

NOVA

NEWSLETTER OF THE VANCOUVER CENTRE RASC
VOLUME 2016 ISSUE 5 SEPTEMBER/OCTOBER 2016



What Kind of Telescope Should I Buy?

by Suzanna Nagy

At our public meeting on July 14, 2016, we hosted a Telescope Workshop that was very well attended. As usual, I answered many questions from members and guests wanting my advice on buying their very first telescope.

As your President and with having my contact details online, I often get emails from members of the public-at-large, also asking for my advice on what their very first telescope purchase should be.

Now, asking someone “What kind of telescope should I buy?” is like asking someone “What kind of car should I buy?” So much depends on personal taste, experience, lifestyle, and budget. Having said that though, I would like to share with you the advice I give when asked this common question.

A few pointers first:

(a) Don't buy anything that is beyond your knowledge. I am referring to GoTo telescopes. If you are not computer or tech savvy, I would

definitely not recommend a GoTo as your first telescope to buy. GoTo's, while great, are also extremely finicky. If you don't know what you are doing and don't fully understand the software programs required, you will very quickly become frustrated. If a GoTo is not star-aligned properly, when you ask the telescope to go to an object, it won't be in the eyepiece. GoTos are great for astrophotography. But, like me, if you are not interested in astrophotography yet, then don't buy a GoTo as your first telescope.

(b) Don't buy more than what you can carry. Despite gender equality, I am not ashamed to say that as a woman, there are weight limitations that I can carry. Not all observing sites allow you to set up your telescope directly next to your parked car. Often one has to carry a telescope into a clearing, or down a path. If you can't carry your equipment, you will soon lose interest in going out observing.

(c) Don't buy your telescope at London Drugs or Costco. Many people think one is getting a great deal and maybe you are in price, but in regards to quality, the telescopes sold at such big-box stores are cheaply made. I'll talk about where to buy further down.

Now, what kind of telescope to buy. If you are an absolute beginner, then I would suggest buying a manual Dobsonian made by either Skywatcher Telescopes or Orion Telescopes. Why?

1. Dobsonians are extremely easy to set up. Place the base on the ground, put the tube on the base, drop in an eyepiece, and in under 5 minutes you are ready to observe. No fiddling with tripods, equatorial mounts, alignment, batteries, software—nothing.

2. Dobsonians force you to learn the night sky. Unlike a GoTo where the computer runs the telescope, with a Dobsonian you will have to

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SEPTEMBER 8

SFU

Michelle Kunimoto of UBC on her recent discovery of 4 new exoplanets. Room SWH10041

SFU

OCTOBER 13

SFU

Dr. Douglas Scott of UBC Physics and Astronomy on the ALMA array and his role in the project. Room SWH10041

SFU

NOVEMBER 10

SFU

Dr. Catherine Johnson of UBC EOS on NASA's upcoming OSIRIS-Rex asteroid sample return mission and her role in it. Room SWH10041

SFU

Members' Gallery



Aurora over Merritt by Doug Montgomery

When the clouds finally cleared over the Merritt Star Quest on Friday night, the aurora could be seen to the north shortly after nighfall and continued to grow until it finally faded around 3am.

For more on Merritt, read Leigh's full report on p. 5.

Cassiopeia over Pemberton by Elena Popovici

Cassiopeia blends in with the night sky as moonlight "pollution" coming from the right lights up some wispy clouds and the top of the trees.



President's Message

by Suzanna Nagy

Unfortunately, we live in a litigating society. Few take responsibility for their own actions anymore—looking immediately to someone else to blame for an injury or a perceived wrongful act.

Using my 32 years of experience as a personal injury paralegal, I have recently spent some time educating myself and subsequently your

Council on the parameters of the RASC National liability policy (the "Policy").

If you were not aware, on behalf of its members, the National Office purchases annually a liability insurance policy to protect its Centres and its members from the risk of being sued for negligence or injury that might occur at a RASC event.

If a member of the public-at-large makes a claim and sues for an act of negligence or injury that occurred at an astronomy event, you as a RASC member are protected. In addition, a RASC member can sue another RASC member and/or its own Centre for injury/negligence.

Of importance to note is that if it

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About RASC

The RASC Vancouver Centre meets at 7:30 PM on the second Thursday of every month at SFU's Burnaby campus (see map on page 4). Guests are always welcome. In addition, the Centre has an observing site where star parties are regularly scheduled.

Membership is currently \$78.00 per year (\$45.00 for persons under 21 years of age; family memberships also available) and can be obtained online, at a meeting, or by writing

to the Treasurer at the address below. Annual membership includes the invaluable Observer's Handbook, six issues of the RASC Journal, and, of course, access to all of the club events and projects.

For more information regarding the Centre and its activities, please contact our P.R. Director.

NOVA, the newsletter of the Vancouver Centre, RASC, is published on odd-numbered months. Opinions expressed herein are not nec-

essarily those of the Vancouver Centre.

Material on any aspect of astronomy should be e-mailed to the editor or mailed to the address below.

Remember, you are always welcome to attend meetings of Council, held on the first Thursday of every month at 7:30pm in the Trotter Studio in the Chemistry wing of the Shrum Science Centre at SFU. Please contact a council member for directions.

2015 Vancouver Centre Officers

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Library

The centre has a large library of books, magazines and old NOVAs for your enjoyment. Please take advantage of this club service and visit often to check out the new purchases. Suggestions for future library acquisitions are appreciated.

On the Internet

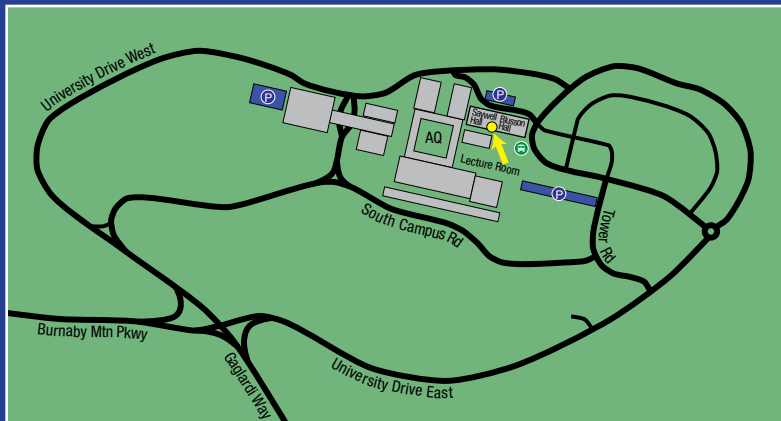
<http://rasc-vancouver.com> or
<http://www.rasc.ca/vancouver>
<http://astronomy.meetup.com/131/>
<http://www.facebook.com/RASC.Van>

 @RASC Vancouver

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Map to Meeting Site



SFU

Our fall meetings are in room SWH10041 of Saywell Hall, about halfway down the main corridor as indicated by the arrow on the map.

Pay parking is available at several locations around campus (indicated as “P” on the map).

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is a RASC event, then the Policy will cover liability.

However, please be aware, that any RASC member taking it upon himself/herself to do their own sidewalk astronomy is not covered by the Policy. Any claim made for an act of negligence would then fall under the RASC member’s personal home insurance.

Therefore, I would like to suggest that if a RASC member chooses to “put himself out there” in the public no matter the good intentions, that

member should ensure he/she has a home insurance (or tenant’s insurance) policy as all home and tenant insurance policies carry third party liability.

The Policy does not indemnify for equipment damage or theft. The Policy is for liability only. Any equipment damage or theft would fall under the RASC member’s private home insurance. If you haven’t already, it is a good idea to ensure that your telescope equipment falls within the maximum insured amount for your home contents. If

not, then an add-on for some extra insurance might need to be purchased.

If any RASC member has any questions or concerns about liability, please email the National Office. Our Executive Director, Randy Attwood, is well-versed on the Policy and would be happy to answer any questions posed. *

Clear skies,
Suzanna Nagy
President

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learn your constellations and where they are in the sky. Once you know your constellations, a good star chart will guide you to the deep sky objects like galaxies, nebulae, etc. (more on star charts later) There is nothing like the exhilaration of searching for an object and then finding it—giving you that “yahoo!” moment.

3. A Dobsonian will last you for years! If kept in good condition, a

Dobsonian will last you for decades to come. Truly, it is a classic piece of equipment. Many experienced astronomers will own a few different telescopes and almost always one will be a Dobsonian. You just can’t beat the simplicity of use and the ease of set up.

Remember: It is always easier to upgrade then downgrade. If you are a true newbie, then buy a Dobsonian. After many years of enjoyment and after mastering all there is you

can see and do with a Dobsonian, you can then upgrade to a GoTo, yet still keep the Dobsonian for those times that you don’t want to fiddle with software.

Personally, I own an 8 inch Skywatcher Dobsonian which I bought 10 years ago and still use regularly today. I can carry it with ease for a couple of blocks. It is good in the city light pollution to find the planets and the brighter deep sky objects

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MSQ – Weather or Not?

by Leigh Cummings

Once again, the lure of really dark skies and the company of fellow astronomers prompted me to rent a van and venture forth to the Merritt Star Quest. Although I missed last year due to health reasons, I usually try to make this an annual pilgrimage to the pristine dark country of the Nikola Valley area. How can anyone resist the opportunity to camp in a gravel pit and use Porta-potties for a week at the end of summer?

Having to plan the event a year in advance puts the organizers in the precarious position of predicting weather with accuracy that the meteorologists would envy. Of course this is impossible to do, and so it is always a crap shoot as to how the week will turn out. This year it turned out to be a week too late weather-wise. Most of the week had cloudy sky at night with rain showers to top it off. We did have a few breaks, however.

I arrived on Saturday afternoon and proceeded to set up two gazebos in what felt like gale-force winds. Thank goodness my new neighbour, Elliot from the Fraser

Valley Astronomical Society, lent me a hand or I believe I would have ended up in Kamloops. By the time I got my camp set up, I was too exhausted to even look up.

On Sunday, Doug Montgomery arrived and set up camp beside me. Another cloudy night with showers kept our astronomy equipment stored away. On Monday night it cleared up so we got our telescopes out only to find it was a very soft sky. The telescope viewing might not have been great but seeing the Milky Way and so many stars reminded me that a poor night at MSQ would be a fantastic night in the Lower Mainland.

Tuesday night—or more precisely Wednesday morning—from midnight on turned out to be the best sky of my stay. One of my problems has always been that I suffer “star shock” every time I go to a dark sky location, and need at least one night to just navigate my way around again. I did not get to find all the objects I wanted but boy what I found knocked my socks off. I finally had to pack it

in to bed around 3:30 as I was falling asleep on my feet.

On Wednesday, Suzanna Nagy and Gordon Farrell arrived and each set up camp next door. The wind was not nearly as bad as it had been Saturday but it still made it interesting to get tents up. The weather turned out to be another cloudy night so visiting was the activity for the evening.

On Thursday, Ken Jackson and his family showed up and camped nearby. His girls helped him set up camp and I would say they were quite experienced. Unfortunately, it was another night of chasing sucker holes. Some of us ended up socializing at Elliot’s trailer for most of the night.

Friday night was supposed to be a good night according to the “Clear Sky Clock.” It turned out more like Thursday night with chasing sucker holes. This time though we did get the added treat—or pain in butt, depending on your point of view—of seeing a really good showing of the Aurora Borealis. It was very beautiful

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Membership has its Privileges!

New members, did you know? The Vancouver Centre has several telescopes available for loan free of charge! We have telescopes ranging from 60mm to 10” in diameter. For more information see the Director of Telescopes after the members meeting. The loaner period is for one month, to be returned after the next meeting. Telescopes are not allowed to circulate outside of these meetings. You

can now reserve two different telescopes per year and use what is left at the end of the meeting anytime.

Your greatest opportunity as a member of the RASC is to take advantage of the company of other enthusiasts to increase your knowledge, enjoyment and skill in astronomy.

The best thing you can do to gain the most from your membership is to get ac-

tive! Take in the club meetings; engage other members with questions; come out to observing sessions (also known as “star parties”), and, by all means, volunteer to take part in our many public events.

For the usual observing sites and times, visit our website at <http://rasc-vancouver.com> or contact the Observing Chair at observing@rasc-vancouver.com.

Upcoming Events

September

24 – Star Party for Science Literacy Week (see Meetup for sites).

December

8 – AGM

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like the M13 globular cluster in Hercules. But in a dark sky, it can easily pick out the very faint objects as well like galaxies and nebulae. I take my 8-inch Dobsonian to the Merritt Star Quest every year and spend days using it to observe.

An 8-inch Dobsonian costs approx. \$550 although I have seen it for less if the Canadian dollar is doing well which unfortunately it isn't right now. If you can spend a little more money, then maybe buy a 10-inch Dobsonian or even a 12-inch. But again, the larger the Dobsonian, the heavier it will be and the more space it will take up in your car.

I would also recommend spending the extra \$90 on a Telrad. All Dobsonians come with a finder scope but personally I think they are very difficult to use. A Telrad is like a bullseye on a rifle. Use the Telrad instead of the finder scope to point the telescope.

Another recommendation is an observing chair. Dobsonians sit low to the ground. After spending an evening bent over the eyepiece,

you will likely feel the stress in your lower back. Observing chairs have adjustable seats which allow you to be in a seated position when looking through an eyepiece rather than a standing and bent over position. The cost of an observing chair is about \$200. So this might be a purchase saved for later but don't be surprised if you find yourself looking to buy one soon after your first all-night observing session.

As for star charts, I would suggest that if you are a beginner, buy Terrence Dickinson's *NightWatch*. It sells for about \$40. It is a beginner's Canadian astronomy book with lots of tips and includes really easy to read star charts.

Once your knowledge with star charts increases, then buy the *Pocket Sky Atlas* but as a beginner, I used the star charts in *NightWatch* for probably six years before buying the Sky Atlas.

Where to buy? I would recommend Vancouver Telescope on Burrard Street near 10th Avenue or Canadian Telescope off Lougheed Highway in Burnaby. Both are great

stores with staff that are all astronomy enthusiasts.

But before buying anything, another tip is to consider investing in a RASC membership. Vancouver Centre offers a telescope loaner program with a variety of telescopes to borrow free of charge to members. You can try out a few different telescopes (Dobsonians and refractors) and see what fits for you. There is also the benefit of the numerous publications that come with a RASC membership such as the *SkyNews* astronomy magazine which also contains a monthly star chart.

Lastly, attend a public star party hosted by your RASC Vancouver Centre. It is a great way to meet other enthusiasts and ask questions. Astronomers love what they do and are always very happy to share their knowledge learned. You don't find many uppity astronomers! ★

Wishing you clear skies!

Suzanna Nagy

President

RASC Vancouver

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and I believe Doug and Gordon got some good shots of them. It cleared more by 1am, however the sky was quite soft again, and the Aurora intensified which increased the sky glow.

On Saturday, we attended the

annual meeting to address the business side of running a star party and made some tentative plans for next year. Door prizes were won by all in attendance.

Thanks go out to all the organizers of the MSQ and FVAS and RASC that put so much work into

making this event so much fun. No thanks go out to the fickle weather gods that toyed with us all week long. I'm so angry that I have already started making plans for next year, just to spite them.

Keep looking up! ★

Small, Faint, Round: Nonexistent NGC Objects

by Bill Burnyeat

A crowd has dispersed, wandering by twos and threes in darkness; some to cars, others to campers in a desert lot bordered by stunted rose bushes and a few pale birches clinging in thirst to the banks of a stream rushing by—the one thing in a hurry here. Over the retreating flow, as though inspecting the water's invisible destination, on a starry throne amid the Milky Way is bright orange Mars. The planet outshines and no doubt brags of this to its envious sky rival Antares, the Mars-coloured star. Its name is Anti-Ares, containing the Greek cognate for the Latin, "Mars."

An hour later and Mars has dipped into the west to keep an appointment with the creek in some magical geography where sky and horizon meet and hold council. In the mundane field, I'm turning the 10-inch reflector high up, hunting for other objects. One must stop to check the eyepiece field. Its ladder time, for this object is high up in Cygnus near Cepheus. On display? The large sparse open cluster NGC 6832. Very nice. I'll bet this doesn't "ring a bell," does it? It's one of 20 Cygnus objects, all one-time entries in the New General Catalogue (NGC), but not in good standing, and are dubbed: Non-existent.

On another evening I was mulling this over, after a talk given at the Green Point theatre, at Pacific Rim National Park. After the

talk, the audience adjourned to the parking lot where Mars and Saturn were on parade. After the viewers had gone back to camp, I took advantage of the courtesy campsite provided by the park, packed the scope into the truck and moved into the site. The campground is surrounded by windblown giants, gaunt trunks standing like huge creatures, many-armed demons like the side-kicks in a Godzilla movie. Here, the water motif is still apparent but now, not a desert brook but the Pacific Ocean. Water, lots of it, once more catches the planets who slip away from notice and plunge into the west.

I was sitting at the picnic table eating some of the lunch my wife had packed me when I noticed the snake charmer well-displayed through a gap in the trees. Since it was still clear, I took up binoculars and scanned the skies of the rich southern Milky Way. High up on the shoulder of the snake charmer sits a very large open cluster and it appeared as a round disk of light in my four-power field glasses, with a 1.25-inch object glass. The cluster is listed as IC 4665, meaning it was included in the Index Catalogue or supplement but missed out in the original NGC catalogue. This, even though a one-inch telescope can spot it. It seems the object's large size has made it unpalatable for inclusion into the earlier lists. As astronomy writer Jim Meketa writes, the precise mean-

ing of the word cluster is unclear (*Deep Sky*, Summer 1984, p12) and it is with this remark that we can put meaning back into the whole mess.

What, astronomically, is the meaning of an object, a cluster, and so on? It is true the Greeks recognized cloudy stars or nebula, and Ptolemy mentions the little cloud in the middle of the Crab, but although stars took positions, there is no interest in the nebula as a special realm and it is not distinct from stars in the catalogue.

Years ago observers used to hang around at the observatory of the H.R. MacMillan Planetarium and they would hang around and stargaze with the half-metre telescope. Often members of the public came in and too often they would ask if we were looking at a bright star such as Vega or Arcturus. We surprised many of the visitors by saying, well, we don't look at obvious bright stars but instead we look at things that can't be pointed out to the unaided eye. Not bright stars but "objects" are the subjects of investigation. But who decided what makes an object and what does not?

The notion of a catalogue containing the locations of stars is said to have originated with Hipparchus, the great classical astronomer. Watching a "nova" (or new star) ride low in the summer sky, this scholar wondered

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how another new star, but perhaps not so bright and obvious, might be told from the other stars in this rich area of the sky. He made a list of more than 700 stars which gave a permanent address to stars and was designed to make it clear if a newcomer had suddenly appeared.

The notion of an object, however, in the modern sense came only after the appearance of the telescope. The cloudy star in the Crab became a tiny collection of stars, and many, although not all, of the foggy places in the sky were found to consist of groups of star too faint or close together to be resolved with the human eye.

The designation of a place in the sky occupied by an “object” is not simply a judgement made after comparing a telescope view with the unaided eye, for how did it come about that the desire for a contrast existed? We don’t change the term for other objects brought nearer by the telescope, so why groups of stars? It seems the origin of an object was in an attempt to arrive at a classification system for deep-sky objects.

In a seeming backwards procedure, classification schemes came before the objects in the sky were carefully examined. This made sense of the observations, which without a pre-existing scheme would not have had a set of organizational principles in which to “appear” as meaningful.

The formation of “objects” is not a self-evident process—it

has a history. After all, we do not classify clouds which look like horses, or reflections in the water from the Moon. Certain things get classified and other things do not.

One of the first astronomical classifiers was Giovanni Hodierna (1597-1660). This little known observer (his name is omitted from the index of the *Norton History of Astronomy and Cosmology*) was court astronomer to the Duke of Montechiaro. This is a wine growing region roughly at the centre of a triangle with apexes defined by Turin, Genoa and Milan in the north of Italy.

Hodierna worked with a telescope of Galilean design which magnified 20 times. With this small glass he was able to view many objects and makes one reconsider the standard dismissal of the very modest scope.

In addition to spying on the cosmos, Hodierna classified what he saw based on the resolvability of the object. He made a list of 40 objects including clusters and some nebula.

Hodierna classified his objects according to what he thought they were resolvable into stars; he believed that all nebulous objects were actually networks of very subtle stars and that if larger and larger telescopes were employed all fuzzy nebula would be revealed as sets of stars.

This was the common idea at the time and right up to the 19th century. Lord Rosse, the builder of the giant six-foot di-

ameter scope was convinced he had resolved both the planetary M27, and the Orion Nebula itself. In fact, he seems to have been looking at very faint stars either closer or farther off than the Dumbbell and he assumed these faint stars constituted the nebula. Galilei had resolved the Milky Way, and e.g. the Praesepe cluster M44. The scheme was:

- *Luminosae*: Stars visible to the naked eye
- *Nebulosae*: Nebulous for the naked eye, but resolved to stars in a telescope
- *Occultae*: Unresolved nebulosity also in telescope

Hodierna’s observations include an independent rediscovery of the Andromeda galaxy, the Orion Nebula and at least nine other deep-sky objects.

Kenneth Glyn Jones notes M6, M8, M36, M37, M38, M41, M47 and several other objects were in the original Hodierna list.

The list of Hodierna

Luminosae

- Ha. I.1 Pleiades
- Ha. I.2 Hyades
- Ha. I.3 Coma Berenices cluster
- Ha. I.4 Alpha Persei Moving cluster
- Ha. I.5 M42
- Ha. I.6 Asterism including Lambda, Phi1 and Phi2 Orionis
- Ha. I.7 NGC 6231

Nebulosae

- Ha. II.1 M44 (Praesepe)
- Ha. II.2 M7
- Ha. II.3 NGC 869/884h and Chi Persei (the double cluster)

- Ha. II.4 M6
- Ha. II.5 Asterism of Nu1, Nu2 Sagittarius
- Ha. II.6 M8 (Lagoon Nebula)
- Ha. II.7 M36 Auriga open cluster
- Ha. II.7 M37
- Ha. II.7 M38
- Ha. II.8 Brocchi's cluster Collinder 399
- Ha. II.9 Asterism around 88 Herculis
- Ha. II.10 Asterism in front of the head of Capricornus

Occultae

- Ha. III.1 Asterism in Coma Berenicis
- Ha. III.2 Asterism in Coma Berenicis
- Ha. III.3 M31 Andromeda galaxy

The list of Charles Messier, a century later, was made to sort out objects that looked nebular and might be misidentified as comets. Messier was primarily interested in finding comets, since these solar system objects illustrated the mechanical motion and served to test Newtonian mechanics. The objects themselves, whatever they were, were just distractions.

The confidence grew that all nebulae in larger and larger telescopes would one by one reveal themselves to be clouds of very small and faint stars.

An illustration of a Lord Rosse drawing of M27 (the Dumbbell

Nebula) includes a sort of overlay of very faint stars, which the Lord believed might be a partial resolution of the nebula into stars. One night, on a very clear evening at Moyie Lake Provincial Park near Cranbrook, BC, I took advantage of very good seeing and turned the 25-inch mobile reflector to this object. It was intensely blue and I could see very faint stars all across the objects. Unlike Rosse, however, I understood that these stars are a mix of background and foreground stars and are not within the planetary nebula itself. Rosse couldn't have known this since, in the days before the spectrograph, the nature of the Dumb-



M27 (image by Gregg Winter)

bell was unclear; its distance was unknown, as was the range to any deep sky object.

While some were sceptical of the existence of true nebulae, others rushed in to make a pat-

tern of the multitude of resolved clusters. Herschel noted that clusters differed in the degree of condensation of the stars within. Some, like the Hyades, were a sprinkling of far-separated members while others, like the globular clusters, seemed richly packed with members in a closed sphere. This suggested a sort of evolution or sequence where stars start off as loose groups but under the influence of gravity they come together into tight arrays. The origin of this idea seems to derive from Newton's speculation on the universe. He envisioned an infinite series of stars and the proof was that, were the universe to contain limits, then all would

begin to fall into a centre and the universe collapse. The evolutionary state of the clusters seems to take off from this argument but applies it to individual objects, a nuance Newton did not make. This both explained clusters and hinted at the state of the universe as well.

Nebulae were left out.

Where do the missing NGC entries come in? It was the Herschels that uncovered thousands of objects, clusters, and nebulae

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that were not resolved, and many external galaxies that came to be called white nebula although how they differed from others was not at first known. In 1886, it was decided to merge the various Herschel lists and, adding the discoveries of others, make a new list that was to be called the “new” general catalogue. The responsibility for drawing up the catalogue fell to J. L. E. Dreyer, of the Armagh Observatory in Ireland. In 1888, the catalogue, containing an initial 7,840 objects, appeared in print. The objects were initially described by visual appearance, large or small, faint or bright, or by location (as, for example, preceding or following a bright star). Separate classes existed for ring type nebula as opposed to regular planetary nebula, though the two things are the same, and room was made for both globular and galactic clusters. Nebulae were noted as to size and brightness.

Wide Field Astroimaging Certificate

The national RASC office recently added three Astroimaging Certificates for wide field, solar system, and deep-sky imaging. The specific requirements for each certificate are on the astro-image-certificate page of their website. I recently applied for and received the RASC Astro-imager – Wide Field certificate. The wide field certificate is an introduction to many types of astronomical imaging. A wide field picture captures the view as it would look to

In 1973, a revision to the NGC catalogue appeared, spearheaded by Jack Sulentic and William Tifft. They endeavoured to locate each NGC object on the plates taken with the Palomar Survey 48-inch Schmitt camera, a scope John Dobson told me was the 200-inch’s finder scope. The photographic limit of the survey is far deeper than magnitude 20 and so many objects could not be located due to the huge number of stars on each plate. This is especially true in the Cygnus star fields, and this explains the “non-existent” objects like number 6832.

The modern group merges ring systems and regular clouds about stars under the simple heading of planetary nebula, while open and globular clusters are separated. Nebulae are acknowledged by brightness and the external galaxies are assigned to the rest that are non-stellar.

It’s comforting to suppose that our notion of objects is now



The Palomar Survey 48-inch survey telescope

soundly and finally determined and yet it is possible to envision other ways of ordering objects. The asterism, a subjective ordering of stars, has been retained and serves to remind us that all this is very much a system that has grown out of a historical pattern and is not that last word on the subject of subjects, the objects in the sky. ✱

by Ken Jackson

have EXIF data, set using ExifTool (<http://www.sno.phy.queensu.ca/~phil/exiftool/>), that describes the date, time, equipment, camera settings, and location. It was easy for me to turn the pictures from Google+ Photos into a log book for the wide field certificate application. My complete log book is available online [here](#) but to the right are a few of my favourites plus one bonus picture from the recent Perseid Meteor shower. ✱



Clockwise from upper-left: **Star Trails:** Oops! Set the camera to take a bunch of 2-min exposures but I forgot to turn on tracking on my equatorial mount. Ended up with a bunch of images with significant star trailing so I merged them to create this image. A smeared version of Cassiopeia is in the center of the field. The bluish haze in the background is likely a smeared Milky Way (Pitt Lake, Maple Ridge,

BC, Aug 11, 2015). **Milky Way:** A Milky Way mosaic created from 22 images during Merritt Star Quest 2015 (Loon Lake, BC, Sept 12, 2015). **Full Moon over Harrison Lake:** Taken with a Nikon D5100 at f/10 with 1/2 sec exposure, focal length 80mm and ISO 800 (Harrison Lake, BC, July 12th, 2014). **Three Perseid Meteors in Auriga:** I pointed the camera in the general direction of Perseus but low enough to take in some of the horizon, then set it up to take sixty 10-sec frames. Three of the frames recorded meteors so I stacked them using Deep-Sky Stacker using the Maximum stacking mode (Pitt Lake, BC, Aug 11, 2016).



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