

# NOVA

NEWSLETTER OF THE VANCOUVER CENTRE RASC  
VOLUME 2013 ISSUE 3 MAY JUNE 2013



## Adventures in Astronomy:

### Magic Circles – Aligned to the Stars? (Part 1) by David A. Rodger

Every year, as we approach the June solstice (summer in the northern hemisphere; winter in the south), my mind flips back to 1978 when a group of us from Vancouver's HR MacMillan Planetarium marked that year's solstice at a special place in southeastern Saskatchewan. What happened—or should I say, what didn't happen—was a highlight of my life. To explain it, however, I need to take you back a further two years.

In July 1976, the International Planetarium Society held its annual convention at the University of Colorado in Boulder. Headlining the conference was Carl Sagan, perhaps the 20th Century's most gifted scientific communicator.

But the talk that really intrigued me was one by Dr. Jack Eddy, a University of Colorado astronomer.

With a grant from the National Geographic Society, Dr. Eddy had

constructed by pre-historic prairie residents. Much of Eddy's talk was on the Big Horn Medicine Wheel, located in northern Wyoming. According to him, it was an

astronomical observatory. With slides and graphs, he showed how some of the stones were aligned to certain points on the horizon, including the rising point of the sun on the June solstice (reminiscent of the solstice alignment of England's Stonehenge). Other Big Horn alignments pointed

to the rising points of the stars Sirius, Rigel and Aldebaran. You can read his article, Mystery of the Medicine Wheels, in the January 1977 issue of

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Big Horn Medicine Wheel

been researching the mysterious stone circles, or “medicine wheels,” of the North American plains. Archaeological evidence suggests that these structures are ancient,

**MAY 9**

Douglas Scott of UBC: The First Results from the Plank Spacecraft. Hennings 201 (see map on p. 4)

**UBC**



**JUNE 13**

Members' Night: Telescope workshop. See Meetup for room location.

**BCIT**



**JULY 11**

Members' Night. See Meetup for details and room location.

**SFU**



# Astronomy Day 2013



# Vice-President's Message

by Suzanna Nagy

What do Oreo cookies, lollipops, and telescopes have in common? International Astronomy Day!

RASC Vancouver Centre, along with the SFU Astronomy Club, celebrated International Astronomy Day on Saturday, April 27 at the SFU Burnaby Campus. Can I say it was absolutely fabulous? I think so, considering we had an estimated 500 people in

attendance.

We taught children the moon phases using Oreo cookies, we played Astronomy Bingo with lollipops as prizes, and we had numerous other crafts, booths, displays, and lectures showing off astronomy-related topics. Despite the poor weather (when doesn't it rain on a pre-planned RASC event?—sarcasm intended),

International Astronomy Day was a great success.

The mobile planetarium from Canadian Telescopes was a huge hit, as was Jim Bernath's hands-on physics booth. There were actually line-ups to see them.

A special thanks goes to the 25 volunteers who made this event as fantastic as it was. Without

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## About RASC

The RASC Vancouver Centre meets at 7:30 PM on the second Thursday of every month at various locations in Metro Vancouver (see page 1 for meeting locations and page 4 for maps). Guests are always welcome. In addition, the Centre has an observing site where star parties are regularly scheduled.

Membership is currently \$73.00 per year (\$41.00 for persons under 21 years of age) and can be obtained by writing to

the Treasurer at the address on page 5. 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 necessarily 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 room P8445.2 of the Physics wing of the Shrum Science Centre at SFU. Please contact a council member for directions.

## 2013 Vancouver Centre Officers

**President** Mark Eburne  
president@rasc-vancouver.com  
**Vice-President/Events** Suzanne Nagy  
vp@rasc-vancouver.com  
**Secretary/P. R./Observing** Scott McGillivray  
secretary@rasc-vancouver.com  
**Treasurer** Ciara Morgan-Fier & Steve Coleopy  
treasurer@rasc-vancouver.com  
**National Rep.** Doug Montgomery  
national@rasc-vancouver.com  
**Director of Telescopes** Steve Meighan  
telescopes@rasc-vancouver.com

**Librarian** William Fearon  
library@rasc-vancouver.com  
**Past President/P. R.** Howard Trotter  
publicrelations@rasc-vancouver.com  
**Membership** Rohit Grover  
membership@rasc-vancouver.com  
**LPA Chair** Jim Ronback  
lpa@rasc-vancouver.com  
**Education** Bill Burnyeat  
education@rasc-vancouver.com  
**AOMO Chair/Merchandise** Leigh Cummings  
merchandise@rasc-vancouver.com

**Webmaster** Harvey Dueck  
webmaster@rasc-vancouver.com  
**NOVA Editor** Gordon Farrell  
novaeditor@rasc-vancouver.com  
**Speakers** Barry Shanko  
speakers@rasc-vancouver.com  
**Councillor** Kenneth Lui  
kenlui121@hotmail.com  
**Honourary President** Dr. John Macdonald  
**Trustees** Ron Jerome  
Pomponia Martines  
J. Karl Miller

## 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>



@RASCvancouver

## Mailing Address

RASC Vancouver Centre  
PO Box 19115  
2302 West 4th Ave.  
Vancouver, B.C.  
V6K 4R8



## Maps to Meeting Sites



### UBC

Our UBC meeting site is in room 201 of the Hennings Building. The main entrance is off Agricultural Rd. (indicated by the arrow on the map at left). Room 201 is up the stairs and on the left.

Pay parking is available at several parkades located around campus (indicated as "P" on the map).

## Evening with 1st Haney Cubs

I am happy to report that we have once again brought astronomy to the Scout/Guide organization, this time for a group of Cub Scouts. This opportunity came about in a more circumspect way than usual.

Dave Whalley, who is a member of the RASC – Okanagan Centre, had received an email from his son-in-law, Jason Buck, asking him if he knew any astronomers in the Maple Ridge area that could help out his Cubs in earning their Astronomy Badges. Dave, of course, thought of Mark and myself, and promptly sent me an email requesting our

assistance.

I got in touch with Jason for more information regarding possible dates, location and other information in an effort to accommodate their request. Jason gave me a list of dates and times which I forwarded to Mark and a few other volunteer candidates in hopes of giving others the opportunity to share the fun. Mark and Terry McComas replied right away that they would be available to lend a hand. Being a fellow Ridge-Rat, I can always rely on Mark to jump in to help, and even though

by Leigh Cummings

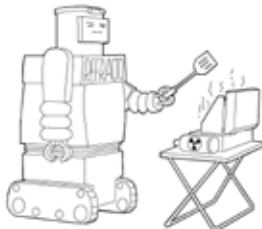
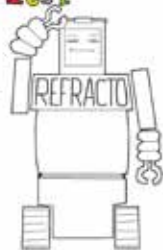
Terry has to travel over our toll bridge to get to us, he continually shows us why he so justly won the "Volunteer of the Year" award last year. I informed Jason that we were on for April 16<sup>th</sup>.

At our monthly meeting, the week before our evening with the cubs, Mark was approached by member Muguette to ask if she could help out with the Cubs in the hope of learning more about how we teach the younger kids about the night sky. Mark asked her to email me so that I could supply her

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55 **Beta Test™**

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# Dunbar Salmonberry Days Star Gaze

by Craig McCaw

Everyone is invited to the eighth annual Dunbar Salmonberry Days Star Gaze.

It will be held again at Chaldecott Park on May 17, 9:30 PM to 1 AM-ish, with an "if clouded-out" second try on May 18.

Located right on the boundaries

of the UBC forest where the sky is dark enough to see the Milky Way on a good night, Chaldecott has a good flat horizon and minimal lighting. So far, we have 20-inch and 16-inch scopes lined up, and in past years 10 to 12 scopes on site with 200 to 300 people is not unusual.

Get there by driving west as far as you can on 25th Avenue (King Edward) where it stops at the UBC forest and the star party can be found on the south side of Chaldecott Park.

Hope to see you there, more info at <http://dunbar-vancouver.org/> or [cfmccaw@gmail.com](mailto:cfmccaw@gmail.com) \*

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the enthusiasm and efforts of our wonderful volunteer group, Council could never have pulled this day off. One of the benefits of membership in the RASC is the opportunity to participate in events like International Astronomy Day. Sharing with others, teaching children astronomy, and all the great things we ourselves love about it only adds to the enthusiasm of enjoying this hobby.

And a big thank you to the SFU Astronomy Club as co-host with SFU Burnaby Campus sponsoring the venue. What a great location!

Also in April, Council was busy helping Scouts get their astronomy badges. We presented on April 5 to Scout leaders in Langley, on April

16 to Cub Scouts in Maple Ridge, and on April 29 to Sparks Scouts in Burnaby.

As to what is next? With better weather finally here, the observing season is now starting up so keep an eye on Meet-up, Twitter, and our website for upcoming events as well as impromptu observing sessions.

Here's hoping for clear skies – your Vice-President and Event Coordinator, Suzanna Nagy. \*



## Membership has its Privileges!

New members, did you know? The Vancouver Centre has 8 telescopes available for loan free of charge! We have telescopes ranging from 60mm to 10" 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/observing-sites/> or contact the Observing Chair at [observing.rascvancouver@gmail.com](mailto:observing.rascvancouver@gmail.com).

## Upcoming Events

### May

17 – Dunbar Salmonberry Days Star Gaze at Chaldecott Park. 9:30pm - 1am.  
See p. 5 for details.

### August

Aug. 3 - 11 – Mt. Kobau Star Party

### September

Aug. 31 - Sept. 7 – Merritt Star Quest

### October

5 – Paul Sykes Lecture

### December

8 – AGM

## Corvus and Crater

by Bill Burnyeat

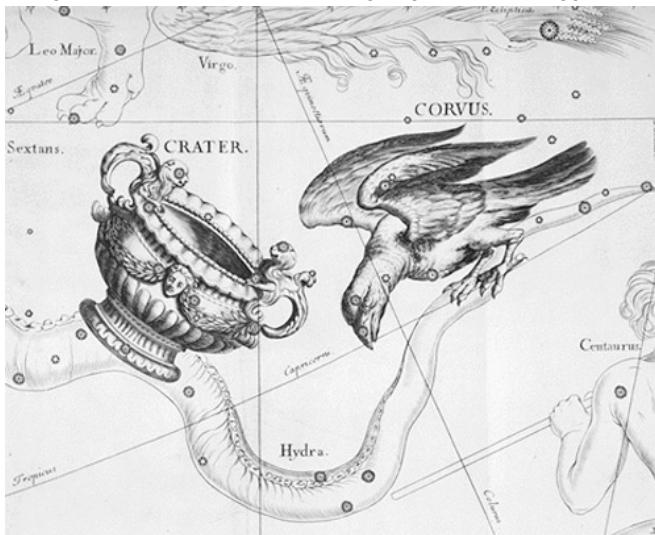
These two constellations are linked celestially, thematically and alphabetically. They are anciently recognized asterisms appearing in Aratus, earliest of sky-writers, as Corvus the Crow who greatly offended Apollo. It seems the Crow unwisely carried gossip involving the indiscretions of a certain lady. For his tale-telling, which we dare not repeat for fear of a like fate, Crow was first blackened, for this bird was silver coloured originally, and afterwards was forced to perch next to a cup from which he was never allowed to drink.

Visually, the Crow is a box shape that lingers far to the south on late spring evenings. This is an otherwise dull part of the sky with Spica to the north and east as the only bright star in the region.

Crater the Cup is very dim. It's a sort of bowl of stars. Only one of the eight stars in the outline attains fourth magnitude. City dwellers must enjoy the cup as a binocular object rather than as a grouping

obvious to the unaided eye.

My own view of Corvus and Crater is thwarted by two very large Magnolia Trees directly south of the house. In late April, the tree's bloom, sporting large whitish



petals with a pink stain within, as if to welcome the Cup and Crow directly and invisibly behind the flowery array. Yet the trees are so lovely that only a peevish and ungrateful stargazer would complain and therefore, bowing to the wonders of this planet, I am content to watch from a different angle.

Sometimes, under the ideal sky of a planetarium dome, I amuse myself and, I hope, the audience

by making the bowl appear and, by turning a switch, running the Moon around the sky causing it to halt, looking, in gibbous phase, like a pale egg placed over an awaiting egg cup. I then draw an admittedly thin connection between the two things by noting that the cup and the craters on the Moon are named from the same Greek word. It's not an enviable task but somebody has to do it.

The Crow has few deep-sky objects of interest to attract it; a handful of doubles, one passable planetary nebulae and some

dim galaxies round out its slender celestial resume. Crater is even more barren. Both these signs are far from the Milky Way's bright fields.

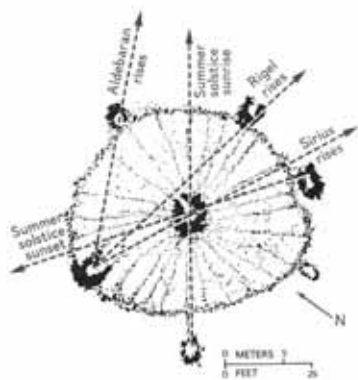
With so little going for them, it is surprising that they are so emphatically included in the lists of the bright constellations. It raises the question: how did stars suggest birds, bears, cups and heroes? By what alchemy, science or fable did

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the *National Geographic* magazine.

I found his talk very exciting. And my excitement peaked when he showed photos of a medicine wheel



### Big Horn Medicine Wheel alignments

in southeastern Saskatchewan, near Moose Mountain Provincial Park. That's my home province. I knew the area, which includes the popular summer resort of Kenosee Lake. It was then that I began conceiving a Planetarium show

on astronomically-aligned stone structures, such as Stonehenge, Chichen Itza in Mexico and—of course—our North American stone circles. Planetariums have their limitations, but they are unexcelled in their portrayal of the visible sky and its phenomena. Showing the rising and setting points of stars, planets, sun and moon for any day or night of the year were bread-and-butter to our Planetarium's Zeiss projector. We would exploit this in our medicine-wheel show.

Now back to June 1978. We decided to do more than merely model the June solstice sky in the Planetarium theatre, as seen from a medicine wheel. We would visit the Moose Mountain Medicine Wheel, and photograph the actual solstice sun rising over the central cairn of rocks, just as Jack Eddy said it would.

With the full cooperation from the local Indian band, on

whose land the medicine wheel was located, we checked out the site in the days before the solstice.



### Moose Mountain Medicine Wheel

By British Columbia topography standards, Moose Mountain is little more than a large hill. Still, it

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with the details and she assured me that she would be joining us. Considering she had to drive out from the city to attend, I think it shows the level of conviction we have in our RASC volunteers.

The weekend before our evening with the 1<sup>st</sup> Haney Cubs, I re-tuned my presentation that I planned to use. I realized that I had not covered the phases of the Moon in my prior version of the presentation. I've not been a big lunar observer,

as of yet, so I overlooked an obvious requirement in their education. In



the past I've had to explain the phases only because the kids ask me

about them. I figured I should not depend on their questions in order to cover the subjects required for them to earn their badge. That was my responsibility. Doing these presentations is always a learning experience for me as well.

On the evening, we all met in the parking lot of the meeting place and checked out where we could set up my little telescope as well as Mark's binoculars for viewing after the presentation. We

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was dry and windswept and had a commanding view of the plains and woods around and below it. Then, three hours before sunrise, we set up our cameras and tape recorders.

Jack Eddy's diagrams showed us exactly where to stand to view the solstice

sunrise — where the ancient people who created the stone circle presumably had stood. Our excitement was almost boundless as we saw the cloudless northeastern sky begin to brighten! At last it

was time for the sunrise. We all stood silently, our eyes riveted on the sunrise point. It was time! And then.....nothing!

Oh, the sun rose alright. We saw it eventually. But it didn't rise over the central cairn as predicted. It rose several degrees to the right (south) of the alignment. We were shocked. What happened? It turns out that, when we stood where Dr. Eddy directed and looked at the central cairn of rocks, we were looking slightly uphill. Thus there was no way we could see the true horizon. And neither could the ancients.

That was totally unexpected. We weren't there to do scientific

research—or to survey the site, either. We were simply there to photograph a predicted phenomenon. Imagine if all the available literature and reports said there was to be an eclipse of the moon next week, and it didn't happen. That's how we felt. Needless to say this prompted

vigorous discussions.

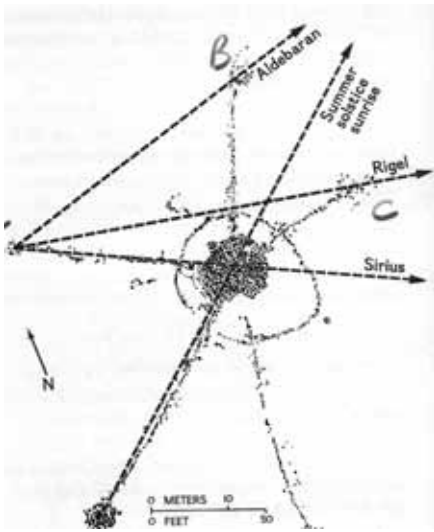
Now I should hasten to point out that the line of rocks running to the central cairn did seem to point to the azimuth position of the solstice sunrise. But that wasn't the issue.

The issue was that you could not see the sunrise if you stood at the place Eddy identified. Sunrise was below the crest of the hill. I suppose the ancients could have built towers to see beyond the hilltop, but there is no evidence for that. Or perhaps their astronomers were 20 feet tall, which is what we estimated, from simple trigonometry, they'd have to be. Perhaps the ground had shifted, risen or fallen, or maybe the rock pile had been moved. You can come up with all kinds of revisions to make the observed phenomena fit a pre-advanced hypothesis. But, of course, science doesn't work that way. You don't get to change the

evidence to fit your hypothesis.

As we continued to question the alleged astronomical purpose of the medicine wheel, other questions

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Moose Mountain Medicine Wheel alignments



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the sky signs arise?

Speculation on the origins of constellations, a fad during the 1970s, has now cooled since no such origin is ever likely to be found. Boötes, for example, represents the first farmer. Who was the first farmer? We shall never know. It's the same with the supposed starting point of sky figures. Even if we confine ourselves to the specifically Greek constellations of Aratus, we find a dead end at the beginning of the enquiry. Perhaps significantly, one other cultural feature seems to have sprung to life fully formed, without a rudimentary or antecedent form, and that is language itself. In some ways, a constellation may be a kind of text. Not a text that says something external to itself but a set of relationships that refer internally to each other.

What everyday things are like constellations? One answer is a deck of playing cards. The cards form a known whole, a set with a finite and specific set of patterns. The four suits, King, Queen and Jack plus the numbered cards up to 10 and not more. The cards come in two colours, not three, and the turning over of one card puts the player in mind instantly of the associations and congruencies of the rest of the deck. The constellations are constructed in a similar system and are not a random assortment of "beasts and

men" as they are often described. These sky signs fill in the heavens with a pattern that can be read off. Usually, our modern habit, to flee from meaning not handed out as universal pabulum, hides subtle patterns and learning the constellations is made less rich, more difficult, and duller, than



need be.

Consider a deck of cards laid out on a table. They are arranged as a solitary player does, in idle moments or recovering from a hangover, with cards making four rows laid out side by side with the Ace at the top, next the King and so on down to the two of each suit at the bottom. Looking across the rows we see four sixes beside each other, four fives and so on. Each row from top to bottom forms a similar pattern with the next row. The clubs are in a one-to-one relationship with the hearts and the same is true of the others. One immediate result of this is as a mnemonic. There are 52 cards and, although each one is unique,

they are all easily fit into a pattern. It is this pattern that gives cards power, not the individual colour or marking on each one. It can all be learned easily and simply.

Now, imagine the constellation figures printed on cards. It turns out; they can be laid out in patterns just like a deck of cards. Let's begin and see how this works.

Let's start with Draco, a northern constellation. We place the Draco card at the top of a row and lay down, in order, the cards of the constellations that are south of the dragon. We find Hercules is just south of Draco, and then Ophiuchus, Scorpio, Lupus and Centaurs is the last card. Six constellations are now down and these are the signs from north

to south. At first, it doesn't seem that we have learned anything. Now, consider the function of these characters. We find culture heroes, or monster-overcomers in Hercules, Ophiuchus and the Centaur. Draco, Scorpio and Lupus (the Beast) represent monsters.

Looking again at the six cards, we find they make an order: Monster-Hero, Hero-Monster and Monster-Hero. There are three sets of monsters set off against a hero.

These constellations run north-south along just about the 15<sup>th</sup> to 17<sup>th</sup> hours of right ascension. Now let's wait. As the sky rotates, our monster and hero sets move towards the west and new sky signs

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come into view. Starting from the north, we find Cygnus, Lyra, Sagitta, Vulpecula and Aquila. This list is entirely composed of signs with a flying and feather motif. The harp is commonly designated with attached wings or as masking a bird and, like cupid's harp, it is a flight-borne sign. The fox is usually shown as carrying a hen in its mouth and Sagitta is an arrow caught in the sky and eternally flying but never getting anywhere. In this way the sky is like the ocean, always changing but never altering. Speaking of water. What are the next groups that come up? Can you guess? Another row contains Pegasus, Pisces, Pisces Auratlis, and Aquarius and Capricorn and Cetus (whale) are nearby while the dolphin skirts the ocean in the stars on the west side. At first the flying horse seems out of place but horses were sacred to Poseidon, lord of the sea, and so fit in naturally to the watery theme.

After the watery place in the sky comes constellations all involved with the Andromeda myth and after this a battle between a Bull and Orion and his attendant dogs.

Everyone loves to see a card trick. It's fascinating to have an expert take an apparently shuffled deck and blithely turn over the first four cards which turn out to be four aces. Although we know it's a trick, there is always a hint of magic that lurks behind the skillful card handler. If it's not clear how the trick was done, we turn to magical explanations, only for a moment, before the rational mind sets the

notion aside with a smile.

Just as we need a magician with a deck of cards to show their stuff, so the sorting out of the sky figures needs an expert, and one far more skilled than this writer. We shall call for aid from astronomer Marcus Manilius, the Roman author of the *Astronomica*.

Little is known about Marcus, even his dates are very doubtful. His birthplace is somewhere in Asia, or maybe North Africa. The traditional account says he was born in 90 BC and came to Rome as an adult. Yet, textual evidence from the five books he wrote, which form the *Astronomica*, indicate that the Emperor Augustus was on the throne during the composition of the first part of the work but that Tiberius was Emperor during the writing of the final pages. Since Augustus dies in 14 AD, this would make Marcus Manilius 104 years of age while busy on the text. Some have claimed the early birth date marked the entrance of our writer's father or grandfather but, the fact is, we know almost nothing about Manilius except that he was clever. Even this is a matter for debate since one of his editors, the poet and classicist A.E. Housman, said Manilius knew nothing about Astronomy. My Lempriere's Classical Dictionary derides his Latin style as stilted, overblown and not pleasing to the ear. Goethe called him a bore. The English critic Frank Kermode describes Manilius as "long, dull and difficult." So much for the ringing endorsements.

Finally, the date of Manilius'

death is not known. Other writers in Rome at the time of Manilius are silent as to his activities, proclivities and to his very existence.

The *Astronomica*, in its first book—or chapter, to use the modern term—is a description of the heavens. All the familiar constellations are here. It's remarkable that the description of the sky is so similar to what we would recognize today. Except that the work is turned in Latin verse, this part of the *Astronomica* might almost have been written by Patrick Moore.

It is in Book Two that the card tricks begin. First of all, taking the zodiac as a starting point, the constellations are given gender. Just as nouns in Greek, Latin and French have gender designations, so too have the constellations. This divides them into two groups, and in a way that seems natural to the user of language. The zodiac signs are composed of six masculine and six feminine signs, and they alternate in gender. A feminine sign is bordered by a masculine sign on each of the west and east borders. It's like a dinner party where male and female are seated alternatively. Masculine signs are Aries, Gemini, Leo, Libra, Sagittarius and Aquarius. Feminine signs are Taurus, Cancer, Virgo, Scorpio, Capricorn and Pisces. Of course, there is nothing really male or female about the constellations; it's just a way of placing them in an order. Once Manilius decides on this, he is off and running with a whole series of seemingly artificial

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(or even nonsensical) distinctions.

We learn that the zodiac signs are either single or double. Single signs are Aries, Taurus, Cancer, Leo, Libra, Scorpio and Aquarius. Pisces and Gemini are double, and so are Sagittarius, as a composite man-horse and Capricorn as goat-fish. Also Virgo gets assigned as double because she is shown as wearing angel wings and is therefore a composite like the previous two.

Manilius is not without explanations for astronomical issues. In his time, the Sun was at apogee (the farthest from Earth) when travelling through Taurus, Cancer and Gemini. This had the effect of slowing the apparent speed of the Sun through this part of the ecliptic. Why does the Sun move more slowly? It's because these three constellations move backwards upon rising and so, they are in no hurry to be in the company of a speeding Sun due to their worry about running blindly into something. Bet you never thought of that did you? Other dividing lines are two sets of day signs and night signs which seems odd since aren't they all seen at night? Once again, the point is to make a distinction.

Another distinction is posture. Three signs are running: Aries, Leo and Sagittarius; three standing:

Gemini, Virgo and Aquarius; three sit: Taurus, Libra and Capricorn; and three are lying: Cancer, Scorpio and Pisces. Notice that the distance between each of those in the list is the same: three signs are always in between each of the three entries. Those who are novices at thinking about sky positions might want to get a planisphere disk and place a plastic ruler across the middle. Then read this part of the



article, and it will make more sense. Some of this ordering anticipates modern results, such as the Dodecatemories. This is the internal division of a zodiac sign into little bits. Since each sign takes up 30 degrees, a line spanning

this section and divided into 12 allows a miniature zodiac to be constructed inside each sign. Each small sign is 2.5 degrees in width. Thus the western border of each sign has a little Aries of 2.5 degrees to start out and the next 2.5 degrees is called Taurus. So, we can specify, for example, the Gemini in Libra, which would be 5.0 to 7.5 degrees east of the western Libra boundary. This is a way of specifying the location of a place in the sky and similar systems were in use to cast horoscopes.

Other distinctions made are more familiar, such as the divisor of the four seasons, with each assigned three signs. This was the first attempt at a systematic order into the sky. It had the advantage of creating special meanings and systems of meanings in the sky. Each star had congruence with things on the earth. Each flower on the stem, so it was supposed, had a one to one relationship with a star. My Magnolia tree flowers when its protecting stars are overhead, but when the seasons change the stars depart and the petals fall in disappointment to the ground. Sometimes, I have to admit, I like to think about this; but only for a moment.

Then, I think about this: the sterility and futility of it all. There

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arose. Why would the builders be interested in marking the summer solstice? If they were concerned about animal migrations or the changing seasons, surely the autumn equinox would be more important. On the Saskatchewan plains nothing much happens at the time of the solstice. Frost and snow can arrive any time after the equinox, however.

Dr. Eddy proposed that the alignments to the rising points of the stars Aldebaran, Rigel and Sirius would have given the prehistoric residents of the site a rudimentary calendar, since the first appearance of those stars in the dawn sky would occur in a sequence about one, two and three months after the solstice. In the pre-dawn sky I scanned the east for Aldebaran. I couldn't find it. I did, however, see The Pleiades. It seemed to me that that beautiful star cluster would be a much more suitable and visible marker than



Summer solstice sunrise at Moose Mountain

Aldebaran, which is an orange star and nearly impossible to pick out in the reddish glow of twilight.

In our next issue I'll describe the consequences of this experience—how we dealt with it at the Planetarium, some surprising insights from a UBC astronomy professor and the scientific

community's reaction (including that of Dr. Jack Eddy). ★

*David A. Rodger was the first Director of the HR MacMillan Planetarium in Vancouver, and served in that position from 1967 through 1980.*

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then went into the venue where I set up for the presentation while Mark and Terry set up the telescope and binoculars for display. Understandably, Muguette, having to drive the farthest, was not able to arrive until after I was underway with my presentation. She took notes and helped with questions from the kids and later was outside with Mark and Terry corralling a very enthusiastic group of youngsters into an orderly line up to view the Moon and Jupiter in the evening twilight.

While they were getting things set up, Mark got the kids occupied competing to see who could see Jupiter first. He offered up a RASC baseball cap as prize. Mark didn't realize I hadn't brought any merchandise with me, so our prize winner had to settle for an IOU at the end of the evening. We know our president is good for it though.

We had a beautiful clear evening for the kids to view the Moon and Jupiter. Being quite young and having parents waiting to pick them up, we only got to view in the twilight hours. I hope we will be

able to host this young group at the AOMO some night under a darker sky in the future. They all showed an understanding of the effect light pollution has on their ability to view some of the objects I was showing them in my presentation. This awareness bodes well for our future generation's desire to undo some of the unintended damage our generation has committed in this area. As usual, I am always amazed at the level of knowledge that kids in this age group possess about astronomy. This is the second

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is no room left for discovery in this astronomy. That's why, given a telescope, Manilius would have discovered nothing. Would a card player be better off inspecting a card deck with a microscope? The trouble with the Manilius system is that it does not allow for anything outside coming in. The signs are symbols but they take on a self-contained reality. All this can never be manipulated into a fresh take. Neither can any of these postulates be disproved so that a better theory can emerge.

Karl Popper drew a line between two types of knowledge. He said a science put out theories which others can then attempt to disprove. The refutability of a theory means it takes chances that it might be false. The theory of relativity

is such a theory. It is rigorously tested and, so far, has passed the tests. But it can never be proved true, it merely escapes refutation. Popper said this was in the nature of science. Theories that can't be refuted fall outside of science. This is the difference, he said, between astronomy and astrology. Most readers of Manilius were interested in casting horoscopes—in other words, card tricks with stars.

The cup is now poised to decline into the west. As it descends, a second cup comes up in the east. It's Aquarius. One cup leaves the stage and another takes its place. The cups are very different. Crater is full and it stingily retains its water. Crow is prevented from drinking and the water is preserved from anyone who would steal it away.

The water bearer, however, is the

opposite. He tips over his water jug, pouring it out liberally, even wastefully, into the empty air. The two cups are the same, yet opposite. And what is happening during the ascendancy of the two cups? Crater graces the skies in the dry season while Aquarius is high in the rainy season just when it is possible to be wasteful with water.

This is easy to see with a planisphere, or use a computer program like Stellarium to identify and highlight Crater and Aquarius. So the constellations, to the pre-modern mind, were a part of the environment and not abstracted away into infinite distance. That's an advantage, but beware of taking all this too far.

In the meantime, I wait for the Cup and Crow and watch the petals fall from the tree. ★

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time I have had a youngster refer to M42 as a "place where stars are born" when all I was looking for was "cloud of dust."

At the end of the evening we were presented with a lovely "Certificate of Appreciation." We were also included in a group photo for their parents and leaders. My biggest reward though is the excitement that the kids show when they view the wonders of the night sky through one of our telescopes.

My special thanks also to Mark, Terry and Muguette for all their help and experience they so willingly gave. ★



# Astronomy Day 2013



## Members' Gallery



### Comet Pan-STARRS (C/2011 L4)

by Oleg Mazurenko

Single exposure  
47 seconds  
ISO 800

Equinox – 80  
Canon 350D

31 March 2013  
9:26 PM PST  
Vancouver



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