

# Event Horizon

October 2000

Volume 7 Issue 10

## Starfest

**W**e, the intrepid amateur astronomers did venture to Starfest. We drove in on the Wednesday, parked next to our friends from Ohio, who by the by, saved us a spot on the hill next to them.

Oksana and I had to leave to go to Elora for what turned out to be, a mass choir rehearsal, in preparation for the International Plowing Match which takes place during the week of September 17. The rehearsal lasted about two hours, and in that time the atmosphere changed. Visibility due to fog was down to three car lengths. Under these driving conditions, it took us three times as long to get back to Starfest. Getting back to our site we discovered that although the fog was so thick that we could not see the trees across the valley, there was an opening in the sky which allowed us to see M13, M81, M82. It was eerie. We, the Ohio group and us, stayed up till after midnight hoping for a sighting of Saturn or Jupiter, but it was not to be. The fog eventually closed in and put a stop to everything.

Thursday, the fog burned off, and with the help of the Ohio group, we located Jupiter around noon. We had everybody comig to look at that, in fact, none of those who looked throug the telescope, had ever seen Jupiter before during the day. Thursday night was super, and from then on everything just deteriorated. No more viewing for the rest of the week. The seminars were GREAT.

Oh lest I forget, our little location test. We are at N32d15.362' W64d51.766'

Where are we?

(answer below)



**Oksana and Lou Darcie**  
**Astronomaires Extraordinaire**

**Answer to location test:**

The location is at the high water mark at Church Bay in Bermuda.

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## Chair's Report

**T**he frost is on the pumpkin ...

... and I've just returned from the East Coast, a wonderful visit with my sister-in-law topped by a magnificent cruise on the Bluenose II in honour of my father-in-law's 80<sup>th</sup> birthday. Now I have to put all that behind me, as it's time to get back to astronomical work.

The first thing on the agenda is to ask you to consider becoming involved in the HAA administration. New Council members are needed! This is a great way to find out the inner workings of a top-quality astronomical club. None of the positions is terribly onerous, but all are very necessary. Make new friends and solidify existing ones! Have fun and eat good food! Oh yes, help keep a very vibrant and worthwhile organization running smoothly! Join the Council! But hurry - time is running out. Please submit your name to me right away! Call me at (905)627-3683 or e-mail me at [grant.dixon@home.com](mailto:grant.dixon@home.com) to get involved!

One of the main cornerstones of this organization is that we pay as we play. Since our inception seven years ago, our dues have remained constant at the ridiculously-low sum of \$15 per individual and \$20 per family. This is less than one CD or a pizza, and brings you a year's worth of camaraderie, intellectual stimulation, ten scintillating guest speakers and exciting meetings,

and monthly newsletters. It's the best bargain around. Unfortunately, due to the ravages of inflation, we have run a deficit the past two years: \$350 two years ago, and \$500 last year. We were able to cover this with surpluses that we had accumulated in earlier years, but we can no longer do this and expect a further loss of at least \$500 this year if dues remain static. Therefore, it is with regret at the inevitable that we will have to raise our dues this year.

At the end of last year, there was discussion on the direction the club should take in capital purchases (special projects). After listening to the membership and following further discussion in Council, we have narrowed our direction to two choices. We feel that the projects that would benefit our membership most are 1) to bring in high-profile speakers, and 2) to buy a data projector. These projects are financed with monies acquired through means other than membership dues, such as private donations and fundraising drives.

We select our speakers from suggestions made by our membership, and I would love to hear from you on who you would like hear, even if you think the person might be too famous. You never know! We've managed to attract some before!

*Grant Dixon, Chair*  
[grant.dixon@home.com](mailto:grant.dixon@home.com)

## HAMILTON AMATEUR ASTRONOMERS

**E**vent 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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## links of the Month

I have three links for you to check out this month. The first is the Two Micron All Sky Survey (2MASS) project at <http://www.ipac.caltech.edu/2mass/>. The entire sky is being scanned in three near-infrared bands to detect and characterize point sources. 2MASS will produce the following data products:

- A digital atlas of the sky comprising approximately 4 million  $8' \times 16'$  images, having about  $4''$  spatial resolution in each of three IR wavelength bands.
- A point source catalog containing accurate positions and fluxes for ~300 million stars and other unresolved objects.
- An extended source catalog containing positions and total magnitudes for more than 1,000,000 galaxies and other nebulae. Survey operations began in Spring 1997 and will last for about 4 years.

A number of months ago I came across some variable star classifications that I couldn't decipher. A quick search of the web didn't help me and none of my astronomy books were of much help. Ann Tekatch came to my rescue by digging through a number of her books. Now I have found a comprehensive list at

[http://www.aqua.co.za/assa\\_jhb/Canopus/c986vars.htm](http://www.aqua.co.za/assa_jhb/Canopus/c986vars.htm).

The third site, "Sunspots and the Solar Cycle", was passed on to me by Burt Rhebergen. The URL is <http://www.sunspotcycle.com/>. This site has items such as today's sunspot count and images of the current auroral activity. The aurora images are taken with NASA's Ultraviolet Imager, a polar spacecraft whose main job is to take ultraviolet pictures of the aurora and are updated every 7 minutes 24 hours a day! You will find tons of other information about our star at this site.

Please note the new location of my "Links of the Month" at <http://members.home.net/stewart.attlesey/lom.html>

**Stewart Attlesey**  
[stewart.attlesey@home.com](mailto:stewart.attlesey@home.com)





## Ask Stella! Keep On Askin'

**S**alutations, star-hoppers. This month we have not one but, a pair, a brace, a couple of questions -- one from a youngster and one from a seasoned scientist. Both of these are great questions, perfect examples of why you should never be afraid to ask if there's a mystery to be solved.

### Part 1: Achernar, the Bright Blue Star

Our first question is from Matt, a middle school student from Chester, New Hampshire. The puzzle that's been keeping him up at night concerns stellar evolution. He asks:

*What stage of its life cycle is Achernar in?*

Well, Matt, the short answer is that Achernar, the brightest star in the southern constellation Eridanus (the river), is in what's called the "main sequence" phase of its life. During a star's main sequence phase (the longest period of its lifetime), hydrogen fusion is the main energy source. This means that deep down in the center of the star, hydrogen atoms crash into each other with enough force so that they stick together and form the second lightest element, helium.

Hey, here's a puzzle:

It takes four atoms of hydrogen make one atom of helium. However, one atom of helium weighs less than four atoms of hydrogen. So, where does the extra mass go? Cover the rest of the article and think about that before you read on.

The answer is that the extra mass is released as energy (heat and light). Einstein's famous equations  $E=mc^2$  means that mass and energy can be transformed into each other. That's what happens at the center of Achernar, or the Sun, or any other star. Einstein's formula describes how stars shine.

Just like Achernar, the Sun is also on the main sequence. The difference between the two is that Achernar is more massive, so it burns hotter and faster. When either of these stars use up the hydrogen in their cores, they leave the main sequence and go through a number of changes. For a light star like the Sun, that means becoming a red giant star and then a white dwarf. But for a heavy star like Achernar, it means several red giant stages, with the end result being either a white dwarf or a neutron star.

### Part 2: What's Up With Blackbodies?

Our next question is from Toni Colosi. Toni's a grad student at a

small college in Virginia. He majors in physics and math, so stars aren't his main point of interest. But his question is very astronomical. Toni writes:

*What specific process gives rise to the photons that comprise a continuum blackbody spectrum?*

*What gives up energy to generate such a photon, and how is the photon produced? Which charges are accelerated?*

Okay, Toni, first thing you should know is that the formation of a blackbody spectrum isn't a process like free-free emission (bremsstrahlung) or spontaneous emission. The photons don't come directly from the movement of an electron. Instead, the source of photons varies, depending on what kind of object you've got in your sights.

If the object in question is a star, then the photons come from nuclear fusion. If it's the canonical blackbody they always talk about in physics books (a heated cavity with a rough inner surface and one small hole to let light out) then the photons come from the thermally excited walls of the chamber. What actually forms the blackbody spectrum is the fact that the photons bounce around zillions of times before escaping. Each time the photon is absorbed and re-emitted (what I'm flippantly calling a bounce) it winds up with a different amount of energy and hence a different wavelength. The end result of all this bouncing is the statistical distribution of wavelengths that bears Max Planck's name.

So it doesn't matter where the

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## Ask Stella

*(Continued from page 4)*

photons come from. As long as the object that's producing them is optically thick (meaning it allows for a large number of collisions before the photon is released) and in thermal equilibrium then the energy distribution of the resultant light will be a blackbody curve.

As a reference, you might pick up G.B. Rybicki, and A.P. Lightman's kick-butt textbook "Radiative Processes In Astrophysics".

Anyway, that's all for this month. Stay tuned, keep looking up, and keep those brains a-humming.

Astronomically yours,

*Stella*



Do you have a question that's keeping you up nights? Then send e-mail to [ask\\_stella@earthling.net](mailto:ask_stella@earthling.net). Remember, Stella is your source for astro-facts

## Observer's Handbook 2001



It is time to order your Observer's Handbook once again. This year, all orders will be taken in advance, so if you want one, be sure to get your order in before November 10. Cost is \$15.00. Email [margw@icom.ca](mailto:margw@icom.ca) or sign up at the club meetings in October or November.

## Observer's Calendar 2001



Observer's calendars have been ordered and will be here shortly. Cost is \$12.00. Reserve yours by signing up at the meetings or email [margw@icom.ca](mailto:margw@icom.ca). First come, first served.



## Junior Page

## Earth: An Ordinary Planet

Ancient philosophers believed that the Earth and humankind were crucial for the workings of the universe. To them the solar system was essentially the universe. The earliest models of the solar system followed the teachings of Aristotle and were geocentric in nature. It was accepted that the Earth was at the centre of the universe, and that everything else moved around it.

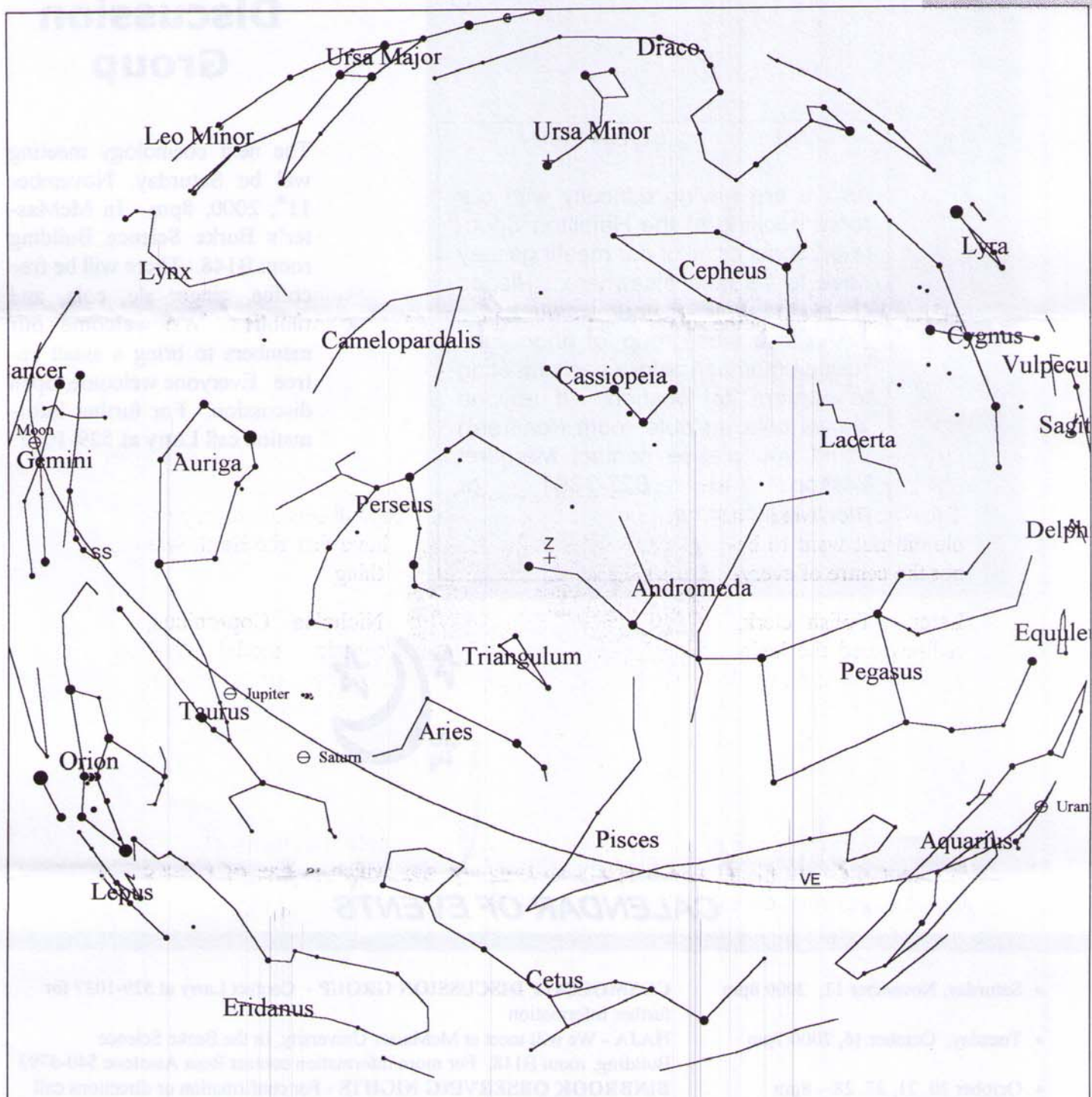
Nevertheless, some ancient Greek astronomers did not accept this notion. One such astronomer was named Aristarchus. He thought that the Earth and all the other planets orbited the Sun. This was not widely accepted, because most people did not want to believe that the Earth was not the centre of everything.

Later a Polish clerk, rediscovered the heliocentric model and showed why it better fit the observed motion of the planets. Eventually it was not easy to convince people. It was difficult to place the Earth in such a non-central place in the universe.



However, it was still believed that the Earth was important enough to orbit a star which was at the centre of the universe. It was not known until later that we live on a rather ordinary planet which orbits an ordinary star which is one of a huge collection of stars called the Milky Way Galaxy. Not only that, but the Sun is not even the centre of the galaxy, it is merely near the edge. The Milky Way is not unique either. There are billions of galaxies spread throughout the observable universe, and the Milky Way is one of them - it is not at the centre of the Universe.





### ECU V3.0 (Star Atlas Mode) - November Night Skies

UTC: 2000/11/16 at 03:30  
LMT: 2000/11/15 at 10:30pm

RA=01h52.4m Dec=+43°16'  
Field=180.0° Azim=355°58' Alt=+90°00'



## 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](mailto:margw@icom.ca).

The next cosmology meeting will be Saturday, November 11<sup>th</sup>, 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, November 11, 2000 8pm
- Tuesday, October 16, 2000 7pm
- October 20, 21, 27, 28 ~ 8pm
- Friday, November 10, 2000 7:30pm

**COSMOLOGY DISCUSSION GROUP** - 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 ANNUAL GENERAL MEETING** - At the Spectator Building auditorium.