

# Event Horizon

September 1999

Volume 6 Issue 9

## Ask Stella : Pink Holes

This month's question comes to us from an anonymous source on the internet. Our astro-enthusiast writes:

How long will the stars in constellations be there?

I've heard that stars die. If this is true how does it happen? Will the constellations stars die out too? I've never understood this.

### **Stella responds:**

It's true that stars don't live forever. How long a star lives depends on two things: how much fuel it has and how quickly it uses up this fuel.

Stars shine by converting hydrogen to helium in nuclear reactions, so a star's total fuel supply is determined by the number of hydrogen atoms inside it. Also, by studying nuclear reactions on Earth, we know how much energy is released when four atoms of hydrogen combine to form one atom of helium. So if we know the mass of a star, we know how many hydrogen atoms are inside it and if we know that, then we know how much energy the star can put out over its entire lifetime.

Astronomers can measure how much energy a star is putting out every second. This "energy per second" measure is also called power. You can think of it in terms of lightbulbs. There are dim bulbs that are only releasing 40 Joules of energy per second (1 J/s = 1 Watt) and brighter bulbs that are pumping out 200 Watts. Some bulbs are brighter than others. Stars are like that too. What kind of wattage a star has is determined by one thing only: the star's initial mass. Massive stars burn brightly, while their less massive cousins are dimmer.

So if we know a star's mass, we know both how much fuel it has \*and\* how quickly that fuel will be consumed. By dividing the first number by the second, astronomers are able to calculate how long a given star will live. To give you an example, the Sun's total lifetime will be about 9 billion years (right now it's about 4.5 billion years old -- middle age for the Sun). But a more massive star like Vega won't live as long as the Sun will. Even though Vega has more fuel, it also consumes it much more quickly. Vega's total lifetime is only about.

That's half of the answer to your question. The stars won't last forever, the constellations won't look the same in a few billion years.

But there's something else! Stars also move through space at different speeds. The movements of stars relative to each other is very slow. You'd have to live thousands of years to be able to detect a change in the constellations with your eyes alone. But precise measurements of stellar positions using telescopes (a

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## Chair's Report

I trust that everyone has had an enjoyable summer. A few of our members were fortunate to be in Europe to witness the total eclipse of the Sun on August 11. I'm sure we will see some nice slides from that (hint, hint). Other club members were able to attend one or more of the many star parties such as Starfest near Mount Forest, the Huronia Star Party near Alliston, the North Bay "Gateway to the Universe", the Great Manitou Star Party on Manitoulin Island, the Syracuse Summer Seminar in New York, and of course the HAA Star Party at Silent Lake. There were plenty of clear nights this summer but somehow most of them didn't coincide with the star parties.

The fall is an excellent time for observing since it is getting dark earlier, the nights are not too cold yet and there are no bugs. The yearly cycle of the stars moving across the sky tends to be cancelled out in the fall by the ever-earlier sunsets. This results in the summer constellations remaining visible for an extended period. The next few months offer many opportunities for observing, whether at our observing site at Binbrook or your own back yard.

October brings us to the end of the

sixth membership year of the Hamilton Amateur Astronomers. We are looking for some new members to join the Council starting in November. We need your help to run the club. Please consider donating a few hours of your time each month. There are no monetary rewards but I can assure you that some of us would not continue to serve on the Council if we didn't have a good time.

I have three web sites for you to check out this month. The first is all about the "Search for Extraterrestrial Intelligence at HOME" <http://setiathome.ssl.berkeley.edu/>. Another interesting site is the "U.S. Naval Observatory Astronomical Applications Department" at <http://aa.usno.navy.mil/AA/> this site provides data about the Sun and Moon such as rise, set and transit times. They also have data about past and upcoming solar and lunar eclipses. The Swansea Astronomical Society at <http://www.swan.ac.uk/astra/astro/oldpage.htm> has a link to a set of Telrad finder charts for all 109 objects in the Caldwell catalogue as well as many other interesting items.

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

## Editor's Report

It's good to see this issue of the Event Horizon so packed full of articles. I trust the October issue will be just as full. Send your articles to me at [assalor@mcmaster.ca](mailto:assalor@mcmaster.ca).

*Rosa Assalone*  
*Event Horizon Editor*  
[assalor@mcmaster.ca](mailto:assalor@mcmaster.ca)



## 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.

### HAA Council

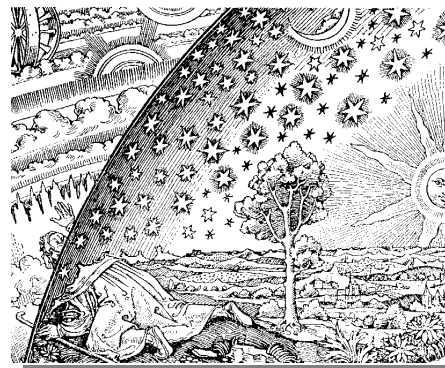
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## Constellation of the Month **Cygnus - The Swan**

*Margaret Walton*

**T**his is one of the most prominent constellations during the summer months. A very rich portion of the Milky Way runs lengthwise through the centre of the constellation and is spectacular through binoculars.

Many civilizations have identified this group of stars as a bird. It has been a flying eagle, a hen, a partridge and a pigeon. Greek myth identifies this as Zeus in disguise as a swan. Zeus fell in love with Leda, the wife of King Thestius of Aetolia. In order to approach her, he disguised himself as a swan and flew to her. She played with the swan and lay with it. As a result of lying with both Zeus (as the swan) and her husband, she laid two eggs. From one hatched the immortal twins Pollux and Helen, and from the other the mortal twins Castor and Clytemnestra.

Another legend comes from the

tale of Sinbad. Cygnus is identified as the roc that carried Sinbad during his second voyage to the Valley of Diamonds where he found and returned with a large treasure.

Cygnus is also known as the Northern Cross. As Christmas approaches, the constellation appears to stand upright during mid evening and appears as a cross. Midnight culmination is the end of July.

### Stars

**Alberio** - Alberio is located at the swan's head and is one of the most beautiful double stars. The stars are a magnitude 3 golden-yellow and magnitude 5 blue.

**Deneb** - Deneb means tail. It is a blue-white supergiant and at magnitude 1.6 is the 19th brightest star in the sky. Its luminosity is 60,000 times that of our sun. Deneb is part of the summer triangle, along with

Vega and Altair.

### Objects to see in Cygnus

**M29 (NGC6913)**. Open Cluster. This is a group of 8 - 30 stars against a rich background of fainter stars. Magnitude 6.6.

**M39 (NGC7092)**. Open Cluster. This is a large group of 30 stars. It is a very loose, poor cluster. Magnitude 4.6.

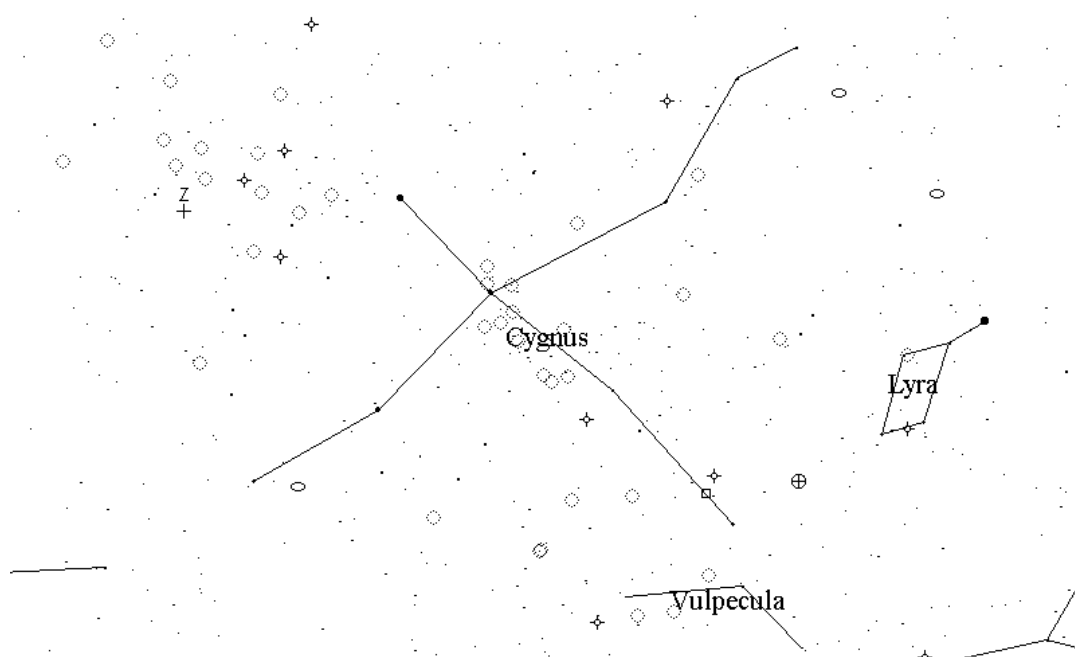
**NGC6811**. 'Hole in a Cluster'. Open Cluster. This is a large, poor cluster of about 70 stars.

**NGC6819**. Open Cluster. This is a large, rich cluster of 150 stars and has a strong central concentration. Magnitude 7.3.

**NGC6826**. 'Blinking Planetary'. Planetary Nebula. This is a bright, large, blue-green disk. By looking straight at it and then slightly away from it you can see the blinking effect. When you look straight at it, the nebulosity seems to disappear.

**NGC6866**. Open Cluster. This is a large, rich cluster of magnitude 7.6 with star chains and many double stars.

**NGC6888**. 'Crescent Nebula'. Emissions from a Wolf Rayet Star. This is a faint, large, crescent shaped nebula. Although it may be difficult to see and is best seen under dark skies with an OIII filter, it is an object well worth looking for.



*(Continued on page 4)*

# Cosmology Discussion Group

Yesterday (before 1950) we knew a lot. We will focus on what Bertrand Russell had to say about our universe. We can also look at a lot of other great thinkers from this period.

### READING MATERIAL

Bertrand Russell writes on the universe in his

- Human Knowledge Its Scope and Limits Part 1, Chapter 2 and Part 4, Chapter 7 BD 161.R77 6<sup>th</sup> Floor Mills Library, McMaster
- The Scientific Outlook Chapter 5 Q158.R96, 4<sup>th</sup> Floor Mills Library, McMaster
- reviews of Sir Arthur Eddington in Vol. 10 of the Collected Papers B1649.R91, 6<sup>th</sup> Floor Mills Library, McMaster (we have been unable to find volume 10 in the 6<sup>th</sup> floor stacks, however it is available for reading in the basement Russell Archives)

Saturday, September 25th, 1999.  
8pm. McMaster's Burke Science Building room B148

Free Coffee, Ginger Ale, and Timbits.

Informal discussion, everyone welcome.

For further information call Larry at 529-1037.

## Ask Stella : Pink Holes

*(Continued from page 1)*  
subdiscipline known as "astrometry") have allowed astronomers to catalogue these movements quite well. What they've found is that long before the stars in constellations begin to exhaust their fuel supplies and die out, the constellations themselves will actually be twisted out of shape. Carl Sagan offers a great discussion of this in his book "Cosmos". He notes that in as little as 25 000 years, the Big Dipper will be pretty hard to recognize

because the stars in it have moved in their own separate ways.

Thanks for your question. I'll be back next month, when the universe is a bit bigger.



Astronomically yours,

Stella

## Cygnus - The Swan

*(Continued from page 3)*

**NGC6894.** Planetary Nebula. This nebula has a bright, diffuse, circular halo.

**NGC6910.** Open Cluster. This is a bright, small, poor cluster with faint nebulosity.

**NGC6960, 6979, 6992, 6995.** 'Veil Nebula'. Supernova Remnant. This is a spectacular object. The brightest parts of it can be seen through binoculars. The veil covers a large area with a lacy nebulosity. An OIII filter brings out the best results.

**NGC7000.** 'North American Nebula'. This is an extremely large nebula visible to the naked eye. It appears as a region of increased brightness in the Milky Way 3 degrees east of Deneb. The best view is obtained with a rich field telescope or binoculars.

**NGC7048.** Planetary Nebula. This is a large, faint, irregular/round nebula.

**NGC7086.** Open Cluster. This is a large, rich cluster of about 50 stars. Magnitude 8.4.

**NGC7128.** Open Cluster. This is a small, rich cluster of about 35 stars. Magnitude 9.7.

**IC5146.** 'Cocoon Nebula'. This is a small cluster involved in a large emission nebula. Magnitude 7.2.

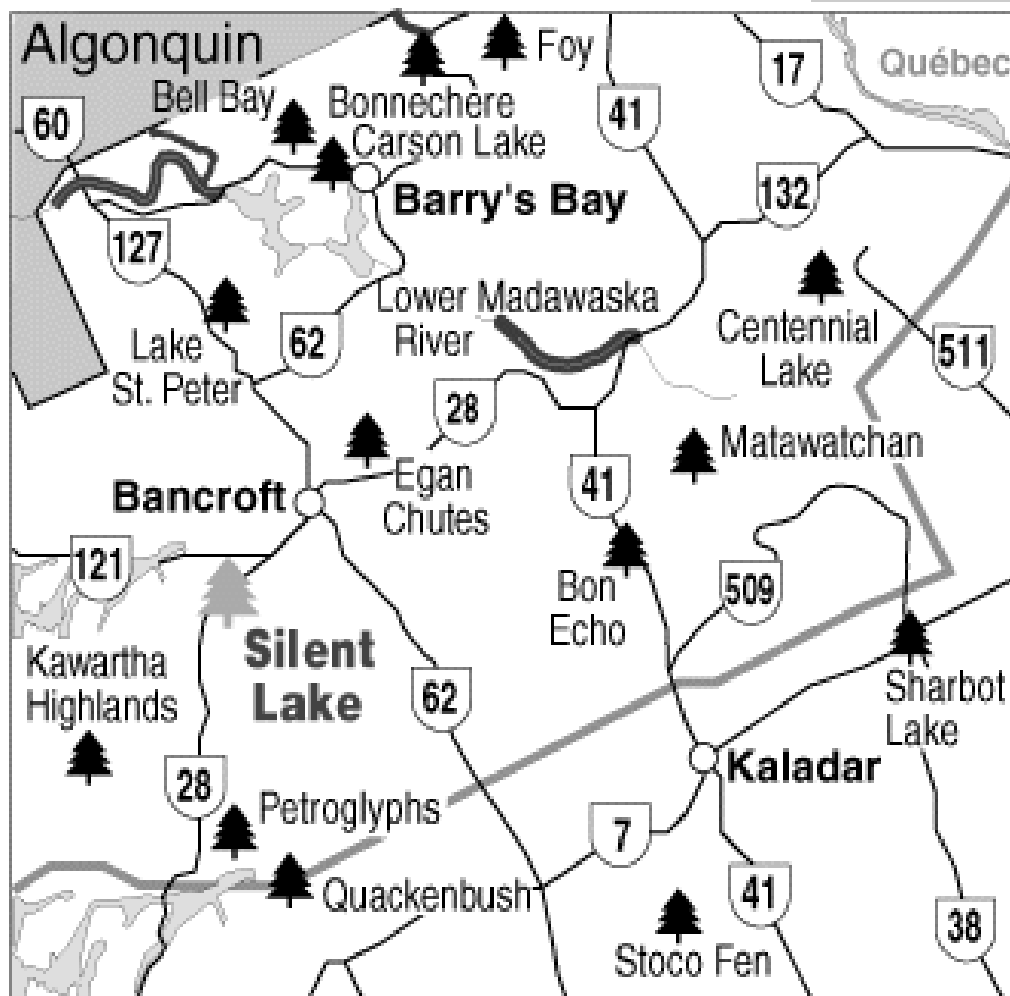
There are many more objects in Cygnus. In order to investigate more, check a good star chart, pick a dark night, and go exploring.

## HAA Fall Star Party - September 10-13

Once again the Hamilton Amateur Astronomers are having a fall star party at Silent Lake Provincial Park near Bancroft. This is a beautiful park with very dark skies. The campsites are large and shaded, so you can sleep in after observing all night. We use the day use parking area, right by the lake, for our observing. During the day there is hiking or canoeing at the park, or rockhunting expeditions around Bancroft. There are free hot showers. At this time of the year there are no mosquitos.

Last years fall party was notable for the incredible 2 nights of observing we had; very dark sky, very transparent, very steady. Hopefully we will have more of the same this year. There is no need to make a reservation, just come and enjoy the weekend. Put a note on the message board at the entrance to let everyone know where you are.

The dates are September 10 - 13. As our (HAA) first



meeting of the year is on Friday night, we may not get there until late that night (if it is clear) or sometime on Saturday, and stay through until Monday. Please feel free to pass this message on to anyone you think may be interested. If you think you can make it, I would appreciate an email letting me know, so I have some idea of numbers. If anyone needs directions or more information, please just

email me at [margw@icom.ca](mailto:margw@icom.ca). Hope to see lots of people out.

**Margaret Walton**  
Secretary, HAA



# Rob'serving Report

**T**

is the season of Jupiter & Saturn.

Jupiter rises at about 9pm and Saturn 45 minutes later. They appear earlier each day, as fall progresses through to winter. For the best viewing, you have to wait at least 2-3 hours for them to get above the atmospheric "crud" close to the horizon. The best images are seen when they transit the meridian (due south line) at 3-4 am for mid-Sept. By mid-Dec. they will be near the meridian in the early evening, 8-9 pm local time.

There are lots of things to see for both planets. Jupiter has its various bands and other surface detail. Many astrobuffs delight in watching the 4 largest satellites and their occultations, transits and eclipses. The transit of a satellite's tiny black shadow across the great disk is easy to follow even in small scopes.

Sky and Telescope lists these phenomena each month- pg. 114 for the Sept. issue. Times are universal, so for us locally in mid-Sept., check the chart between 1:00 UT (Jupiter's rising) and 10:00 UT (morning twilight.) Subtract 4 hours to get your local Daylight Savings Time. Jupiter's satellite phenomena for Sept. can also be found in the Observer's Handbook on page 187.

The Great Red Spot transits the center line of Jupiter's disk approximately every ten hours. Universal times for these

events are given on page 116 of Sky and Telescope, Sept. issue. There are also many "close encounters" of Jupiter's moons with each other in Sept/Oct.

Saturn's main attraction is its rings, of course. You can look for the divisions between rings, the Cassini Division being visible in a respectable small scope. You may be able to see up to 5 satellites, depending on your scope and the seeing conditions. Sky and Telescope, Sept., page 113 has a chart to help you identify which is which.

Both Jupiter and Saturn are going to be more and more prominent in the months to come. Promise yourself to check the charts and plan a session to look at something specific. Go out and have a good look!

Upcoming Binbrook observing nights are scheduled for Sept. 10, 11 and Oct. 1, 2, 8, 9. Bret says that he will open up the Conservation area after the monthly meeting if skies are clear. Call Rob Roy (692-3245), Bret Culver (575-9492) or Marg Walton (627-7361) at 7pm for local weather conditions and to confirm. The gate will be opened at about 8 pm.

## Monthly In-Sights

### September

**08-** Two week period begins for viewing Zodiacal light in the

morning twilight.

**13-** Sundials will be 4 minutes fast today. (Aren't you glad you asked?)

**15-** Moon near Mars which is 3 deg. N of Antares.

**23-** Autumnal Equinox. Fall begins at 7:31 am EDT.

**25-** Harvest Full Moon tonight.

**26-** Venus is brightest at magnitude -4.6

## October

**08-** Two week period begins for viewing Zodiacal light in the morning twilight.

## The Planets

Mercury is too close to the Sun and the horizon for viewing.

Venus is visible in the predawn sky in Sept., becoming a bright morning "star" in the fall and winter months.

Mars, low in the southwest evening sky, is too faint and small for much telescopic detail.

Jupiter rises at about 9 pm with best viewing about 5-7 hours later.

Saturn rises at about 9:45 pm.

Uranus & Neptune are in Capricornus after evening twilight.

**Rob Roy,**  
**Observing Director**  
**rroy@idirect.com**

## Past and Future Eclipses: The Path of August 11, 1999

*Ray Badgerow*

This article deals with the occurrence of **Total** Solar Eclipses at various points along the path of the solar eclipse of Aug. 11, 1999. Here is what I found using the software Guide 7 to do my research. I was one of the people who traveled to Turkey for the solar eclipse and viewed it at the ruins of Hasankeyf with the Calgary Center of the RASC. When was the last Total Eclipse at these points? and when will the next one be? Take a look.

	<u>PLACE</u>	<u>DATES</u>	<u>DURATION/MAG.</u>
<b><u>United Kingdom</u></b>			
	<b>Penzance</b>	1715 May 3	3m51s
		1999 Aug.11	2m00s
		2090 Sep.23	2m31s
	<b>Plymouth</b>	1724 May 22	25s
		1999 Aug.11	1m39s
		2090 Sep 23	2m07s
<b><u>France</u></b>			
	<b>Paris</b>	1724 May 22	2m28s
		1999 Aug.11	0.996
		2081 Sep 3	2m53s
<b><u>Belgium</u></b>			
	<b>Luxembourg</b>	-922 Jan 18	22s
		1999 Aug.11	1m20s
		2151 Jun 14	2m19s
<b><u>Germany</u></b>			
	<b>Stuttgart</b>	1706 May 12	2m02s
		1999 Aug 11	2m17s
		2151 Jun 14	2m17s
	<b>Munich</b>	1706 May 12	3m15s
		1999 Aug 11	2m08s
		2151 Jun 14	1m48s
<b><u>Austria</u></b>			
	<b>Salzburg</b>	1485 Mar 25	2m43s
		1999 Aug 11	2m02s
		2151 Jun 14	58s
<b><u>Hungary</u></b>			
	<b>Budapest</b>	1842 Jul 8	47s
		1999 Aug 11	0.997
		2726 Jul 21	2m45s
<b><u>Romania</u></b>			
	<b>Bucharest</b>	1961 Feb 15	1m59s
		1999 Aug 11	2m22s
		2487 May 23	3m17s
<b><u>Turkey</u></b>			
	<b>Istanbul</b>	1661 Mar 30	4m04s
		1999 Aug 11	0.950
		2081 Sep 3	1m59s
	<b>Sivas</b>	1361 May 5	1m19s
		1999 Aug 11	2m07s
		2006 Mar 29	2m25s
	<b>Elazig</b>	393 Nov 20	2m56s

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		1999 Aug 11	2m04s
		2135 Oct 7	3m49s
	<b>Diyarbakir</b>	393 Nov 20	1m37s
		1999 Aug 11	1m20s
		2060 Apr 30	4m22s
	<b>Batman</b>	393 Nov 20	46s
		1999 Aug 11	2m07s
		2060 Apr 30	3m07s
	<b>Hasankeyf*</b>	-584 May 28	3m20s
		1999 Aug 11	2m06s
		2135 Oct 7	58s
	<u><b>Iran</b></u>		
	<b>Estafan</b>	876 May 27	2m58s
		1999 Aug 11	1m33s
		2541 Jun 25	2m57s
	<u><b>Pakistan</b></u>		
	<b>Karachi</b>	1914 Aug. 21	1m09s
		1999 Aug 11	1m13s
		2726 Jul 21	3m10s
	<u><b>India</b></u>		
	<b>Ahmadabad</b>	-9 Jun 30	3m25s
		1999 Aug 11	0.995
		6163 Nov 23	51s
	<b>Nagpur</b>	-9 Jun 30	2m58s
		1999 Aug 11	0.982
		3029 Sep 30	4m12s
	<b>Vishakhaptnam</b>	-9 Jun 30	1m36s
		1999 Aug 11	0.982
		3029 Sep 30	4m29s

## CALENDAR OF EVENTS

- September 10-13 **HAA STAR PARTY** - At Silent Lake Provincial Park. See page 5 for more details.
- September 10, 11 **BINBROOK OBSERVING NIGHTS** - For confirmation or directions call Rob Roy at 692-3245 or Bret Culver 575-9492 or John McCloy 523-4359.
- Friday, October 8, 7:30pm **HAA GENERAL MEETING** - At the Spectator Building auditorium.
- Saturday, September 25th 8pm **COSMOLOGY DISCUSSION GROUP** - McMaster Burke Science





# *Membership Renewal*

## *November 1, 1999 - October 31, 2000*

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Province: \_\_\_\_\_ Postal code: \_\_\_\_\_

Phone number: (\_\_\_\_) \_\_\_\_\_

E-mail: \_\_\_\_\_

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, 1999