Hamilton Amateur Astronomers

Event Horizon

May 1998 Volume 5 Issue 7

William (Bill) McCallion, 1918-1998

-Kelly Curwin, McMaster Courier

Some 45 years ago, William (Bill) McCallion used a war surplus parachute suspended from a classroom ceiling as a makeshift domed screen to share his passion for he night sky with fellow students, colleagues and the public.

His passion and pioneering efforts led not only to the development of the McMaster Planetarium as we know it today, but went a long way in providing the general public with knowledge and information about the beauties of the heavens.

"Bill was McMaster's leader in public outreach. He understood the importance and the rewards of explaining science to the public," says Doug Welch, chair of the Department of Physics & Astronomy.

McCallion, professor emeritus of mathematics, died April 18. A memorial service for him was held April 24 in Hamilton.

His life-long interest in astronomy began in 1943 when he joined the Royal Astronomical Society (Hamilton Centre). In 1946, he was instrumental in obtaining a Spitz Planetarium for Hamilton and McMaster. "This instrument was the first of its kind to be installed in Canada and the third one to be sent outside the United States," wrote McCallion in a 1959 article published in the *Journal of the Royal Astronomical Society of Canada.*

A permanent planetarium was established in the Burke Science Building in 1954 and it is estimated that, during his career, the professor gave presentations to more than 100 000 individuals.

He viewed the naming of the University's refurbished planetarium in his honour in 1993 as "a signal highlight of my retirement years."

McCallion's time at McMaster spanned almost 50 years; first as a student, then as a teacher of mathematics; and later as a dean and administrator in various areas of the University's broad spectrum of services to the public.

Born in Toronto, he obtained a BA in mathematics and physics and an MA in mathematics from McMaster during the mid-1940's. He became

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Answers to the Genitive Game

Group I : Andromeda, Aquila, Auriga, Cassiopeia, Hydra, Libra,Vela.

Rule: Add "e" to the end of each.

Exception: Vela, the genitive of which is not Velae, but Velorum.

Group II : Apus, Aquarius, Capricornus, Cepheus, Equuleus, Lupus, Taurus.

Rule: Remove "us" and add "i" to the end of each.

Exception: Apus, the genitive of which is not Api, but Apodis.

Group III: Dorado, Draco, Leo, Pavo, Virgo.

Rule: Add "nis" to the end of each.

Exceptions: Dorado, the genitive of which is not Doradonis, but Doradus. Also, Virgo becomes Virginis, which doesn't fit the rule either.

-Denise Kaisler
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inside...

Notes From the Editor

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Come out and meet your fellow astronomers!

We meet after every general meeting for drinks, food and great conversation at the Winchester Arms in Dundas. We have the whole back room to ourselves and everyone is welcome!

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.

Web Site
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Chair's Report

There have been some reports recently that make me hopeful that we are finally on our way to another Solar Maximum. For those of you who aren't aware, the Sun goes through an 11 year cycle of low to high surface activity. Other than giving Burt Rhebergen more sunspots to draw and putting the electronics on satellites at risk, increased solar activity means more aurora! Aurora are caused when streams of charged particles emitted by the Sun impact and ionize gas molecules in our upper atmosphere. This occurs preferentially at the Earth's magnetic poles since charged particles travel along the magnetic field "lines" which enter and emerge at the respective poles. There was a series of bulletins the first weekend in May that warned of a potentially severe geomagnetic storm and very intense auroral activity. Due to the cloudy weather I have no idea if we actually had any though. The last cycle gave us some spectacular aurora so I am looking forward to more of the same. You can improve your chances of seeing them by monitoring solar activity reports. For those of you with access to the Internet this is easy. In the past when almost no one had access there was an informal system whereby if a nice aurora was seen and your name was on a list to be notified then you received a phone call. Perhaps if there is enough interest we could set up something similar.

From time to time our general meeting is a member's night. The idea on these nights is that instead of having a formal speaker club members can share observing experiences, slides, etcetera with everyone. It seems that it is always the same people who participate. I would like to encourage anyone who has something to share to talk to me. I could even show your slides for you if you aren't comfortable in front of a group.

Stewart Attlesey
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It's a Bird, It's a Plane ...

. . . it's a test of how well you know your stars !

Below are a list of fifteen constellations -- not their familiar Latin names, but their English translations. Can you decide which ones are real? You get bonus points if you can write in the constellation's Latin name.

the bird of paradise
_____
the seal
_____
the altar
_____
the herdsman
_____
the chisel
_____
the southern fish
_____
the ship's sail
_____
the frog
_____
the the ship's compass
_____
the river
_____
the mountain
_____
the giraffe
_____
the butterfly
_____
the eastern cross
_____
the chariot
_____

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Darkroom Adventures - Part 2

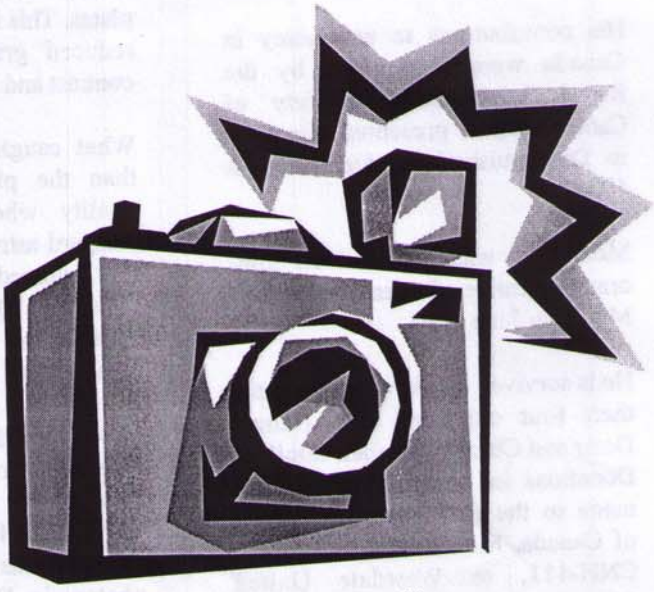
-Everett Cairns

Last general meeting I brought some prints made on Ilfochrome CC.F7 clear film. This is a great material for celestial photos as it can be back lit on a light table. This product produces enlargements directly from slides and requires the same chemistry and exposure time as does Ilfords normal Ilfochrome paper. Someone asked me what the film speed was (obviously considering the interesting possibility of loading CC.F7 directly into an astro-camera?). At this time I did not know the ASA film speed rating, which Ilford does not give. All I knew was that an enlargement from an original slide to an 8x10 print took 15 seconds at f11 in my particular enlarger. **MUCH** later the obvious way to get the ASA rating occurred to me.

The secret to measuring the ASA speed of a darkroom paper is to consider your enlarger as a camera taking a picture of the original slide, as the object, onto the paper, as the camera film. Then you need only use your light meter at the position of the enlarger lens to measure the incident light from the object. If you stay in close you can meter right through the lens. Then you need only set the meter to the film speed that gives the exposure and f-stop that you know to be correct.

There is however a small sticking point to this procedure, which I think is why it took me so long to appreciate the obvious. You must remember how a light meter is calibrated. It measures the light received within a certain angular acceptance cone, and assumes that this light is spread on the film at one focal length behind the lens. However in this particular case the paper was at 4.9 times the focal length behind the enlarger lens. The light gets spread over an area 4.9x4.9 as large as the meter assumes. So to allow for this you set your meter to an **EFFECTIVE** f-stop of f11X4.9 = f53.9.

So, I did all this and determined that CC.F7 has an ASA film speed of 8.0. (Yes 8.0,not 80). So much for direct exposure!



William McCallion Cont ...

(Continued from page 1)

a sessional lecturer in mathematics in 1943 and continued to teach here until his retirement in 1984.

McCallion also made significant contributions to adult education studies.

His long association with the University's extension department began in 1951. In 1961, he was named director of educational services and in this capacity worked, with Mohawk College, to establish a downtown centre for in Hamilton for adult education studies. Other centres were also set up in Burlington, Brantford, Grimsby, Hagersville, Oakville and Stoney Creek.

He served as dean of the School of Adult Education from 1970 until 1978. His abilities in the area of life-long learning were recognized upon his retirement with the establishment of five William J. McCallion scholarships for part-time students.

His contributions to astronomy in Canada were recognized by the Royal Astronomical Society of Canada, which presented him with its Distinguished Service Medal in 1996.

McCallion was awarded an honorary doctorate of science from McMaster in June 1995.

He is survived by his wife, Jean, and their four children: Ken, Nancy, Doug and Cheryl, and their families. Donations in his memory may be made to the Parkinson Foundation of Canada, McMaster's Mac Fund, CNH-111, or Westdale United Church.

Is Black And White Film Astrophotography Dead?

-Everett Cairns

First let me say that I will not answer the question, but will only supply some titbits that I discovered recently from a paper given by Quentin A. Parker *et al.* in 1994 at a conference on "The Future Utilization of Schmidt Telescopes."

Some comparisons are drawn between the use of Kodak techpan film and CCD arrays.

Techpan is a very interesting black and white film with resolution at the 3 micrometer level and excellent astrographical potential if suitably "HYPERED". Hypering increases its speed by a factor of 10. It can be purchased in hypered form from suppliers of amateur astronomy goodies. What is interesting about techpan is that it is about 3 times "better" than the best professional plates. This is primarily the result of reduced grain size at the same contrast and sensitivity.

What caught my attention (other than the plainly superior image quality when compared to the standard astro plates) was the claim that hypered techpan had a DQE (Detective Quantum Efficiency) of 10%. I had always believed that films peaked at about 1% efficiency.

First I should explain what DQE is. Most of us are familiar with RQE or Responsive Quantum Efficiency. For a CCD this is basically number of electrons out / number of photons in. However for a complex detector like photographic film, this becomes a bit tricky to define. So about 1946 Albert Rose came up with the definition of DQE as

$$DQE = \frac{(signal/noise)^2_{output}}{(signal/noise)^2_{input}}$$

The square terms were chosen so that for a detector with no excess noise but an RQE less than 100% RQE = DQE.

For a photographic film DQE goes as exposure × contrast at this exposure / (rms granularity squared). It sort of makes sense in that the less granularity, the easier to see the stars against the sky, and the higher the contrast the less change in light input to swamp the grain noise. Where does the input noise appear in this expression? - in the exposure.The light from the stars has its own "granularity" as it arrives one photon at a time. Photographing a star is like trying to determine the average rate at which cars go by your house. The longer you average the less the PERCENTAGE fluctuation, or noise .

All these considerations lead to the following shortened table from Parker *et al.:*

Exposure	160x2K CCD	6xTechpan
Magnitude	25	24
Exp. Time	25 hours	6 hours
Area	6x6 Deg	6x6 Deg
Resolution	15 µm	3 µm
Pixels	6.7e10	8.4e10

The 6 techpan exposures are digitally averaged. Note that if you had one Godzilla CCD that the exposure would only be 25/160 hours or 1/6.4 the length of ONE of the techpan exposures.

Constellation of the Month : Boötes

-Margaret Walton

Boötes is a prominent constellation in the spring and early summer sky, with its midnight culmination occurring around May 1. The Kobuea Indians of Brazil thought that the constellation represented a piranha. There are several other stories to explain Boötes. The name comes from the Greeks and means "ox-driver". Boötes represents the first ox-driver to hook oxen to a plough, the "plough" being the Big Dipper.

Boötes has also been identified as "Arcas", the son of Callisto and Zeus. He is hunting his mother (Ursa Major) with the help of his dogs. Another legend links several constellations in the area with the Athenian Icarus, his daughter Erigone, and his dog Maera. Icarus was killed by peasants who thought that they had been poisoned when they became drunk from wine given to them by Icarus. His daughter, along with his dog, searched for his grave and was so grief sticken when she found it that she killed herself. Zeus placed her in the sky as Virgo, Icarus became Boötes and the dog Maera became either Procyon in Canis Minor or one of the dogs in Canes Venatici.

STARS

Arcturus - This is the 4th brightest star in the sky, with a magnitude of -0.04. It has a declination of 19 degrees north, allowing it to be seen from every inhabited continent. It is 36 light years away and is an orange giant. Arcturus is moving through space in the direction of the constellation Virgo at a speed of about 90 miles per second. At this time it is almost as close to Earth as it will get; in another several thousand years it will pass us and begin moving away from us.

Its name means "bear-keeper", referring to Boötes chasing Ursa Major and Ursa Minor around the North Pole. Arcturus was featured at the 1933 Chicago World's Fair. A telescope was centered on the star and the incoming light was focused onto a photoelectric cell. The current generated was used to turn on the lights at the opening ceremonies.

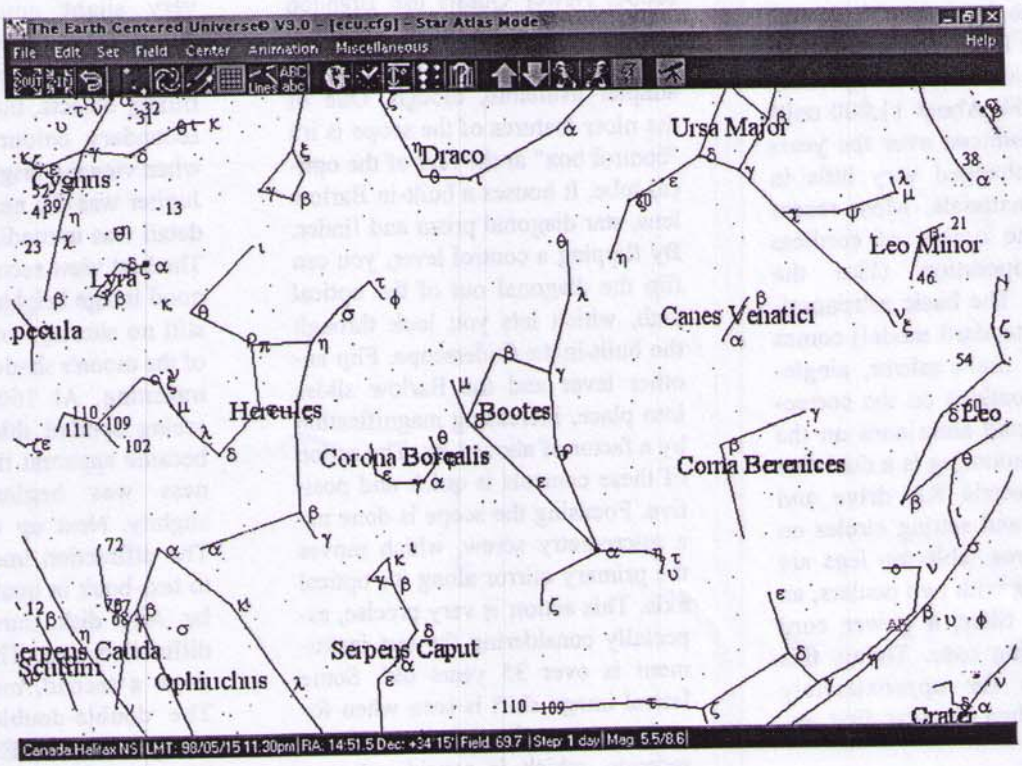
Izar - This orange star has a magnitude of 2.7 and is a double, with a blue,
5th magnitude companion.

OBJECTS TO SEE IN BOÖTES

NGC5466 - This is a large globular cluster with a magnitude of 9.1

NGC5248 - This is a elongated galaxy with a bright nucleus and many dark lanes. Its magnitude is 10.2.

NGC5660 - This magnitude 11.8 galaxy is bright, large and round, with several branching arms.



NGC5676 - A bright, large elongated galaxy with many arms. Its magnitude is 10.9.

NGC5899 - A bright, large elongated galaxy with several arms. Its magnitude is 11.8.

There are 14 other galaxies in Boötes listed in Sky Atlas 2000.

Test Report: The Questar 3.5"

-Clive Gibbons

Life is strange, sometimes. Up until about 2 years ago, this was one test report I thought I'd *never* write. You see, I didn't have much appreciation for Questar telescopes or what I thought they represented. Maybe some of you still feel the same way; that Questars are something of an expensive curio. Too small to be serious, too precious to be used on a regular basis; the sort of instrument you'd expect to see under a glass dome, in a doctor's or lawyer's study. And, what stargazer in their right mind would spend $5000 for a teeny weeny telescope, when you could spend that much on a big Schmidt-Cass, or a monster Dobsonian? Well, hopefully this report will shed some light on the answer.

First, some background. The Questar 3.5" is a Maksutov Cassegrain telescope, which has been in production since 1954. About 11,000 units have been produced over the years and they've changed very little in design and materials. Most recent units have the option of cordless DC-power operation (like the Meade ETX). The basic astronomical version (Standard model) comes with a Pyrex main mirror, single-layer MgF2 coatings on the corrector and protected aluminum on the mirrors. The mounting is a dual-tine fork, with electric RA drive and slow motions and setting circles on both axes. Three table-top legs are included, along with two oculars, an off-axis solar filter, a power cord and the carrying case. Today, this package sells for approximately $3500 US. When Questar first appeared in 1954, the price was $795 US, so if you factor in inflation, today's price is a relative bargain. A "Duplex" model is available, which allows the optical tube assembly to be easily removed from the fork mounting, for use as a spotting scope or telephoto lens. Optional enhanced coatings are also available, as is a Zerodur primary mirror.

The Questar I tested was a 1962 vintage Standard model, with Pyrex mirror and standard coatings. It had been obviously well used, but was mechanically fit. This was no doubt helped out by the quality of materials used in the construction and the overall fit and finish of the instrument. No plastic here! The optical coatings were dusty, but after a cleaning, showed no sign of deterioration. The two oculars included with this unit were a 26mm Koenig and a 13mm Erfle. Both use a proprietary thread to attach to the telescope. Newer Quests use Brandon oculars, but again, having a "non-standard" mounting. There is a 1.25" adapter available, though. One of the nicer features of the scope is it's "control box" at the rear of the optical tube. It houses a built-in Barlow lens, star diagonal prism and finder. By flipping a control lever, you can flip the diagonal out of the optical path, which lets you look through the built-in 4x finderscope. Flip another lever and the Barlow slides into place, increasing magnification by a factor of about 1.8x. The action of these controls is quick and positive. Focusing the scope is done my a micrometry screw, which moves the primary mirror along it's optical axis. This action is very precise, especially considering the test instrument is over 35 years old. Some lateral image shift is seen when focusing, amounting to about 45 arc seconds, which is considered normal. Other fine Questar touches include a Moon map printed on the exterior of the optical tube assembly, and a star chart portrayed on the outside of the sliding dew shield/ light shade. A mention should also be made of the RA and Dec. slow motion controls. They have a smooth, continuous action and are clutched so that no locks need to be engaged or disengaged to make positional adjustments.

The first celestial target was the first quarter Moon. At low power (48x), the image was tack sharp. At 96x (using the Erfle ocular), the apparent field is 75 degrees and still looks extremely sharp. Only towards the edges of the wide field does the image go soft, due to aberrations in the ocular. With the Barlow flipped in, the power goes to 160x and craters still snap into focus. The only drawbacks to using the Barlow are a broad, ring-like reflection that appears towards the edge of field and a very slight amount of residual colour. This reflection isn't present when viewing other, less field-filling, objects, but the tiny dose of secondary colour can be spotted when viewing bright planets or stars. Jupiter was the next target and nice detail was immediately seen at 48x. The best view seems to be 96x, with good image brightness, contrast and still no shortage of fine detail. One of the moon's shadows could be seen transiting. At 160x, the mediocre seeing spoiled things a bit and it became apparent that image brightness was beginning to suffer slightly. Next up were some stars. The diffraction image looked close to text-book in quality; a nice, regular Airy disk, surrounded by one diffraction ring. The brightest stars show a second, much fainter ring. The double-double in Lyra was nicely resolved. Even Eta Corona Borealis (about 1 arc sec. separa-

(Continued on page 7)

Test Report : The Questar Cont ...

(Continued from page 6)

tion) is revealed as overlapping disks. It's clear from all this that the Questar performs about as well as an obstructed 3.5" instrument can. But, the *real* pleasure of using this instrument comes from it's tremendous portability and user-friendliness. It's only a matter of minutes between deciding to go observing and actually looking though the eyepiece. And, once you get to that point, all controls are easily at hand and a pleasure to use. The clock drive is accurate and dependable, with only a few seconds lag when first starting up.

Does the Questar have flaws? Sure, but these are largely caused by trade-offs in it's ultra compact design. The finderscope's aperture is a mere 15mm. That's really too small, but this is somewhat compensated by the sharpness of image it delivers. The farthest south the scope can observe when polar aligned is -42 deg. declination. This is due to the relatively short length of the fork arms. Also, the finderscope's view gets obscured by the drive base when pointed south of -25 deg. dec. Finally, it does only have 3.5" of aperture, so it's not the best choice for a diehard deepsky fanatic.

Is it expensive? I guess that depends somewhat on your financial resources, but when one considers the longevity of a Questar and how often it'll get used during that time, the price might not seem so great, after all.

So, what's the final verdict? Well, let's just say that my previously negative opinion of things Questar has been largely overturned. It's high quality, ingenious features and ultra-portability have opened my eyes to see why it's the right choice for some, very sane, stargazers. And, if you ever see one available for a "fire sale price", I'd recommend you snap it up!

Cosmology Group

It's back! The Hamilton Amateur Astronomers Cosmology Discussion Group will be starting their meetings again under new "leadership". This is an informal discussion group for anybody and everybody interested in how the Universe works - don't worry if you aren't an expert (most of us aren't). The next meeting will be Saturday, May 23 at 8 pm in room B148, Bourke Science Building, McMaster Campus (follow the signs to the Planetarium, it's the room next door).

Possible topics include:

-Beyond the Visible Universe
-Flying Saucers
-Albert Einstein's Relativity
-Black Holes, Worm Holes and Supernovae
-On Collecting Asteroids and Comets
-A Moon Vacation
-Possible North-South Pole Reversal
-The Sun and Sun Spots
-Prophecies of Doomsday
-Big Bang versus Steady State

Bring your own suggestions!
For more information contact Larry at 529-1037

- Friday, May 15th, 7:30 PM
- Monday, May 25th, 7:00 PM
- Friday, June 12th, 7:30 PM
- May 23,24,29,30 8:00 PM

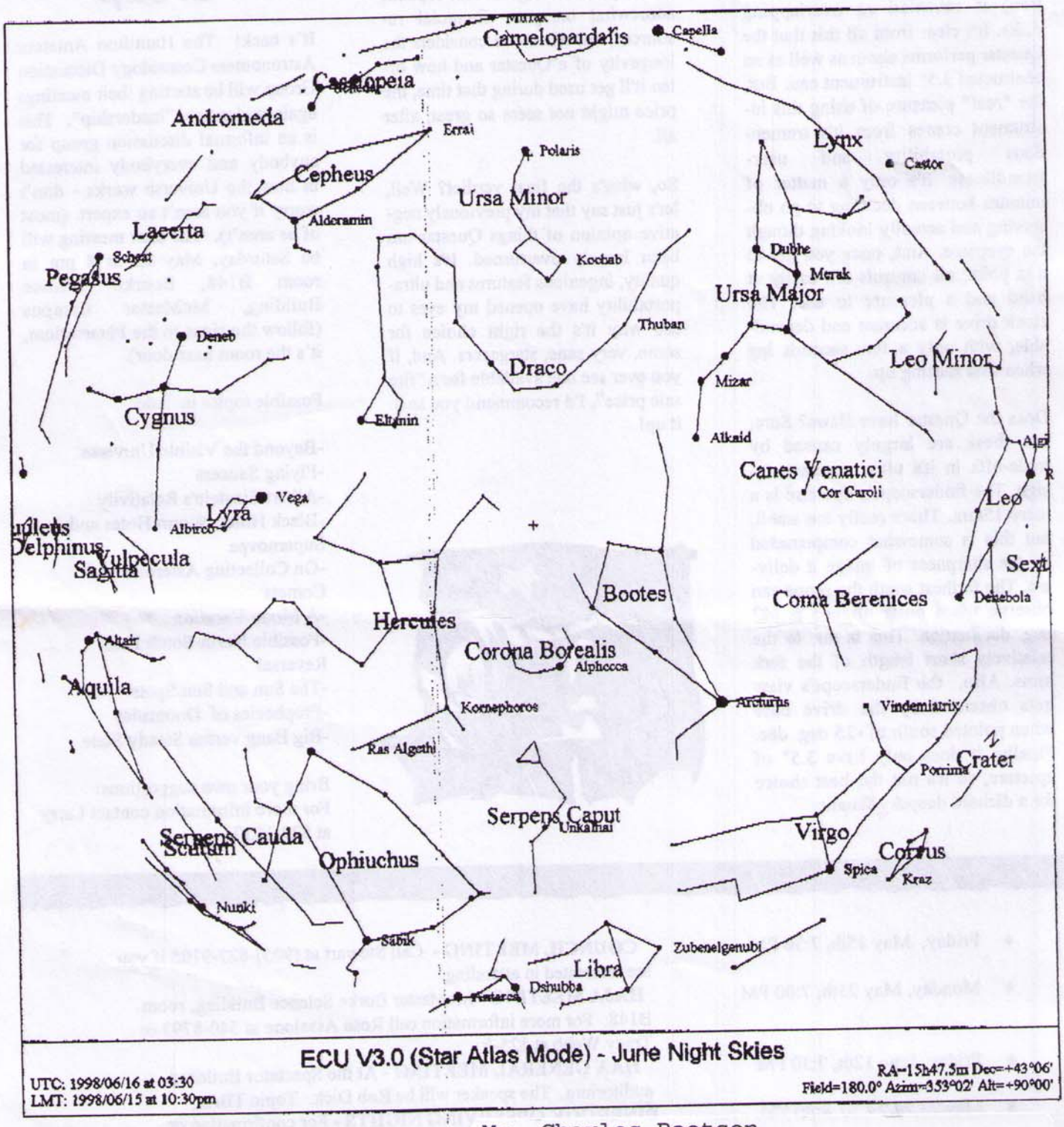
COUNCIL MEETING - Call Stewart at (905)-827-9105 if you are interested in attending.

HAJA MEETING - McMaster Burke Science Building, room B148. For more information call Rosa Assalone at 540-8793 or Tracy Webb at 525-8

HAA GENERAL MEETING - At the Spectator Building auditorium. The speaker will be Rob Dick. Topic TBA.

BINBROOK OBSERVING NIGHTS - For confirmation or directions call Tony Wallace (526-6154)

June Night Skies



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