
HAMILTON AMATEUR ASTRONOMERS

Event Horizon

Volume 1 Issue 2

December 1993

Editorial

As the natural world outside settles down for a nice long nap, there is no lack of activity within the club. This past month has seen members researching into a site, organizing, and preparing a trip to Toronto (See inside for the racy details). While some members looked into Kinsmen Park as a dark sky observing site, Doug Welch explored a more remote site in Chile. Hamilton was also treated to a total lunar eclipse this past month.

I've been amazed at the number of articles submitted this month. I really do not want to sound like a telethon host, but here it goes. Keep your contribution coming, if the line is busy please try again. Seriously, however, keep sending your articles. I love the new challenge of actually CHOOSING which articles to print.

Send any ideas, articles, suggestions, drawings, sketches to the address below. Any format will do, even English.

As we approach the winter solstice it really feels as though the days were getting shorter. With all the parties to attend, shopping to complete (make that start) and food to enjoy, not to mention those things which are done regularly, it seems as if there is less time in the day.

Speaking of short, that's what I'm going to make this editorial.

Stephen Sheeler
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Chair's Report

Needless to say, I am very pleased by the excellent turnout at our first meeting. Furthermore, I thank Patricia for bringing in the "Cluster Buster" and Ann Tekatch for showing us her lunar eclipse slides. Many kudos to our illustrious editor, Stephen Sheeler, who did (and no doubt will continue to do) an outstanding job putting together a very attractive and informative newsletter.

This newsletter also brings us the sad news that Barb Wight has accepted a job offer outside of the Hamilton area and has consequently had to pass the torch as treasurer. Since Barb has been with us since the beginning (!) I would like to thank her for volunteering to be treasurer and help set things up and pass along her experience to our incoming treasurer - Ann Tekatch.

Apologies to two Council members whose responsibilities I failed to describe accurately in the last newsletter. Charles Baetsen is the Secretary and Ev Butterworth is our Observing Director. And Ann Tekatch actually fought government bureaucracy and lived to tell the tale, not the tail!

At last count, we had 38 members. Remember that you are all encouraged to participate in every way, including writing articles, giving talks at our meetings, and coming out to observing sessions and special group meetings. See the list of upcoming events later in the newsletter for details.

- Doug Welch

A Backyard Project: The Barn Door Drive

Recently I undertook to construct a barn-door drive for my camera. Since I don't own a clock driven scope, this seemed like the best way to obtain streak free photos of the night sky.

The design I followed, came from an article in the April 1989 issue of Sky & Telescope entitled "Two Arms are Better than One". This article offered four different designs, of which I chose the type-4 design, with a few modifications thrown in for good measure. The basic barn-door drive consists of two boards where one serves as a base and the other serves as an arm attached by a hinge. At

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the other end of the boards, a drive screw spreads them apart. This screw is allowed to turn at a constant speed by a synchronous motor, thus separating the boards, allowing it to follow the sky. The basic problem with this design is that as the boards move apart, the rate of change of angle (between the boards) decreases. Ideally, the rate of change of the angle should be constant, since the earth turns at a constant rate. This problem is known as tangent error, and is a consequence of geometry. In order to minimize this error (It can't be eliminated in this type of design), one can use two arms, instead of one. According to the above article, this type of barn-door drive (type 4) can stay on target for up to two hours.

As I began construction of the barn-door drive, I encountered few problems. The original design consisted of an L-shaped secondary arm, supported by a rectangular primary arm as seen in figure 1a. There were two things I did not like about this design: it was wider than it had to be and there was unnecessary torsional stress on the secondary arm's hinges (especially if there are heavy attachments on your camera). In order to correct this, I redesigned both the primary arm and secondary arm so that one fit inside the other (see figure 1b). Another problem I encountered was that the hinges I chose were too wobbly to attain good images. The solution to this was simple. Buy good quality brass hinges?

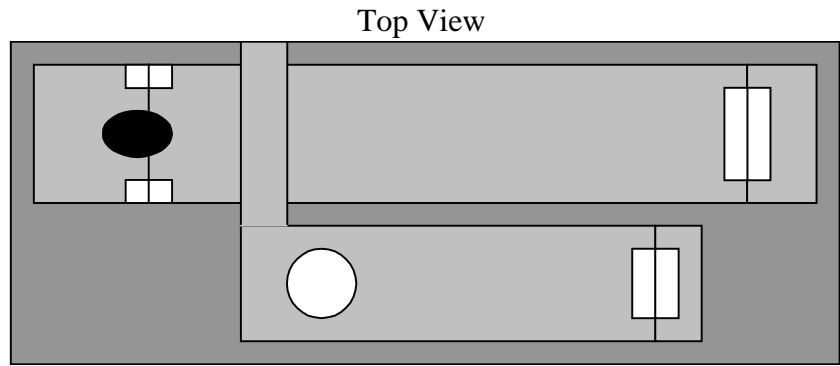


Figure 1a: Original Design

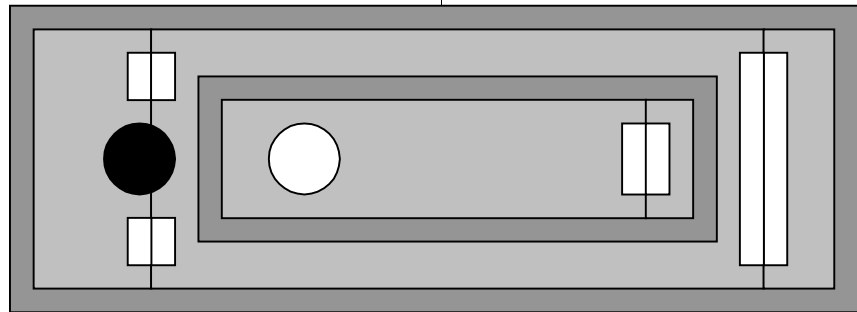


Figure 1b: Modified Design

The final, and in some ways the most difficult problem to overcome had nothing to do with construction. It had to do with finding a suitable trunnion (the pivoting device that holds the lower end of the drive screw). The design shown in the article required welding and machining of which I knew absolutely nothing. I don't even have access to any of this equipment. Finally after many failed attempts to improvise, I found a solution. The

greatest thing about it was that the only tool it required was a drill. What I did was drill two 1/16 inch dimples 180 degrees apart on the appropriate nut. Then using two binding posts (available from any electronics surplus store), I suspended the nut on two pins (see figure 2). It worked perfectly.

Now I am at the stage of testing my drive. The only problem I have left is finding an electrical outlet where there are dark skies. The 60 Hz - 1 rpm motor driving the screw, needs house current. My next project is to replace the synchronous motor with a stepper motor (that can be salvaged from old printers), which can be run off of my car battery.

If you were to ask me "Would I do it again?", I would say yes! It was not a terribly difficult project to complete. If you can cut wood, you can make a barn door drive.

Charles Baetsen

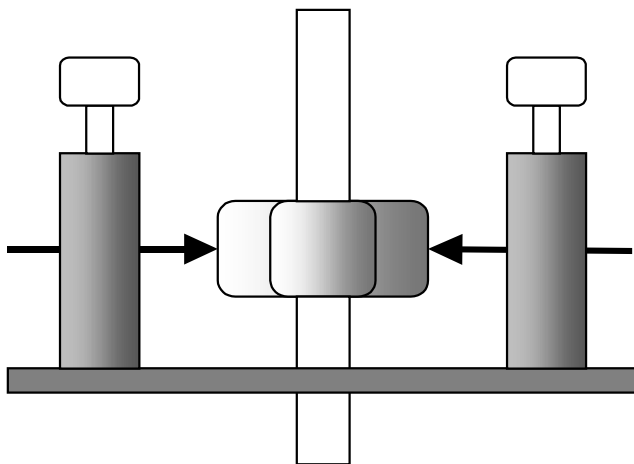


Figure 2: Trunnion

Greek in the Round

Welcome to the new stage of the Greek In The Round, Sky Performers. Just as our star performers have changed to a new home in the Event Horizon Newsletter, I have chosen to talk of a special changing star - "POLARIS". As steady and never moving as it is to us, it also has a history full of circles. With this, let the curtain rise.

Many people unknowingly believe that Polaris or the North Star as the brightest star in the heavens. It is not. It ranks 49th from the top in brightness at magnitude 1.99. This is not to take any of its magic or importance away from it. On the contrary, it is the most important star to current day navigators and travelers.

Present-day navigators are fortunate to have a star to point the way north. The earth's axis is tilted at an angle of 23-1/2° to the plane in which the earth orbits the sun - called the plane of the ecliptic. It's this tilt that causes the seasons, as the planet's northern and southern hemisphere lean alternately toward the sun's face. Also, the axis of the earth wobbles, the way the axis of a top wobbles as the top spins. This is the effect called precession. Polaris is not exactly at True North. The actual "precession cycle" is about 25,800 yrs. and Polaris is currently 0.8° from true north. In 150 yrs. from now, the Celestial Pole will make its closest approach to Polaris in the year A.D. 2102, at which time it will be a little less than 1/2° or (27' 31") from that star.

Bryant refers to the traditional use of Polaris as a guide to seamen in his Hymn to the North Star

*"Constellations come, and climb the heavens, and go.
Star of the Pole! And thou dost see*

*them set.
Alone, in thy cold skies,
Thou keep'st thy old unmoving station yet,
Nor join'st the dances of that glittering train,
Nor dipp'st thy virgin orb in the blue western main.
On thy unaltering blaze
The half-wrecked mariner, his compass lost,
Fixes his steady gaze,
And steers, undoubting, to the friendly coast;
And they who stray in perilous wastes, by night,
Are glad when thou dost shine to guide their footsteps right.
A beauteous type of that unchanging good,
That bright eternal beacon, by whose ray
The voyager of time should shape his heedful way."*

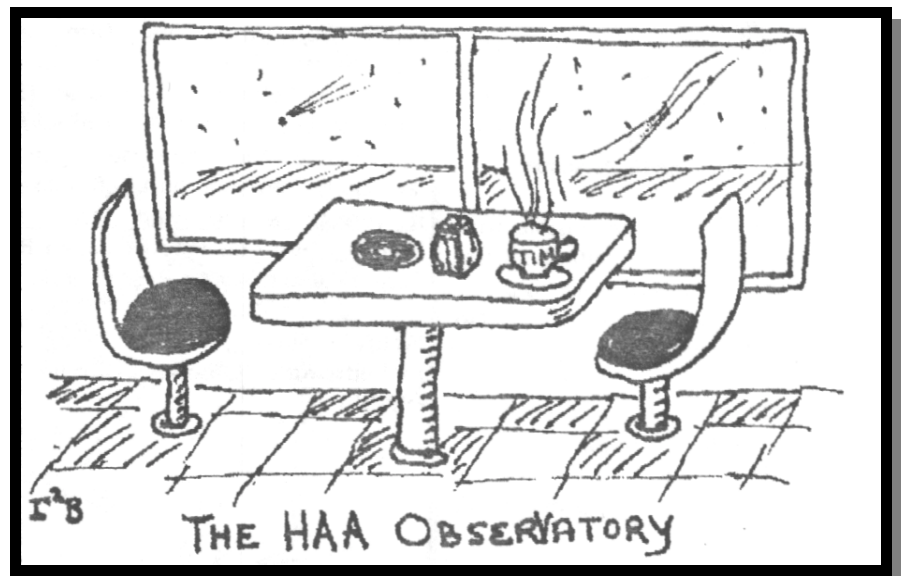
Polaris has not always been our Northern Pole Star. The Polar Point WOBBLE position has a change circle of 47°. The Earth's axis changes position during the approx. 26,000 yr. "precession cycle". The Polar point moves in a great circle some 47° in diameter. Some 4,600 yrs. ago, about 2830 B.C., the earth's axis pointed towards Alpha Draconis or Thuban (less than 10' from true north) in Draco and that was our "Pole Star" during the

"Old Kingdom" age of the Pyramid builders of ancient Egypt. The Egyptians built their pyramids with an open shaft directly facing Thuban so its light would penetrate the depths of the pyramid. And last, but not least, 12,000 yrs. ago the bright star Vega held this position of honour and will again in AD 12,000, some 4 1/2° at its closest approach.

Those who live in the southern hemisphere are not so fortunate to have a pole star. The region around the pole is rather vacant. The closest star to the true South Pole is the star Sigma Octans, 1° away from the pole. It is a star of magnitude 5.5, barely at the limits of naked-eye vision.

At this time, I would like to mention that I do not actually write these stories. I have used many sources of material. The Greek Myths, Burnham's Celestial Handbooks, Sky & Telescope "Skylore" articles, The Glorious Constellations and other odds and ends I've picked up here and there. I hope I will be able to convey a sense of wonder and lifestyle that our ancestors dreamed and lived by that can be enjoyed today and passed on to our descendants.

"Wish Upon a Star"
Ev Butterworth



Upward Skybound

Welcome to December. Christmas is in the air! As busy as it is, do try to squeeze in some time for observing.

Did you see the total lunar eclipse of Nov. 29? Some of us went to a small park in Dundas to observe the event. The skies were crystal clear for the partial phases of the eclipse. We only saw 15 min. of totality, however, before the clouds socked us in. During totality the middle of the moon appeared grey. There was also some red apparent on the edge of the moon. Also, some of the rim seemed mostly out of the shadow during totality. Grant Dixon suggested that we might be seeing sunlight reflecting off the earth, as the moon was very close to the edge of the shadow. The rest of the partial phases took place in mostly clear skies. I will get the name of the park we observed from as it may prove a feasible site.

The Winter Solstice will occur on Tues Dec 23, 1993 at 20:26 UT. This month watch for the Geminid Meteor Shower, which peaks on the night of Monday December 13, at midnight into the wee hours of Tues morning. You may see approximately 60 an hour. The shower should be good as the moon will be new. If you miss the Geminids, check out the Ursids. On the morning of December 22 you should see 15 to 20 meteors an hour. Also, Comet Encke is returning and is well placed in evening sky. It should be quite a treat for anyone with a small telescope.

Mercury & Venus: are visible with difficulty early in the month, both low in the southeast just before sunrise.

Jupiter: is moving from Virgo into Libra at mid-month. It is a bright object in the southeast just before sunrise. As the month progresses, it will get higher in the sky and further south

Saturn: is moving from Capricornus back into Aquarius late in the month and is

due south at sunset, and sets about 5 hours later. Catch the planet as often as you can as it will soon be gone.

The Hamilton Amateur Astronomers (HAA), will be offering to its members a certificate of achievement for finding all the Messier objects. This will be available in two options. 1) finding the objects with Binoculars, in which there will be two categories, or, 2) finding all objects with a telescope of any size. You must hunt them down on your own, which can be very rewarding. Check out the January general meeting for information and details.

Last, but not least, we have the opportunity to take advantage of the **Kinsmen Park** in Beamsville, for a **dark observing site**, Nancy Morgan, lives a couple miles down the road and has invited us to come and observe with her. For now, we will be setting aside one Saturday each month, closest to New Moon for this purpose. (There is a Tim Horton's with facilities, 5 minutes away and Nancy has kindly offered to allow us the use of her home washroom). Nancy, thank-you very much for your generosity and finding this site for us. **Our first two observing sessions, (weather permitting) will be held on Dec. 11, 1993 & Jan. 8, 1994**, after 8:00 pm. We are also currently looking into other sites (so Nancy's washroom won't flood).

Directions: From Toronto or Niagara QEW- take Ontario Street (*Beamsville*) cutoff. Go to first lights. Turn Left on Main Street. Turn Right on Mountain Road. Turn Left on Kinsmen Road. (Look for white fences on both sides of road-if you come to Mud Street you've gone too far) Go to Stop Sign, turn Left, into park. If coming across Mud Street from Hamilton turn Left onto Mountain Road. Turn right on Kinsmen Road to park.

Watch the Skies
Ev Butterworth - Observing Director
632-0163

Field Trip Alert!!

Join the gang on an adventure to the **McLaughlin Planetarium** in Toronto. The date is **Saturday, January 22/94**, and showtime is 3:00 p.m.

FUN FOR THE WHOLE FAMILY

Group rates are available at the following fees:

ADULTS: \$4.40
YOUTH, under 14 \$2.50

Group rates must be paid an advance; **deadline is January 14, 1994.** (HAA general meeting)

OR

Regular rates may be paid at the door,
ADULTS: \$5.50
YOUTH, under 14: \$2.75

must be at door a half hour before show time to ensure seating

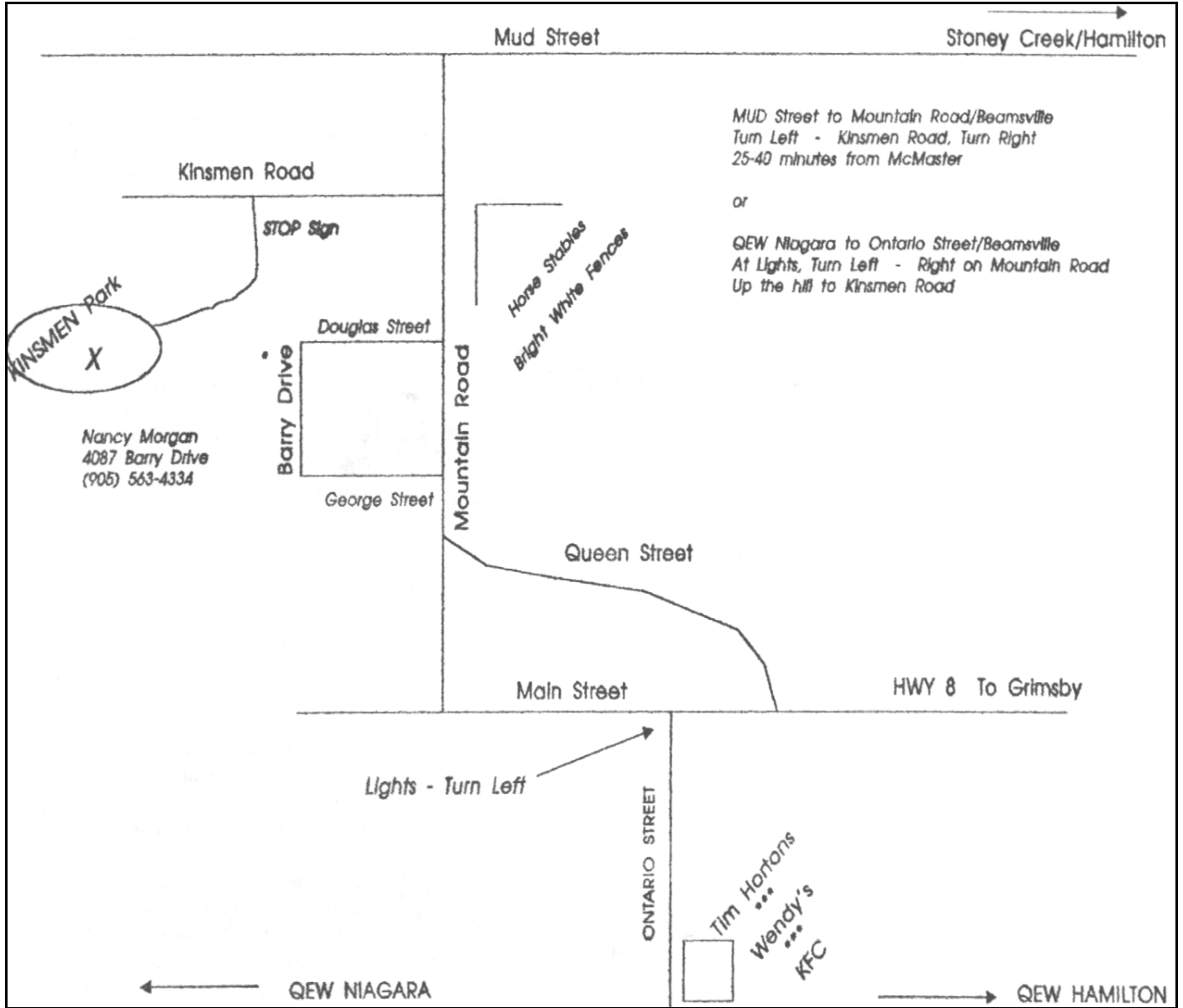
If interested please contact Patricia Marsh at 575-4191 or see her at the January 14th meeting.



The Seven Sisters

*Nothing puzzles me more than
time and space, and yet nothing
troubles me less*

-Charles Lamb



Use this map to locate Kinsmen Park.
Thanks to Rob Butterworth for creating this graphic.

Yes, Virginia, there is a Santa Clause... Thank God!

-1897, an editorial in the New York Sun to Virginia O'Hanlon's letter, "Please tell me the truth; is there a Santa Clause?"



*Have a save and happy holiday
All the best to you in the new
year. Enjoy the season and we
will see you in '94.*

A Brief History

The first general meeting of the Hamilton Amateur Astronomers took place on the evening of November 12, 1993.

Dr. Doug Welch opened the meeting, which was attended by a full house. The first order of business was to introduce the new treasurer, Ann Tekatch. Doug regretted to report that the former treasurer, Barb Wight, would be moving away and could no longer be able to fill the position.

The, then, upcoming Star Party on November 20 at the Dundas Conservation Area's Trail Centre was announced. The public night was eventually cancelled due to the misbehaving weather.

It was announced that the Cosmology Group will start meeting in January 94. The group will be headed by Bill Tekatch.

Next Ann Tekatch explained the causes of lunar eclipses and showed some slides of eclipses which she had taken herself.

Patricia Marsh then showed her telescope, the "Cluster Buster" and briefly explained how she had made it. Reference was made to Jim Winger and his Caledonia Amateur Telescope Makers (ATM) group.

Ev Butterworth then presented her 4-1/2 inch telescope to the audience. Jim Winger then spoke about his group and mentioned that their next meeting would be in the new year.

The audience then attentively listened as Doug Welch gave a superb lecture on "Missing Mass". He explained the evidence that exists to make the case for "missing mass". He then eliminated those things which the "missing mass" could not be. Then he presented the latest findings of two separate groups.

Their data suggested that they have indirectly detected some of the so-called MACHO's (Massive Compact Halo Objects). The talk was very enlightening, to think 90% of the universe's matter is "invisible." Doug's talk was followed by many questions.

Before Doug Welch closed the first meeting, he made a suggestion that everyone go to the Planetarium, just down the Hall, for a brief show.

Events and Announcements

◆ Cosmology Discussion Group

A meeting is being planned for Saturday, January 19, 1993. At this point it looks like it will be held at the home of Bill and Ann Tekatch. Seating will be limited, if you're interested or want more information, call Bill Tekatch at 575-4433. Details will be announced in the next month's Event Horizon.

◆ Membership Cards

New members who haven't received their membership cards can pick them up at January's meeting. Family members are entitled to cards for each participating family member. Please see me at a general meeting or call me with the names and cards can be sent.

Ann Tekatch Treasurer
573-5433

◆ January's General Meeting

The next meeting will be on Friday January 14, 1994 in the Spectator Building. The main speaker will be Dr. Ralph Pudritz who will give a lecture entitled, "A Star is Born."

◆ Planetarium Field Trip

Will occur on January 22. See previous page for more details.

◆ Event Horizon Deadline.

Send your articles, suggestions or drawings to the address on the first page by January 3, 1994

Welcome HAA

Unaccustomed am I, to see events occur as punctual as they did at the inaugural meeting of the Hamilton Amateur Astronomers. Slide show, telescope display, a professional speaker to enlighten us on the latest dark matter discoveries and a very respectable newsletter, combine to give the fledgling HAA a feel of true co-operation and efficiency.

It was obvious that the public was also impressed given the large response. (probably due to the dedication showed by someone who must have done a lot of legwork with the media). Surprised I was and a little put out to find that I was accused of arranging the arrival of an occultist, fringe group, complete with handouts, (put out, because I never thought to invite them, they just sort of showed up on their own!).

Treated we were, to missing dark matter, AND a tour of the Planetarium. What more could someone interested in astronomy, ask for on the opening night of a new astronomy club.

Members and public are invited to wine and dine (sort of) at a new bistro in Dundas and some very memorable toasts were made, (at least I hope they were memorable as I expect this club will be around for at least 50 years).

As I sit back now, I reflect on something that I read in the Event Horizon, penned by Ev about fellow members Sarah Catherine, Danny and Jimmy; I think that what they hope the HAA can do for them, is not all that unlike aspirations that I have. I am looking forward to these fine young people to open the night sky for me.

So I say welcome to new members and welcome HAA. I hope for nothing but good things to happen to you.

Habib

(I may be a great humanitarian but it is people that I hate!)
