

* Event Horizon *

Volume 3 Issue 4

February 1996

Editorial

Thanks to Denise Kaisler we have a visual quiz in this month's issue. On most pages you will find a picture of a famous astronomer with a clue to his identity. See how many you can guess correctly. You will have to wait until next month to find out how good you are.

On page 5 is the latest information on Comet C/1996 B2 (Hyakutaki). I case you haven't heard, this comet has the potential of putting on a spectacular show. It may reach magnitude **0.1** by the end of April. As if that wasn't enough, it will be 1/10th the Earth-Sun distance away from us at closest approach and will be moving at over one degree an hour. This movement will be obvious even with the naked eye. Let's hope that it will live up to the predictions.

Stewart Attlesey
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1) "A nosey

HAMILTON AMATEUR ASTRONOMERS

Chair's Report

Thanks to your suggestions, we'll be presenting special talks aimed at newcomers to astronomy at each of our general meetings from now on. Some of the suggested topics include eyepieces, telescope types and mounts. If you have any ideas or subjects you'd like to learn more about, please let me or anyone else on council know. The entire club will benefit from your input!

Last month, Stewart mentioned Rob Roy's recent contribution to Sky and Telescope. Well, it seems that the HAA and its members continue to bask in media spotlights. Doug Welch has had an article published in the winter issue of CCD Magazine. (Book Villa on King Street East in Hamilton carries CCD Magazine for those who don't subscribe.) Patti Baetsen did us proud with her

enthusiastic radio interview on McMaster University's CFMU January 23rd. Ralph Pudritz and Rob Dick were featured on a CHML talk show that explored the possibility of extra-terrestrial life. Both Ralph and Rob are to be congratulated for their reserve and patience! The only caller who wasn't relating a UFO sighting was John Gauvreau. He did manage, however, to plug both the HAA and the Hamilton Centre of the RASC. Way to go, John! Lastly (but never leastly), our wonderful webpage has been honoured by CBC Radio's Quirks & Quarks programme with a link from their webpage. Maris Software (makers of the programme, "RedShift") have also set up a link to our webpage from their page. Congratulations (again) to our webmaster extraordinaire!!

Whew. As we say: "Resistance is futile....."!

Before I close, please note that our March meeting will NOT be on the usual 2nd Friday of the month. Because of a scheduling conflict with the Spectator, we will be meeting on MARCH 15 at the Spectator building at the usual time of 7:30 p.m. Mark the new date on your calendar so you won't miss it! Our

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featured speaker Paul Turcotte will be doing an astrophotography workshop.

Wishing you all clear and steady skies,

Ann Tekatch
Chair
575-5433



I hope everyone enjoyed the logo entries displayed in the January Event Horizon. Thank you to Stewart for the lovely display and to the children for designing them.

The meeting last month was great fun for the children and the adults alike. We talked about comets and sublimation. To help the children understand sublimation we brought in a large sample of dry ice. The kids were fascinated by the stuff; we explored the process of sublimation and other neat properties of the solid carbon dioxide.

Initially, Nina was worried that the children would try to touch the dry ice, which is a chilly -78 degrees Celsius. We soon discovered that we had nothing to worry about where the children were concerned. The adults were a different story, especially Bob Botts. He played with the ice for about 20 minutes while the children enjoyed a planetarium show. I would like to mention that the dry ice was generously donated to us by a local business, Garden City Oxygen Limited. We have to thank for the success of the demonstration.

This month, the meeting will be on February 20 and the topic will be

"The Sun: Our Nearest Star." Please make a note that the meeting date for March will not be the usual third Tuesday of the month. It will be on March 12, the second Tuesday of March and we will talk about "Time, Seasons and the Zodiac." I hope you can make it!

R a e c h e l C a r s o n
3 0 8 - 8 0 4 1

More New Planets Discovered

Following close on the heels of the discovery of Bellerophon, the planet orbiting 51 Pegasi, comes word of 2 new planets orbiting stars other than the Sun! This adds new evidence to the theory that planets are not a rarity in our corner of the Galaxy.

Geoffrey Marcy, professor of physics and astronomy at San Francisco State University and visiting scholar at the University of California at Berkeley, together with Paul Butler, a postdoctoral researcher with a double appointment to UC Berkeley and SF State summarized their discovery at the 187th meeting of the American Astronomical Society in San Antonio, Texas. One of our members, Pat Durrell, was at this meeting, but he didn't get a chance to talk to Marcy or Butler. Apparently, silly things like trying to get a job took precedence.

The stars in question are 70 Virginis and 47 Ursae Majoris, both of which are visible to the naked eye. Of course, the presence of the planets is not as easily ascertained. Detection required a novel setup that included a chamber of iodine gas in front of the telescope. The presence of large planets causes the spectrum of a distant star to

wobble, owing to a phenomenon called the Doppler shift. With the iodine lines present, it is easier to detect minute shifts and discover a planet.

The planets are the first fruits of a project begun by SF State and UC Berkeley in 1987 which watches stars between 10 and 100 light years away for these tiny wobbles. As far as the planets themselves are concerned, not much is known about them at present. The planet near 70 Vir is 9 times as massive as Jupiter (that's 2862 Earth masses) and has an eccentric orbit that is only 116 days in duration. The planet circling 47 UMa is less massive ("only" 3 Jupiter masses), but takes over 3 years to complete an orbit.

While Bellerophon, whose discovery was also confirmed by Marcy and Butler, is heated to an astounding 1000 degrees C, the newer planets are far enough from their host stars for liquid water to exist in their atmospheres. While this might mean an ocean on a small, rocky planet like the Earth, it's not certain what it would mean for a gas giant several times the mass of Jupiter.

D e n i s e K a i s l e r



2) "Heresy by thought, heresy by word, heresy by deed . . ."



The Golden Sun

Thar's gold in that thar sun!
Most of the 92 naturally occurring elements have been detected in the solar spectrum, albeit many are present in only trace amounts. Because of the large mass of the Sun, these traces translate into vast quantities by earth standards. An interesting case in point is the amount of gold in the Sun.

Analysis of the solar spectrum yields a figure of about 9 gold atoms for every trillion (10^{12}) hydrogen atoms. Curiously, this agrees well with the 7 parts per trillion abundance of gold in meteorites.

This doesn't seem very impressive until you realize that the Sun's mass is 2 octillion (2×10^{27}) tons. This means 10 quadrillion (10^{16}) tons of gold are present, which at current world market values amount to roughly 200 sextillion dollars ($\$2 \times 10^{23}$)!

Way less than a trillionth of the Sun's gold would take care of all federal and provincial debts. Before getting too excited, however, remember that this gold is locked up in one of the safest bank vaults in the universe.

Adapted from a Sky and Telescope "News Notes", January, 1987.

Rob Roy a5817394@mcmail.cis.
m c m a s t e r . c a

Off the Beaten Path

This month brings lots of new and interesting objects to observe in the winter sky. One of the richest regions of the sky is where the milky way flows over Monoceros and Canis Major. Here is a brief list of sites to seek in this area.

C a n i s M a j o r
NGC 2204 Bright, pretty large, compressed, rich with several nice chains of stars superimposed with a background of fainter members.

NGC 2345 Pretty bright, somewhat compressed, arrowhead shape points to starless region. Star at tip of arrowhead is double.

NGC 2360 Bright, large, compressed, rich and round. Easy to see in an average finder. This is a winter favorite.

M o n o c e r o s
NGC 2237 is a part of the Rosette Nebula. It is large enough that it got several numbers in the NGC (2237-8-9 and 2246) because when William Herschel discovered this nebula it would only fit into his scope in smaller pieces. This area of the winter Milky Way is a naked eye bright spot that will start to show the nebula in a pair of binoculars or a large finder. Binoculars should show a horseshoe of nebulosity around a scattered star cluster, under dark skies. A UHC filter makes the nebula stand out much better and defines the contrast with the dark lanes.

NGC 2244 is the star cluster involved in the Rosette. It is very bright, very large and not compressed. Several of the stars are yellow and one is a lovely orange. On the best of evenings, this area is a bright spot in the Winter Milky Way to the unaided eye.

NGC 2301 This open cluster is bright, large and pretty rich with about 40 members and is easy to pick out in the finder scope. This cluster has a lovely

blue and gold double star right in the center. It is definitely a cluster to put on your list.

L e p u s
NGC 1904 (M 79): Pretty bright, pretty large, round, very bright in the middle at 135X. Well resolved, with a compressed central section against a very grainy background. Easily seen in the finder. It is the only bright globular visible until spring.

C a n c e r
NGC 2672 Fairly bright, pretty large, elongated and much brighter in the middle at higher power. There is a companion galaxy (NGC 2673) superimposed on its east side and it is pretty faint, small and round.

NGC 2682 Bright, very large, extremely rich and somewhat compressed with stars from 10th to 14th magnitude. Using a wide field eyepiece (like a Naglar) makes this excellent cluster fill the field of view with beautiful chains of stars and several dark lanes that meander through the cluster like dusky rivers.

IC 2392 Faint, pretty small, round and somewhat brighter in the middle. This galaxy is easier to spot with Delta Cancr out of the field of view.

Charles W. Baetsen,
Observing Director

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3) "Just say no..."

More MACHOs

If you have read a newspaper or magazine in the last few weeks, you may have noticed a news item regarding results from the MACHO Project. We recently announced that analysis of data from our first two years of observations indicates that about 50% of the mass in the halo may be in the form of massive compact halo objects - MACHOs for short. Let me briefly describe the result and how it supercedes previous results.

When a massive object crosses close to the line of sight between us and a more distant star, some of its rays may be deviated in such a way that the brightness of the background star appears to increase. The duration of the brightening is affected by the mass of the object, its velocity across the line-of-sight, and the impact parameter - the angular distance of closest approach to the background source. Reasonable estimates of the distance of the lens and the average speed of halo objects across the line-of-sight allow the masses of the lenses to be estimated. The duration of the event is proportional to the square root of the mass of the lens with a solar mass lens producing a duration of approximately 100 days. Since we can study timescales from a fraction of an hour to many months, we are sensitive to masses from planetary-sized objects up to near-solar mass objects. Such masses may be in the form of brown dwarfs, stars or stellar remnants - these being the known forms of "normal matter".

When the first year of data was analysed, only three events were considered highly probable microlensing events and the average timescale for these events was a little under a month. From this number, it appeared that only about 20% of the halo mass could possibly be in this form. Since that time one of the three events has had a second increase in brightness - indicating that it was actually an unusual variable star and not a microlensing event.

The recent analysis covered the combination of data from the first two years and benefited from our experience in detecting the nearly one hundred microlensing events detected towards the bulge of our galaxy. We learned there that although microlensing is inherently achromatic, it is very common for the lensed source to be blended by atmospheric seeing with another object along nearly the same line-of-sight which is **not** being amplified and consequently the source appears to show a colour change during the event. Additional constraints were also added to exclude main sequence variable stars and to require higher amplifications to be c o u n t e d .

The result of these new cuts is a total of six high-probability microlensing events - with an average timescale of two months! After folding in our estimated efficiency at detecting events with different timescales, we conclude that this indicates that about 50% of the halo mass is in the form of MACHOs. Such a number is within spitting distance of 100% by astronomical standards and as a result many people are suggesting that we may have found most of the mass of t h e h a l o !

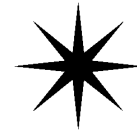
What form does this mass take? The quick answer is: We don't know. One form of non-luminous matter which has about the right mass scale is the white dwarf. However, producing the necessary numbers and distribution of white dwarfs presents some problems for reasonable scenarios of galaxy evolution.

One interesting aspect of this search is that it becomes more sensitive to more massive objects as time goes by - it is intriguing to speculate that the average timescale may be even longer in the next analysis and that the current estimate may be a lower limit! Clearly we live in interesting times!!

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4) "Eclectic, Elliptical, Elements."



Under Cover

*cloudless skies
new moon nights
gentle breezes
that calm the soul*

*starlit beauty
hidden comets
universal music
that feels uplifting*

*warm coffee
fresh donuts
quiet voices
that say:*

You Are Not Alone.

Patti Baetsen "Jazz is Taoist"
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Bright Comet!!

No I didn't repeat last month's article by mistake. This really is yet another bright comet. Check out the magnitude estimates on March 28 and April 27! One of the most amazing things about this comet is that its closest approach to earth it will be moving at more than one degree an HOUR!!! - Ed.

Circular No. 6304

Central Bureau for Astronomical Telegrams
INTERNATIONAL ASTRONOMICAL UNION
COMET C/1996 B2 (HYAKUTAKE)

Total visual magnitude estimates: Feb. 1.49 UT, 10.1: (A. Hale, Cloudcroft, NM, 0.41-m reflector; coma diameter about 2'.5); 1.73, 8.9 (D. A. J. Seargent, The Entrance, N.S.W., 25 x 100 binoculars; coma 4'); 1.81, 11.7 (Y. Kushida, Yatsugatake, Japan, 0.40-m reflector; coma 2'.5-3'.0).

The orbital elements on IAUC 6303 indicate that the comet will pass only 0.11 AU from the earth on Mar. 26 on its way to perihelion rather more than a month later. The comet can be expected to become a naked-eye object, both on account of the approach to the earth, and later as it approaches perihelion. The predicted magnitude in the following ephemeris for around those times is, of course, highly uncertain. There is also a very large positional uncertainty, particularly in late March, when it amounts to tens of degrees.



5) "Wilson and Palomar owe him a lot".

COMET C/1996 B2 (HYAKUTAKE)

	R.A.	Decl.	Delta	r	Elong.	Phase	m1
Feb. 7	14 36.94	-24 54.9	1.623	1.941	92.9	30.5	9.4
Feb. 12	14 40.63	-24 47.7	1.456	1.858	97.1	31.8	9.0
Feb. 17	14 44.07	-24 32.9	1.289	1.733	101.4	33.1	8.5
Feb. 22	14 47.21	-24 07.0	1.122	1.687	105.9	34.3	8.0
Feb. 27	14 49.98	-23 24.8	0.955	1.599	110.5	35.5	7.4
Mar. 3	14 52.28	-22 16.6	0.789	1.508	115.4	36.4	6.8
Mar. 8	14 53.95	-20 23.1	0.623	1.416	120.6	37.1	6.0
Mar. 13	14 54.65	-16 58.2	0.460	1.321	126.5	37.2	5.0
Mar. 18	14 53.46	-9 42.4	0.302	1.223	133.5	36.2	3.8
Mar. 23	14 46.46	+11 55.0	0.159	1.122	139.0	35.6	2.0
Mar. 28	12 28.3	+80 59.2	0.118	1.017	96.0	77.4	0.9
Apr. 2	3 24.64	+57 28.7	0.236	0.909	60.9	106.0	1.9
Apr. 7	3 12.26	+46 13.5	0.387	0.796	48.0	110.8	2.4
Apr. 12	3 06.26	+40 56.1	0.545	0.677	39.5	109.7	2.5
Apr. 17	3 00.45	+37 22.2	0.706	0.554	32.2	105.0	2.2
Apr. 22	2 53.20	+34 04.2	0.869	0.426	25.0	95.7	1.5
Apr. 27	2 43.52	+29 55.5	1.033	0.303	17.0	76.6	0.4

Please Note

It has been necessary to reschedule two of our regular meetings in March

Hamilton Junior Amateur Astronomers:
Tues March 12, The topic will be - "Time, Seasons and the Zodiac". Mac Burke Science Building Rm B148. For more information, contact Raechel Carson, at 308-8041

HAA General Meeting:
March 15/96 Our guest speaker will be Paul Turcotte, "Astrophotography Workshop", 7:30 p.m. Spectator Building, Hamilton, ON.



6) "Double, double, toil and trouble. Here's a guy called:"

Roman Around

Minerva (Greek - Athena or Athene) The name Minerva is connected with the root *manas* or *mens*. She is the least Italic of the divinities. Minerva plays no part in any specifically Roman legend. The Roman Minerva was especially the protectress of commerce and industry and of schools. It was only later that she assumed the character of a warrior-goddess.

The Roman goddess first appeared in Etruria and was perhaps a goddess of the thunderbolt. She was then introduced into the Capitoline Triad, with Jupiter and Juno. According to Roman tradition the cult of Minerva originated in Falerii when in 241 BC. the Romans took this town and carried Minerva off. One of her earliest temples was built on Mons Caelius and bore the name Minerva Capta. There was, however, a temple already consecrated to Minerva in Rome on the Aventine. In any case her cult was not ancient in Latium or among the Sabines. According to one tradition Minerva was one of the gods brought to Rome by Numa. The festival of Minerva was celebrated in March at the *Quinquatria*, which lasted five days during the Spring Equinoxes.

The attributes of the goddess are analogous to those of the Greek Pallas Athena. She presided over intellectual and, in particular, academic activity. On the Esquiline there was a shrine dedicated to Minerva Medica, Minerva the healer. Minerva was venerated throughout the Empire. Particular homage was paid to her by corporations of artisans, flute-players, doctors and so fourth. There was no purely Roman figure of Minerva. The Etruscans had represented her with wings, holding a screech-owl in her hand. It will be remembered that this bird was sacred to Athena.

Ev Butterworth



7) "Not egocentric but..."

Thank You HAA Members!

To all who donated books and magazines to me I would like to sincerely thank you. Out of all our possessions we lost in our housefire, my collection of books and magazines were the most devastating to me personally. I had received a great many of them as gifts from special friends and relatives throughout the past few years and have found it most difficult to replace them. Your generosity has overwhelmed me to say the least, and I have enjoyed each and every donation. I'm slowly getting a few of them replaced from local bookstores and hopefully will come across some of the others one day.

I've always know that the HAA was "special" and I feel most fortunate to belong to such a wonderful club. Many thanks to Grant Dixon for spreading the word and to Ann & Bill Tekatch for your continued support and friendship. Your generosity will forever remain in my heart.

Nancy Morgan
Beamsville

What's Your IQ?

Have your sweetheart beside you as you answer this months questions. They may surprise you with their answers. Make sure she also has her chocolate.

- 1) *When the planet Venus passes in transit on to the face of the Sun, it seems to draw a strip of blackness after it, and when this strip disappears the transit has already begun (when the trailing edge of the planet passes the Sun's limb) - so that it is impossible to time the moment of immersion accurately. This 'Black Drop' effect ruined the method of measuring the distance of Venus, and hence of the Sun, by transit observations. It is due to the fact that Venus is surrounded by a dense atmosphere.*
- 2) *(c) is correct. The name comes from Ares, which is the Greek equivalent of the war-god Mars.*
- 3) *False. The average meteor is no larger than a grain of sand.*
- 4) *True: Tycho Brahe, who set up his observatory at Hven, in the Baltic, in 1576 and remained there until 1596. The prison was installed to incarcerate tenants who refused to pay their rents. In his youth Tycho had part of his nose sliced off in a duel, and fashioned himself a false one.*
- 5) *Orbit means 'path'. Thus the Earth is in orbit round the Sun.*
- 6) *No. Some star-groups are visible from both hemispheres; but from England we can never see the far-southern groups such as the Southern Cross, while from Australia you can never see the far-northern groups such as the Little Bear.*

Is your candy good. Enjoy them slowly as you test your knowledge.

- 1) Explain the term 'absolute magnitude'.
- 2) Give the 'odd one out': R Carinae, R Leporis, R Arae, R Cassiopeiae, R Trianguli.
- 3) T/F The Gottorp Globe is an ancient orrery.
- 4) T/F If you could go to Alpha Centauri, the Sun would appear as a fairly bright star in the constellation of Cassiopeia.

- 5) Phosphorus and Hesperus were old names for the planet Venus.
- 6) T/F You can see about 3,000,000 stars with the naked eye on a really clear night.

Looking forward to those March blizzards. I am. I don't have a driveway to shovel. Bundle Up!

Io, Keeper of the Flame
Jupiter Co-ordinator



8) "Apple or Fig"

Editor's Address

Please send articles, drawings, pictures, comments and suggestions to:

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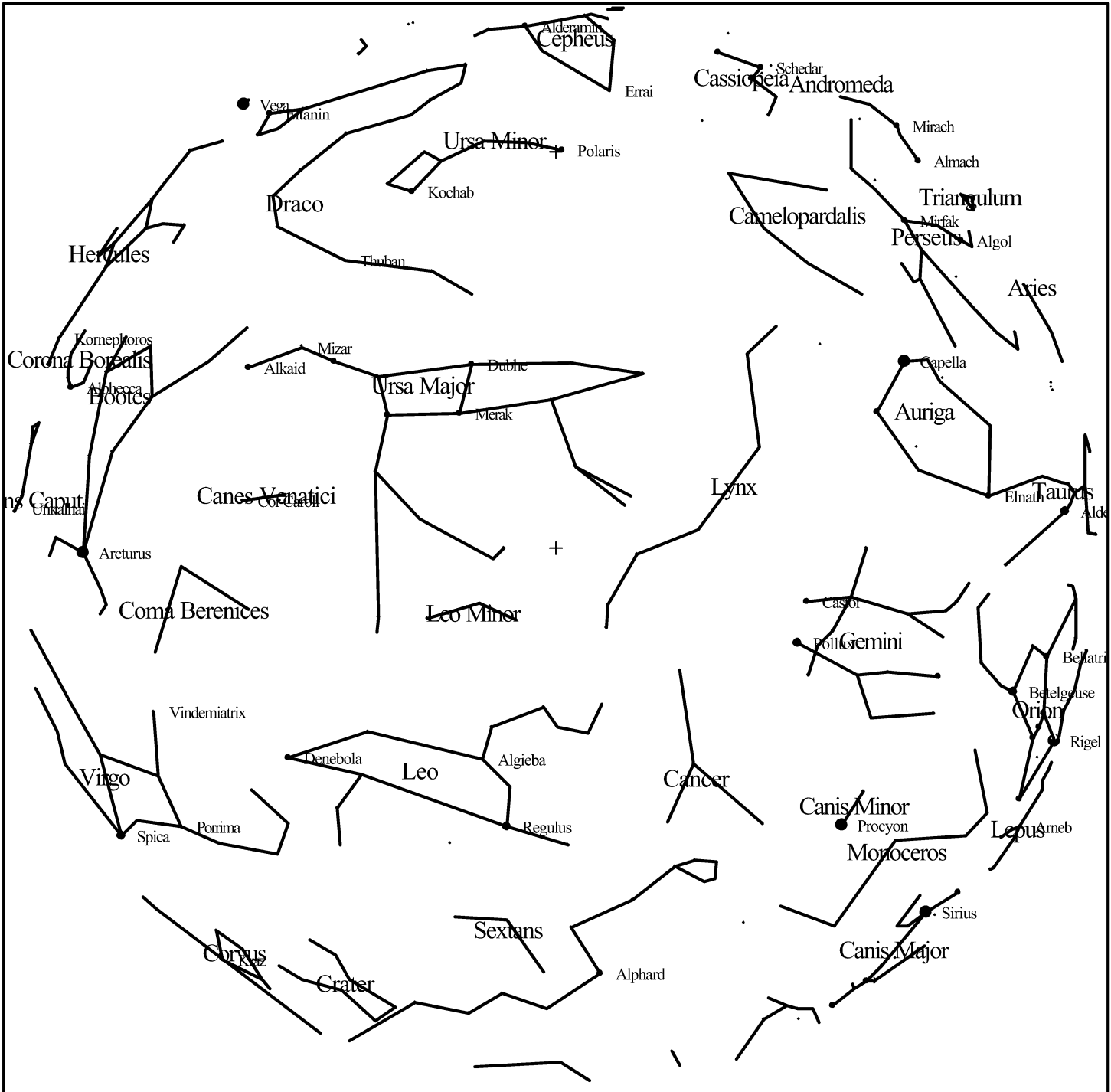
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DEADLINE:
March 8, 1996

CALENDAR OF EVENTS

- ◆ February 10, 16 or 17 1996, 8:00 PM **BINBROOK OBSERVING NIGHT** - On the first CLEAR night of the three dates. Call Charles Baetsen (ph:524-0148 or e-mail: charlesb@abelcomputers.com) for more details.
- ◆ Sat. February 10, 1996 6:30 PM **OBSERVING WORKSHOP** - at McCallion Planetarium - rain or shine!
Topic: "Finding your way Around in the Dark: a Guide to Maps and Atlases for the Sky". Bring your red flashlights! Call Grant Dixon or Charles Baetsen for more details.
- ◆ Mon. February 12, 1996 7:30 PM **AMATEUR TELESCOPE MAKERS** - are meeting at the home of Jim Winger in Caledonia. For directions and details please call Jim at 765-4649.,
- ◆ Tue. February 20, 1995 7:00 PM **HAMILTON AMATEUR JUNIOR ASTRONOMERS MEETING**
- Mac Burke Science Building Rm B148, "The Sun: Our Nearest Star"
For more information, contact Raechel Carson, at 308-8041
- ◆ Fri. February 23, 1995 7:30 p.m. **COUNCIL MEETING** - at the home of Nina Snaith
Call Ann Tekatch at 575-5433 if you're interested in attending.
- ◆ Mon. February 26, 1996 7:30 PM **AMATEUR TELESCOPE MAKERS** - are meeting at the home of Jim Winger in Caledonia. For directions and details please call Jim at 765-4649.,
- ◆ Thu. March 7, 1996 8:00 PM **ROYAL ASTRONOMICAL SOCIETY OF CANADA Hamilton Centre-**
General Meeting - McMaster University Medical Building Room 1A6
- ◆ Tue. March 12, 1996 7:00 PM **HAMILTON AMATEUR JUNIOR ASTRONOMERS MEETING**
- Mac Burke Science Building Rm B148, "Time, Seasons and the Zodiac"
For more information, contact Raechel Carson, at 308-8041
NOTE THE DATE CHANGE
- ◆ Fri. March 15, 1996 7:30 PM **H.A.A. GENERAL MEETING** - Spectator Auditorium, The guest speaker will be Paul Turcotte, "Astrophotography Workshop" *NOTE THE DATE CHANGE*
- ◆ Sat. March 30, 1996 8:00 PM **COSMOLOGY DISCUSSION GROUP**
- Mac Burke Science Building Rm B148 (Beside the Planetarium)
"Star Trek, and Hitchhiker's Guide to the Galaxy."
- ◆ Fri. April 12, 1996 7:30 PM **H.A.A. GENERAL MEETING** - Spectator Auditorium, The guest speaker will be Les Nagy, "Something Different"



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

UTC: 1996/03/16 at 03:30
LMT: 1996/03/15 at 10:30pm

RA=09h46.9m Dec=+43°05'
Field=180.0° Azim=335°40' Alt=+90°00'