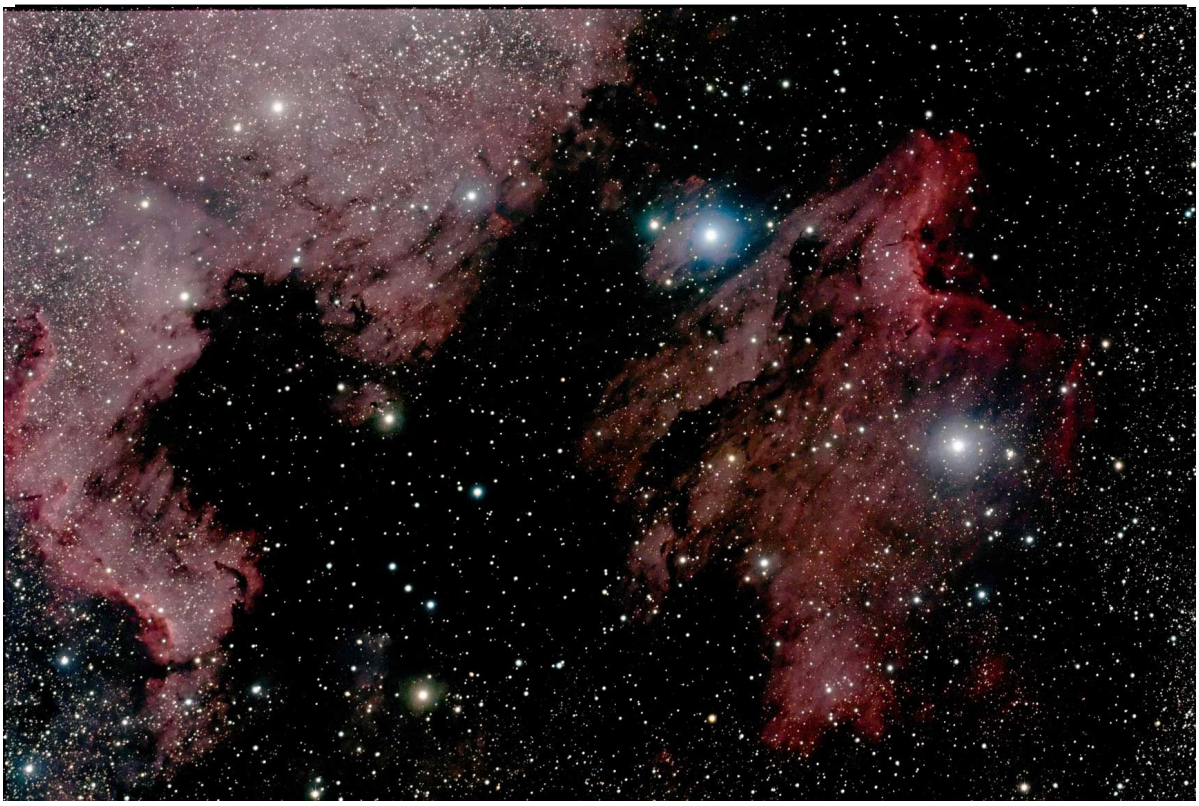

Orbit

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Volume 43, Issue 7: May, 2011

Issue Number 7, May, 2011
Roger Hill, Editor

When I said last year that with a larger Board, that we were really looking forward to achieving some things, I really meant it. We've found a new meeting room, revamped out meetings, the 17.5" is operational, the autofocuser is working on the 16", the astrophotography group is up and running, we've set up a Yahoo! Group to allow picture and file storage and the website is being re-vamped. It's been a busy time.

Firstly, for me it's been busy, too. The high winds we suffered in April finally took their toll on the nice high fence that existed between my neighbour and me. It's a shame, as that fence blocked off a few streetlights. When discussing what sort of fence to put back up, my first consideration was height! His kids were also curious about the odd structure in my backyard, so they'll be dropping by to have a look at the Moon and Saturn one evening soon!

The other thing I've been up to has been trying to come up with a way of mounting my new 6" Ritchey-Chretien on to my 12" SCT. I'd seen a video by a couple of guys I was familiar with on how to make an aluminum dovetail with wood tools—http://www.youtube.com/watch?v=ZABNA1EfnSE , and as with so many things, I like to do things for less money than I have. So, since I have a bit more time than money, I set off to make something myself.

I thought it would be better if I used something with a bit more strength that 1/4" plate, particularly since I was going to have to span some 18" of length atop my telescope. So I went to the Metal Supermarket in Oakville and asked for a 4" piece of aluminum plate 24" long and 1/2" thick. They has a 6" wide piece for the same price, so I took that instead. This was good, because I hadn't figured out quite how to attach the aluminum to the top of my scope, and the extra width allowed me to use the extra aluminum to make some mounting blocks.

A couple of quick tests indicated that my hobby type 9" bandsaw would cut aluminum and away I went. It was slow, but successful. The next part had to wait until I got my drill press back from Gary Colwell, who'd been using it to build the 17.5" Dob.

It took a while to build as I was going purely by trial and error, which meant a steadily growing pile of scrap lumber as I tried various things first on wood. But finally I had some radius blocks and a slab of aluminum on top of my scope.

The 6" R-C has a Vixen dovetail on the bottom, so next I had to try to make something that would allow me to clamp it to the aluminum plate. I had an extra 15" long piece of Vixen style dovetail, so I chopped it in half, and then took an 1.5" off each them to make a couple of extra dovetails to mount a ball and socket tripod on one and a support for a 300mm telephoto lens. The good thing about this is that these will also make them fit on my Meade modified EQ4 mount.

Well, I tried various options, but the all seemed unnecessarily complicated and truth be told, I still don't have a finished solution. I do have an idea, though. I bought a dovetail plate clamp from K-W Optics that included a 3" wide bar of 1/2" thick aluminum about a foot long along with a pair of 100mm Parallax rings. What I didn't ask when I bought it was what type of dovetail was it? Vixen or Losmandy D? Turns out it was neither. However, turning it over in my hands just a couple of minutes ago, and thinking of my newly found experience with drilling and tapping aluminum, and I think I've got an idea...If I can find the time this week to get it finished, I'll bring it out on Saturday night at the Observatory.

The problem this week is that I've got Orbit to finish, a Monthly meeting to run and the last night of the Burlington Seminars to give. In between, one of my favourite authors is giving a reading from his latest book. Neither my daughter (who has now completed her degree at WLU!) nor I want to miss a chance to have a chat with Robert J. Sawyer, so that's Tuesday night gone. Wednesday sees me at a Toronto FC soccer game . I may not get to realize my idea!

The Burlington Seminars are going well, and I'm having a blast! So, apparently, is Andy Blanchard, who filled in for me on the third of the series when I had to work that Friday night. We've already scheduled the next set of four to run in the Fall. This time, we'll be running them for four consecutive Friday evenings after Thanksgiving. This avoids a conflict with Discovery Landing, which is currently booked for the two Fridays prior to Thanksgiving. The good thing about this is that my schedule does not have me working any of those Friday nights, so I'll be able to do all four. This is good, because I've been dying to do a demonstration with paper tape to illustrate how empty the Solar System is. Or at least a better one than what I currently use.

As a result of some chat on the email list last month, we'd like to try to have the "Pre Summer Telescope Smackdown" on Saturday, May 7th. There's some pretty high end scopes in the area, and the idea of getting a good Apo, a Mak Newt, a honking big Obsession and the Centres 16" in a face-off sounded like a good idea. I'm not sure if we've given the people with telescopes enough time to make it out, but it'd be nice if they could try. If the weather is not good, then we'll try again in the Fall not...look for this one late summer or early Fall evening. We'd like as many telescopes as possible to take part, so bring out your Newtonians (Dobs and equatorials), SCT's, Refractors, Maksutovs, Mak-Newts, Ritchey Chretiens, tri-Schiefspieglers or what have you.. We'll be inviting out the Burlington Seminar people, as well, and hopefully any of them that would like help with their telescopes will be able to find it and for those without one will get a chance to have a look at all kinds of 'scopes. With some luck, we'll have a clear, steady night. Could be a LOT of fun. Well, at least as amateur astronomers describe fun, anyway!

I'd talk about the new focuser on the 16", but Gary Bennett has promised me an article on it before the day is out.

Gary B. has been a busy guy. Not only has he done a great job with the 16", but he's been revamping the web site. At the Board meeting in April, we got a chance to have a preview, and it looks waaay cool! The trick is to port everything over to the new one while having the least disruption to service. Keep your fingers crossed. We'll let you know when it's done. In the meantime, it's a good idea to visit every now and then anyway.

The other initiative is that we're moving the chat list over to a Yahoo! Group. The reason for this was simple. We had a look at some of the more active centres across Canada, and many of them used Yahoo! Groups. The reasons are many, but some of the biggest are:

1) Files and Photos can be uploaded and downloaded by members, giving us a more secure place to put them.
2) A digest of daily email can be sent, rather than individual emails. So if you're wondering about clogging your email with dozens of messages, you can avoid this by getting an (at most) email a day.
3) Calendar Facility—automatic notification of upcoming events and meetings.
4) There's a web interface, so if you're not at home, or don't have email at home, you can access everything you need from virtually any internet enabled device...like your SmartPhone, at work or on vacation.
5) There's even a live chat session with the new Beta version.

So, head off over to http://tech.groups.yahoo.com/group/raschamilton/, and sign up. It's members only, and we'll cull the list twice a year. We'll also be putting the latest copy of Orbit there, and (probably) starting in September or October, the public web site will be two issues behind what you'll find in the Group.

One other thing I have to say is a huge **THANKS!** To Ed Mizzi. We had a greeting table set up at the last meeting which instantly became THE place to go and have a chat...could have been because of the Timmies we provided (thanks to all who contributed to the donations jar!), but I'm not sure that Hamilton Centre members are quite so easily bribed. Then again, I could be wrong. I've been wrong before, I'll be wrong again!

So...that's all for this month,

Clear skies, one and all,

Roger Hill

A solar physicist walks into a bar and says to the bartender, "I'd prefer a cold Corona."

Cosmic Recount by Dr. Tony Phillips

News flash: The Census Bureau has found a way to save time and money. Just count the biggest people. For every NBA star like Shaquille O'Neal or Yao Ming, there are about a million ordinary citizens far below the rim. So count the Shaqs, multiply by a million, and the census is done.

Could the Bureau really get away with a scheme like that? Not likely. Yet this is just what astronomers have been doing for decades.

Astronomers are census-takers, too. They often have to estimate the number and type of stars in a distant galaxy. The problem is, when you look into the distant reaches of the cosmos, the only stars you can see are the biggest and brightest. There's no alternative. To figure out the total population, you count the super massive Shaqs and multiply by some correction factor to estimate the number of little guys.

The correction factor astronomers use comes from a function called the "IMF"—short for "initial mass function." The initial mass function tells us the relative number of stars of different masses. For example, for every 20-solar-mass giant born in an interstellar cloud, there ought to be about 100 ordinary sun-like stars. This kind of ratio allows astronomers to conduct a census of all stars even when they can see only the behemoths.

Now for the *real* news flash: The initial mass function astronomers have been using for years might be wrong.

NASA's Galaxy Evolution Explorer, an ultraviolet space telescope dedicated to the study of galaxies, has found proof that small stars are more numerous than previously believed.

"Some of the standard assumptions that we've had—that the brightest stars tell you about the whole population—don't seem to work, at least not in a constant way," says Gerhardt R. Meurer who led the study as a research scientist at Johns Hopkins University, Baltimore, Md. (Meurer is now at the University of Western Australia.)

Meurer says that the discrepancy could be as high as a factor of four. In other words, the total mass of small stars in some galaxies could be four times greater than astronomers thought. Take that, Shaq!

The study relied on data from Galaxy Evolution Explorer to sense UV radiation from the smaller stars in distant galaxies, and data from telescopes at the Cerro Tololo Inter-American Observatory to sense the "H-alpha" (red light) signature of larger stars. Results apply mainly to galaxies where stars are newly forming, cautions Meurer.

"I think this is one of the more important results to come out of the Galaxy Evolution Explorer mission," he says. Indeed, astronomers might never count stars the same way again.

Find out about some of the other important discoveries of the Galaxy Evolution Explorer at http://www.galex.caltech.edu/. For an easy-to-understand answer for kids to "How many solar systems are in our galaxy?" go to The Space Place at: http://tiny.cc/I2KMa

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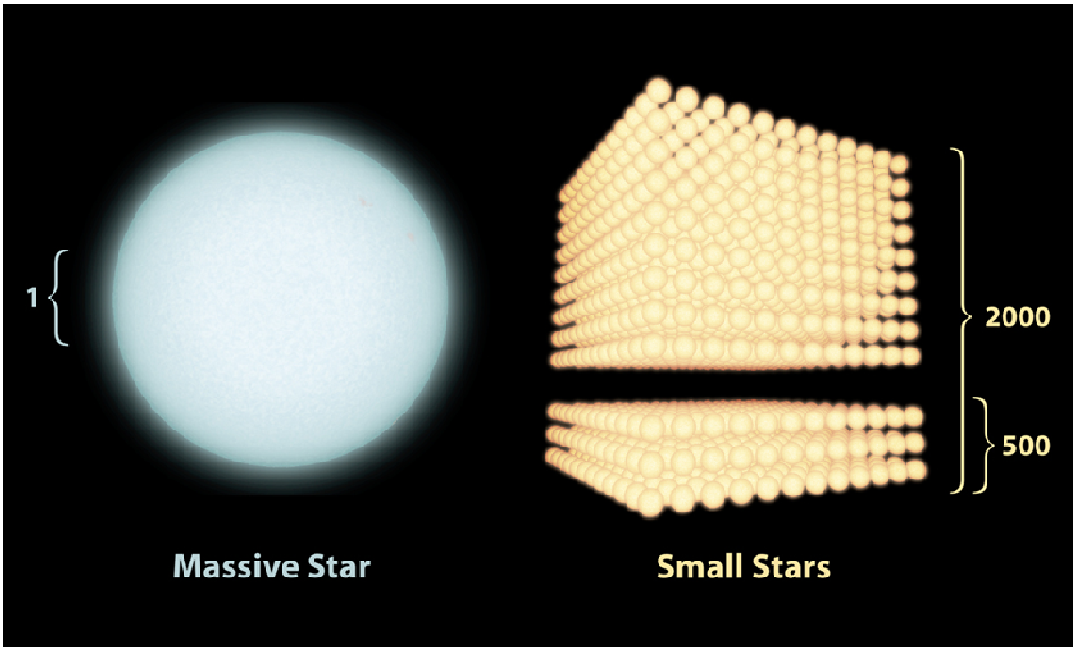
You and the kids in your life can learn about space weather at

http://scijinks.gov/space-weather-and-us.



This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

The 16” Focuser Project by Gary Benett.

The Optical Guidance Systems 16” RC is now sporting a “new” focuser!

Back in December the Board decided to begin a process to improve the performance of the clubs 16” RC telescope and at the same time, make it easier to use. The objective of the project was to:

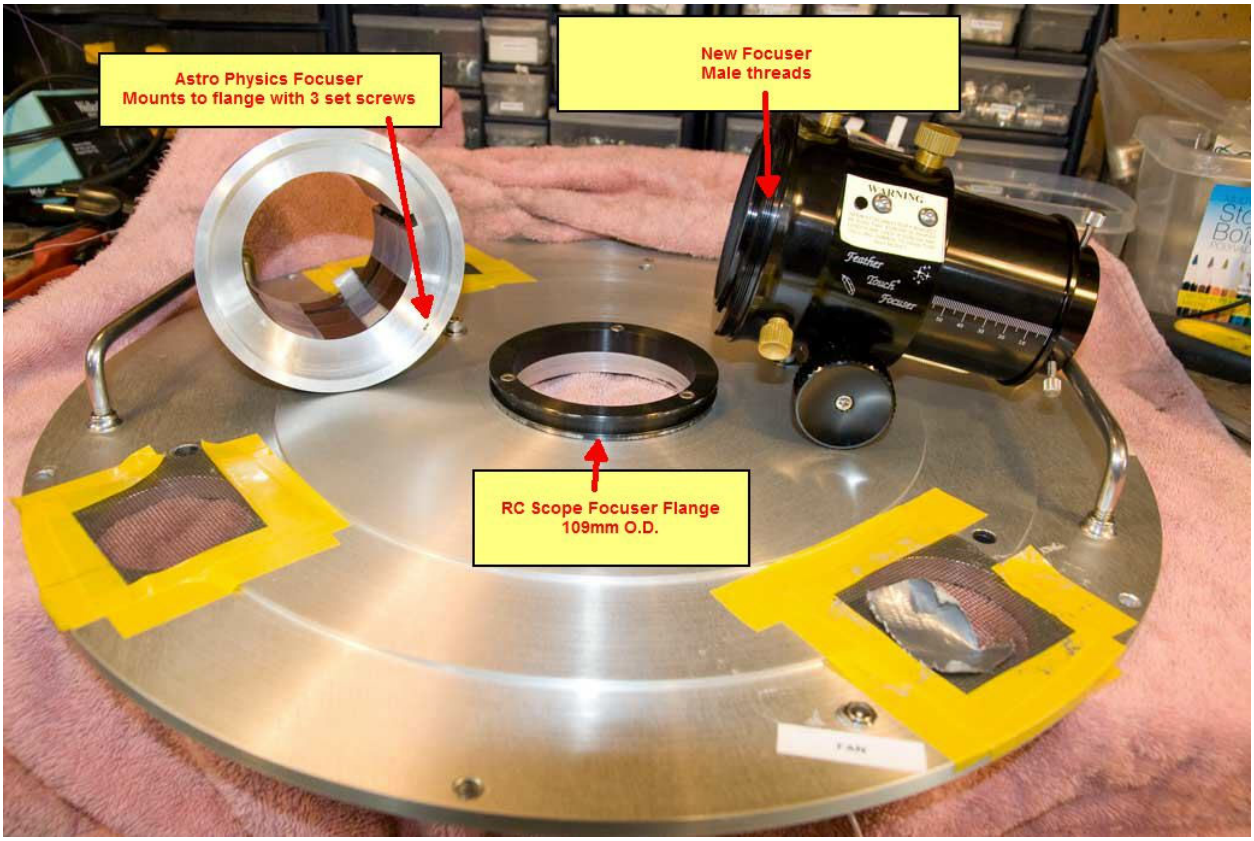
- Eliminate the need to use the scopes built-in motorized focuser (which physically moves the secondary mirror). This focuser has caused problems in the past by “coming off the rail”.
- Automate focusing for astrophotography.

Andy Blanchard and Gary Bennett volunteered to make this all a reality and we are happy to report that the project is 90% complete. The only items that remain are to perform a fine collimation, and some “computer tweaking”. We will also be putting together a brief training course for astrophotography. In the mean-time, it is fully functional for visual use.

Like most projects, doing 1 job turns into several jobs that you had not planned on and the Focuser Project was no exception.

After several weeks of research we elected to replace the focuser with a Feathertouch Focuser complete with stepper motor and computer interface (auto-focus). We documented our scope specs. and requested quotations from several Dealers. 2 months later we took delivery of the spiffy new focuser.

At this point you would think that this would be the end of the story. But our attempts to remove the old focuser met resistance. The old focuser would not budge! It was as if it were welded to the scope which was surprising because it had been removed with ease several times before. Removing the focuser was going to require a machine shop so we proceeded to dismantle the entire scope. With the old focuser still attached to the aluminum rear cell, it was off to the machine shop where we used a large vise to clamp the focuser while I grabbed the aluminum rear cell and gave it a hefty twist. Fortunately it came off with no issues.

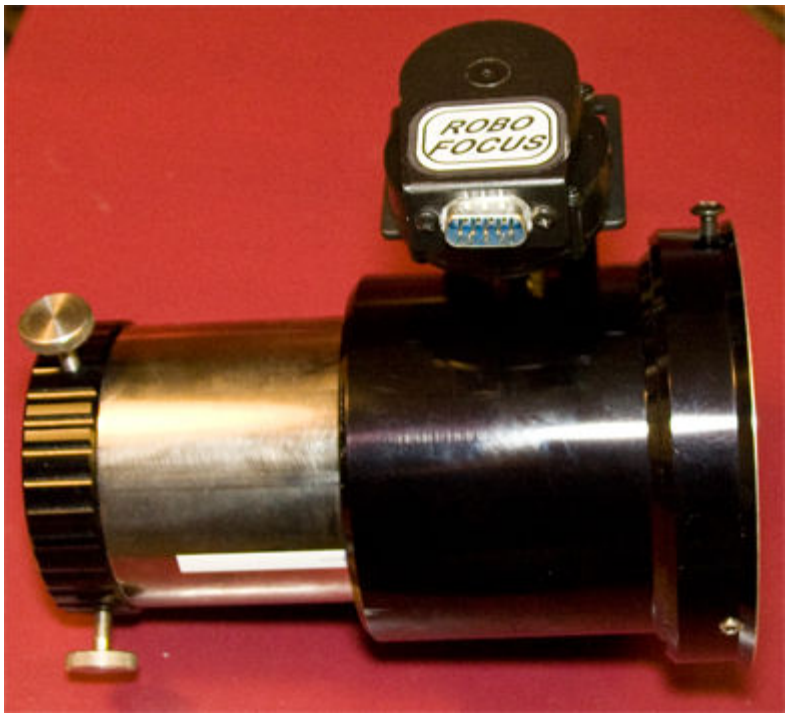


As it turns out, the focuser and retaining collar have a very tight tolerance and a small scratch on the focuser retaining sleeve is all it took to cause it to jam. A quick spin on the lathe took care of that.

But that is not the end of the story. Our spiffy new Feathertouch focuser did not have the correct hardware to mount onto the scope. The new focuser had threads instead of a collar secured with set screws. We spoke to the folks at Feathertouch and discovered that we would need a custom made collar. We considered the additional cost and time delay and made a command decision to abandon the Feathertouch (money refunded) and install a RoboFocus unit onto our existing focuser.

RoboFocus is a stepper motor that can move the focuser with the use of a hand controller or by computer instructions.

Visual observers will love the rock steady focus control. Having a hand controller means you don't need to fumble with the focus knob. Astrophotographers will love the "auto-focus" capabilities.



For astrophotography, our goal is to automate the entire process of image capture for the most commonly used cameras (Canon EOS DSLR). When this project is completed, the procedure will go something like this:

- Attach an adapter to your camera.
- Add a 2" extension tube.
- Insert into the focuser.
- Go over to the computer and "launch" FocusMax.
- Sit back and watch what happens automatically:
  - The focuser moves to a pre-determined position.
  - The scope slews to a good star for focusing (mag 4-6 star) and centers the star in the image frame.
  - Adjusts focus by taking images and measuring the size of the star.
- Use "TheSky" (planetarium) to select your imaging target. Then command it to slew the scope there.
- The camera then takes a photo and adjusts the aim of the scope to center the object in the frame.
- The guide camera now kicks in.
- Now all you need to do is tell MaximDL what exposure you want (seconds) and how many pictures to take.
- Go have a nap for a while!

For Everyone thinking of building their own Telescope: Tools Explained

DRILL PRESS: A tall upright machine useful for suddenly snatching flat metal bar stock out of your hands so that it smacks you in the chest and flings your beer across the room, denting the freshly-painted project which you had carefully set in the corner where nothing could get to it..

WIRE WHEEL: Cleans paint off bolts and then throws them somewhere under the workbench with the speed of light . Also removes fingerprints and hard-earned calluses from fingers in about the time it takes you to say, 'Oh Shit '

SKILL SAW: A portable cutting tool used to make studs too short.

PLIERS: Used to round off bolt heads. Sometimes used in the creation of blood-blisters.

BELT SANDER: An electric sanding tool commonly used to convert minor touch-up jobs into major refinishing jobs.

HACKSAW: One of a family of cutting tools ... It transforms human energy into a crooked, unpredictable motion, and the more you attempt to influence its course, the more dismal your future becomes.

VISE-GRIPS: Generally used after pliers to completely round off bolt heads. If nothing else is available, they can also be used to transfer intense welding heat to the palm of your hand.

OXYACETYLENE TORCH: Used almost entirely for lighting various flammable objects in your shop on fire. Also handy for igniting the grease inside the wheel hub out of which you want to remove a bearing race.

TABLE SAW: A large stationary power tool commonly used to launch wood projectiles for testing wall integrity.

HYDRAULIC FLOOR JACK: Used for lowering an automobile to the ground after you have installed your new brake shoes , trapping the jack handle firmly under the bumper.

BAND SAW: A large stationary power saw primarily used by most shops to cut good aluminum sheet into smaller pieces that more easily fit into the trash can after you cut on the inside of the line instead of the outside edge.

TWO-TON ENGINE HOIST: A tool for testing the maximum tensile strength of everything you forgot to disconnect.

PHILLIPS SCREWDRIVER: Normally used to stab the vacuum seals under lids or for opening old-style paper-and-tin oil cans and splashing oil on your shirt; but can also be used, as the name implies, to strip out Phillips screw heads..

STRAIGHT SCREWDRIVER: A tool for opening paint cans. Sometimes used to convert common slotted screws into non-removable screws and butchering your palms.

PRY BAR: A tool used to crumple the metal surrounding that clip or bracket you needed to remove in order to replace a 50 cent part.

HOSE CUTTER: A tool used to make hoses too short.

HAMMER: Originally employed as a weapon of war, the hammer nowadays is used as a kind of divining rod to locate the most expensive parts adjacent the object we are trying to hit.

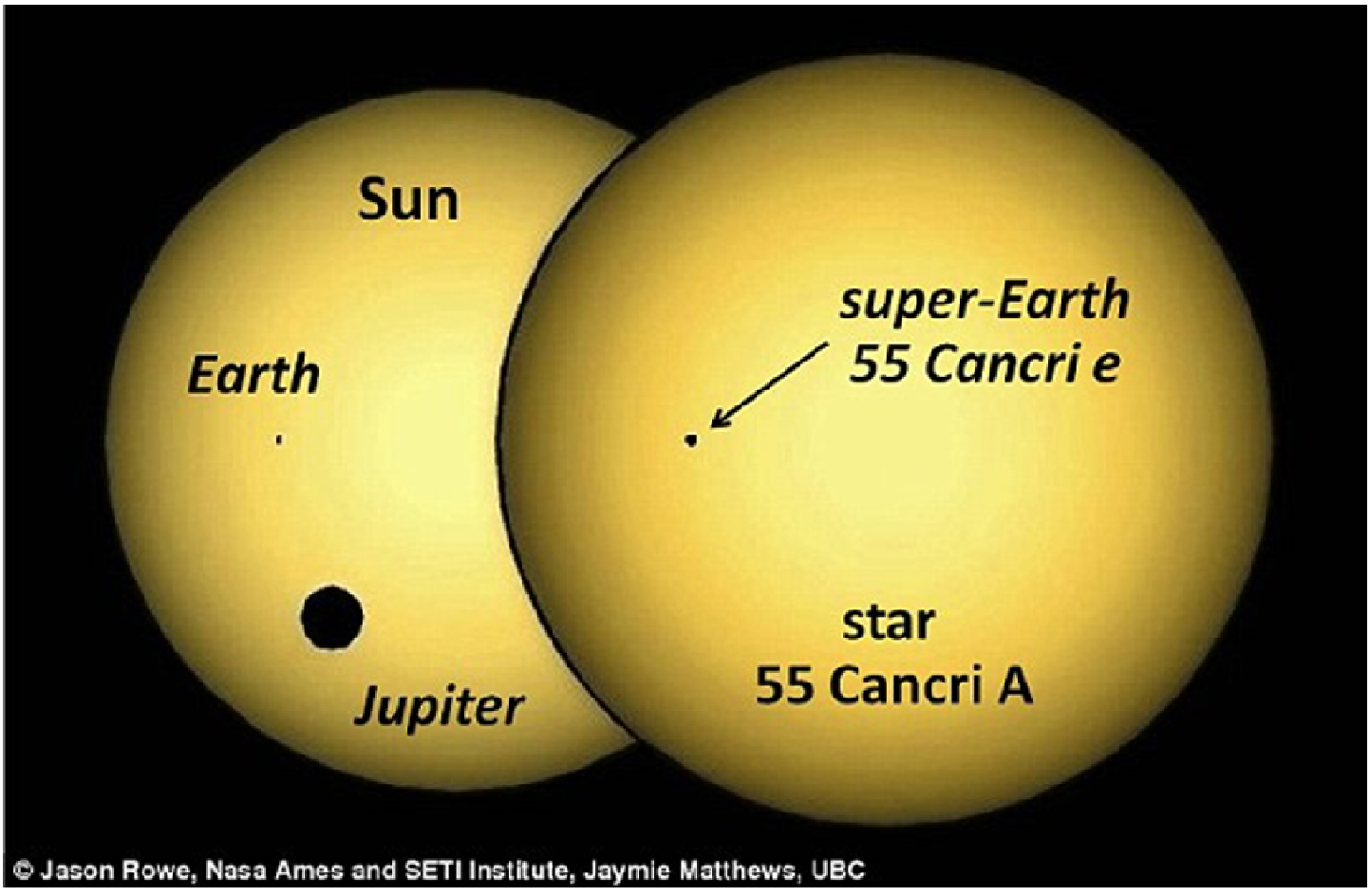
UTILITY KNIFE: Used to open and slice through the contents of cardboard cartons delivered to your front door; works particularly well on contents such as seats, vinyl records, liquids in plastic bottles, collector magazines, refund checks, and rubber or plastic parts. Especially useful for slicing work clothes, but only while in use.

It's an Earth, but not as we know it: Remarkable new find 'holds key' to planet evolution By Daily Mail Reporter

The discovery of an ‘exotic super-Earth’ that is as dense as lead and where a year lasts just 18 hours could be the most significant breakthrough yet in the study of planet evolution and survival.
The remarkable find - named 55 Cancri e - is the densest and most solid planet ever uncovered and is so close to Earth that stargazers can view its sun with the naked eye.
The rocky ‘exoplanet’, meaning it’s out of our solar system, is 13,000miles in diameter or 60 per cent larger than Earth but is eight times as massive and twice as dense.

And despite a surface temperature close to 2,700C (4,900F), some astronomers believe the planet may retain an atmosphere thanks to its strong gravity.
Super-Earths, which are up to ten times larger than our own planet, hold a special interest for scientists because they have the potential to be solid or have liquid oceans.
That means if other conditions, such as temperature, are right, they may be a potential home for alien life forms.

‘It's so exotic, it's like the poster child for rocky super-Earths,’ mission scientist Jaymie Matthews, of the University of British Columbia, said.
‘It’s the densest solid planet found anywhere so far, in the solar system or beyond - you would weigh three times heavier than you do on Earth.'



Making the discovery even more remarkable, the planet was found using a bargain-basement space telescope from the University of British Columbia.

The data collected by the suitcase-sized telescope called MOST (Micro variability and Oscillations of STars) shows the new planet orbits a star, called 55 Cancri A, so closely that a year lasts just 17 hours and 41 minutes.

‘By day, the sun would look 60 times bigger and shine 3,600 times brighter in the sky,’ Professor Matthews said. ‘You could set dates on this world by your wrist watch, not a calendar.’

Approximately 40 light years away, the planet’s host star - a G-type star, or yellow dwarf like our own sun - is visible to the naked eye for the next two months in the constellation of Cancer.

Cancri e is part of a system of four planets that have been under surveillance by scientists since 1997 but the latest find stands out because it’s so dense and so close to Earth.

The group was discovered using the ‘Doppler technique’ that measures wobbles in stars caused by the gravitational pull of their unseen planets.

Although the inferno-like heat means life on 55 Cancri e is all but impossible, it is the type of planet scientists are desperate to 'visit' with their telescopes.

‘The brightness of the host star makes many types of sensitive measurements possible, so 55 Cancri e is the perfect laboratory to test theories of planet formation, evolution and survival,’ lead study author Josh Winn of the Massachusetts Institute of Technology said.

‘It's wonderful to be able to point to a naked-eye star and know the mass and radius of one of its planets, especially a distinctive one like this.’

The discovery also excites Jaymie Matthews: ‘That's the kind of thing Captain Kirk would do in an old episode of Star Trek.

'We're finally catching up with - maybe starting to surpass - the science fiction I dreamed about as a kid.’

MOST is a micro-satellite that orbits the Earth as part of a Canadian Space Agency mission and carries a telescope that feeds into a photometer, an instrument that measures the intensity of light from distant stars.

It was launched by the Canadian Space Agency in 2003 to study 10 stars in a mission that was expected to last just a year. But almost eight years later, MOST is still going strong and has observed more than 2,000 stars.
‘We've had a big bang for the buck,’ Professor Matthews said of the $10million device.

The discovery team included astronomers from the Massachusetts Institute of Technology, the University of British Columbia, the Harvard-Smithsonian Center for Astrophysics and the University of California at Santa Cruz.

On the Beach at Night—Walt Whitman, 1871, *Leaves of Grass* (1891-92

On the beach at night,
Stands a child with her father,
Watching the east, the autumn sky.

Up through the darkness,
While ravening clouds, the burial clouds, in black masses spreading,
Lower sullen and fast athwarth and down the sky,
Amid a transparent clear belt of ether yet left in the east,
Ascends large and calm the lord-star Jupiter,
And nigh at hand, only a very little above,
Swim the delicate sisters Pleiades.

From the beach the child holding the hand of her father,
Those burial-clouds that lower victorious soon to devour all,
Watching, silently weeps.

Weep not, child, Weep not, my darling,
With these kisses let me remove your tears,
The ravening clouds shall not be long victorious,
They shall not long possess the sky, they devour the stars only in apparition,
Jupiter shall emerge, be patient, watch again another night, the Pleiades shall emerge,
They are immortal, all those stars both silvery and golden shall shine out again,
The great stars and the little ones shall shine out again they endure,
The vast immortal suns and the long-enduring pensive moons shall again shine.

Then dearest child mournest thou only for Jupiter ?
Considerest thou alone the burial of the stars ?

Something there is,
(With my lips soothing thee, adding I whisper,
I give thee the first suggestion, the problem and indirection,)
Something there is more immortal even than the stars,
(Many the burials, many the days and nights, passing away,)
Something that shall endure longer even than lustrous Jupiter,
Longer than sun or any revolving satellite,
Or the radiant sisters the Pleiades.

On the Beach at Night Alone - Walt Whitman, 1856, *Leaves of Grass* (1891-92)
On the beach at night alone,
As the old mother sways her to and fro singing her husky song,
As I watch the bright stars shining, I think a thought of the clef of the universes and of the future.

A vast similitude interlocks all,
All spheres, grown, ungrown, small, large, suns, moons, planets,
All distances of place however wide, All distances of time, all inanimate forms,
All souls, all living bodies though they be ever so different, or in different worlds,
All gaseous, watery, vegetable, mineral processes, the fishes, the brutes,
All nations, colors, barbarisms, civilizations, languages,
All identities that have existed or may exist on this globe, or any globe,
All lives and deaths, all of the past, present, future,
This vast similitude spans them, and always has spann'd,
And shall forever span them and compactly hold and enclose them.

What you missed in April...!

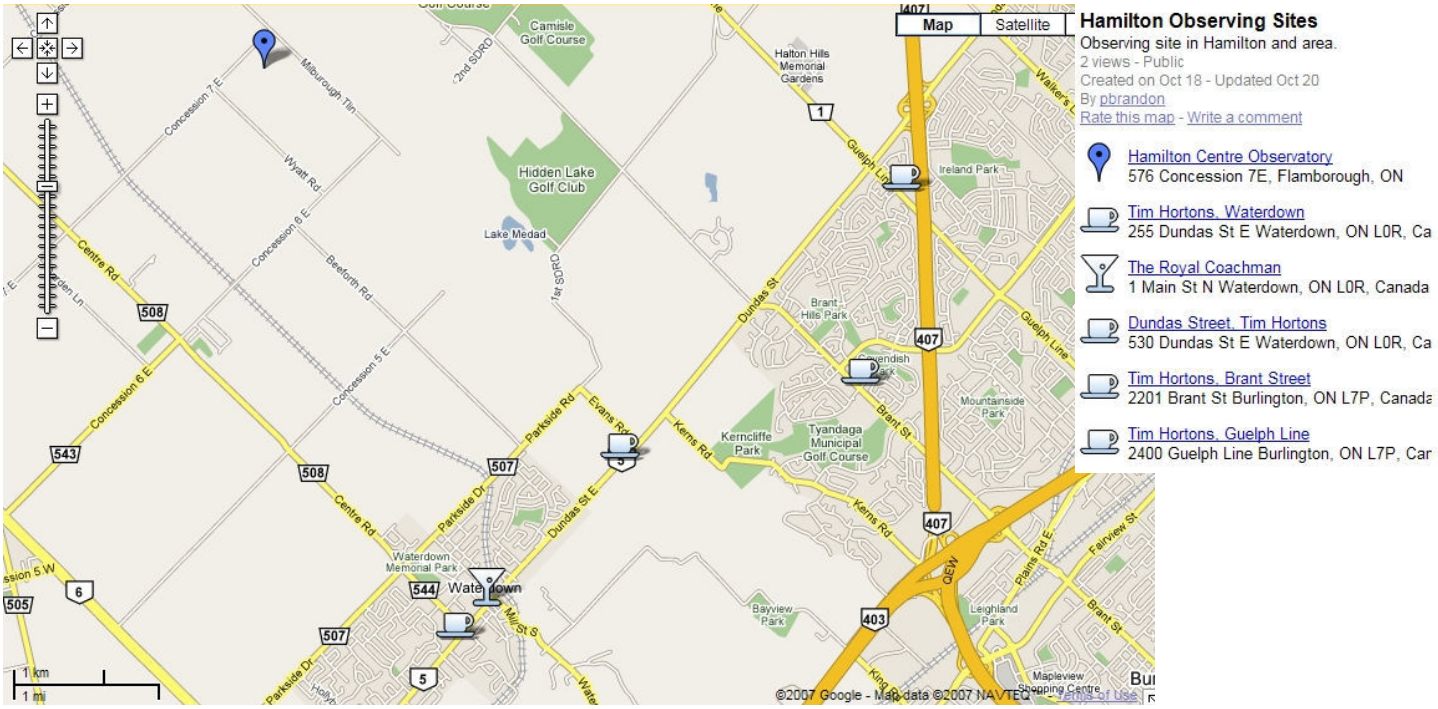
Wow, did we ever have a good speaker! You were told he'd be a good one, and Ray Carlberg did not disappoint! He was entertaining, informative, thought-provoking and intensely knowledgeable.

It turns out that some of the best skies on the planet may actually be found here in Canada. Hardly surprising, though, that they're tough to get to. 10 degrees from the North Pole, intense cold, and difficult to get to. Sounds like the entire country as it was regarded by the rest of the world 20 hundred years ago!

Astronomically, though, there are a number of huge advantages to putting a telescope atop a 2600 metre high mountain on the nearest piece of land to the North Pole. 24 hours of darkness for weeks on end, for one. Another is it's so cold, you barely have to chill most CCD cameras! Also, the times when you can't observe during the summer are the times when it's easiest to get there.

There were a couple of other things, too. Colin Haig (RASC 2nd VP), and Mark Pickett (Hamilton National Rep) told us about the recent National Council meeting, Glenn Kukkola and Bert Rhebergen all had things to say, and Roger got to hug his new 6" RC!

All in all, a great night...and May looks like another one...don't miss it, too!



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What you Missed pictures by Ed Mizzi. Front page image by Gary Colwell (again!)

Meetings are on the first Thursday of every month except July and August, up-stairs at the Royal Canadian Legion, 79 Hamilton Street in Waterdown. Start time is 8pm.

May 5th: **John Moores,** York U.
Malcolm Parke, NYAA

June 2nd: **Mark Coady,** Peterborough Astronomical Association

September 1st: Members Night

October 1st: **FRIDAY!** Return to the DDO in Richmond Hill

October 6th: **Annual General Meeting** at the Observatory

Answers for Astronomy Test from Last month

1 (R) Titan	2 (H) Jupiter	3 (N) Oberon
4 (S) Vega	5 (O) Planet	6 (C) Crater
7 (J) Meteor	8 (M) Nova	9 (B) Charon
10 (P) Pluto	11 A (K) Neptune	12 (A) Ariel
13 (G) Herschel	14 (L) Nereid	15 (I) Launch
16 (E) Encke	17 (F) Halley	18 (D) Deimos
19 (T) Venus	20 (Q) Sol	