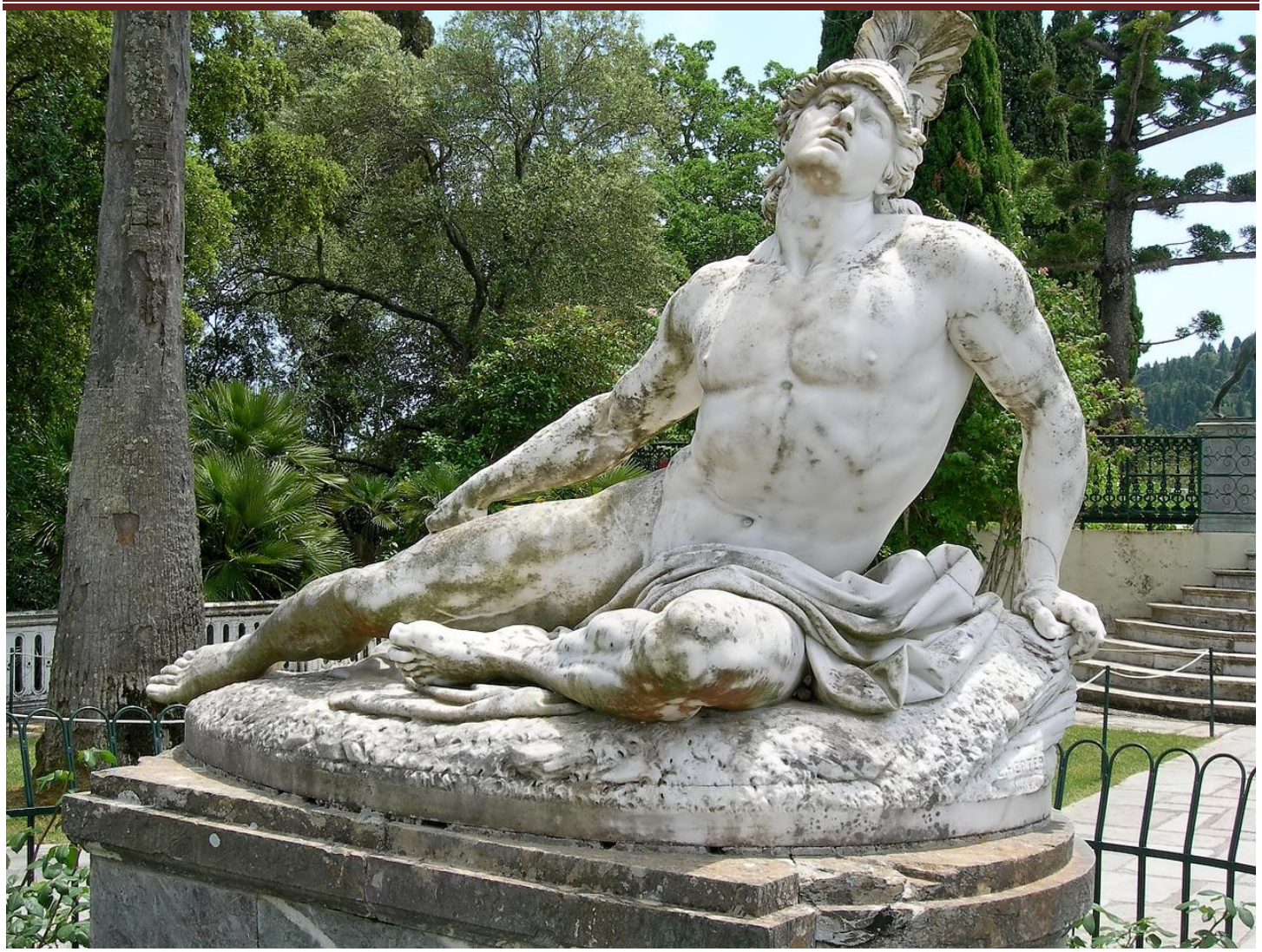
SKYNEWS

Messier 27 (the Dumbell Nebula) from VCO, Nov 8, 2020; by John McDonald

Merry Conjunction!

With the rest of the holiday season a bit of a mess this year, the big event for amateur astronomers is the conjunction of Saturn and Jupiter on December 21st. The orbits of the two largest planets in our solar system overlap once every 20 years. The fact that they'll also be visible above the horizon this year is especially good for the amateur astronomy community. Having it occur this close to the winter solstice also gives us a better chance to see the two planets contrasted against a darker sky.



Achilles Statue in Corfu, Greece

The time of year for this planetary conjunction has resulted in a lot of recent articles about this type of conjunction being the source of the legendary Star of Bethlehem. In the Ancient World, comets were the symbol of choice to associate with the birth of someone deemed to have legendary status or someone wanting everyone to know they could be a contender for legendary status. Aesculapius, Krishna, Buddha, Confucius, Lao-tzu, Abraham, and Jesus were all reported to have been born under some sort of non-standard heavenly lighting. When you have ancient peoples telling a story about someone they considered to be a prophet or great hero, saying that they were born under a comet is just part of the storytelling convention and these details don't get told as stories until many years after the person was born.

Anyone who has read a lot of mythology, anthropology, or who happened to pick up any of the works of Joseph Campbell will understand that when you spend your efforts trying find literal truths in ancient stories you tend to miss the mark. If we start fact checking the story of Confucius's legendary birth, we're probably not only going to find some discrepancies, but we're also proving that we're not very good at interpreting ancient myths and legends. The Confucius of legend came from a virgin birth, while being guarded by two dragons, and was attended by numerous other heavenly miracles. The Achilles of the *Iliad* wasn't dipped into the River Styx to make him invulnerable. That was a non-Homeric story that was invented much later, during Hellenistic Greece. Stories evolve with the people telling them.

The five planets, observable by the naked eye in the night sky, have been studied by astronomers for thousands of years. A number of people, from a number of different religious paths, have tried to calculate the birth of a prophet to happen during a planetary conjunction, which sometimes requires a bit of creativity with the actual birthdate. Noted for

popularizing the framing a planetary conjunction as the Star of Bethlehem, Johannes Kepler calculated that in 7BC there were three conjunctions with Jupiter and Saturn. Modern astronomers, who have taken the time to recheck his math, have found that those conjunctions would have had the two planets still seen as much further apart than Kepler believed them to be and nowhere close to the conjunction that we will observe this December 21st.

For those of you wanting to experience the conjunction of Saturn and Jupiter in the here and now, you'll want to find a spot to with an unobstructed horizon to the south-west on December 21st. You'll want to be in position before the sun goes down, especially if you're setting up a telescope or photography equipment. The weather forecast is a bit of a concern for the Greater Victoria region. The current prediction calls for bad weather on Monday, but clearing in the evening, so it will come down to what time the cloudy skies clear up enough to have a look at the night sky. You'll likely want to bring rain gear and tarps for gear, as you wait for the clouds to break and the rain to stop. If the weather doesn't cooperate on Monday, Saturn and Jupiter will still be very close together in the sky on Tuesday, so it's worth looking then too.

Should the weather cooperate, you might want to take a picture of the planetary conjunction. Be forewarned that planets hate posing for portraits and close ups tend to get a bit blurry. Most of the good planetary images you see are made by using a bunch of photographs or even video frames, and then stacking them all with post production software to create a single image. It's very difficult to make a single frame photograph of planetary close-up look good. An alternative idea is to use a wide field camera lens and take a photo that shows the planetary conjunction in relation to a landscape or prominent building. It also gives you the opportunity to have more of a chance at controlling your composition. At that point you need to be aware that to expose for the foreground, the planets will be extremely overexposed, so you'll need to make some choices. You could paint the foreground with a powerful light to split the difference, but why ruin your night vision and every else's in the area when you're out under the night sky.

Bruce Lane

Editorial Remarks

As we round out 2020, it's time to wish you all a Happy Hanukkah, Merry Christmas, Saturnalia, Kwanzaa, Childermas Day, Festivus (the holiday for the rest of us), and Winter Solstice. I'm personally a big fan of the honesty shown by the Philippines by giving the title of *Additional Special Non-Working Day* to December 24th. It's just telling it like it is. Of course, for a lot of us, the only way we want to see this year is in the rear view mirror. When the ball drops in Time Square, on New Year's Eve, most of will just want to see that ball kicked down the street, with an agreement that it never be discussed again. The 14th annual *Good Riddance Day* in New York, on December 28th, is certainly taking on a new meaning this year for a lot of people.

In this issue of *SkyNews*, we'll have more recaps from our Centre's activities, 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 December

Post-election uncertainty and record high covid case numbers overshadowed recent astronomical developments. A few warrant an honourable mention. On November 16th, the Space X Crew Dragon -1 *Resilience* was launched from Cape Canaveral on a Falcon 9 rocket. It delivered three American astronauts and one Japanese astronaut to the International Space Station the next day. This mission was a milestone, as it was the first American space vehicle to deliver an operational crew to the ISS since the Space Shuttle *Atlantis* in July 2011. In the meantime, astronauts had to hitch rides on Russian Soyuz spacecraft. The commercial entity Space X provided both the launch vehicle and capsule for this 6 month mission.

On November 25th, Space X also placed another 60 Starlink satellites into orbit, bringing the total so far to 955. Delivery of global broadband internet to underserved areas, from this fledgling network, has already commenced. A constellation of 12 000 Starlink satellites have already been approved and a request for an additional 30 000 has been submitted. The growing alarm from the astronomical community regarding the impact of this vast swarm of satellites was discussed in the May 2020 President's message.

But as the adage goes, *what goes up must come down*. I am not talking about satellites here but rather the receiver of the Arecibo Radio Telescope in Puerto Rico. Weighing in at 900 tons, the receiver spent November dangling 500 feet above the iconic 1000 foot diameter spherical dish. When one cable broke in August it caused some alarm, but when a second more substantial cable snapped, in early November, it was decided that the instrument could not be safely repaired. That decision received dramatic justification on the morning of December 1st with the failure of yet another major cable. This allowed the receiver to plunge into the side of the dish in a catastrophic manner, which was captured on an astonishing video (*https://www.sciencemag.org/news/2020/12/arecibo-telescope-collapses-ending-57-year-run*). What a tragic end to such a productive and beautiful symbol of science.

A softer landing occurred on December 1st, when China's Chang'e 5 spacecraft successfully touched down on an elevated volcanic mound Mons Rumker, in Oceanus Procellarum. A video of the landing and the collection of moon samples can be found at this link: *https://www.space.com/china-chang-e-5-moon-landing-lunar-sample-video*. The Chang'e 5 ascent vehicle lifted off the Moon on December 3rd and is planned to return samples to Earth within a week.

Another sample return mission is underway. On October 20th, NASA's ORISIS-REx spacecraft successfully acquired about 60 grams of the asteroid Bennu, during a touch and go operation. Images suggest that it caught more than anticipated and the sample storage procedure was expedited and completed two days later. The spacecraft will begin its return journey in March 2021 and is scheduled to reach Earth in 2023. This mission will provide a pristine sample of the primordial material that formed the Solar System.

One asteroid of particular interest is 3200 Phaethon, which is the parent body of the Geminid meteor shower. Most meteor showers are associated with comets, but because 3200 Phaethon comes very close to the Sun, it heats up to 700C and sheds particles and dust, and has been dubbed a "rock comet". This year the Geminids will peak around the 13th of December which is a new moon. We will be particularly well situated to enjoy this spectacle…weather permitting. To learn more about "rock comets" be sure to attend the December 7th Astro Café, where meteor expert Dr. Abedin Abedin will be the guest speaker.

Remember that the FDAO will be holding a Zoom Winter Solstice Star Party on December 19th. Click the following link to learn more: *https://centreoftheuniverse.org/events/2020/12/19/virtual-star-parties-solstice-edition*. Also remember that the **Great Conjunction** of Jupiter and Saturn will occur on **December 21st**. Saturn will only be 12 Jupiter diameters away! It is the closest that they have appeared since 1623. So if skies cooperate, point your scope to the western horizon near sunset and savour the sight.

So despite the pandemic plenty is going on aloft. So when skies are usable be sure to look up and enjoy.

Wishing you good health and the very best of the festive season.

Reg Dunkley

Astro Café: Continues Online

The weekly social gathering of amateur astronomers on Monday nights, known as Astro Café, is now online. As with many groups, we're trying to find ways to still function as a Centre, without meeting in person. Members are posting their astrophotography, short articles, as well as links to astronomy stories from the Web. 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/

November's first Astro Café began with Chris Purse reminding people about the RASC calendars for sale by our Centre, the RASC National Explore the Universe program, as well as the upcoming annual general meeting coming up in February, along with the election of a new council. John McDonald gave an update on the work being done with the newly acquired OSG Ritchey-Chretien telescope at the Victoria Centre Observatory, Reg Dunkley reviewed the items on the Astro Café webpage and mentioned some upcoming meetings, and Dave Robinson showed some deep space astrophotography from the Edmonton RASC Centre. David Lee gave a presentation on *Small Refractor Imaging & Electronically Assisted Astronomy*, with Jim Hesser wrapping things up with an announcement about the UVic Physics Department's Colloquium.

The 2nd Astro Café of the month did double duty as the RASC monthly meeting. Once the official business was concluded, Jay Anderson (former RASC Journal editor) joined the Zoom meeting from Winnipeg and gave a presentation titled: *Four Decades Beneath the Shadow of the Moon*. Afterwards, Reg gave an update on the Astro Café page and reviewed the RASC National bulletin. To end the evening Randy Enkin showed a lunar sketch and Nathan showed a Mars rotation sequence video, from observations made from over a month.

Given the recent loss of Diane Bell, members present at the 3rd Zoom meeting held an online wake, remembering fondly one of the Centre's most active and beloved members. Afterwards, Jim Cliffe and David Lee talked about DSLR choices for astrophotography, Reg gave updates on the Astro Café page, Dave Robinson showed some more pictures from RASC Edmonton, Lauri Roche and Ben Dorman made an announcement about the upcoming FDAO online star party, and Randy wrapped things up previwing his upcoming FDAO presentation: *Selenophile or Lunatic? 30 Years of Loving the Moon.*

For the 4th Astro Café of the month, Chris Purse started things off with another reminder about RASC Calendars and the need for nominations (both for the council and awards) for the upcoming AGM, as well as an update about RASC gift memberships and the shipping delays of the 2021 Observer's Handbook. Janeane McGillivray (Nanaimo Astronomy Society) dropped in to announce Pranvera Hyseni's talk: *Astronomy Is For Everyone*. Reg gave an overview of the webpage, Randy commemorated the 50th anniversary of the Apollo 12 landing with a look at Alan Bean paintings; Chris Gainor told some more stories about Alan Bean, Apollo 12, and talked about an upcoming article about Canadian space telescopes in Dec 2020 RASC Journal; while Dave Robinson showed some more images from RASC Edmonton. John McDonald shared some information about a recent advance in the science of black holes, Jim Hesser discussed CASTOR (a UV space telescope mission led by Canadians), Bill Weir talked about a new comet that he's observed in the night sky (Comet C/2020 M3), and David Lee mentioned the upcoming Penumbral Lunar Eclipse.

On the 5th and last Monday of November (Ed*. that's a lot of Mondays*), Chris Purse again gave a reminder about the RASC calendars, nominations for the upcoming annual general meeting, updates about RASC membership and Observer's Handbook shipping delays, news about RASC National online events, and a review of the Astro Café web page. Joe Carr showed the partial lunar eclipse photo by Stephen Beddingfield (Yellowknife), David Lee talked about *Electronically-Assisted Astronomy & Amateur Telescope Making*, Dave Robinson showed a deep space image shot from a non-tracking tripod from RASC Edmonton, and Randy Enkin announced that he has finished all his lunar observations for the Isobel Williamson certificate and after sending in his work for examination he is considering taking on the Lunar 100 list next. The meeting wrapped up with the discussion of a possible online Astronomy Day in 2021.

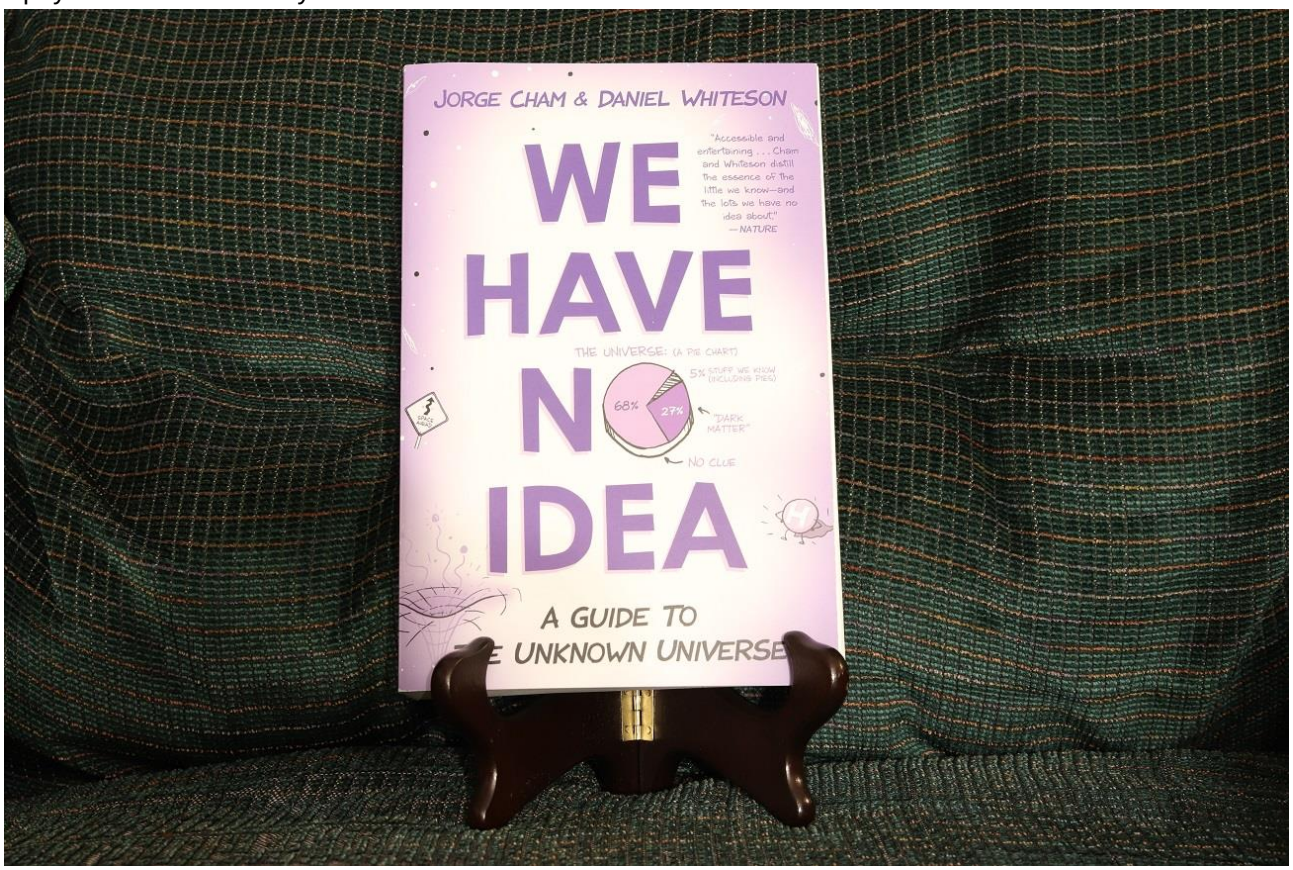
Bruce Lane

The Iris nebula (NGC 7023) and the dust clouds of Cepheus, Nov 15, 2020, by Dan Posey

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 covering many aspects of astronomy, including: 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. I've been doing book reviews of the contents of our Centre's library, but until the resumption of our monthly meetings, I'll 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 *We Have No Idea: A Guide to the Unknown Universe*, by Jorge Cham and Daniel Whiteson. Some of you might be familiar with Jorge Cham's work, as the creator of the PHD (Piled Higher and Deeper) webcomic, about the experiences of a group of fictional PHD students and their professors. If you haven't seen it before you should give it a look. It's a great webcomic, with a scientific flavour to it. Daniel Whiteson teaches experimental particle physics at the University of California.



Instead of writing a scientific book that is filled with the facts about what is known, Jorge Cham and Daniel Whiteson tackle the big questions of cosmology that continue to puzzle scientists. It covers a wide spectrum of subjects in cosmology and particle physics, and is both informative and accessible. *We Have No Idea* really answers the need for people who are interested in reading an updated version of Stephen Hawking's *A Brief History of Time*, but want it to be more entertaining and humorous. This book is probably the only book on the subject of physics and cosmology that I would ever refer to as a *page turner*, while still retaining a lot of information. Part of what makes approaching the subject matter with a sense of humour work, for this book as well as the PHD webcomic, is that it comes from fluency and enthusiasm of the topic they're covering. *We Have No Idea* is an enjoyable and highly recommended read and it's available from your local bookstore.

Bruce Lane

Hill and Dale (Observing on the Island)

Observation sessions at the Victoria Centre Observatory have tentatively returned, with restrictions put in place by the National Research Council to ensure we limit the numbers of RASCals on the Hill and stay safe. The new rules allow for only 4 members (including the MiCs) at the VCO and 2 more amateur astronomers up at the Plaskett parking lot. Reg Dunkley, John McDonald, Garry Sedun, and Joe Carrr went up to the VCO on November 1st, despite there being an almost full moon. On November 7th, John McDonald and Reg Dunkley returned to the Hill to do more astrophotography testing with the 12.5" Ritchey-Chretien telescope. On the same evening, from his driveway, David Lee was imaging with his small refractor, using an umbrella on a light stand to protect his imaging from a nearby street light. The weather took a turn for the worse for the remainder of November, although there were still a few decent nights to be had. On a couple of cloudy days, the skies broke open late at night to reveal the stars to the more patient and lucky observers.

Joe Carr has sent out a survey email, so that RASC Victoria members can help the Technical Committee plan the future of the VCO and has posted the report about the results. The Tech Committee will still be taking survey returns until Christmas, so there's time to fill it out and have your say. There's a lot of interest in getting a nice refractor for our observatory, to work in tandem with the main telescope like we used to have as a setup. The interim 12.5" Ritchey-Chretien telescope is being put through its paces to ensure that it's up to the task of being our primary astrophotography telescope. The 20" Obsession Dobsonian reflector telescope remains available for observers.

A reminder that although the VCO belongs to and is for the use of the members of the RASC Victoria Centre, with both weekly scheduled and unscheduled sessions run by our MiCs (Members in Charge). 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) *membership@rasc.victoria.ca* and we'll see you up there on the Hill some night soon.

Bruce Lane

Astronomical Term(s) of the Month: Afocal Projection

When you use a point and shoot digital camera or smartphone for astrophotography you can't remove the lens and attach it directly to the telescope. This means you'll be projecting what the eyepiece sees into the optics of a camera perpendicular to the eyepiece. You can also use a lightweight, crop sensor DSLR with a very short lens (like a pancake lens). While some great pictures have been taken by holding the camera over the eyepiece, it's best to make use of a dedicated smartphone or camera assembly that allows you to clamp onto the eyepiece and keep the whole assembly from shaking.

Even with your camera or smartphone clamped onto the telescope eyepiece, you'll be well served by using a time delay mode; so that the picture is captured shortly after you've finished pushing buttons, allowing for any vibrations to quiet down. I'd also recommend using macro mode on your camera, instead of shooting to infinity, since this is more of an exercise of imaging the projection from the end of the eyepiece.

One of the technical issues that you will have to contend with is vignetting (*Ed. this should probably have been an astronomy term of the month in its own right*). Vignetting occurs because your camera is too far away from the eyepiece, so you are beyond the eyepiece's eye relief distance, and not seeing a very flat field. Because of this, you get diminished light and image quality at the edge of the photo. You would have a similar problem if you stand back too far from the eyepiece and tried to look through it. You can address vignetting by using eyepieces with larger eye lenses (the end closest to you) and that have longer eye relief. It's important that if the eye lens is the same size as the camera lens it will give you the best results (provided it doesn't have too short an eye relief).

Bruce Lane

In Closing

We're still a long way from the end of the Pandemic. You could think of it more like half time at the Grey Cup, with the home team going into the locker room bruised and beaten up. The coach gives a rousing speech, a few veterans chime in, and everyone can see a way forward. It's a good thing too, because *Arcade Fire* is the halftime show, but because it's 2020, the only members of the band to show up are ten people playing triangles and some guy on the washboard. The point is that there's a lot more football still to be played before we should start giving any thought to dumping barrels of energy drinks on any coaches. New Year's Day will not mark the end of the pandemic or likely even the end of the worst of the pandemic, but at least it will point to the way forward.

As we come to the end of 2020, there are hopeful signs that things will be getting better, with one vaccine approved and another likely to be approved within a matter of days. These two new vaccines mark a huge step forward in medical science, in that they are first mRNA vaccines ever developed for use on humans. Instead of building resistance by injecting someone with some dead virus, these smart vaccines send a message to your cells, letting them know what to look for and what to do if they see any of that dastardly covid-19 lurking about. This could be the biggest advance in immunization since the first use of cowpox as a vaccine against smallpox in 1790s. There are a lot of people excited in the scientific community about the future possibilities of using mRNA science against diseases and it could even be employed in the fight against cancer. This new science could result in the displacement of a lot of conventional pharmaceutical medicine in the future, with mRNA instructing your body to become its own laboratory and produce what is needed for your specific medical condition. Besides an unprecedented amount of funding, one of the factors that have put this science over the top was the recent adoption of deep thinking artificial intelligence by the pharmaceutical industry. It's the same kind of technology that allowed for the creation of the first image of the event horizon of the Sagittarius A black hole in 2019.

For the local amateur astronomy community the recent Geminid Meteor Shower was a disappointment, despite it occurring so close to the New Moon, but given how cloudy it can be in December it wasn't a huge surprise. The Conjunction of Saturn and Jupiter has been a bit more giving, with members of RASC Victoria getting the opportunity to get some sneak peaks of the two planets, as their apparent position in the sky becomes closer by the night. Whether or not the weather will cooperate on December 21st is anyone's guess. Even on a cloudy day, you might be lucky enough to view this anticipated conjunction through a hole in the clouds.

Bruce Lane: SkyNews Editor

Photography Credits

Cover: Messier 27 (the Dumbell Nebula) from VCO, Nov 8, 2020, by John McDonald. Canon Ra camera with Optical flattener attached to 12.5" OGS scope on Paramount ME mount. 81 - 30s exposures at ISO 6400, with 42 darks and 21 bias frames for calibration. Processed with Deep Sky Stacker and Photoshop.

Page 2: Achilles Statue in Corfu, Greece, Feb 10, 2015, by YmV; fair use image from Pixabay

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

Page 4: Crop of Reg Dunkley (RASC Victoria President) at 2018 AGM, by Joe Carr

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

Page 6: The Iris nebula (NGC 7023) and the dust clouds of Cepheus, Nov 15, 2020, by Dan Posey. Canon Ra, with Sigma 105mm, on an unguided iOptron Skyguider Pro. 1h58m (236x30s frames) at f1.4/ ISO640. The lights were calibrated with bias and flats, and stacked/processed in Pixinsight.

Page 7: Posed Book, “We Have No Idea”, taken in Editor’s home on July 15, 2020, by Bruce Lane

Page 8: Afocal Projection Kit, taken in Editor’s home on Dec 20, 2020, by Bruce Lane

Page 9: Barred Owl on garden fence pole, Aug 14, 2020, by Bruce Lane

Page 11: Apollo 14, View of firing room during Apollo 14 Flight Readiness Test. December 10, 1970. Scan by J. L. Pickering. Courtesy of NASA.

Call for Article and Photo Submissions for the January Issue

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

RASC Victoria Centre Council 2020

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Pearson College Liaison	Bill Weir	
Members at Large	Jim Hesser	David Lee
	Dan Posey	John McDonald