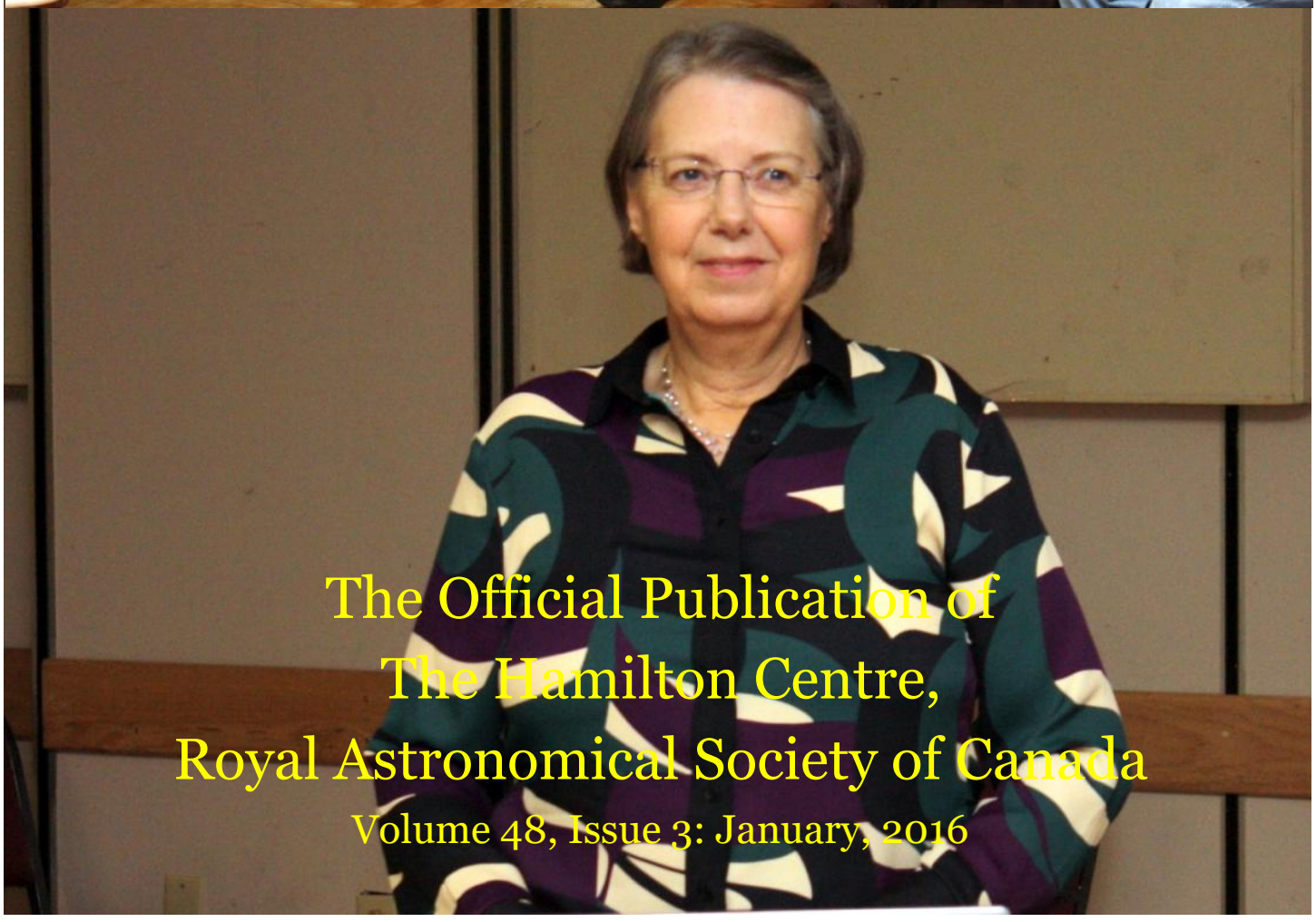
Orbit



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Issue Number 3, January, 2016
Roger Hill, Editor

I hope this new year finds you happy, healthy and looking forward to a great year in astronomy.

The dawning of 2016 finds the Centre with a board of directors brimming with confidence, ideas, plans and with a plan for the next few years that is almost breathtaking.

I've frequently said that a Board of the Hamilton Centre is capable of generating more ideas per minute of a Board meeting, than almost any group I've come across. The current group is no exception in this regard. Where it is exceptional is the ability to actually implement these ideas.

For instance, our new webmaster, John Devonshire, will have implanted a newly designed website at about the same time as our January meeting.

The new forums will be unveiled the same evening, and for those that can't make it, you'll get an email stating how to access them.

Thanks to Muhammad Ahmad, our first Observing Night, was in December, and the next one is planned for the night after the January meeting.

The January Armchair astronomy will have happened already by the time you read this.

The plans for AstroCATS 2016 and the accompanying Canadian Astro Photography School are well advanced. Similarly, the Westfield Night on May 13 promises to be a great evening with a 1st quarter moon, Mars (near opposition), Jupiter and Saturn all visible.

Actually, May could be a fantastic month for those who are interested in planetary astronomy, since there will be a transit of Mercury on May 9th.

So, astronomy-wise, it's looking like a good year coming up, and there's lots of activity in the Centre.

I just hope that the evenings of almost unrelenting cloud of the last couple of months will soon be over. Frankly I've been going a little crazy about being unable to take my telescope out, or heading off to the Observatory to do some observing or astrophotography. Last year I managed to accumulate a couple of hours of data from the Rosette Nebula using an old Pentax 300mm f/4, an Hα filter and my modified Canon T1i. And produced an image I'm very happy with (see the front cover of Orbit for October, 2015). I'd now like to do the same thing with the Horsehead.

On a personal level, I'm heading off down to Chile again, to spend some time with Les and Paola Nagy. The exact dates depend on my work schedule, but I'm really looking forward to some time at altitude. One of the things Les and I have talked about was going back to look down on ALMA now it's completed. We'll also be driving some 1200 km down to La Serena on the Pacific coast, so I'll get to see more of the Chilean landscape than the mighty Atacama Desert. Perhaps I'll take my snorkelling gear with me this time. The ocean temperature should be about 18º, so the water will be cold, but not breathtakingly so. Perhaps I'll spot some of the local Humboldt penguins.

Clear skies and happy observing!

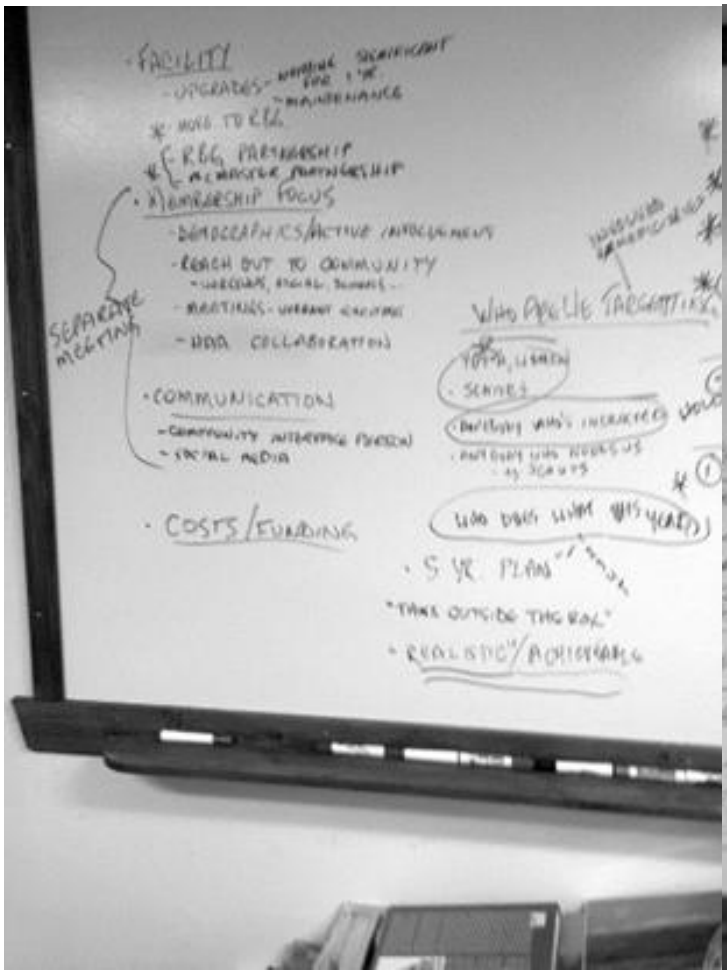
A message from the President by Gary Bennett

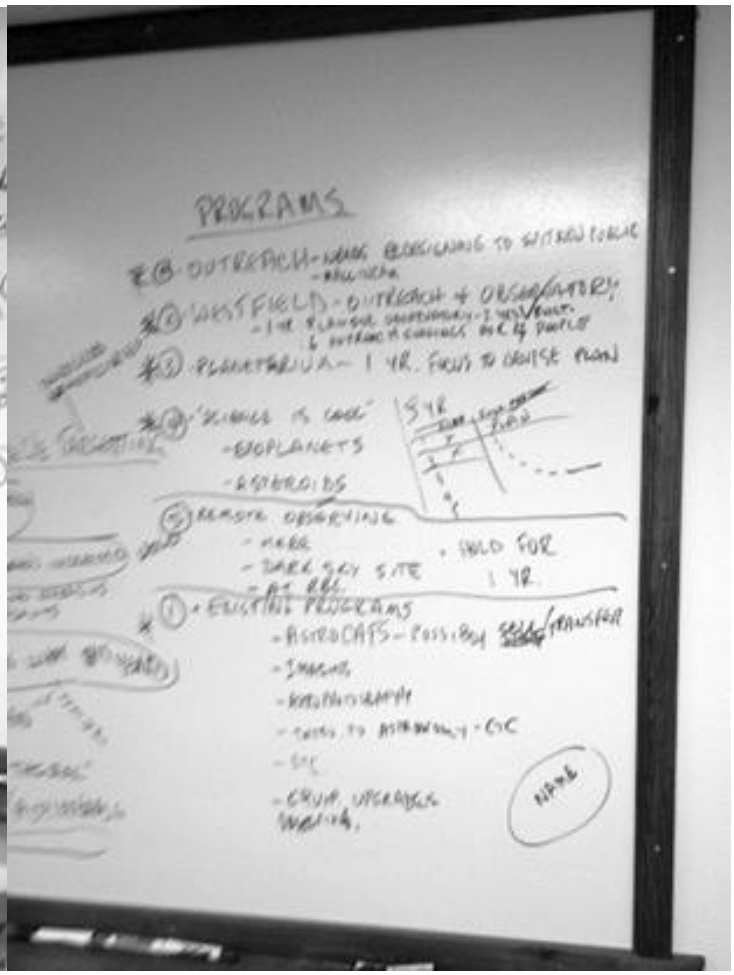
Happy New Year! And what a great year it's going to be!
Andy Blanchard and John Devonshire have been burning the midnight oil and AstroCATS 2016 is now ready to present to the world. This year, 2 very exciting additions are going to make this the best event ever. For one, AstroCATS is being held in conjunction with the RASC General Assembly AND on the 2 days before the Trade Show, we now have an Imaging Conference. I will let Andy tell you all about that, but suffice it to say, we will raise a significant amount of revenue that will be the launching pad for some major new initiatives.
This is the year that our club is taking a new path into the future. It will mark the beginning of a journey that will take our club to a whole new level.
Some of you already know that on December 6, the Board of Directors met to formulate a 5-year strategic plan. The guiding question was … what activities will fulfill our published mandate as "a learned society" for the benefit of our membership and public outreach.
We hope you will all be able to attend our next meeting on Thursday Jan. 7 to learn more about the outcome of this important meeting. As a teaser, here are some photos that demonstrate the formulation of the strategic plan:
It will take some time and sweat equity to fully implement the strategic plan, but some of the highlights include:

- A much improved location for our monthly meetings
- Facilities upgrades at our observatory property
- We will be engaged in doing real science!
- We'll have a hand in making astronomy the coolest hobby of all time!
- We will introduce thousands of people to the wonders of the universe by giving them their 1st look through a telescope.

We know that you will all want to be part of the journey ahead.

Gary Bennett



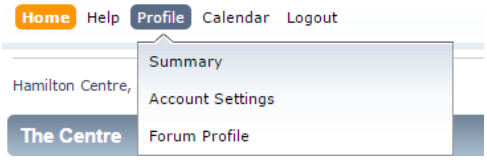


Forums—What you need to know

Okay...I know...perhaps I'm overly excited about the arrival of the our Forum. We've tried this twice before, but hopefully this time we'll have done enough prep work to make it work.

So, head over to http://hamiltonrasc.ca/forum/index.php , where you'll be asked for a username and password. The username is your firstname.lastname that we have on our member list that we get from National office. The passwords are all ready to go, too, and you'll find out what yours is when you either attend the January meeting, or get an email afterwards.

The first thing you should do is to change your password. So hover your mouse pointer over Profile and select Account Settings. Change your password, and click Change Profile.



Next, do the same thing and select Forum Profile, and fill in anything you choose. If you choose to have a picture associated with your name, you can upload an avatar. Please try to keep them no larger that 100x100 pixels. There's all sorts of things to play with in there, feel free to check them out.

Click on Home, and if you're a member of the Centre, you'll see several large sections. The first is labelled as The Centre, and it contains Announcements, Introductions, Meetings and Events. Check them out to see what's in there. Things in here are visible to members and guests.

Next is a section called For Members Only, and here you'll find items of interest to members of the Centre. Mostly it'll be for discussion of events, programs, and items of use to our members.

The next to main areas are open to members and a group that we call Friends of the Centre. These are people who are interested in Astronomy, but don't want to join the Centre for any reason, or none. People in this group do have verified usernames and email addresses. All people whose membership has lapsed and the 3 month grace period has ended will have their status changed from Member of the Centre to Friend of the Centre. Anyway, here is where I suspect you'll find the most action. You'll find topics such as Welcome to Amateur Astronomy, where you can ask, answer, or discuss some of the basics of astronomy.

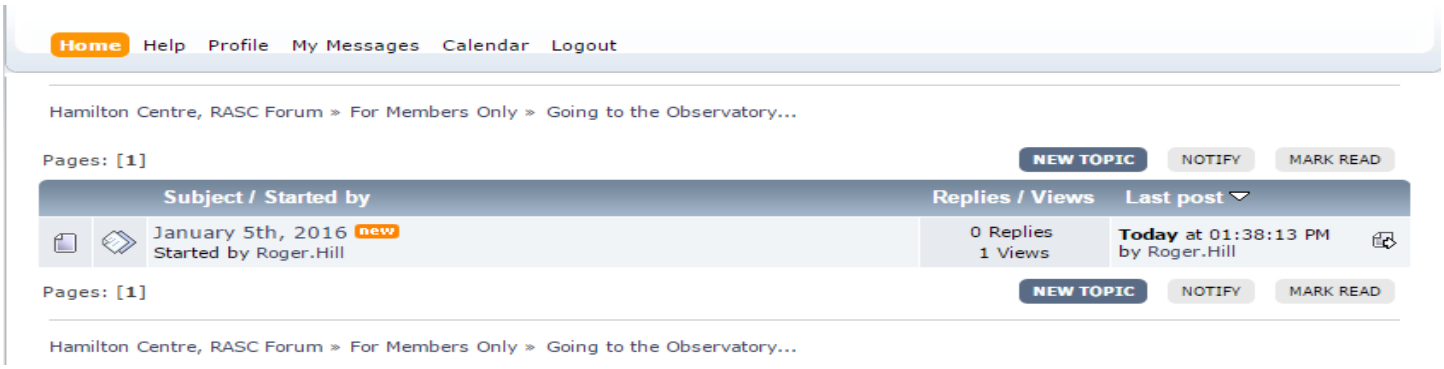
Next up is the General category, where you'll find two areas. The first is called Science and is for anything in the world of Science and Technology that is not astronomy or space related. Archaeology, climate change, particle physics, etc., for instance. The Not Science is for anything not covered by any of the previous topics. How the Leafs are doing, your current job situation, what you're listening to these days, television thoughts, movies, non RASC politics...that sort of thing.

Finally comes the Info Centre, which contains a list of the 10 most recent postings, some forum statistics, and who is currently on-line.

You can use the forums to contact other members, too...it's called Personal Messaging and allows contact between people on the board...for instance if someone has a piece of equipment for sale and the buyer and seller want to meet, they can PM (Personal Message) each other to arrange time and place.

And then there's the Calendar. You'll have seen it by now...it's on the back page of Orbit! I've tried to put any and all current and future events in, including the phases of the Moon, transits, occultations, Centre events. You should be able to find date, time, location, topic and contact information for all events in here.

So...how do you find out if there has been something interesting posted to the Forum? For instance, perhaps you'd like to be informed when someone is headed out to the Observatory. First, click on Home, go into the Members Only section, and select the Going to the Observatory topic, and click on Notify. You'll now be notified by email whenever there's a new entry or replay to anything in the "Going to the Observatory…" section. I'd strongly suggest going into each of the area's you're allowed into (currently 23 for Members of the Board, 18 for Members of the Centre, and 11 for Friends of the Centre) and select Notify. If the amount of traffic gets too much, then select Unnotify.



There are some general rules we'd like you to follow. The first of which is to be civil. The second is to try to post a new topic into the relevant section. For instance, don't put a new astrophotograph that you'd appreciate comments on into the "In the Media" section, for instance. Personal attacks will not be tolerated, for instance. There's a full set of rules on the forum itself...it's the topmost entry in the Announce section. I copied it from another list I'm on, and while I think I did a good job of modifying it for our use, if you wonder why you have to be nice to the supporters of a different football club, you now know.

There is a limit of 512kb for an attachment, a maximum of 1024K per post, and a maximum of 4 attachments. If you have a large image you'd like to share, please create a smaller one (say to 1920x1080), compress it to say 50% and then attach it. Then, include a link to where the full 15 meg file can be seen.

I could go on, but I think that will do for now. There will be some teething problems. There will be people who really don't like the idea of having to go to a web site when all they'd ever needed before was to open up their email. All I can say to them is to ask them to bear with us. There is a possible solution on the way but I'm not sure how practical it is. I may ask for a couple of volunteers to test it out. Apparently it gives the forum the same sort of functionality as you get from Google Groups but it will take a bit of work to get it all set up.

Please send any issues you may have to orbit@hamiltonrasc.ca, or PM me at Roger.Hill !

Program Directors Report by Andy Blanchard

My big news is that the Canadian Astro Imagining School (CAPS) is off and running with students already starting to enrol. We need 17 students to break even, so we are confident that this new initiative will be very successful. Especially in light of our instructors. Chris Go / Ken Crawford / Warren Keller / Ron Brecher / Richard Wright. You can go to www.astrocats.ca and check out each instructors syllabus. The cost of the school is $350 for two days of instruction. Five referrals gets you free admission.

AstroCats is also off and running with Vendors already booking booths. This year AstroCats is in London during the RASC General Assembly, a gathering of RASC members from across the country. With CAPS the GA, and also AstroCats, we anticipate a wonderful weekend of astronomy and speakers. The GA Keynote speaker this year is Bill Nye the science guy, with many interactive displays, like the Mars Rover, and the Dresdon Meteor.

If you want to take part in what will likely be a pivotal event in Hamilton Centre's future please see me this week at our general meeting.

Don't forget to come out to Arm Chair Astronomy on Monday night and observing night on Friday. Also we will have a guest speaker for Astrophotography night the last Thursday on January the 28th. If in doubt check the forum's calendar.

Even if you thought that was enough, we have a really big announcement on Thursday that will make all of the above look like a flee fart. So if you're not busy I strongly recommend you attend Thursday night, to see and hear our five year plan.

Observatory Nights—Muhammad Ahmad

On December 11th, we held our first visual observation night at the club's Observatory. The night started clear at 7 PM, as curious members trickled in to have a look through the 16" Ritchey–Chrétien reflector and Dobsonian telescopes. Objects of interest included globular clusters, such as M15, and the planets Uranus and Neptune. These were first time sights for some members!

The chilly (5°C) but enjoyable evening was cut short at 8 PM by cloud cover. However, with eight of us it was a great turn out. Our next observation night is on Friday, January 8th at 7 PM at the Observatory.

You're welcome to bring your own telescope, binoculars, or try out the club's equipment. If you just bought your first telescope, we can help you get started. Remember to dress as if it's 10 degrees colder than it actually is! If the sky is not clear that night, watch for an e-mail postponing the event.

Upper photo::
Ed demonstrating a Dobsonian telescope to Julian and Rosie.

Lower picture:
Front: Doug Smith, Dino DiSabatino, Ed Mizzi, Ron Prokop
Back: Rosie Kenig, Jeff Booth, Julian Portelli, Muhammad Ahmad

A Novice images Saturn by Jeff Booth

It's not true, you know. The planets aren't necessarily "out there" . millions of kilometres away. Beyond your reach. They can be as close as . well, right outside your door. It was with just this frame of reference that one novice recently attempted to photograph the sixth planet from the Sun.

Why Saturn? Well, because said novice had just been out under the evening sky testing a fresh-out-of-the-box digital camera by taking general photos of the heavens. Things went well.

At that same time, Saturn was in the same evening sky and visible for about an hour or so. It must have been teasing me, ya know. The planet was low, though, just over 20 degrees above the horizon.

The attempt to get an image of this far-off neighbour was also seen as being a crucible of experience where one could learn more about our telescope and about astrophotography, among other things. Getting any kind of recognizable photo of the second-largest planet in our solar system would be a bonus. While multiple attempts were made, over a period of three or four weeks, it was evident - and this is worth emphasizing - that each attempt was easier than the previous one, and each attempt showed what needed to be improved, and each attempt showed what else needed to be learned about the equipment that was being used. Best of all - each attempt produced better results than before. First efforts used a digital camera, later attempts a CCD camera, both attached to a telescope.

Attempt No. 1 took place in Binbrook, where the skies are noticeably darker than here in light-polluted Oakville. Had the digital camera mounted to the rear of a telescope. Easily found Saturn. But found out that focusing the camera on what was a tiny dot of light was rather difficult . so multiple attempts, each with different focus and different exposures. Each photo was taken by physically pressing the shutter release, which also produced noticeable "camera shake" in the photo. Could not do a polar alignment, so used a digital compass to point the mount to the magnetic North (wrong, but more on this later).

Pretty well every image ranged from a smudge of light to a different smudge of light. Arguably, a total failure. (See figure 1)

However, also equally arguable, good lessons successfully learned; get a remote shutter release to eliminate camera shake, find out if there a better way (for me, anyway) to photograph a planet than with a digital camera. Also a success that evening: My wife and I did get to see Saturn and its rings through several eyepieces. The planet and rings were bright and whitish-grey. (Growth point: Next time, use some eyepiece filters to bring out detail on the planet). Bonus this evening was meeting several other enthusiasts who had gone to the same location to photograph deep sky features later that night.

Since Saturn had appeared just as bright from our backyard as it appeared in Binbrook, it was agreed Attempt No. 2 would be from the ol' homestead, from right beside the tomato plants. Would love to actually do a polar alignment here, but Polaris is blocked by the house, so kept on pointing to the magnetic North (wrong again, more on this later).

This produced a better image; at least we had something that was recognizable, albeit kinda small. Made good use of our new remote camera release, too (no more camera shake). (See figure 3)

Lessons learned: next time, try that entry-level CCD camera (Neximage5) instead of a digital camera to get a larger image, have a can of bug spray (mucho important in late summer!) Third and fourth outings, again out by the tomato plants and this time -- mercifully -- with a can of "Off" at the ready. Test drive with the new entry-level CCD camera. A family of raccoons seemed interested - but only for a moment.

Using a CCD camera is waaay different. It requires a whole new set of image-specific skills such as: how to find a planet when the field of view is vanishingly small when compared to a normal camera; how to focus using this technology; getting familiar with the computer software that is used to capture the image into a computer; then getting familiar with the software that is used to process the images that are captured by the CCD camera's video feed. All new directions of learning. Head only hurt a bit. Big take-aways from 3rd and 4th outings: Study how the capture and processing software work and can be used; do a better job of aligning the telescope because with the CCD camera's small field of view it becomes more critical to be properly aligned.

Final sojourn to the edge of the veggie garden was in mid-September. This time the telescope would not be aligned with the magnetic north - as in all earlier attempts -- but aligned in such a way as to compensate for the variance that magnetic North has from true north for my location (about 10 degrees magnetic declination, according to all-knowing Google).

This was the last newbie attempt, as Saturn was getting just too low on the Western horizon for much time to do anything with it. However, Attempt #5 was also the effort that resulted in the best image yet, as it was also the attempt that brought the most-lessons-learned to the moment. I am blown away by the fact that in that image you can see the shadow of the planet on the rings behind it and perhaps the shadow of the rings on the front of the planet. Ditto for some detail on the rings themselves. Lessons learned here: how to use the CCD camera's image capture software (iCap) with greater facility; better alignment of the telescope tracking (the planet does not rush out of the field of view but actually stays put (how novel!), better facility with the image processing software (Registax and PhotoShop), there are fewer biting bugs in mid-September.

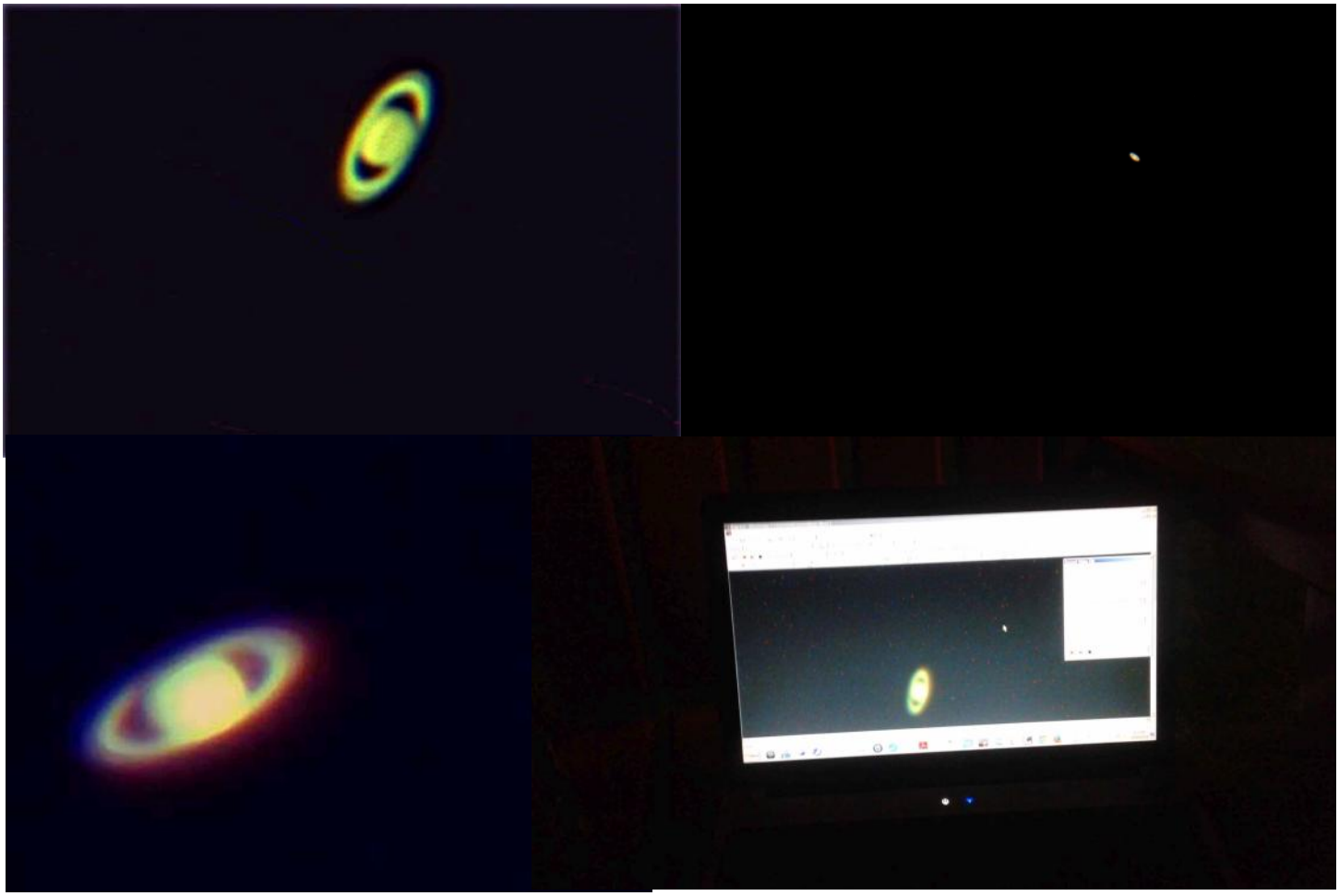
A few weeks after this, the I-wanna-take-a-picture-of-Saturn newbie dropped into a couple RASC Hamilton Centre meetings as a guest, liked what he saw . and signed up.

Have since figured out how to get a larger image of Saturn. Now . Gotta find out when that ringed beauty will next be high in the sky . can't wait!

Figure 1, below: An image of Saturn from the digital camera.

Figure 2, right: The setup with the ‘scope and Neximage CCD.

Figures 3 to 6, clockwise from top right:
3: Small, but sharp image of Saturn.; 4 picture of the laptop screen.; 5, Saturn with the Neximage camera; 6: best image so far.



Christmas Nights at Westfield by Mark Pickett

On December 5th, I went to Westfield to set up the antique telescope for Christmas Nights. My sister, Jan, went with me, although she didn't know any astronomy, but could help in other ways. It was good, with 150-200 people looking though the telescope until about 8:30, when it clouded over.

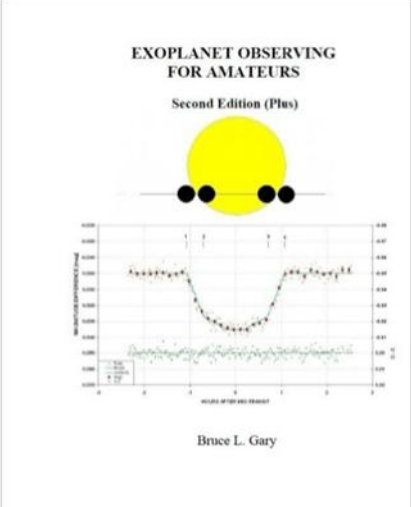
On December 12th, we had perhaps four or five people that were going to help, but it was cloudy that night. On December 19th, I was alone again, but it was cloudy for the final time.

In summary, one night was good but only one astronomer was there. The other nights were cloudy, one with a lot of people to help, and one with only one astronomer on call. This is not very good - Westfield is fun!

Editors note:
Mark is correct...Westfield can be a lot of fun. There are few things in this hobby that are better than seeing the light go on when people see Saturn for the first time, or craters on the Moon. We'll be doing a program in May when there'll be 3 planets in the evening sky and the First Quarter Moon in the sky. We'll needs lots of help that night with so much to see.
RH

Librarian's Report for January 2016 by Chris Talpas

It is only recently, since the early 1990's, that the existence of exoplanets [planets around other stars] was confirmed. The first observation of an exoplanet by measuring the dimming of a star as the planet transits the disk was achieved in 1999 for planet HD 209458 b [the planet had been previously discovered via radial velocity measurements]. Shortly thereafter in 2002, OGLE TR-56b was discovered directly by the transit method. As early as 2000, Finish amateur Arto Oksanen had captured the transit of HD 209458 b and 5 of the 45 brightest transiting exoplanets have been discovered by the XO Project which includes a team of amateurs. Observing the transits of exoplanets, while technically challenging, is certainly within the reach of amateur astronomers and this month's book provides probably the most comprehensive treatment of the subject available.



At 258 pages [20.3 x 25.4 x 1.5 cm], and written by former professional radio astronomer and now amateur astronomer Bruce Gary who has been capturing transits since 2002. Published in 2014, it provides an invaluable information source for the amateur who wishes to pursue this exciting new field. The sound advice and techniques described within this volume are equally applicable to precision photometry of variable stars. It is based on many years of the author's floundering and learning as he says 'it can save you from lots of time with trial and error'.

As one Amazon reviewer stated " For any amateur who is interested in exoplanet photometry or even high-precision photometry of variable stars, this is an essential book. Examples galore, well written and easy to follow."

It is available from Amazon.ca for $46.10; just recently, after ordering the book, this same edition of the book became available as a free pdf download from: http://brucegary.net/book_EOA/ExoplanetObservingAmateurs2ndEdition.zip

The book is divided into 24 chapters and 10 appendices and begins with a brief introduction to the subject in the first chapter entitled "Could I Do That?" in which the author lays out his background, the minimum requirements- an 11 to 14 inch scope [an 8 inch can capture brighter transiting exoplanets] equatorially mounted and a monochrome 16 bit CCD camera, and what sort of previous experience could be valuable- variable star observation. He then provides a tour of his two dome observatory housing 11 and 14 inch telescopes and their ancillary equipment in the second chapter.
Chapter 3 covers the types of exoplanet search activity that the amateur might pursue while chapter 4 lists 45 bright transiting exoplanets and explains a number of spreadsheets to aid in observation available on the author's website. The Czech site http://var2.astro.cz/ETD/ currently lists 242 transiting exoplanets and includes tools to search for transits based on observer location. Chapter 5 lays out what steps one should consider for an observing/data capture session.

The technical meat of the book begins in chapter 6 which dives into the subtleties of the atmosphere covering dust scattering vs. altitude, Rayleigh scattering and total atmospheric extinction as a function of wavelength while chapter 7 covers a variety of filters that can diminish these effects.

Topics familiar to astrophotographers such as flat fields, dark frames, exposure, focus drift, and autoguiding are covered in chapters 8 to 12. The major difference being that with astrophotography we are interested in pretty pictures, here we require precise calibrated data. Chapters 13 through 18 go into significant detail around photometry and data processing using spreadsheets developed by the author.

The importance of star colours are discussed in chapter 19 which goes into detail discussing how redder stars suffer less extinction than bluer stars and the challenges of using reference stars of a different colour than the transit star. Stochastic (random) noise which includes Poisson noise, scintillation noise, aperture pixel noise, and seeing noise are covered in chapter 20.

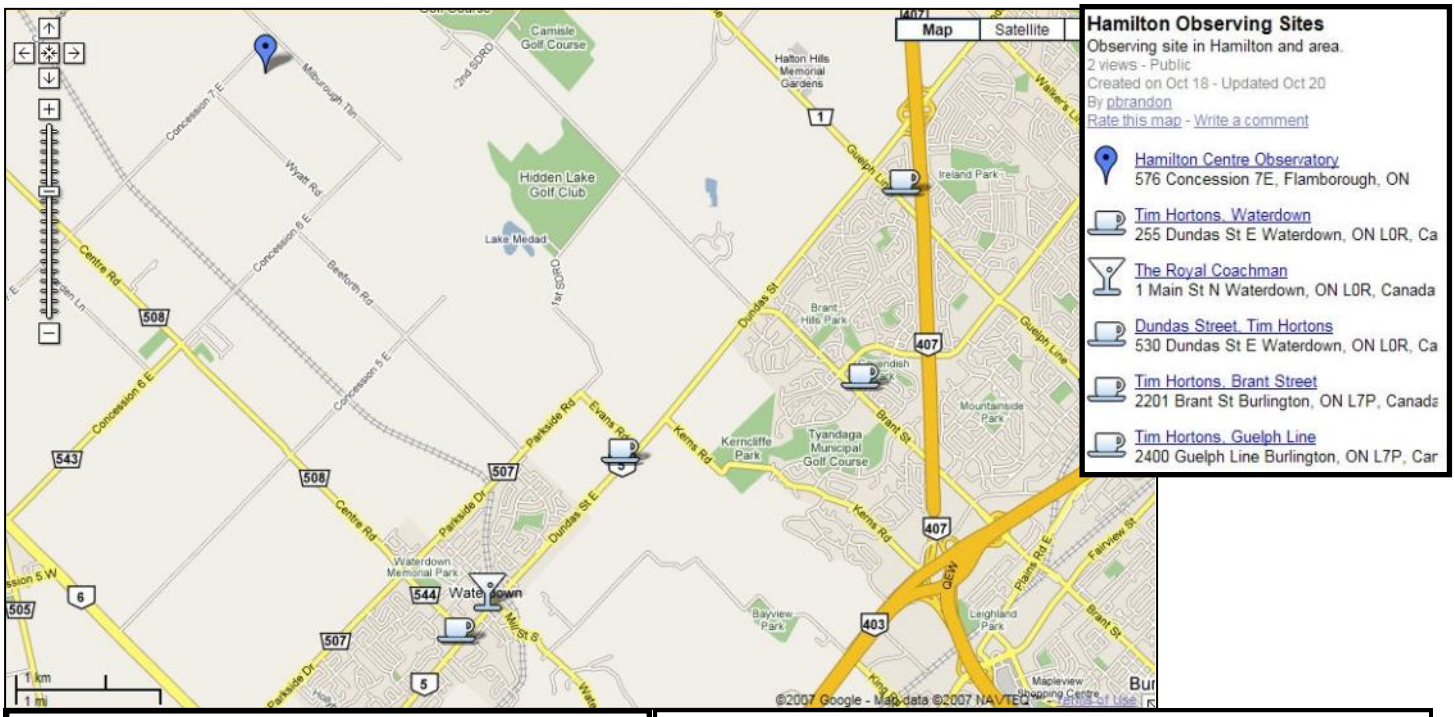
The major differences between variable star observing and exoplanet observation are explained in chapter 21 while chapter 22 covers data anomalies including transit timing anomalies indicative of undiscovered exoplanets within that particular star system, rings and moons of the transiting planet, star spots and out of transit observations. Chapters 23 and 24 finish up with what the author believes an optimum observatory would have and shares his joy of exoplanet observing.

The remainder of the book is a series of appendices going over a number of the topics in additional technical detail. The book finishes up with a list of abbreviations, a fine glossary, sources of equipment and software, references and finally an index.
As one can see, this is a fairly technical book but it does provide a solid foundation for the experienced amateur to pursue real science and be on the cutting edge of discovery. A recent paper " Benchmarking the power of amateur observatories for TTV exoplanets detection" was published in the July 2015 Monthly notices of the Royal Astronomical Society [UK] and about half of the light curves analyzed were contributed by amateurs.

What you missed last month… words by Roger Hill, pictures by Ed Mizzi

Did you miss the December meeting? Me too. However, by all accounts, Cathy McWatters delivered a spectacular evening, again! Anyway, to give you an idea of what happened, check out the front cover, and other pictures below.

You should come out to a meeting...you never know what you'll learn!



Observatory:
576 Concession 7 East, Flamborough ON
N43° 23’ 27” W79° 55’ 20”

Mailing Address:
Hamilton Centre, RASC
P.O. Box 969 Waterdown,

President	Gary Bennett
Vice President	David Surette
Secretary	Chris Talpas
Treasurer	Bill Leggitt
Observatory Director	Gary Colwell
Orbit Editor	Roger Hill
Outreach	Mark Pickett
Programs Director	Andrew Blanchard
Special Projects	Bob Prociuk
Webmaster	John Devonshire

The planets this month:

Mercury: Very low in evening twilight at the beginning of the month, and everging very low in the ESE in the morning sky at the end.

Venus: Very low in the SE morning sky.

Mars: Rises in the ESE around 2am.

Jupiter: Rises after 10pm in the E, transits high in S near 4am.

Saturn: Very low in the SE morning twilight.

Young crescent Moon on the 11th.

Moon occults Aldebaran on the 19th.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1 Last Quarter Events: New Years Levee at Andy Blanchards	2
3 - Week 1	4	5	6	7 Events: 8pm - General Meeting at the Waterdown Legion	8 Events: 8pm - Visual Observation Night	9 New Moon
10 - Week 2	11 Events: 8pm - Armchair Astronomy	12	13	14 Events: 8pm - Board meeting	15	16 First Quarter
17 - Week 3	18	19	20	21	22	23 Full Moon
24 - Week 4	25	26	27	28 Events: 8pm - Astrophotography at the Observatory	29	30
31 - Week 5 Last Quarter						