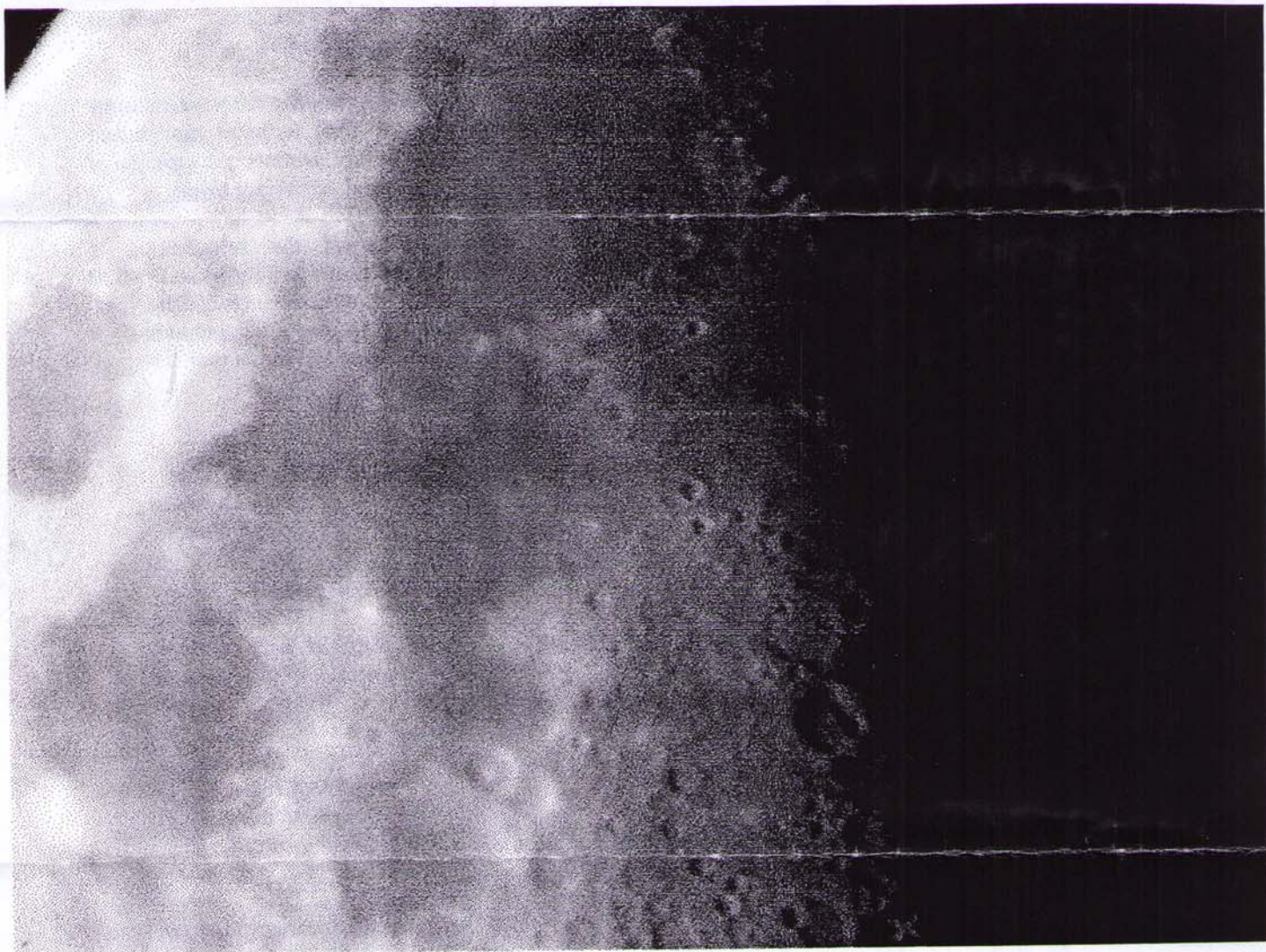


Event Horizon

September 2000

Volume 7 Issue 9



This photo of the first quarter moon was taken September 5th through a 70 mm f6.8 refractor with a Nikon Coolpix 950 digital camera. I simply held the camera up to the eye-

piece and snapped the photo, allowing the camera to focus and expose automatically.

The telescope was on a simple tripod - no wedge, no po-

lar alignment, no drive.

I think this is the beginning of a beautiful friendship...

Ann Tekatch

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Chair's Report

Welcome back to a new season of astronomy with the Hamilton Amateur Astronomers. I hope everyone had a brilliant vacation. Unfortunately, mine was less than perfect - a rainy canoe trip is not the ideal way to enjoy the great outdoors. On the other hand we did get a lot of reading done - great fun if you don't mind sharing your reading time with one wife and two dogs in a very small tent. It wasn't all a washout, though, as on our last night there the clouds parted and we were treated to a grand display of Persiads followed by a spectacular aurora.

The fall is setting in, and with it the nights will get longer, the skies should become crisper, and we will all be ready with our telescopes for the celestial displays. Just for a minute let us stop and think of another form of astronomy that could use your talents. The time for filling council positions is almost upon us. The jobs the councillors do are extremely important for the running of the club and yet are not onerous. In the past we have been very fortunate to have a good balance of new and seasoned people to fill the needed positions. Please consider getting involved on the council; it is fun,

rewarding, and you will have your finger on the pulse. While there are no downsides to volunteering, there are many upsides, not the least of these being that there is a party atmosphere once a month with great people and fine food.

I hope all of you have been considering the question that I posed at the last meeting about possible directions we want to take this club. Both now and next month are the times to put forward your suggestions on what direction you envision our moving.

A news flash has just come in! Denise Kaisler has had an article published in the October 2000 issue of *Astronomy* magazine!!!! Denise is a long time friend and member of the HAA. Not only is it an article in a major international publication; it is also the cover story and is about globular clusters. I have two things to say about this: way to go, Denise! and I think this would be a great time to get out and buy *Astronomy* magazine.

Grant Dixon, Chair
grant.dixon@home.com

A note from the editor

As always club members have submitted some great articles to *Event Horizon*. If you would like to submit something for inclusion in *Event Horizon* the process is simple, just send an e-mail to al965@hwn.org or call 540-8793. Poems, photographs, drawings, book reviews, notices,

and other articles are all excellent additions to your newsletter.

Thank you everyone who submitted articles this month, especially Dean, a member of the Hamilton Amateur Junior Astronomers who used a portion of his summer vacation to write a story for the newsletter.

Rosa Assalone

HAMILTON AMATEUR ASTRONOMERS

Event Horizon is a publication of the Hamilton Amateur Astronomers (HAA).

The HAA is an amateur astronomy club dedicated to the promotion and enjoyment of astronomy for people of all ages and experience levels

The cost of the subscription is included in the \$15 individual or \$20 family membership fee for the year. Event Horizon is published a minimum of 10 times a year.

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Ask Stella!

Greetings yet again, you star-hoppers and alt-az swivelers. What's new in your little corner of the universe? Well, for me, thank heavens, there is a new and fresh question to kick off this new and fresh year of Event Horizon. This month, our question is from Bobby Porter, of Diboll, Texas. Bobby, ever one for the down-and-dirty fundamentals of it all, writes:

According to Hubble, the farther away a galaxy is the faster it travels. Shouldn't it be slowing down or remain static?

Okay, first thing's first:

Distant galaxies aren't *accelerating* away from us.

However, more distant galaxies do recede from us more quickly than nearby galaxies. Mathematically, this is written as:

$$v = H \cdot r$$

where v is the speed of a galaxy, H is a number, and r is the distance of the galaxy from our own island universe, the Milky way. The letter H is called "Hubble's constant" and is the same for all galaxies. The value of H has produced some of the most heated debates in all of modern astronomy. The most recent measurements tell us that the value of H is about 70 km/s/Mpc (where 1 Mpc -- that is, one megaparsec -- is a unit of distance equal to about 3.3 million

light years). Now the measurements to make this value were done extremely carefully and repeated many times, but it's a well-known fact that lots of astronomers have their own favorite values for Hubble's constant and these can differ by quite a lot from the value quoted here.

Anyway, the foibles of astronomers aside, Hubble's law says that if galaxy B is twice as far away as galaxy A, B will recede from us twice as fast.

But this explanation doesn't really answer your original question which asks "why is the universe expanding at all?" "Why isn't it slowing down or remaining static?"

The universe is expanding because of the Big Bang. All the energy that's driving everything further apart came from that original, titanic kablooie. But the universe may not continue to expand forever. Whether it does depends on two things: the amount of matter in the

universe and the value of the cosmological constant.

First, let's start with the amount of matter in the universe.

If there are enough stars, galaxies, and cold dark matter for their mutual gravity to stop the expansion of the universe at some finite time, we live in a closed universe. If there isn't enough stuff in our universe to stop the expansion then we live in an open universe. In a closed universe, the expansion will eventually stop and then reverse. All galaxies will then begin to move towards each other -- the reverse of what we see now.

Seems pretty straightforward, right? But cosmologists aren't sure that the picture is so simple. The complication has to do with a mistake that Einstein made in 1915.

In the early part of the 1900s, astronomers believed that we lived in a static universe where all galaxies stayed the same distance apart. But in 1915, when Einstein formulated his theory of general relativity, he was dismayed to find that his theory predicted a dynamic universe -- one that was either expanding or contracting. This was contrary to the the accepted ideas of the time. No doubt it made him tear at his hair, perhaps giving rise to the wild 'do that's become an Einstein trademark.

(Continued on page 5)



Starfest 2000/Huronia Star Party

Along with several other HAA members, I attended this year's Starfest 2000. Once again they put on a very well organized, entertaining and educational party and broke their previous attendance record, with over 1000 people visiting over the weekend. The highlight, to hear the organizers talk, was the Parthenon they built around the stage, and it was very well done.

They had an excellent lineup of speakers, including our own Doug Welch, who despite sleep deprivation gave an excellent talk on the status of cosmology. Nagin Cox, from JPL, gave an entertaining presentation on the Galileo Mission to Jupiter from a first hand perspective. She managed to create an adventure/suspense story and like any good story teller kept us wanting to hear what happened next.

The most interesting scope there was a 72" scope with a folding mirror. It used a projection system to project the image onto a glass bead screen. Although I wandered over a few times to hopefully see it in action, that didn't happen. I'm not sure if it ever saw light that weekend or not.

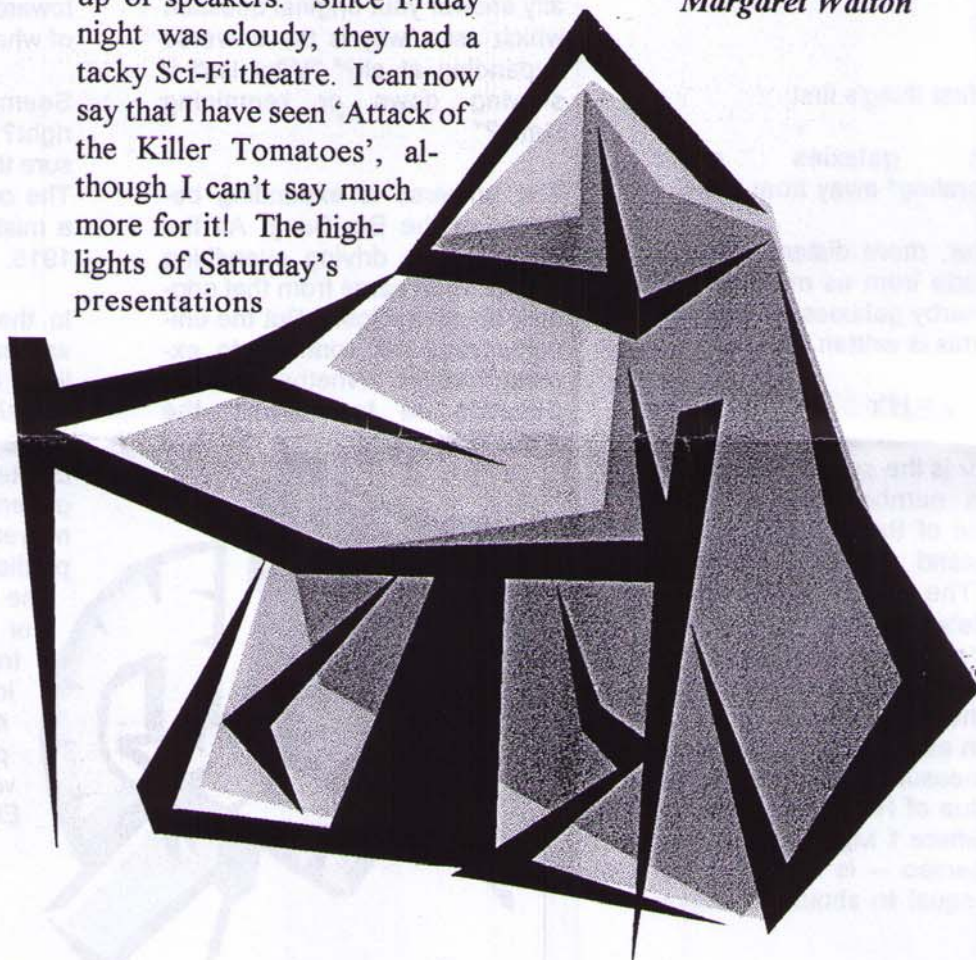
Thursday night was clear, and we got in some great observing, including finding Stephan's Quintet, although 'quintet' for me was three. Friday night was also clear, but the seeing was very poor, so we mostly spent the evening showing some of the more spectacular objects to those lined up to look through the scope.

The weekend after Starfest was the Huronia Star Party. This is a much smaller party, but they also had a great lineup of speakers. Since Friday night was cloudy, they had a tacky Sci-Fi theatre. I can now say that I have seen 'Attack of the Killer Tomatoes', although I can't say much more for it! The highlights of Saturday's presentations

were Ivan Semeniuk talking about cosmic rays, in particular a new class of very high energy rays, and Paul Delany on the history of observational astronomy. Unfortunately, with rain on and off all day Saturday, and cloudy skies again Saturday night, we didn't even get the scope out of the car the entire weekend.

Hope everyone had a great summer,
Hope to see you at next year's parties.

Margaret Walton



Stella

(Continued from page 3)

To make his new theory agree with the leading ideas of the time, Einstein invented something called the cosmological constant -- a pressure that would counteract the force of gravity and allow the universe to exist in a steady state. But later on, astronomical observations by Edwin Hubble and others showed that all galaxies except the ones very close to the Milky Way were moving away from us. When Einstein heard of this, he abandoned his cosmological constant, calling it the greatest mistake he ever made.

But recently, astronomers who study the origin and fate of the universe have begun thinking that maybe there is something to Einstein's idea after all. If the cosmological constant is not zero then it could have big consequences about our understanding of the universe. For instance, even if there is enough matter to close the universe, it might still keep expanding forever. Another consequence is the "loitering universe". Much like teenagers at a mall, the universe may well have just hung around in a static state for a few billion years when it was young.

So there you have it -- the reason why, more often than not you'll see galaxies receding from us. Not that the Milky way is in any way special, by the way. The intelligent Xarvons of the water planet Glug also see pretty much ever galaxy moving away from their home galaxy of M87. Every

point in the universe is moving away from every other point.

Oh great. Here come those X-Files people to talk to me. I think I'll say a quick adios and and start heading for the border.

Astronomically yours,

Stella.



Do you have a question that's keeping you up nights? Then send email to ask_stella@earthling.net.

Ask Stella: your source for astro-facts.



Ask Stella: Time In A Bottle

Friends, Romans, Stargazers, the moon has waxed and waned. Another month is upon us. And you know what that means! It's time for another astro-question.

This month's query is a little esoteric. It comes to us anonymously via the 'net and has to do with the wild and wonderful effects of special relativity:

Gravity controls time, so does it control radio-activity in the center of large planets where gravity is reduced?

In the words of my cosmologist friend Amy Lo: "Gravity doesn't slow time."

To explain this more fully, I'd like to take a step back and talk about where your question came from.

No doubt you've been bending your brain around Einstein's theory of Special Relativity. In this theory, the big-haired brainer describes a phenomenon called time dila-

tion, which does indeed occur when two inertial reference frames (non-accelerating points of view in which Newton's laws apply) are accelerating with respect to one another. In plain language: if you put a person in spaceship and and watch it accelerate away from Earth, time will appear to slow down for the person on the ship as seen by the person on Earth. But this time dilation is only apparent to the earthbound observer. The person on the ship will not feel time slow down.

So time dilation does occur, **but** it only happens if one frame of reference is accelerating with respect to another. If the spaceship in our example was sitting still or coasting at a constant speed with respect to the earth, we wouldn't see a time-stretch. Also, the observers have to be in these separate frames of reference for them to see any effect. If they were both on the ship, everything would appear normal.

Now let's get back to your question. If you were standing on the surface of the earth with a Geiger counter and a radioactive sample (a lump of cesium 137, let's say) then you and the cesium would be in the same inertial reference frame. If you went to the moon and did your radioactivity experiment there, your Geiger counter still wouldn't ping any faster because you'd

still be in the same reference frame. Even if you and the cesium were floating in the icy depths of space where there was a miniscule gravitational field, it wouldn't make the decay happen any faster. So if you were somehow wedged into a crevice way down in the Earth, the reduced gravity wouldn't affect the radiation.

But if you put the cesium on the Space Shuttle, fired it away from you, and recorded the results with a super-duper mono-directional Geiger counter that could work over long distances, then you **WOULD** see the decay rate slow down!

Relativity - gotta love it.

Astronomically yours,

Stella



Do you have a question that's keeping you up nights? Then send email to ask_stella@earthling.net. Remember, Stella's, your source for astro-facts



UNFRIENDLY ALIENS

By Dean, age 10

One day, I was in my backyard playing tag with my friends. A few minutes later, an alien space ship landed in my backyard. It was surprising to see an alien on planet Earth.

We asked him, "Who are you?"

"I am an alien," he said in a mean voice.

The next day, he was more friendly than before, so I introduced myself.

"My name is Dean, and these are my friends Joey, Joel, Rudy and Jeff. Hey," Dean said, "since

summer just started, we can hang out with each other."

Everyone agreed to the plan, including the aliens.

"What should we do?" Dean said.

The alien said, "maybe we can visit Planet Sea or Planet Rock. And by the way, you can call me Mr. Green."

On Planet Rock, the creatures are called the Rockies, and on Planet Sea, creatures are called the Seas.

"So let's go now," said Dean.

All of them went in the space ship.

"Nice," said Rudy, Joel

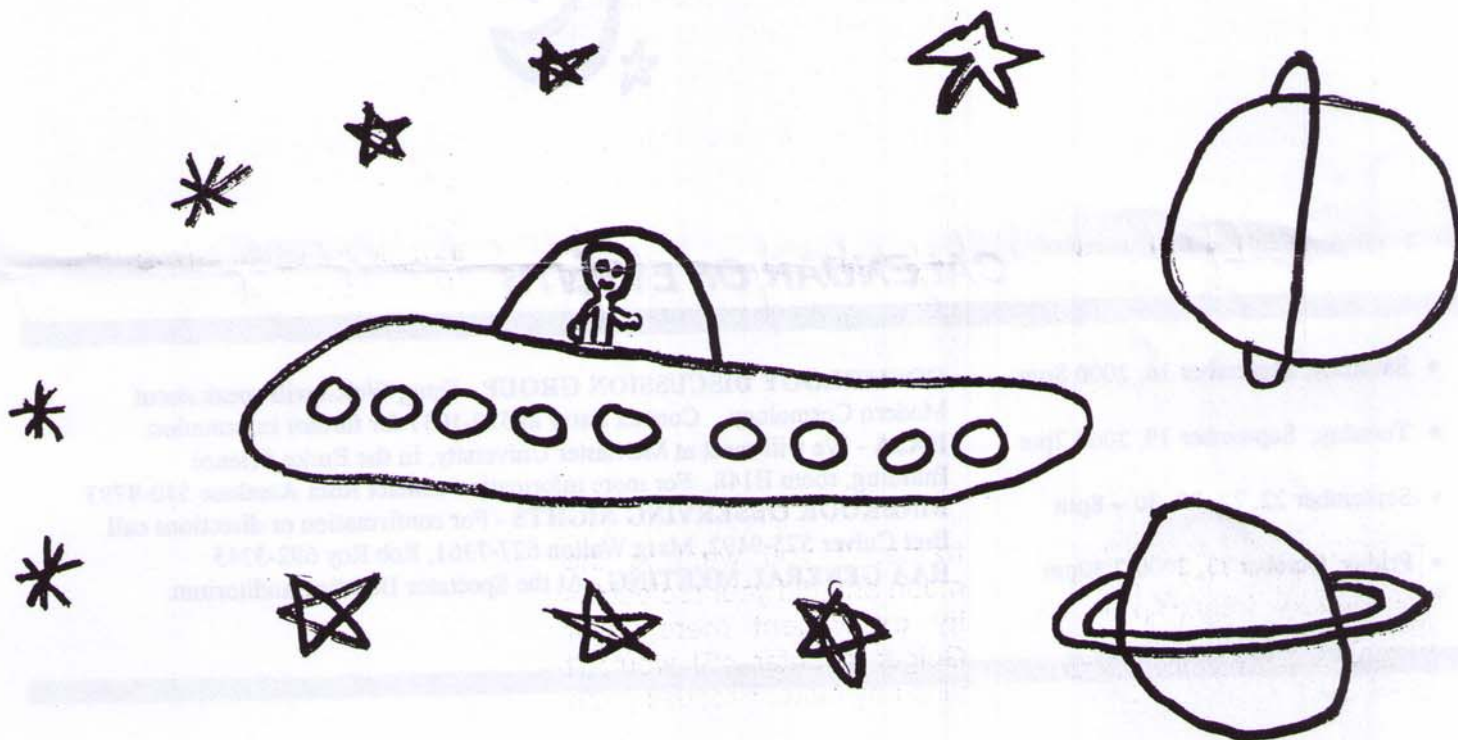
Joey, Jeff and Dean. Bip bip - what in the world? It's a reading from Planet Rock and Planet Sea.

"Help," the radar said.

"There is a force invading us, we have to go. Sorry we can't take you, but it is WAY too dangerous," said Mr. Green.

"Bye," everyone said.

- THE END



Cosmology Discussion Group

MEETING LOCATION

As we are having difficulty with our room booking at the Hamilton Spectator, some or all of our meetings may have to be held elsewhere. Please check the web, or your email, or the HAA discussion group, or phone any council member before each meeting to confirm its location. If anyone knows of a suitable room (for free!) could you please contact Margaret Walton at 627-7361 or margw@icom.ca.

Presents our own Doug Welch who will speak on **Modern Cosmology** Saturday, September 16th, 2000, 8pm. In McMaster's Burke Science Building room B148. There will be free coffee, ginger ale, cola, and timbits. We welcome our members to bring a small entree. Everyone welcome, open discussion. For further information call Larry at 529-1037.

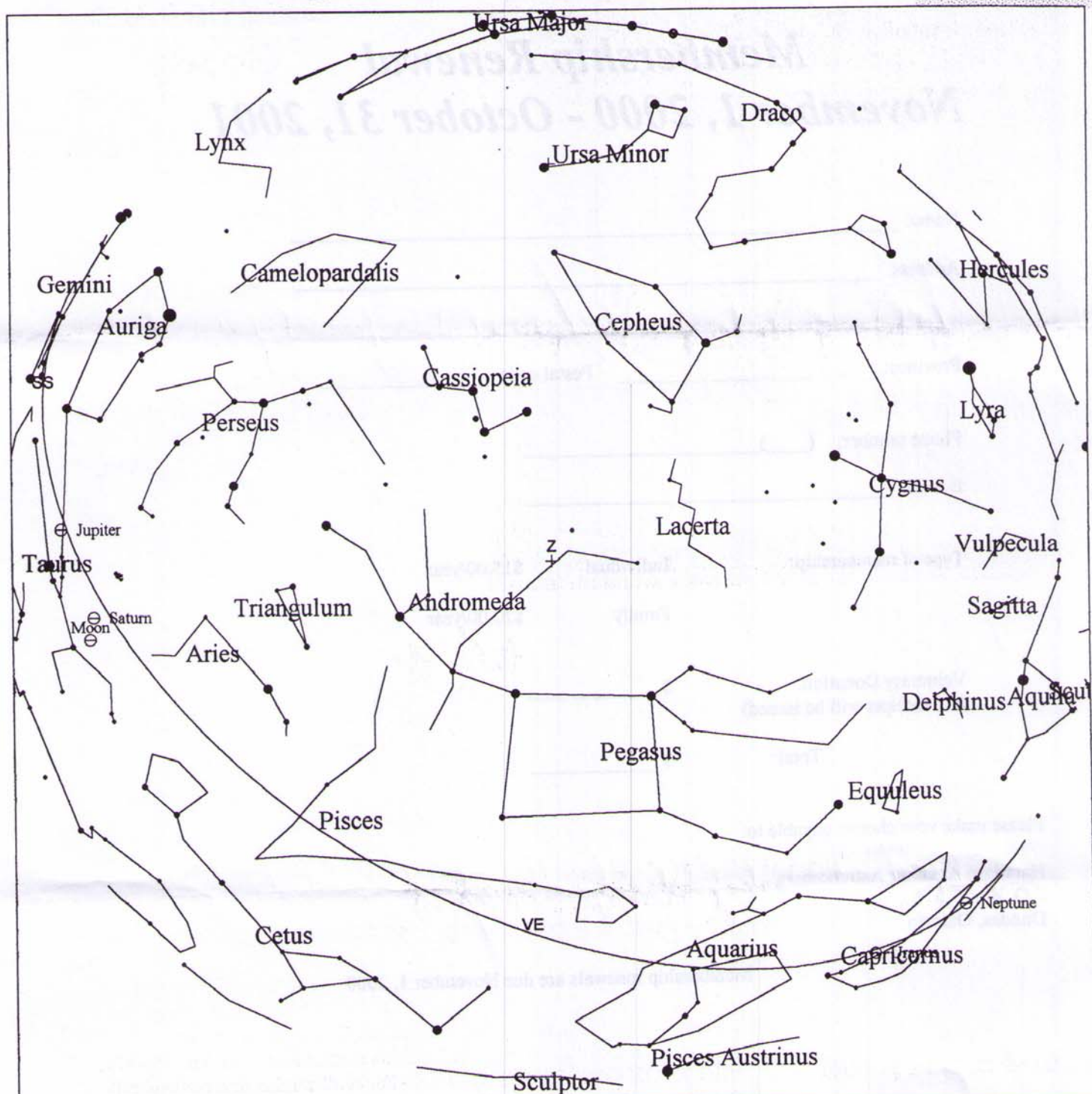


CALENDAR OF EVENTS

- Saturday, September 16, 2000 8pm
- Tuesday, September 19, 2000 7pm
- September 22, 23, 29, 30 ~ 8pm
- Friday, October 13, 2000 7:30pm
-

COSMOLOGY DISCUSSION GROUP - Doug Welch will speak about Modern Cosmology. Contact Larry at 529-1037 for further information
HAA - We will meet at McMaster University, in the Burke Science Building, room B148. For more information contact Rosa Assalone 540-8793
BINBROOK OBSERVING NIGHTS - For confirmation or directions call Bret Culver 575-9492, Marg Walton 627-7361, Rob Roy 692-3245
HAA GENERAL MEETING - At the Spectator Building auditorium.

October Night Skies



ECU V3.0A (Star Atlas Mode) - October Night Skies

UTC: 2000/10/16 at 03:30
LMT: 2000/10/15 at 10:30pm

RA=23h50.2m Dec=+43°16'
Field=180.0° Azim=342°24' Alt=+90°00'

Membership Renewal

November 1, 2000 - October 31, 2001

Name: _____

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| | | |
|---------------------|------------|--------------|
| Type of membership: | Individual | \$15.00/year |
| | Family | \$20.00/year |

Voluntary Donation: \$ _____
(tax receipts will be issued)

Total: \$ _____

Please make your cheque payable to:

Hamilton Amateur Astronomers
P.O. Box 65578
Dundas, Ontario

Membership renewals are due November 1, 2000