

Event Horizon

Volume 2 Issue 7

May 1995

Editorial

I've been sitting here for some time now, trying to find things to talk about in my editorial. Between Grant's exquisite Chair's Report and the abundance of events and announcements in the following pages, there's really nothing more that I can add. I'll let you get right into the meat of the newsletter. Enjoy!

Patricia Marsh

Chair's Report

Spring, sweet Spring! It looks as though Mother Nature suddenly realized what was on the calendar and told the trees and flowers to get with it. Enjoy!

The HAJA has been very successful this past season. In fact, it has been so successful that, starting in September, the group will meet monthly. Since it was unanimously agreed that such excellent quality didn't need improvement, the Board thought maybe a greater quantity would be welcome. Most of the credit goes to Patricia Baetsen for founding the group and to Raechel Carson for continuing the momentum, but thanks is also owed to the legions of volunteers who have contributed to HAJA's success.

As you may already have heard (or read in the newspapers), Carmen Martino's proposal to build an observatory, complete with 16-inch telescope equipped with a CCD camera, on the roof of the new Saltfleet High School has been approved by the Wentworth County Board of Education. Well done, Carmen! This represents a

major boost for astronomy in the Hamilton area. In fact, it is only the third such structure in Canada (and will hopefully set a precedent). The HAA is actively involved in this project, as we have offered to help the students with the use of the equipment. In exchange for this service, we will be given access to the observatory. This is definitely a win-win situation!

Congratulations to Doug Welch for presenting a talk at the General Meeting of the Hamilton Centre of the RASC on May 4. The topic was "An Update on Pulsating Variables". He will be the speaker at the HAA's General Meeting next month, presenting a lecture on "MACHO". Our globetrotting Second Vice-President is currently in Australia setting up an HTML Hyperlink to the Australian section of the MACHO Project. He has recently accepted a position on the MACHO Project staff, and he has been asked to sit on the Board of the AAVSO. Yes, he still is a professor at McMaster, when time allows. If he wasn't such a slacker, he could really set the world on fire. Get with it, Doug!

It is commonly said that a convert is the most convinced of all, and Bert Rhebergen is no exception. Having finally accepted the 20th century as inevitable, Bert now has his own

World Wide Web page. Actually, it's about time that the world found out about Bert's dedication to solar observation. In the past few years, he has logged an incredible amount of time in recording the motion of sunspots, using his highly portable 4-inch telescope and making over 800 solar drawings. His exploits are written up on the Web, and 4 of his fine drawings are reproduced onscreen. Bert's page is included in the "Observing" section of the HAA's home page. Check it out!

For those of you who do not have an Internet hook-up, do I have news for you! The Hamilton FreeNet is now up and running! Although it isn't graphical, it uses LYNX, making it possible to access the Web, Newsgroups, and e-mail. We're presently negotiating to have the HAA home page made a direct link to the FreeNet -- nothing concrete can be reported yet, but we're hoping. So if you have a computer with a modem, log on! It's fun and informative, and the price is right! When you get your e-mail address, let me know. That way, I can send you the news as it happens.

The Halifax Centre of the RASC now has its own Web home page, as well as maintaining a page for the National Office of the RASC. They asked and we gladly provided links to their

Inside This Issue

- | | |
|--|--|
| <input type="checkbox"/> 2ND ANNUAL HAA STAR PARTY | <input type="checkbox"/> PLANNING YOUR OBSERVING |
| <input type="checkbox"/> BARBECUE | <input type="checkbox"/> POLE TO POLE |
| <input type="checkbox"/> FIRST LIGHT | <input type="checkbox"/> GREEK IN THE ROUND |
| <input type="checkbox"/> BOOK REVIEW | <input type="checkbox"/> WHAT'S YOUR I.O.? |
| <input type="checkbox"/> BRIEF HISTORY OF SPACE FLIGHT | <input type="checkbox"/> SALT FLEET OBSERVATORY |
| <input type="checkbox"/> MESSIER MADNESS | <input type="checkbox"/> BATTLE OF WATERLOO |
| <input type="checkbox"/> NAMING A PLANETARIUM | <input type="checkbox"/> ANNOUNCEMENTS AND MORE... |

home pages. We wish them every success with their endeavour.

The Hamilton Centre of the RASC has invited us to a barbecue/observing session at their observatory in Flamborough. It will be held on Saturday, June 3 at 5:00 p.m. BYOB & BYOF. Bob Botts is planning a surprise event for all participants; there will be prizes! All HAA members are encouraged to attend.

The Charles-Baetsen-Point-Pelee-Excursion has suffered at the cruel hand of Mother Nature twice now, having been rained out both times. If at first Charles is persistent, however, and hopes to vanquish MN yet. Check the Event Calendar in this newsletter, but do so quietly (in case she is listening). Maybe we can all sneak down there and back before the old girl can conjure up her clouds. If not, Charles' wailing will be heard for another month.

The June edition of the HAA General Meeting will be a special one for a number of reasons: 1) Doug Welch is the speaker; 2) the North York Astronomical Association will co-host the meeting; and 3) it's the last meeting of the season so I can go canoeing. Besides being an extra lively and particularly well-attended meeting, Kelsey's will be jammed afterward (they may never get over it!).

Astronomy itself won't stop in the summer, however, because we are planning our **Second Annual Summer Star Party!** This will be held on the weekend of June 23 & 24 at a glider strip north of Fergus, Ontario (no, Virginia, it means that gliders -- that's engine-less airplanes -- take off and land there). When we're not looking up at the heavens, we will have the opportunity to soar like eagles in said gliders. Thank you very much, Ann Tekatch and Stewart Attlesley, (uh, or is that Stooart Addledby? Stuart Attulsly?) for organizing this super event!

That's it until the next Event Horizon!

Grant Dixon

2nd Annual HAA Star Party

Thanks to the efforts of Stewart Attlesley we will be having our second annual HAASP on June 23 & 24 at the York Soaring Club east of the village of Arthur off of highway #9.

This will be a camping weekend. The Soaring Club offers hot showers, running water and flush toilets. (My idea of camping!) There is no hydro - we will be "roughing it" in that respect.

During the daytime, members of the Soaring Club will be offering glider rides at \$35. Antique and boutique shopping in Arthur, Fergus and the surrounding area is available for the shopaholics. Hiking at the Elora Gorge is another option. Last year, during our star party weekend we went rock collecting. If I can find collecting sites near Arthur, perhaps we can do the rockhounding thing again.

Of course, at night we will be setting up our telescopes to take advantage of the dark skies in this rural setting. The York Soaring Club is allowing us the use of their runway at night for setting up our scopes and they have confirmed that cars are allowed on the runway. That means that those of our members with really BIG scopes won't have to carry them great distances to the observing site (eh, Stewart?).

The cost of camping is a whopping \$3.00 per night. Bring your own camping gear, food, stove, etc. Families are especially welcome. I'm sure the kids will love watching the gliders and they won't soon forget the views through all the telescopes. Arthur is only about 1 1/2 - 2 hours drive north of Hamilton on highway #6. We'll have directions in next month's newsletter.

PLEASE let me know if you're

interested. We need to have a rough estimate of the number of people planning to attend.

Ann Tekatch

575-5433

a7503934@mcmail.cis.mcmaster.ca

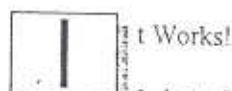
HAA- Hamilton Centre, RASC BBQ

Roger Hill, President of the Hamilton Centre, RASC had a vision. He thought it would be a great idea to have the two Hamilton based clubs join together for a special observing session. We are pleased to announce a joint gathering, hosted by the Hamilton Centre at their Flamborough Observatory grounds.

The date is **Saturday, June 3, 1995**, only to be cancelled by rain. The festivities begin at **5:00 pm**. Come out and enjoy an evening of barbecuing, socializing, and observing. Please bring your food, disposable dishes, drink (wink wink), equipment, and warm clothing for the late night of observing. BBQs will be supplied by Hamilton Centre members. If you have a small BBQ and don't want to wait in line, by all means, bring it along. Rumour has it that the two clubs have chipped in a small amount of cash in order to have a "Scavenger Hunt". Directions are as follows: From Hamilton and Burlington, take Hwy#403 to Hwy#6 north. Head north until 7th Concession and turn right onto 7th Conc. Drive down 7th Conc. until you hit the end. Just before the end of the road, you will notice an "Observatory" sign. Turn right into the observatory parking lot.

Thanks go to the two groups for setting up the event, and especially to Roger Hill for the gracious invitation.

First Light



It Works!

I just finished building my second 'scope (a 12.5" Dobsonian mounted reflector) and I'm relieved to report that it has seen first light and ... it works!

The main mirror was made by Doug Welch some years ago (when he was younger and had nothing better to do). The secondary mirror is from Coulter Optics - the people who bring cheap aperture to the masses.

When I bought the mirror from Doug, he warned me that the optics were, at best, 1/2 wave. The coating is lightly scratched and there's a chip out of the edge. Not exactly anyone's idea of "dream optics"! However, all I wanted was cheap aperture for doing variable star work and possibly supernova searches (who knows, I might someday find one of those things in M101 too, eh Barry?).

After having roughly collimated the thing, Rob Roy and I went galaxy hopping on April 29th. at the Binbrook Conservation Area. We were not disappointed! The light gathering capability of a 12.5" is quite remarkable and I got lost in the Virgo Cluster - all those dim smudges! (So many galaxies, so little time!) Thirteenth & fourteenth magnitude stars were easily seen - the scope is everything I dreamed it would be for my variable star work.

Next we looked at Mars. Planets are always a good test for optics. (Planetary detail is only crisp in very good mirrors.) Mars was somewhat disappointing: an orange blob at 300X. Rob suggested the double-double star in Lyra, rising to the east. I swung the scope around and quickly located this beautiful pair of pairs. At 300X, only two "stars" were visible where four should be. Oh well, Doug did warn me!

Rob and I can conclude after our

(exhaustive?!) tests that this telescope is no Astrophysics, no Obsession, no Ceravolo! It is, however, a GREAT deep sky hunter and a fabulous variable star observer. I'm offering free views of your favourite deep sky object to anyone who cares to come out to the next observing session. We will, however, be careful NOT to show you any planets or double stars. :-)

Ann Tekatch

A Book Review

The Observer's Guide to Astronomy (Volume 1 & 2) Edited by Patrick Martinez Translated by Storm Dunlop (Cambridge University Press, 1994, Hardcover: Vol. 1: ISBN 0 521 37068 X and Vol. 2: ISBN 0 521 45265 1 Paperback: Vol. 1: ISBN 0 521 37945 8 and Vol. 2: ISBN 0 521 45898 6 Available from McMaster University Bookstore or your local bookseller, about \$80-\$100 for the softcover set)

How can the backyard astronomer make better observations? What are good observational methods? How do I find new celestial objects? And why should I clean the dust of my old telescope? I think we all have been asking ourselves these questions at one time or another. Recently, I purchased The Observer's Guide to Astronomy with the hope of discovering a good reference on techniques and scientific method which would take me beyond the simple, leisurely interest that I have had in Astronomy. The Observer's Guide to Astronomy is such a book, and is aimed at "serious" amateur astronomers, or at least people with more than a passing interest.

The guide is divided into a series of articles by numerous authors, and is sectioned into two volumes. One aspect that I particularly enjoyed is that the book has a decidedly European flavour to it, with some different

nomenclature and techniques that I had not been exposed to. Broadening one's horizons (or getting a wide-field eyepiece) is always worth doing. This book is a collection of articles on all kinds of observing activities and topics. The first volume includes observing the sun, solar eclipses, planetary surfaces and satellites, comets, minor planets (asteroids), and artificial satellites. The second has sections on aurorae (the Northern and Southern Lights), meteors, all kinds of stars, novae, and instrumentation such as CCD's, spectroscopy, and photometers.

The Observer's Guide to Astronomy is chock full of techniques and tools, and practical tips to help you get more out of your observing. It includes numerous photographs, sketches, diagrams, and charts, and also includes necessary and relevant calculations. The authors assume a decent grounding in at least high-school math, and having a university background certainly doesn't hurt. However, this should not intimidate anyone because there are many activities and excellent examples that can be put to work. A particularly good feature are worksheets which can be used as a template for your own log. There are so many illustrations, it seems that there is nearly one per page!

Each section has been written to be extremely practical and methodical. For example, the section on searching for comets gives methods to search the sky, and even throws in some important warnings and hints on what works, and what doesn't and why. The book also includes little tidbits such as the fact that D. Macholtz (a well known comet hunter) used a pair of home-made 29x125 binoculars that he made from surplus lenses. The authors also provide a lot of reassurances on how long it can take to get good results.

Once of the nice aspects of this book is that it is organized like a buffet of information, where you can choose the section you want to explore, and sample it as much as you like. The Observer's Guide is not "light reading", but is frequently more practical and fun than

some of the things I've come across from (primarily) American authors. The perspective of the book includes European, Japanese, Russian, American, and Canadian discoveries. There is an excellent section on Constellation Photography that discusses films, exposure times, and even ways to mount the camera (including the Haig Mount - maybe discovered by a relative of mine? - Now you see why I like this book).

All considered, this two-volume set is recommended if you have the desire to continue your observing in a more serious way. Some parts are more demanding of the reader, and the intended audience is not the Junior Astronomer. The only frustration that I have experienced with the book is the lack of a proper index. This is likely due to the fact that each section in the book is a separate article, written by different authors. However, this still would have been helpful. The Observer's Guide can be a great way to pump new life into your old hobby, or to show you new ways of looking at the boring old universe.

by Colin A. Haig, M.Sc.

A Brief History of Space Flight: Part I - The Early Years

The first man to write about a trip to outer space was a Roman living in the 2nd Century AD. He was the first known science fiction writer in history. Since that time the Chinese developed fire crackers and gun powered, which eventually lead to the development of canons and other weapons, whose theory was based on the use of explosive chemicals to fire projectiles in the air.

Exactly what one would need if they were to leave the confines of this earth. During these intervening years man continued to wonder and fantasize about a trip in space. In the late 1950's this fantasy was become a reality with the launch of Sputnik.

On October 4, 1957, the Soviets successfully launched the first artificial earth satellite called Sputnik 1. Before this satellite was launched, the earth's atmosphere was studied only up to about an altitude of 30 km and practically nothing was known about outer space. Many difficulties had to be overcome in developing instruments and insuring their operation in flight let alone in getting them up there. Since this was the first object placed in orbit, scientists wanted to maximize the knowledge it would bring back, while minimizing its size, with a bit of publicity thrown in for good measure. Sputnik was made spherical so that they could easily calculate the density of the outer atmosphere from drag measurements. Two 1 W transmitters operating at 20,005 MHz and 40,002 MHz were placed inside Sputnik. Beside being for the benefit of the West, these transmitters enabled scientists to determine the effect of the ionosphere on radio waves by measuring the time differential between the satellite's optical and radio rising. In addition, temperature inside the capsule was also relayed back by changing the frequency of the "beeps".

Less than a month later, the Soviets launched another Sputnik with the dog Laika on board. The purpose of this launch was to observe the effects of weightlessness and cosmic radiation shielding on a biological system. After the success of this launch, scientists concluded that animals can endure lengthy periods of space travel, paving the way for manned flight. For the dog to survive they had to provide for the circulation of air in the absence of gravity. To accomplish this, highly active chemicals were used to produce O₂ and absorb excess CO₂ and H₂O vapour. On this mission, it was

discovered that the flux of charged particles (which are responsible for aurora) increased with altitude and geomagnetic latitude.

On the 16 December 1957, the United States was prepared to answer the Soviets with its own satellite, Vanguard 1. When it reached 6 feet of the ground it fell back and exploded. Back in 1954, Von Braun proposed sending a single satellite on board a US Army Redstone rocket. It would have been cheap and fast, but it turned down in favour of Vanguard. After the explosion, the White House gave Von Braun permission for his "Project Orbiter". Within 90 days the first U.S. satellite, Explorer 1 was put in orbit. Explorer 1 weighed 31 lbs (5.6 kg), much smaller than Sputnik (83.6 Kg), but despite its small size, it was able to discover the Van Allen radiation belts.

The Soviets later sent other satellites mainly to investigate radiation shielding for a possible manned flight. The Soviets had to choose between a ballistic flight (parabolic trajectory) or an orbital flight. It was later chosen that an orbital flight would have more propaganda value. On 12 April 1961, Yuri Gagarin was launched from the Baikonur Cosmodrome in Vostok 1, the entire flight lasted only 108 minutes with one complete orbit. On 11 August 1962, Vostok 3 and 4 were launched into similar orbits with the two ships coming as close as 6.5 km. This demonstrated a solution to the problems of two spaceships in close orbit with very high precision. This mission also demonstrated that two way communication was possible in space, without the benefit of our ionosphere.

These few missions laid the ground work for future missions that would end up with a man on the moon.

Charles W. Baetsen, M.Eng.
charlesb@dogwood.physics.mcmaster.ca

Messier Madness

I joined my first astronomy club in early 1991. After many evenings of standing around in a line up, waiting for one of my new friends to find an object of interest in their telescope for me, it became clear that I required an optical device of my own. The ATM group was in full force by late 1991 after all interested parties received their shipment of supplies. By May 1992, my mirror was ready to be aluminized. In August 1992 (the night of the Persied meteor shower) I had first light and a crude but functioning 8" f6 telescope. Now what...

Since I loved looking at deep sky objects and was beginning to get a knack for handling star charts, I decided to make drawings of these messier objects which allowed me to spend more time at the eyepiece. The longer I looked at these galaxies and clusters, the more detail I would see.

My first drawing was made on September 1st, 1992 of the Andromeda galaxy. Since I was in the area anyway, the second was of galaxy M32, one of Andromeda's companions. And on it went, over a span of 2 1/2 years. I would average five objects on a good night and maybe one on a bad night. Some nights I couldn't find the guide star for star hopping, even though I was looking right at it.

I have many fond memories of the adventure. I can remember getting lost in the Virgo cluster. I gallantly found my guide star and began hopping to where my star chart indicated I would find galaxy # M86. Moments later, I moved my eye from the finder scope to the eyepiece and couldn't believe that I was looking at five galaxies in one field of view. I sat back thinking, which one is M86? The star chart did indicate that there were many, many objects in close proximity, but I had no idea that so many



M51, Whirlpool Galaxy

would show up in my telescope at once. What was I to do? Luckily, I was at the observatory in Flamborough and had access to the Uranometria sky atlas, which revealed dimmer stars. Now I could orient myself and distinguish one galaxy from the other. This drawing, consisting of two Messier galaxies and three NGC galaxies is one of my favourites.

Shortly after saturating my eyes with galactic photons, I entered the world of globular clusters. It was now the month of June 1993, and by the time I got to Sagittarius, I can truly say, I had had my fill of open and globular clusters for a while. At this point, I slowed down the hunt and enjoyed some planetary and lunar observations.

Soon winter came, and these faint fuzzies began calling my name again. The adventure was back on. Pregnancy and sub zero weather was no deterrent. Actually, that's when I did my best work. I'm a pro at handling a sketching pencil with thermal gloves on. It seems that on the first time searching the winter sky(1992), I picked out the easiest and brightest objects. The second time around (winter 1993) forced me to seek and find the intermediate and slightly dimmer smudges. By the winter of 1994, I had only the most difficult and barely visible

Messier objects left to find. Naturally, spring 1995 was practically a nightmare. I had only a few galaxies and clusters left to find, all of them low in Virgo and Hydra. Galaxy #M83 had to be the most difficult for me to find as it was still very low on the horizon and at the optical limit of my 6" telescope. March 1995 put this galaxy just high enough by approx 11:30 pm for me to "bang off". I was cold, tired, and so relieved that the long hunt was now over. Sure, I could have waited another month until Hydra was better situated above the tree line, but...na.

What was my reward for taking on this adventure? A great knowledge of the sky, constellations, star hopping, a fabulous collection of drawings, and a nifty certificate to be proud of. Go for it!

Patricia Marsh

The Naming of a Planetarium

How did the planetarium at McMaster University get its name, you ask? Well, ask no more...

The McMaster University Board of Governors approved a recommendation from the President that the planetarium in the Burke Science Building be named the William J. McCallion Planetarium, in recognition of the scientist's development of the University's first planetarium and of his many contributions to astronomy in Canada.

Bill McCallion '43 enrolled at McMaster in the fall of 1937, graduating with a BA in mathematics and physics in 1946. In 1943, he became a sessional lecturer in mathematics and continued to teach at the University until his retirement in 1984.

With the assistance of the

superintendent of buildings and grounds, Bill arranged for planetarium presentations, first using a war surplus parachute suspended from the ceiling. It is estimated that he made presentations to over 100,000 individuals.

Bill's skills were recognized by a series of appointments, first as assistant director and then as director of University extension. In 1961, Bill became director of educational services for the University and in 1970 dean of the School of Adult Education, a position he held until 1978.

Excerpt from McMASTER TIMES, Winter 1993

Submitted by Bob Botts

Planning Your Observing Sessions - Based on the Weather!

How many times this past winter did you venture out to view Mars and were met with an out of focus image that made you just a little bit nervous about your optics? Perhaps you envisioned a great dust storm obscuring your view of the Martian features. More than likely, it was just the wrong kind of weather!

I will suggest what kinds of objects you should view given different kinds of weather scenarios. You've already done it before, you have planned on NOT observing certain kinds of deep space objects because of another celestial object: The Moon! The Moon casts a strong enough light that it is very hard to view most nebula, so you pick planets, and double stars to view near the Full

Moon instead.

Well, if you pay attention to atmospheric turbulence, and clarity, you can likewise lay out your plans even more effectively. Let me explain.

Let's break down the objects that you would view in a given night into three simple categories:

Deep Space - not very bright (we'll call this TYPE 1), and

Planets/close double stars - quite bright, but small (we'll call this TYPE 2).

There are also certain objects that can fall somewhere in between Type 1 and 2, such as star clusters, and planetary nebulas, we will call those Type 3.

Type 1, deep space objects generally require very dark skies (no Moon, no haze or clouds), but atmospheric instability is not that much of a problem. Type 2, planets and close double stars require a steady atmosphere, but are not that much affected by bright moonlight. This means that the following can be applied in planning YOUR observing session:

Steady Atmosphere - Clear, Moonlit night - Type 2, Type 3

Steady Atmosphere-Haze, Moonlit night - Type 2

Steady Atmosphere - Haze, No moon - Type 2, Type 3

Steady Atmosphere - Clear, no moon - Type 1, Type 2, Type 3

Unsteady atmosphere - Moonlit night - Type 3

Unsteady atmosphere - Clear, no moon - Type 1, Type 3

Notice, I have intentionally left out the category:

"Unsteady atmosphere, haze"

That is because the atmosphere is usually stable on nights WITH haze, which gives you a good opportunity to view planets and the Moon on that night! Using the above, let's say that we have a very cold, turbulent night, but no

Moon. This would allow viewing of all deep space objects, although they may show some shifting, and be less defined than usual. Alternately, a hazy, moonlit night would basically allow viewing of planets and close double stars. The haze, if not too thick, especially away from the horizon, will hinder the view FAR LESS than an unsteady atmosphere.

How do you know what kind of night you are facing? The best indicator is to see if the bright stars are twinkling. If not at all, you have excellent stability. If twinkling just a bit, then you are still doing well. If they are twinkling a lot, but the planets are not, then you still may view the planets with higher focal length eyepieces, just don't get real tight. Finally, if the planets are showing some signs of twinkling themselves, forget viewing the planets or splitting close doubles, leave it for another night entirely!

How can you tell ahead of time what kind of weather you will be facing for a given night? Well, next month I will talk about the different weather systems that will produce the above mentioned weather conditions, and also take a look at what kind of clouds you may be able to observe right through!

Clear Skies!!!

- Todd Gross
Toddg@shore.net
WHDH-TV Meteorologist
Channel 7 Meteorologist, Boston

Amateur Astronomy buff, and
weatherdude..

An idea that is not dangerous is
unworthy of being called an idea
at all.

Oscar Wilde



Pole to Pole

The Return of an Old Favourite

TUBELESS MARK I

Astronomy has always been a consuming passion of mine:- right from early childhood. Then, as a young teenager just entering high school, the interest became more crystallised and I joined the local astronomical society. Leading the junior section at the time was a patient, elderly man named Kurt Menzel. Every month the juniors would meet at his home to discuss astronomy and the when darkness fell we would go outside to his observatory and view the universe. In those days an observer owning a 6" reflector considered himself fortunate in owning such a large and powerful instrument, so to use Mr Menzel's 12" cassegrain was always a thrill. Often some of us would visit Mr Menzel much more often than once a month. However for me, Mr Menzel did more than just foster a young boy's interest in astronomy;- he helped me obtain my first two telescopes.

In 1966 I became the proud owner of a 6" f4 mirror which, with much help and encouragement, I managed to convert into a newtonian telescope. Then in 1971 Mr Menzel sold me a 5" f5 refractor complete with equatorial mounting, motor drive, home made astrocamera, and fold-out roof

observatory. The telescope featured a 2-element, cemented objective, manufactured by Jaeger's in 1957. It was known as an "apogee" telescope and originally purchased for use in the "MOONWATCH" program. Having such a short focus there was some chromatic aberration however it was never the major problem that some books made it out to be. Also being only 25" long it was a highly portable instrument. In 1979 I had the opportunity to compare it with an 8" schmidt-cassegrain while observing Jupiter. There was no difference in the amount of detail visible!

Set up in a corner of my parent's home, the equipment provided me with many years of observing pleasure. With it I observed many spectacular sights: Total eclipses of the sun and moon; comets such as West; the Jupiter/ Scorpii occultation; Sirius B; mutual phenomena of Jupiter's satellites. The list could go on. Along the way I gained an appreciation of the clear, crisp images that a refractor delivers. With the equatorial head mounted on a pipe mount using an old wheel rim as a base (which resulted in the telescope being given the nick-name "Tubeless") I learned the advantages of a highly portable telescope, and it accompanied me on many observing expeditions around Australia. The fast focal ratio was ideal for photography and proved very valuable in photographing my favourite astronomical objects, comets.

Then came the aperture revolution of the 1980's with the giant dobsonian light-buckets. Like so many other amateurs, I was caught up with the dream of owning a large telescope, and so ordered a set of 16" optics. However to finance the order it was necessary for Tubeless and I to part company.

The 16" certainly proved its worth in studying deep-sky objects. Faint tendrils of gas in nebulae, spiral arms in galaxies, globular clusters composed of myriads of tiny pinpoints of light. It also enabled me to follow comets to a much fainter magnitude and on one occasion to visually recover a periodic comet

inaccessible to professional astronomers. (comet Honda-Mirkos-Padusakova in 1987) However I did miss the sharpness of the refractor. Also the 16" was BIG!! The design was transportable but definitely not portable, and the alignment of the optics was always a problem. Photography was out and when I saw some of the photographs taken by the new owner of Tubeless, using new generation colour films, I found myself wondering if I had done the right thing in selling the 5".

Eventually I had to sell the 16" and later built a 10" planetary telescope but the images were still not as sharp as those delivered by a refractor. Meanwhile Tubeless had changed hands several times and was now owned by one of my friends in the astronomy club. This converted him to a refractor fan.

By 1993 I had sold my 10" and was trying to make up my mind as to what telescope would suit me best. The new range of apochromatic refractors interested me greatly but the price was a problem. How could I justify \$1000 per inch of aperture? Still the images would be superb and the instrument would be highly portable. On the other hand a large dobsonian also had many advantages. So what to get?

While pondering this dilemma my friend contacted me regarding Tubeless. He wanted to upgrade to a larger instrument. Did I know anyone who would be interested in purchasing Tubeless? Needless to say it was not long before we had agreed on a price and after a break of some 10 years Tubeless was back in my possession.

Although not as good as when I previously owned it (someone had been too exuberant in cleaning the objective and left a number of fine scratches) the telescope still gives high quality images. Recently I was observing the moon with another club member and when he compared the image in tubeless to the image in his 10" newtonian, he was amazed to find the 5" delivering clearer and better images. (He has since sold the

10". Another convert to refractors!) Photography is as enjoyable as ever and I am looking forward to experimenting with some of the new films produced since I last owned Tubeless.

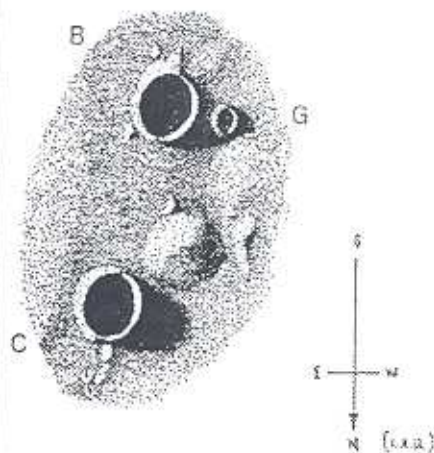
However I find there is another factor in once again owning Tubeless. Often while using the telescope my mind drifts back to a young teenager going to Mr Menzel's observatory and observing with both the 5" refractor and the and the 12" cassegrain. Mr Menzel passed away a few years ago. His observatory no longer exists, the site now being part of a housing estate. The 12" cassegrain likewise no longer exists as a result of damage to the mirrors. All that now remains is the 5". By having it in my possession I feel like I am keeping some contact with my old mentor.

The refractor also reminds me of the patience of Mr Menzel. When I am feeling frustrated with some of the younger members of the club, a look at the telescope reminds me of how 30 years ago Mr Menzel accepted the junior members and sought to instil in us some of his own love for astronomy. In my own case, I know I have reaped a great reward from the seeds he sowed back then, and using Tubeless reminds me that I should endeavour to pass on that same love for the universe to other young amateur astronomers.

Tubeless has seen many owners and has given a large number of people countless hours of viewing pleasure. Amateur astronomy has changed much since it was made 37 years ago, but one thing that will never change is the need for experienced amateurs to pass on their knowledge and love for astronomy to others. This is still one of the main tasks for Tubeless.

Somewhat I think Mr Menzel would be pleased.

Maurice Clark,
Murdoch Astronomical Society
Perth, Australia



Dome S/W of Gambart C (Drawing)

1993 November 22nd
8" Schmidt - Cass x 225, x 270
18:45 - 19:04 UT
Seeing: III
Transp: Good
Suns Mean Col: 15.22 deg

Notes:

First observation made using Celestron 8" Schmidt Cass. Dome was readily visible, but no summit crater was observed. A mass of detail (small craterlets) was visible North of Gambart C, during moments of good seeing.

Nigel Longshaw.
Manchester Astronomical Society,
U.K.

Did You Know That ...

Quasars have an enormous energy outflow for their size - comparable to finding a rock that can outshine the sun.

It would require over 150,000 years to count the number of miles in one light year.

Greek in the Round

In light of the different entertaining topic surrounding Astrology by Denise, a guest of HAA's April General Meeting, I have chosen this month to stage a slightly different performance. I will look at the Precession of the First Point of Aries, the Equinoxes and Solstices. Their shift pattern is in reference to the 26,000 yr. cycle (25,765 yrs.) of the Earth's Precession rotation around the sun.

Both subjects originated about 2000 years ago but were not separate. Astrology/Astronomy used ecliptic stars. The same Zodiac is still used today although it has changed over the years due to Precession and our own Earth's WOBBLE. The term "wobble" is used loosely to describe the motion of the Earth, as in a top spinning. At present, Polaris is our North pole star but thousands of years from now, that will change and eventually we will have a new pole star. True North is about .80 off Polaris. The following definitions will help you understand what precession is all about;

PRECESSION (of Earth) - (NOT to be confused with Wobble) A slow, conical motion of the Earth's axis of rotation, caused principally by the gravitational torque of the moon and sun on the Earth's equatorial bulge.

- *Lunisolar precession*, precession caused by the moon and sun only;

- *Planetary precession*, a slow change in the orientation of the plane of the Earth's orbit caused by planetary perturbations;

- *General precession*, the combination of these two effects on the motion of the Earth's axis with respect to the stars.

PRECESSION (of Equinoxes) - (NOT to be confused with Wobble) Slow westward motion of the equinoxes along

the ecliptic that results from precession.
WOBBLE - Wandering of the poles; variation of latitude. It is extremely slight and does not effect precession on the whole.

PROPER MOTION - The angular change in direction of a star per year as seen from the sun.

By definition, the first point of Aries has 0 RA. and 0 DEC. Because precession shifts the points position over time, the co-ordinates of all the stars and other objects in the sky also shift. Hence, new Star Atlases every 50 years. Between 1800 BC and AD 1, the Zodiac was invented and the Sun lay in Aries at the time of the Vernal Equinox, named "the first point of Aries". It still bears this name, even though the Sun on the day of the Equinox has now moved into the Constellation Pisces. The first point of Aries will continue to shift and in another few hundred years the Sun will move into Aquarius. Giving approximate milleniums (1 millenium = 2000 yrs.) the sun lay in the following constellations at the Vernal Equinox:

	B.C.	6000 -
4000 Gemini		
	4000 -	2000
Taurus (4380-2220 BC)		
	2000 -	0
Aries - Birth of Christ		
HALT ASTROLOGY/ASTRONOMY -		
ERA DID NOT ADVANCE - STAYED		
IN ARIES		
	A.D.	0 -
2000 Pisces		
	2000 -	4000
Aquarius		

At 0 A.D. there was a halt in astrology/astronomy. The creators of myth, ancient gods and religions disappeared. Christianity was established and no one was able to manipulate the celestial vision. Instead of going from Aries into the era of Pisces, everything stayed the same except the apparent motion of the sun which shone and still shines in Pisces at the Vernal Equinox. The sun does not move into Constellations. The Earth moves around the sun and it is due to precession that the

sun appears to change position on the ecliptic line.

Astronomers separated from Astrologers when Precession was realized and Astronomy was recognized as a science. Astrologers still use the stars of 2000 years ago, an unchanged ecliptic Zodiac. This means that modern astologists use a zodiacal model that has been outdated for almost two thousand years. The current Zodiac actually has 14 Constellations. Ophiuchus - the 13th and Cetus - the 14th. Ophiuchus has obtained a substantial 2 week time slot on the ecliptic and Cetus has now snuck on for 2 days interrupting Pisces.

Long before Hipparchus ever made his star charts, early astrologers had named the 12 zodiacal constellations. Even then, they were shrouded in mythology and the symbolism of astrology. Originally, the division of the zodiac into 12 constellations, or signs, may have emerged when early skywatchers noticed that Jupiter took 12 years to complete its orbit around the ecliptic, and spent one year in each zodiac constellation. Jupiter is the brightest planet seen throughout the night and must have been an object of great interest in early times. (Venus is brighter but is only visible for a few hours before sunrise or after sundown.) Far back in ancient antiquity, the number 12 became a very powerful symbol - 12 apostles, 12 Biblical patriarchs, 12 jurors and of course, 12 months in a year. This final division is most likely a product of the lunar orbit, which travels around Earth 12 times a year, with 12 days left over.

As you can see, the stars perform many other fascinating dances which are not visible to us. However over great spans of time we have been able to see slight changes of these shifts. Also, we can now track backwards and forward in time with great accuracy to see what precession has and will bring our way.

**BC 4000 - 2000

TAURUS

LEO

SCORPIUS AQUARIUS
 sp.eq. sum.sol. aut.eq.
 win.sol.

**BC 2000 - 0 (birth of Christ - Zodiac created)

ARIES CANCER
 CAPRICORNUS LIBRA
 sp.eq. sum.sol. aut.eq.
 win.sol.

**0 - 2000 AD

PISCES GEMINI
 VIRGO SAGITTARIUS
 sp.eq. sum.sol. aut.eq.
 win.sol.

**2000 - 4000 AD (the upcoming "Point of Aries" - approx. 2,7??)

Aquarius TAURUS
 LEO OPHIUCHUS
 sp.eq. sum.sol. aut.eq.
 win.sol.

We can see relics of the old Equinoxes right here on Earth with the names of our Lines of Tropic. Currently they are the Tropics of Cancer & Capricorn. If we apply precession they should be The Tropics of Gemini & Virgo.

Ev Butterworth

What's Your I.O?

I understand that the April showers bring the May flowers. I've seen the truth of this statement for myself. The grounds are lovely, each week new varieties of fauna are springing from the earth. The colour at this time of year is spectacular. Last months answers were found by all I trust. Worry not, here they are anyway.

1) False. One sol is a Martian day (approximately 24 1/2 hours). Phobos has a revolution period of only 7 1/2 hours, which is less than a sol, but the revolution period of Deimos is 30 hours.

which is more than a sol.

2) The Old Royal Observatory at Greenwich. When King Charles II decided to found the Observatory, he commissioned Christopher Wren to design the first buildings, and paid for them by selling old and decayed gunpowder to the French.

3) W.T. Hay, otherwise known as Will Hay. He was an enthusiastic and skilful amateur observer.

4) Only one: Ganymede, in Jupiter's system. Both Callisto in Jupiter's system and Titan in Saturn's system are now known to be slightly smaller. The diameter of Triton, the major satellite of Neptune, is not yet known with precision, but is almost certainly less than that of Mercury.

5) False. An instrument for splitting up light is a spectroscope. An interferometer depends upon the principle of light interference.

6) The Galaxy is the star-system of which our Sun is a member. It contains around 100,000 million stars.

I hope you'll answer these questions outside on a beautiful sunny warm day.

1) Who held the post of Astronomer Royal on January 1, 1987?

2) The constellation of Delphinus is named in honour of the dolphin who, in legend, rescued a famous singer from drowning. What was the name of the singer?

3) Give the 'odd one out': Aristillus, Alphonsus, Autolycus, Timocharis, Lambert.

4) T/F The only bright star with a strongly green colour is Vega.

5) Give the English names for: Sinus Iridum, Mare Nubium, Lacus Mortis, Mare Frigoris, Oceanus Procellarum.

6) Who founded the Lowell Observatory in Flagstaff, Arizona?

IO, Keeper of the Flame
Jupiter Co-ordinator

Saltfleet Observatory will be a Reality Congratulations Carmen!!

Tonight the Wentworth Board of Education met to decide the future of a proposed observatory on the roof of the new Saltfleet High School. The structure will be a 12-foot dome isolated from the main building. It is to house a fully-equipped 16-inch telescope complete with computers and a CCD camera.

Carmen Martino, Chair of the Science Department of Saltfleet High School and a member of both the Hamilton Centre of the RASC and the HAA, was the driving force behind this proposal. Tonight's meeting was the climax of more than a year's work on his part. Supporting him at this meeting was Dr. Doug Welch of the Department of Physics and Astronomy at McMaster University and Grant Dixon, Chair of HAA and member of the Hamilton Centre. Doug was eloquent in his presentation of the scientific and cultural merits of this endeavour. Grant was able to demonstrate the level of interest in astronomy in the Hamilton area by citing the vast numbers of participants in public lectures and demonstrations at the William J. McCallion Planetarium at McMaster and the Hamilton Centre Observatories.

The architect for the Saltfleet project pointed out that an observatory with a value of \$150,000 could be built into the school's building costs for only an additional \$38,000. Grant explained how an income of between \$5,000 and \$7,000 could be generated yearly by use

of the Saltfleet observatory that would offset maintenance costs and ongoing capital expenses. Doug pledged professional support from Physics and Astronomy at McMaster.

The Board was particularly impressed by the level of support from the students at Saltfleet, who have already raised \$15,000 toward the project. The final outcome of the meeting was that the Board voted overwhelmingly in favour of the observatory project; construction of the structure including the dome will proceed, with money for equipping the observatory to be raised by public subscription.

I would like to pass along here Carmen Martino's ebullient thanks to all who have assisted in making the Saltfleet observatory project a reality.

Thank you, Carmen, from all of us, for your vision and hard work. Because of you, countless young people will be able to reach for the stars!

Grant Dixon

Date: Tue, 2 May 1995

From: Doug Hube

dhube@phys.ualberta.ca

Subject: Re: Hard work by RASC Member Carmen Martino

Grant;

Congratulations to you, Carmen, Doug Welch and all the others who have contributed to convincing the Wentworth County Board of Education of the value of the observatory!

Let us hope that it proves to be so successful and of such benefit to students and to the general public that every school board across the Country will want one.

Doug Hube

President,

Royal Astronomical Society of Canada

The Battle of Waterloo

How strange to be on the other end. I remember when I was nagging people to write articles, now I'm being urged on.

If you were not aware, I am off to school in the computer science program at the University of Waterloo. I have my hobby to thank for preparing me for the numerous long nights.

It is good to see that the club is still active. (And there I was thinking that the whole organization would fall apart without my presence.) These days I read my Event Horizon on-line - before the paper version arrives via snail-mail. This example of modern efficiency is brought to you by the World Wide Web and Grant Dixon. Thanks to Grant our club has global exposure. And what a fine the newsletter it is. Many kudos to Patricia for producing a high quality newsletter every month.

Astronomy here at Waterloo is alive and well. The Physics department has several astronomers among its ranks, including Dr. Fich and Dr. Harris, both of whom you'll recall giving presentations at our general meetings. My daily astronomical reminder came in the form of a dome atop the Physics building. At one time this dome probably got a lot of use, but the light pollution on campus and from Kitchener-Waterloo chokes out much of the sky. A great deal of the pollution is due to the nearby monument honouring the Borg. Located next to the Physics building, the huge cubic shape of the Dana Porter Library looks strangely similar to something Captain Picard should battle. They insist upon lighting up this building, such that it appears at night as a cubic sun rising on the horizon when viewed from a distance.

What now? Well I am actually

typing this up from my new apartment in London before "wiring" it off to Trish. I am here to seek out new life and strange new civilizations. I am here to explore the "real" world. I have a co-op position at an interactive television company which relies heavily upon computers. Now I get an opportunity to apply my newly gained knowledge. I guess they're not up to date on beer drinking games out here.

Stephen Sheeler

Note to Ev, Ann and Patricia: Computer Science is not a good place to meet women either.

Celestial Tent Spring Star Party Invitation

ANNOUNCING A LONDON
RASC SPRING STAR
PARTY

All Southwestern Ontario
Amateur Astronomers are invited.

Date: Friday MAY 26-27 Cloud date
May 27-28

Time: 19:00 (7:00pm EST) to Sun Up or
later

Cost: FREE

Location: Derek Hitchens' country
estate, just across the road from the A.W.
Cambell Conservation Area, north of
Alvinston.

From London travel west on Hwy 81 to
Mount Bridges, then southwest on
County Road 14 to Glencoe. Go right
onto Hwy 80 and northwest to Alvinston,
then right onto Hwy 79 and take the first
right gravel road. Derek's white dome
can be seen on the left just before the
Conservation Area.

Accommodations: Several bedrooms are
available, and a large grassy area is
available for tents. Inside washrooms are
available.

Bring your own camp stove, dishes,
drinking mug, food, folding table, etc.
Hot chocolate, tea coffee and good
company will be available all night, no
charge.

If you are interested in
attending, please call me at 472-1437.
Derek's skies are quite good, and he is
going to ask all his neighbours to turn
off the lights.

Clear Skies or Grind Glass

Dave McCarter,
Observer Chair for London Centre,
RASC.

Announcing the Hamilton Wentworth FreeNet

The Hamilton FreeNet is here!
The phone number is 540-
5000. You can phone up and
sign-up. For \$20/year, you
can get your own personalized username
and for \$50/year you can get a modem
pool with less competition. There is e-
mail, but no ftp due to disk space
limitations. You interface with the world
using lynx. No SLIP or PPP either.

What you need:

- * An IBM-compatible computer running
MS-DOS, PC-DOS, or Windows
- * A communications program
- * A modem
- * An available telephone line

There are many commercial
software packages available. Modems are
available from any computer retailer.
Good-quality modems can be bought for
less than \$100. You can use your current
telephone line to connect to the Hamilton-

Wentworth FreeNet.

Try out the various services and information sources available. However, some services, like sending and receiving electronic mail, are not available to guest users. To take full advantage of the FreeNet, you must register.

Saturn Loses It's Rings!

A headline screaming out from the front page of a tabloid newspaper? Possibly. But this year Saturn's rings will be seen edge-on or nearly edge-on, from our perspective here on Earth. In small backyard telescopes they may be virtually invisible. So we could say that Saturn has lost its rings!

On May 22nd, the Earth will pass through the plane of Saturn's rings. From then until August 10th, we will be looking at the unlit (south) side of Saturn's rings. We have become used to seeing the bright, sunlit side of the rings. I've never seen Saturn any other way. This should be fascinating!

According to some of the information I've been reading, 13 of Saturn's moons were discovered during ring plane crossing events. With the rings no longer reflecting bright light at us, we can see fainter objects near the planet. Any small or dim moons would become more easy to spot. (I never thought of Saturn's beautiful rings as light polluters!)

If you'd like to learn more about this celestial event, Sky & Telescope May 1995 has an excellent article. Terence Dickinson makes mention of it in the planet section of the 1995 RASC Observer's Handbook (p.142). For those of you with access to the Internet, the Jet Propulsion Lab in Pasadena, California has set up a Saturn Ring Crossing Home Page:

<http://newproducts.jpl.nasa.gov/saturn/>

Another Saturn Ring Crossing home page has been established by the Ames Research Center:

<http://ringside.arc.nasa.gov/www/rpx/rpx.html>

Unfortunately, Saturn rises only 2 or 3 hours before the sun this month. At dawn, it won't be very high in the sky. This will make viewing difficult. But if you want to watch this spectacle unfolding, it would be worth getting out of bed early to check it out. Those of you who aren't "morning people" can wait until August, when we cross Saturn's ring plane again. Saturn will be rising at mid-evening by that time and will be more accessible to "night people"!

Ann Tekatch

Upward Skybound

May. Real Spring is finally here! This also means that our days are getting longer, added to that daylight savings time, so our nights are getting much shorter. Take advantage of all the hours you can. You might also consider that the mosquitoes and other insects are not in full swing yet. Now is the best time to start or continue your Messier collection in earnest.

FQ: May 7 / FM: May 14 / LQ: May 21 / NM: May 29

Mercury: is at greatest elongation on May 12. It will be difficult to see and low to the west north-west horizon. Use binoculars to spot it. Mercury lies north of the ecliptic for the first half of May and is brightest at the beginning of the month.

Venus: bright in the eastern dawn sky.

On the morning of May 27th the crescent Moon lies nearby.

Mars: is past the meridian as dusk falls and sets after midnight. On the 24th it passes 10 N of Regulus. It will start to lose detail in Earth-based telescopes as it moves too far away.

Jupiter: in Scorpius rises in the southeast shortly after sunset, and is visible for the rest of the night.

Saturn: in Aquarius rises about 3 hours before the Sun and is in the southeast at sunrise. On May 22nd Earth lies in Saturn's ring-plane and Saturn appears ringless. Another feature is that Saturn appears appreciably dimmer than when its rings are tilted toward Earth. This will also allow a better view of its six major satellites.

Pluto: in Libra, is at opposition on May 20.

Workshops: May 20/95 Saturday 1:30pm. - **Rock Chapel Conservation Area "Solar Observing"** (please note the change in venue) As long as its not raining this workshop is on. Come and learn how to safely solar observe. The good weather is coming and this is a wonderful way to enjoy the outdoors and still do astronomy. I will show different types of solar filters, their uses, and concentrate on the safety precautions. Done properly, this is a most enjoyable pastime. We may also take in a hike. Bring the family.

Jovial Satellites: July 4 Tues. or 5 Wed. (weather permitting) 7:00pm. - **Rock Chapel Cons. Area "Solar/Lunar Observing"** Did you know our sun and moon have names just like each of us. Meet Sol and Luna. Catch Sol safely and see what our star really looks like. Then we'll take a look at Luna through binoculars and telescopes. It is the most interesting 'planetoid body' you'll ever see. Call me if you're unsure if this workshop will be running.

Clear Skies

Ev Butterworth - Observing Director - 632-0163

Important Astronomy Phone Numbers

Mount Hope Weather Office:
679-3361

Sky & Telescope News Line "Skyline":
1-617-497-4168

Universal Time Signals from the
National Research Council in Ottawa at:
1-613-745-1576

Special Event Announcement

The H.A.A. and the North York Astronomical Association will be hosting a joint meeting of the two clubs. Please help us welcome our friends from NYAA at the Spectator Auditorium on **June 9th, 1995 at 7:30 pm.** Guest speaker will be Dr. Doug Welch from McMaster University and his topic of discussion will be MACHO, or MASSive Compact Halo Objects.

Let's make the most of our last meeting before the summer break!

Editor's Address

Please submit all articles, thoughts, or ideas to this address:

Patricia Marsh
21 Kendale Crt. Apt. # 111
Hamilton, Ont. L9C 2T8

or via modem- 575-4191

or via e-mail at:

marshp@dogwood.physics.mcmaster.ca

Deadline is May 30, 1995

CALENDAR OF EVENTS

Sat. May 13, 1995 8:00 pm

Fri. May 19, 1995 7:30 pm

Sat. May 20, 1995 1:30 pm

Sat. May 20, 1995

Fri. May 26-27, 1995 7:00 pm

Sat. May 27

Mon. May 29, 1995 7:30 pm

Thurs. June 1, 1995 8:00 pm

Sat. June 3, 1995 5:00 pm

Fri. June 9, 1995 7:30 pm

Fri. June 16, 1995 7:30 pm

June 24-25 1995

Tues. July 4, 1995 7:00 pm or

Wed. July 5, 1995 7:00 pm

July 27-30, 1995

August 25-27, 1995

COSMOLOGY GROUP MEETING—McMaster University, Burke Science Building Room B148. The topic will again be "Orbits, Spin, and What Makes the World Go Round" For more information please call Bill Tekatch at 575-5433

COUNCIL MEETING—being held at the home of Patti & Charles Baetsen. For details and directions, please call Grant Dixon at 627-3683.

SOLAR OBSERVING SESSION—Rock Chapel Conservation Area. Weather permitting. Call Ev Butterworth for details and to confirm at 632-0163

OMEGA CENTAURI EXPEDITION—weather permitting. Please call Charles Baetsen at 524-0148 if you are interested in participating. Everyone is meeting at the Spectator Building parking lot at 4:00 pm. Charles will make the final decision regarding the weather at approx 2:00 pm.

SPRING STAR PARTY HOSTED BY LONDON CENTRE, RASC—see announcement for details and directions.

OMEGA CENTAURI—rain date **CANCELLED** but feel free to try it on your own

AMATEUR TELESCOPE MAKERS MEETING—at the home of Jim Winger in Caledonia. Please call 765-4649 for directions.

ROYAL ASTRONOMICAL SOCIETY OF CANADA, HAMILTON CENTRE

General Meeting—McMaster University Medical Building Rm 1A4. Guest speaker will be Ivan Semeliuk from the Ontario Science Centre. Topic of discussion will be on the refurbishment of the Hubble Space Telescope.

H.A.A. AND HAMILTON CENTRE, RASC BBQ—being held at the Hamilton Centre Observatory located in Flamborough. See previous announcement for details and directions. Remember to BYO food and drink. It will only be cancelled if it's raining. Everyone welcome!

H.A.A. GENERAL MEETING- *SPECIAL EVENT* This meeting will be a joint meeting of the HAA and the North York Astronomical Association. Come early to ensure good seats. Guest speaker will be Dr. Doug Welch and his discussion will be on MACHO, or MASSive Compact Halo Object.

COUNCIL MEETING—for details please call Grant Dixon at 627-3683

H.A.A. 2ND ANNUAL STAR PARTY—for details please call Ann Tekatch at 575-5433

JOVIAL SATELLITES—Solar/Lunar Observing Session - being held the Rock Chapel Conservation Area. See Upward Skybound for more information.

HURONIA STAR PARTY—held by the South Simcoe Amateur Astronomers

STARFEST—held by the North York Astronomical Association

