a tracking mount to keep the Moon's apparent motion across the sky from affecting your picture. If you know how to set your camera's white balance, set it to "*daylight*", which is the closest default setting to the night sky. In time you'll likely start using more customized white balanced settings.

For lunar photography, if you want any surface details without having to over-crop in post-production, you're going to need at least a 300mm lens. Bigger is really better in this case. When you crop an image in post-production, you're also losing the pixel resolution you paid for. However, if you're using a telescope as a camera lens, this is one time that bigger might not be better. This is because once you get to around 2000mm focal length from a 200mm aperture Schmidt-Cassegrain telescope, you can't see the entire moon in the picture anymore without using a focal reducer-flattener. In short, you don't need a big telescope to look at the moon. You could also use a digital camera adapter or regular adapter to connect your camera to a spotting scope. Again, with the Moon, you won't need anything with tracking to keep it in focus while you shoot, unless you start using lower shutter speeds.

Getting perfect focus can be difficult when you're squinting through the viewer at distant objects at night, be it city lights or objects in the night sky. If your camera has a "*Live View*" or equivalent screen function, where you can view your subject on a screen in real time, you can use the "+" buttons to magnify details and get a much cleaner focus. Always focus manually, or the camera will focus on whatever it wants to and not always what you want. Infinity seems like the perfect focus setting, but you'll be backed off from that, and atmospheric conditions can change the focus from night to night.



If you want a good picture you should always shoot with a tripod and remote trigger (or timer). If you feel that hauling a huge tripod is too much of a chore, there are some very small, portable tripods out there that work well for this type of photography. Anytime your shutter speed is slower than a ratio of 1/mm of your lens you shouldn't be doing handheld photography. When you use a tripod, always remember to turn off the image stabilizer on your lens (if it has one). If the image stabilization feature is on, when the camera is perfectly still, the lens will introduce artificial shaking because it just assumes you're using it handheld. Timers are acceptable, although the button mashing will mean that for a few seconds the tripod will still be shaking, how long depending on how sturdy your tripod is.

You should be fine if you wait at least 7-10 seconds. The same goes if there's a gust of wind. If there are clouds moving around the Moon and you have everything timed perfectly, a remote shutter trigger is always the best option for photography. Use a remote trigger and tripod to get the least vibrations. If there are people walking around the tripod or you're next to a busy road, you might even want to invest in anti-vibration pads under the legs of your tripod or wait until the coast is clear. This is more important for longer duration exposure photography. If you get caught without a tripod and remote trigger, in a pinch you can crumple up a jacket to form a supportive nest around your camera and use the timer. It's probably best not to ask for someone else's coat though, if you want to be well thought of. It's probably cold out and you're the one who forgot the tripod.

A lot of people forget about composition when they photograph the Moon. If you're shooting it between the branches of a prominent tree or as it rises over a classical piece of architecture majestic hill, it can really add to the shot. Sometimes it's just being in the right place at the right time. If you want the perfect shot though, you may want to carefully observe the movements of the Moon across the night sky a few nights in advance and then wait for it to get into position on picture day. Another option is to use planetarium software and a compass (or compass app on your phone) to plan your shot location well in advance. One idea is to have a model (friends are cheaper) posing in front of the Moon, pretending to hold onto it or otherwise interacting with it as if it was a ball.

If you're photographing the lunar eclipse, the biggest difference from regular lunar photography is that you need to get your focus before the Moon's features are darkened by the eclipse or it will be tough to get perfect focus. You need to understand that you will need to regularly adjust the shutter speed as the moon darkens, from the Earth's shadow, and then again when it begins to brighten after totality. As the shutter speed gets slower, unless you have a camera on a tracking mount, you'll probably also need to increase the ISO at some point, so that the apparent movement of the Moon doesn't blur the shot for longer exposures. Above all, take a lot of shots and experiment.

Another technique to consider is "*painting*" the foreground with a flashlight or a detachable flash. The Moon is so bright compared to the dark ground that this extra light will help to provide some detail to the ground so that it appears to be more than just a dark shape. Practice this technique beforehand, especially if you don't have a lot of time when you're doing your photographs of the Moon. Just don't do waive a flashlight or flash around if you're in a place where other people are doing astrophotography, as you'll be ruining both their experience and their photographs. While the Moon is the easiest night sky target for you to get good shots of straight out of the camera, some people still want to do some post production. If you really want to get fancy, take two photographs, one of the moon and one of the foreground, and then combine them in post-production. Or you can do what some astrophotographers do: take a series of pictures and use software to stack them into a single image. HDR (high dynamic range), blending 2-3 or more different camera exposures into one image, is one way to accomplish that. For the Moon, using HDR usually means shooting bracketed shots. That means one properly exposed, one slightly over exposed, and one slightly under exposed. This gives you the best details of the highlights and shadows when the three shots are stacked together in post-production. On a tracking mount, you can stack many pictures for even more of a hyper-realistic image. Most importantly, while you're out there taking pictures of the Moon, don't forget to take a moment to have a long look at it. It's an amazing feature in our night sky that is often taken for granted.

Bruce Lane

Astronomical Term of the Month: Rayleigh scattering

Rayleigh scattering is an observed scientific fact relating to the scattering of light and the length of light wavelengths to determine the colour we see in the sky. Shorter wavelengths we primarily see during the day are blue. Longer wavelengths are yellow or red, like those observed during sunrises, sunsets, and lunar eclipses. There is significantly more blue and white wavelength light emitted from the Sun and it also scatters much more than colours with longer wavelengths do, when it comes into contact with molecules in our upper atmosphere where the molecules are further apart. The blue wavelengths are scattered away from the point of light of the Sun, which is why it appears to be yellow when see through our atmosphere. There's also a lot of math involved in this phenomenon, which above all makes the skies we observe even more of a natural wonder than before we learn about Rayleigh scattering.

John William Strutt had this and several other phenomenon named after his capacity as Baron Rayleigh. He published a series of works on atmospheric light polarization, starting in 1871, before presenting his discovery of Rayleigh scattering in 1899. Strutt had an extremely successful academic and scientific career, winning numerous awards, including the Nobel Prize for Physics and the Copley Medal. He held office as the President of the Royal Society and the Chancellor of Cambridge University. The body of his scientific work also laid the foundation for a number of current scientific fields.

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In Closing

I'm not saying that it's been raining a lot recently, but the chickens came to the front door the other day to borrow carpentry tools to build an arc. While it often rains in the autumn, this is a whole lot wetter than we're used to. There's certainly not much observing or astrophotography to be done during these heavily overcast days. The steep road beside me resembles something better used for kayaking than driving on. A lot of people's houses with below ground levels to get around building codes and driveways angled downwards to bring the water in, are designed to be flooded in weather like this. In the Nanaimo District, many riverside properties are under an evacuation order. In the interior there are landslides and flooding beyond what have been witness there in many decades. Merritt, home to the biggest star party in BC, was being evacuated at the time I am writing this. Military helicopters have also been rescuing motorists, trapped between two landslides on Highway 7. As is often the case, the undesirable weather here on the Saanich Peninsula is often catastrophic elsewhere in the province.

It looks like there's a chance we'll get a break in the weather for the upcoming lunar eclipse, but it's difficult to say just how fortunate we'll be. Even if there are too many clouds or if they're in the wrong place at the wrong time, it will not be an evening to remember for the right reasons.

RASC Victoria is organizing another *Light Pollution Survey*, to map out the dark skies and less than dark skies of the Greater Victoria Area. The last time our centre did this was in 2010 and there's been a considerable amount of development since that time. There are still some half-decent skies to be found south of the Malahat, but it doesn't help that so many of our horizons are obscured by trees, hills, and condos. There's certainly a lot of small parks around the region to explore for new observing locations.

Bruce Lane: SkyNews Editor

Photography Credits

Cover: Soul Nebula IC 1848, imaged Oct 11, 2021, by Brock Johnston. Taken with an Askar FRA 400 telescope, an ASI 2600MC Pro, using an IDAS NBZ filter and 6:50 total exposure time, with 73 x 300s subs. It was processed in Siril & GIMP.

Page 2: Apollo 16 training: John and Charlie are on the Grover during a field exercise in the Coso Range; at the U.S. Naval Ordnance Test Station near Ridgecrest, California. Nov 17, 1971. Scan by J.L. Pickering. Courtesy of NASA.

Page 3: Crop of Bruce Lane (SkyNews Editor) at 2013 RASCal Star Party in Metchosin, by Chris Gainor

Page 3: Randy Enkin (RASC Victoria President) with Sextant, Feb 20, 2021, by Eva Bild.

Page 4: Moon on Dallas Road, Oct 8, 2021, by Randy Enkin

Page 5: Photograph and Design of Astro Cafe Mug, by Joe Carr

Page 5: Apollo 16, Pre-flight photo of the Apollo 16 flown LRV console. Photo date unknown. Scan courtesy J.L. Pickering. Courtesy of NASA.

Page 6: Andromeda Galaxy, imaged October 2019, Martin Gisborne. Shot with a 70-200mm lens on a Nikon DSLR. 40 frames, at 2 second exposure each, at ISO 12 800. Post production with Starry Sky Stacker.

Page 6: Andromeda Galaxy, imaged October 2021, Martin Gisborne. William Optics Zenithstar 80mm apochromatic refractor on an autoguided iOptron CEM25P, using a Nikon DSLR. 29X3min frames (87 mins). Dark, flat, dark flat and bias frames were shot for calibration. Pre/Post-processing with PixInsight, Lightroom, and Photoshop), controlled with an ASAIR Pro raspberry-pi computer.

Page 7: Apollo 16 training: Charlie Duke practices with the drill during training at the Cape. The wrench is leaning against the near side of the stem rack. Scan by J.L. Pickering. Courtesy of NASA.

Page 8: Milky Way towards Sagittarius and Scutum from HMCS Winnipeg in September 2021, by Christopher Sulyma. Image was taken with a tripod-mounted Canon M50 with 35mm lens at f/2.0, 35 images stacked at 1/20s exposure per (1.75s total integration time) and ISO 3200. Taken in approx. 2m seas with 30 knots wind across deck.

Page 9: Apollo 16 Training, Technician works on John Young's EMU, perhaps securing PLSS connections and/or straps. 2 November 1971. Scan by J.L. Pickering. Courtesy of NASA.

Page 10: Apollo 16 pre-flight, Charlie Duke (*foreground*) and John Young (*beyond the wheels*) examine the flight Rover during its installation on the outside of the Descent stage. Charlie is standing at the hinge connecting the aft and center sections. Journal Contributor Harald Kucharek notes that, unlike the other people in the picture, John and Charlie are wearing EVA gloves. "*This makes perfect sense as the only way they will handle the LRV on the Moon is with EVA gloves, so it is important for them to have that experience from the beginning.*" Nov 12, 1971. Courtesy of NASA.

Page 11: NGC 7354 Planetary Nebula in Cepheus sketch, Oct 11, 2021 by Bill Weir; observed with f/3.3 508mm Dob at 480X with an OIII filter.

Page 12: The Deer Lick Group with prominent galaxy NGC 7331 or Caldwell 30. Oct 8, 2021 at the Victoria Centre Observatory by John McDonald. OGS 12.5" scope on Paramount ME mount with field flattener and Canon Ra camera.; Exposure - 19-240s lts; 7-Dks; 30 bias and 7 Flats.; Processing in Deep Sky Stacker; PixInsite and Photoshop.

Page 13: Apollo 16 training: Charlie Duke (*left*) loads a film magazine into his Hasselblad. In the background, John Young works at the MESA. Photo filed Nov 30 1971. Scan by J.L. Pickering. Courtesy of NASA.

Page 14: Apollo 16 training, John Young on simulator steps. Scan by J.L. Pickering. Courtesy of NASA.

Page 15: Ameraucana Chicken, from a Steven Miesel emulation project, using chicken models, by Bruce Lane in 2016.

Page 17: Sundial Cemetery Marker at St Stephen's Church, taken at 2019 RASC Star Party, by Bruce Lane

Call for Article and Photo Submissions for the December Issue

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

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