Hamilton Amateur Astronomers

Event Horizon

May 1997 Volume 4 Issue 7

Sojourn with Stones

Last week, I had some free time on my hands, so I visited the oldest observatory in Asia.

"Despite Chomsongdae's resemblance to a giant Dobsonian, the tower was only used to support other instruments."

To do this, I travelled to Kyongju - a city that was capital of the Shilla dynasty for its 900-plus year rule. The Shilla, for those whose Korean history is a little rusty, were one of three warring tribes who were tearing up the Korean peninsula around the time Rome fell. The Shilla finally allied themselves with the Chinese, allowing them to royally thump any other tribe silly enough to gainsay them.

Soon the gainsayers had all been permanently silenced. With peace came prosperity and the time to do frivolous things like build observatories.

The result is Chomsongdae, a lonely stone tower that has miraculously
survived Japanese invasions and the ravages of the Korean war. It was erected in the 7th century A.D. to honor a Shilla queen. No doubt the phallic imagery pleased her enormously.

The scale of this structure (for those to whom such things matter) is around 10 meters. Although it looks spare and functional, the people who designed Chomsongdae were undoubtedly astronomers. From top to bottom, the tower comprises 30 layers of stone - one for each day of the month. The base is made up of 12 square slabs, representing the months of the year. There are 366 blocks in all - again, no accident. The south-facing window is exactly halfway up from the bottom and stretches across four layers of stone which represent the seasons.

Despite Chomsongdae's resemblance to a giant Dobsonian, the tower was only used to support other instruments. Shilla astronomers used a ladder to ascend to the window (you can still see the grooves!) and climbed through interior of the tower to the top. Details of what kind of astronomy they did, have unfortunately not survived.

Watching other tourists react

(Continued on page 10)

Fun with UVB

I get a lot of junk mail at work. Partly this is because companies think that I may use their product in my classes. Most of it isn't worth a second look and much of it goes into the garbage unopened. I recently got a flyer for a new and worthwhile product that is of some astronomical interest. It is a handheld meter to measure the amount of UVB radiation. Basically, it is a small UV photometer.

There are three widely-recognized regions of ultraviolet radiation. These are UVA (320-400 nm), UVB (290-320 nm), and UVC (<280 nm). UVA is at the very short wavelength end of the visible spectrum. The eye has some sensitivity down to about 390 nm which is where the calcium H and K lines are in the solar spectrum. UVB contains the ozone absorption band-head and is the region of the spectrum primarily responsible for both tanning and skin damage. UVC never makes it to the ground.

One of the goals of this hand-held unit is to allow ordinary folks without $500 meters to measure the UVB flux and to determine how long they can stay in the sun without burning. This is dependent on skin type and so the unit comes with a handy set of small cards for each of the six skin types that tells you how long you can stay out for a given meter reading. The meter has its own solar cells, so it never needs batteries or an on-off switch! The readings are taken on a two-digit LCD panel. The whole thing easily fits in your shirt pocket and weighs about one

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inside...

Editorial

This month's general meeting is a special one with the Kitchener Centre of the RASC joining us. We would like to extend a special welcome to them. Don't forget, we will be joining them at their general meeting in June.

The listserver group Bigbang has started up again at **bigbang@physics.mcmaster.ca**. If you don't know what I am talking about, a listserver allows people to exchange information with a large group of people via e-mail. When you send a message to the listserver it is automatically routed to everyone who is a subscriber. This list is intended to be a *non-partisan* forum for discussing astronomy and passing along astronomical information to subscribers (who will be principally in southern Ontario). Send e-mail to **bigbang-request@physics.mcmaster.ca** with the message: subscribe

Oops! I didn't quite have enough room to put everything that I wanted in this issue. The newsletter is kept to a maximum of 10 pages to keep our mailing costs down.

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Baffling Newtonians

I'd like to start by asking two rhetorical questions: First, how many of you would spend your hard earned cash on a refractor that didn't have any baffles or glare stops? Even the cheapest "department store specials" have at least one or two; and high quality refractors are invariably advertised as being fully baffled.

So, the second question is: how many of you own a fully baffled Newtonian? Maybe we are missing something here.

It is generally accepted that refractors are superior to reflectors in regards to contrast and definition. Certainly the central obstruction is a significant factor here. However, we believe that baffles or glare stops are also an important factor in improving contrast and installing them in a Newtonian requires relatively little cost or effort.

When asked why Newtonians don't get baffles, the usual answers are:

- Newtonians are inexpensive scopes - baffles would not be cost effective.
- People build large Newtonians like professional observatory scopes - with an open framework because they consider it state-of-the-art.
- Baffles are too much trouble.
- I don't know.

So, here is an easy step-by-step procedure to improve the contrast of your Newtonian, and specifically, how to properly size and locate the baffles. First some general guidelines for contrast enhancement:

Prevent off-axis light from reaching the primary mirror. This is the most important, but not the only, function of the baffles. Extend the telescope tube far enough beyond the focuser to prevent extreme off-axis light (street lights for instance) from reaching the image plane or eyepiece directly. Prevent the secondary mirror from receiving any scattered light. Install black velvet on the first 3 or 4 baffles; those that the secondary sees most directly. Install black velvet on the tube wall directly opposite the focuser. Blacken everything, including the edge of the secondary mirror. Use the smallest possible secondary support and the smallest reasonable secondary.

To determine the optimum baffle size and location you'll need to

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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 10 times a year.

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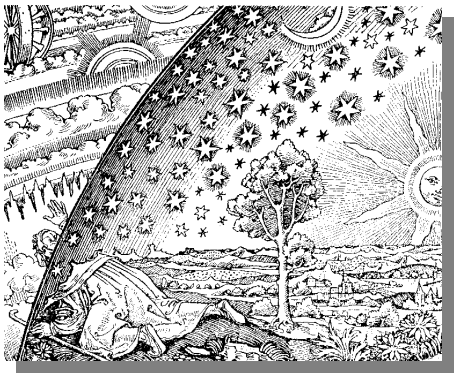


Baffling Newtonians ...

(Continued from page 2)

know the maximum true field of your telescope.

There are two ways to go about this:

1) If you know the apparent field of view of the lowest power/widest field eyepiece you plan to use, the formula is:

True Field = Apparent Field / Magnification

For example, a TeleVue 32mm Wide Field has a 65 Degree apparent field. In a 10" f/4.5 scope the magnification is:

(45" * 25.4 mm/in) / 32 mm = 35.7

and the true field is then:

65 Degrees / 35.7 = 1.82 Degrees

2) Otherwise, you can determine the true field based on the size of the image plane. Following the example above, the TeleVue 32mm has a field stop of 1.43". You may wish to use a smaller value; for instance in an f/4 rich field scope at 18X magnification the diameter
of the best quality image is 0.64". In any case, given the size of the image plane or field stop:

Image Size / Eyepiece Focal Length = Apparent Field (in radians)

So, for the TeleVue 32 mm:

1.43" / (32mm / 25.4 mm/in) = 1.135 radians

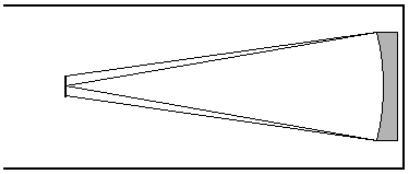
then, converting radians to degrees:

1.135 radians * 57.3 = 65 Degrees

From here you can use the formula above to get the true field.

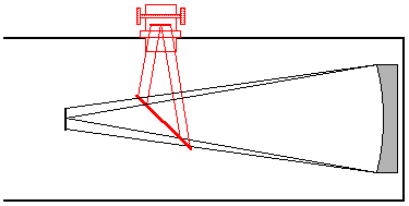
Until I work out a spreadsheet to automate this, start with a scale drawing of the tube, mirror and image plane.

Using the distance of the image plane from the tube center (optical axis), locate the secondary,



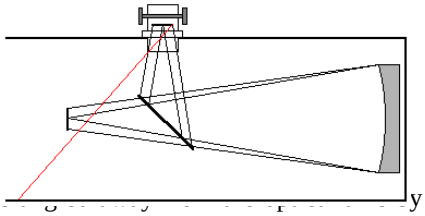
bend the beam, and draw in the focuser assembly. Make sure the diameter and location of the lower part of the drawtube is accurate.

Draw a line from the outer edge of the image plane, past the edge of the focuser drawtube, to the tube



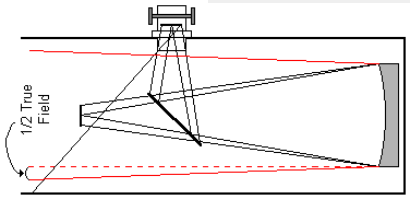
wall. This determines the minimum tube length to prevent off-axis light from reaching the image plane directly. The image plane should coincide with the field stop location.

Now we add the most important lines of the model. Draw a line from one edge of the mirror which



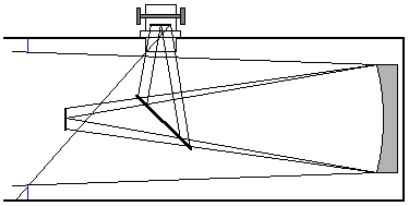
i y 1/2 the true field angle, determined above. This defines the *forbidden zone*. All baffles should be outside this zone. Add a similar line from the other side of the mirror, similarly angled away from the optical axis.

Where the line from the image plane to the tube wall crosses the forbidden zone is the location for the first baffle. The baffle extends from the



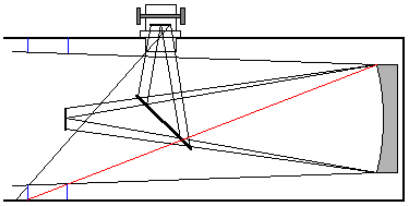
tube wall to the forbidden zone.

Next draw a line from the from the base of the first baffle to the opposite side of the mirror. Where this line crosses the forbidden zone is the



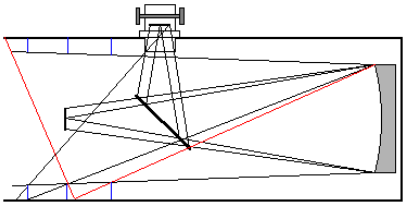
location for the second baffle.

Careful! This is the where the most common error is made. *DO NOT* draw the next line from the base of the second baffle. Instead, draw a line from the end of the telescope tube past the tip



of the second baffle and on to the tube wall. Where this line hits the tube wall is the starting point for the next line to the mirror edge. Where this line crosses the forbidden zone is the location for the third baffle.

Repeat the previous step until the location for the next baffle falls behind the front of the mirror. You're done. Note that in this example, one of



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Rob'serving Report

Jupiter's Satellite Shadow Crossings

The first time is the start of the shadow crossing (ingress) and the second is the end (egress). Only one of the shadow's ingress and egress times may be listed because of Jupiter's rising times and the time of morning twilight. All times are Eastern Daylight Savings. For the four shadow crossings remaining in May, check April's Event Horizon. There are three double shadow crossings in June, but all of them occur in daylight hours.

June 1 Io 3:30 EDT --->*
June 7 Europa *---> 2:49
June 10 Io *---> 2:09
June 13 Callisto 2:21 --->*
June 14 Europa 2:32 --->*
June 17 Io 1:46 ---> 4:03
June 21 Europa 5:06 --->*
June 24 Io 3:40 --->*
June 26 Io *---> 0:26
June 30 Callisto *---> 1:19

For other events, search the table in the "RASC Handbook" or "Sky and Telescope". At the beginning of June check between 05:00-09:00 UT, at midmonth between 04:00-09:00 UT and near the end between 03:00-09:00 UT. Jupiter is rising about 1 hour earlier every two weeks. To get your local EDT subtract 4 hours from the UT shown for each event.

Monthly In-Sights

May

- 21- Mars 2 deg. N of Moon.
- 22- Mercury at greatest western elongation (25 deg.) in morning sky.

June

- 1- Saturn 0.5 deg. S of Moon.
- 10- Jupiter begins its retrograde motion.
- 13- Mars 0.3 deg. N of Moon.
- 14- Earliest sunrise.
- 17- Earliest morning twilight.
- 21@4:20EDT- Summer Solstice. Longest day- 15hr&1min at 40 deg. Lat. North.
- 24 Latest astronomical twilight.
- 27 Latest sunset.
- 28 Saturn 0.2 deg. S of Moon.

- ~~Mercury is still visible in~~ the morning for the first few days of June.
- Venus is low in the evening twilight and sets about 1 hour after sunset..
- Mars is in the SW in the evening and sets after midnight..
- Jupiter rises at about midnight at midmonth and is near the meridian at sunrise.
- Saturn rises about 3 hr. before sunrise at midmonth.
- Neptune & Uranus are near the Sagittarius/Capricorn border.

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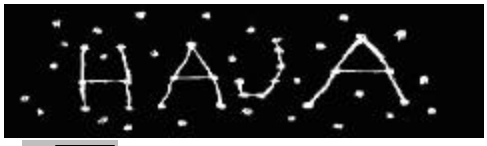

The April meeting of the Hamilton Amateur Junior Astronomers was well attended. We talked about Comet Hale-Bopp, created a comet out of liquid nitrogen and other ingredients, and Ann showed some great slides of the comet. The children had a good time playing with the remains of the comet we made.

The next meeting of HAJA will be on Monday, May 26th, 1997. All children under the age of 12 are welcome to attend. We meet at McMaster University, in room B148 of the Burke Science Building. This is the room beside the planetarium. The meeting starts at 7pm and usually lasts for about an hour. For further information please call 540-8793.

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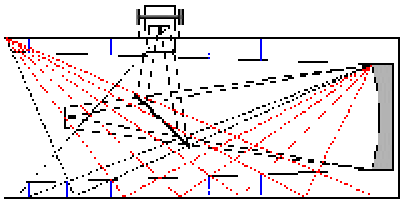
Baffling Newtonians...

(Continued from page 3)
the baffles falls on the focuser. The baffles are actually ring-shaped, and you'll have to cut a section out of this one to clear the focuser assembly.

Some final thoughts -

- The baffles should be as thin as



possible as they quickly add up to a significant amount of material.
- Additional baffles in the drawtube can be beneficial as long as they stay outside the forbidden zone.
- An excellent article covering a number of issues related to baffling Newtonians is Richard Berry's *Inside the Well-Baffled Newtonian*, in the Winter 1988/89 issue of *Deep Sky.*
- Harrie Ruttan and Martin van Venrooij have a short section on baffles in *Telescope Optics, Evaluation and Design.*

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Fun with UVB ...

ounce!

A second goal of Sunsor is to establish a wide network of volunteer UV reading submitters to provide a daily UV index for local weather stations. As such, they would like anyone with a meter to submit a reading once per day, preferably before solar noon (about 1:20pm EDT in Hamilton during the summer).

I did a little experiment with the meter last weekend. I wanted to see how quickly the UVB flux rose with solar altitude. Said differently, I wanted to determine the extinction coefficient in the bandpass 290-320 nm. Saturday, April 26 was one of the first *really nice* clear warm days this year. From the time I first got outside, to close to solar noon, I made measurements. Here they are:

1997 April 26 (Hamilton, ON)

The sun was at declination 13.6 degrees, my latitude was 43.25 degrees, and solar noon was at 13:17 EDT in Hamilton. The altitude was calculated with:

Time (EDT)	UVB	Sun Altitude (degrees)	Airmass (X)
09:07	23	29.2	2.05
09:35	32	34.2	1.78
10:40	50	45.2	1.41
10:56	56	47.7	1.35
12:09	74	56.9	1.19
13:34	77	60.1	1.15

sin(alt) = sin(lat)*sin(dec) + cos(lat) *cos(dec)*cos(hour angle)

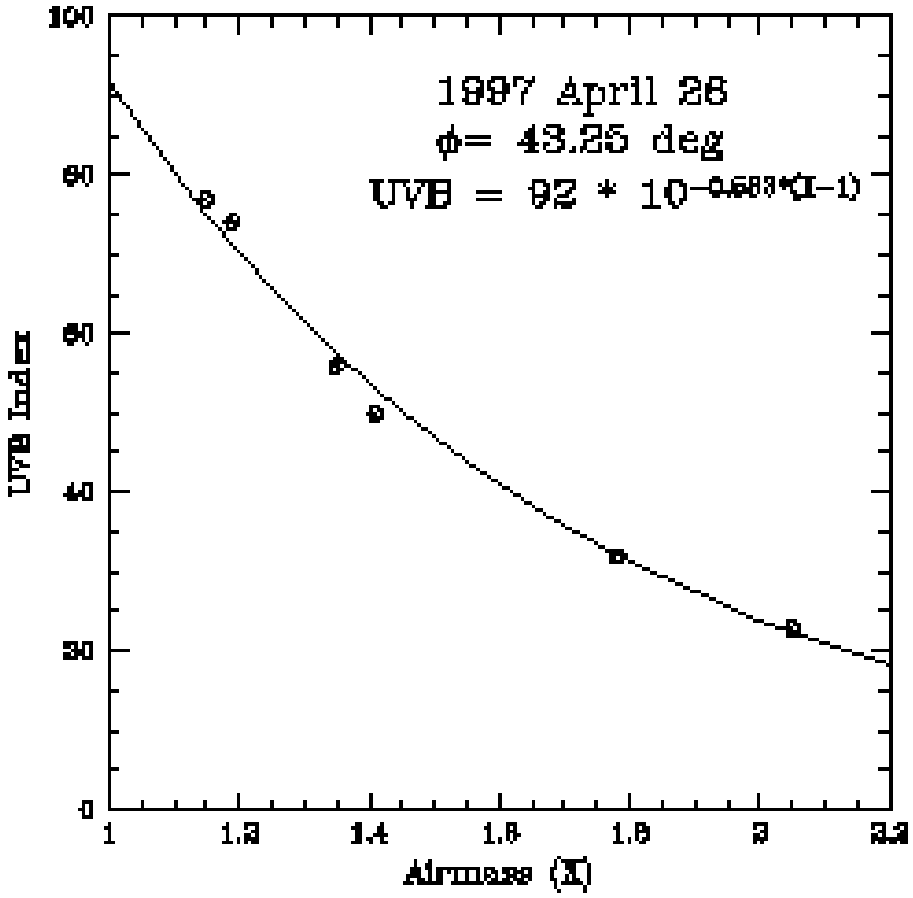
If the absorption is occurring in a layer of finite thickness, then the path length through that layer should vary as the cosecant of the sun's altitude. This is sometimes referred to as the 'air mass' and is defined in such a way that the path length at the zenith is one. Obviously, at the horizon the path length would be infinite - which it isn't - but that is because we have only considered a plane-parallel atmosphere. However, the approximation is pretty good up to zenith angles of about 80 degrees! The amount of absorption increases *exponentially* with the path length. My job is to find out which exponential fits the data.

In the adjacent graph, I plot the results of these measurements and calculations. The intensity of UVB radiation does indeed fall off rapidly with angle from the zenith. At an altitude of 30 degrees, the sun is 1.45 magnitudes fainter than it would be directly overhead! This compares to a change of about 0.25 over the same range of angles in the visual part of the spectrum.

The photometer unit is made by:
Sunsor, Inc.,
4361 Route 8,
Allison Park, PA 15101
Tel: (412) 492-9814;
FAX: (412) 492-9309;
Toll-free:1-800-492-9815

It costs US$39.95 plus shipping and handling. They have a Web page at:
http://ourworld.compuserve.com/homepages/sunsor and an e-mail address of :
103426.1052@compuserve.com

Doug Welch
welch@physics.mcmaster.ca



Spring's Finest Sights

The following descriptive list was adapted from a 3-part series which first appeared in *Sky and Telescope* from Nov/1965 to Jan/1966. The authors, James Mullaney and Wallace McCall, had spent five years carrying out a visual survey of every conceivable object down to -40 degrees declination.

"Get out your star atlases and your Greek alphabet and plan your spring star

Although the main instrument was a 13-inch refractor, the 100 or so star clusters, red stars, nebulae, galaxies and multiple stars in the list were examined in instruments ranging from 3-inch to 30-inch. These objects were, in their opinion, the finest. One seldom finds all-inclusive lists.

The first 32 are listed on page 7 in increasing R.A., from 9 to 16 hours using approximate co-ordinates. The separations of some multiple stars might have changed in 31 years. Get out your star atlases and your Greek alphabet and
plan your spring star hopping. Many would form the nucleus of an excellent public star party list. It can be further modified to better match the size of your own instrument. The article may be old, but the objects timeless.

Description of Objects

1. M81's bright core and fainter outer parts can be seen in a 10-inch scope at 80x.
2. M82 is the nearby spindle-shaped companion of M81. Dark lanes are visible in a 10-inch.
3. Gamma Leonis is a beautiful yellow pair, 4.5-seconds apart, easily split in a 3-inch.
4. NGC3243 is one of the brightest and easiest of all planetary nebulae. Visible as a blue disk in a 3-inch at 90x.
5. Xi Ursa Majoris forms a tight white pair (2.5-seconds) in a 6-inch.
6. Delta Corvi is a wide (24-second) pair, white and lilac, in colour.
7. 24 Coma Berenices, a 20-second pair show orange and blue-green stars, vivid in larger scopes.
8. M104, the Sombrero galaxy, shows the dark equatorial band in a 13-inch at 190x. Small instruments show only a hazy ellipse.
9. Gamma Virginis, one of the best-known binary stars, has a white pair of nearly the same magnitude, nearly 5-seconds apart.
10. Y Canum Venaticorm has a deep orange colour, particularly intense in small apertures.
11. M94 is a very bright galaxy, round and featureless in small instruments, but easy to see.
12. Cor Caroli, a 20-second blue-white double, is one of the best for small scopes.
13. M64, the Blackeye galaxy, large and bright, needs a 6-inch to see the dark central patch which gives rise to its nickname.
14. Mizar is a fine double, its components, both white, 15-seconds apart, while Alcor is 12-minutes away. Excellent for comparing what the naked eye can see with what the telescope reveals.
15. M51, the Whirlpool galaxy, shows

(Continued on page 7)

The Cosmology Corner

Our next meeting is 8:00 pm May 24 the topic is "Reality". My final meeting will be September 20, and the somewhat ironic topic is "An Introduction to Cosmology." All HAA and Hamilton Centre members and their guests are welcome.

A reminder, if you attend the May 24 meeting, please don't forget to bring a magic trick(s) or illusion(s) with you. Magic is a great way to work into our discussion of quantum reality, and our personal perception of reality.

A short report of the latest news about high energy gamma rays. Currently there is a satellite being used to monitor space for gamma rays. It has been a puzzle for some time now as to the origin of bursts of high energy gamma rays that have been detected on almost a daily basis. There was only one source that was identified with a known object. That source is the Crab Nebula. Scientists feel comfortable theorizing that the cause is matter falling onto the pulsar or neutron star that is the remnant of the supernova which formed the nebula. Many X-ray sources are believed to be similar. The high energy gamma sources have been much more difficult to identify. The detection of the gamma rays is often a one time event, so when optical telescopes look at the area where the rays seem to originate from, no obvious source is found. Without a repetition of the event, even if a likely source is found, it cannot be verified. Now a repeating source has been found and identified by other telescopes. The galaxy Markarian 421 is 400 million light years distant. It has an active galactic nucleus possibly powered by a black hole causing a powerful jet of matter with its axis pointing directly at us. Last year it displayed the strongest flux of gamma rays ever, ten times that of the Crab Nebula. The spectrum of this object reported recently has caused scientists to suggest that the amount of dust and infrared photons in intergalactic space have been overestimated. It ties in nicely with the recently reported fountain of anti-matter projecting 3000 light years out of the plane of our Milky Way galaxy from a point at or near the core.

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Spring's Finest Sights ...

	Object/ Constellation	Right Ascension	Declination	Magnitude	Type of Object
1	M81 UMa	09:52	69.3	8	Spiral galaxy
2	M82 UMa	09:52	69.9	9	Irregular galaxy
3	Gamma Leo	10:17	20.1	3, 4	Double star
4	NGC3242 Hya	10:22	-18.4	9	Planetary nebula
5	Xi UMa	11:16	31.8	4, 5	Double star
6	Delta Crv	12:27	-162	3, 8	Double star
7	24 Com	12:33	18.7	5, 7	Double star
8	M104 Vir	12:37	11.4	9	Spiral galaxy
9	Gamma Vir	12:39	-1.2	4, 4	Double star
10	Y CVn	12:43	45.7	5-7	Red star
11	M94 CVn	12:49	41.4	8	Spiral galaxy
12	Alpha CVn	12:54	38.6	3, 5	Double star
13	M64 Com	12:54	21.8	9	Spiral galaxy
14	Zeta UMa	13:22	55.2	2, 4	Double star
15	M51 CVn	13:28	47.4	8	Spiral galaxy
16	M3 CVn	13:40	28.6	6	Globular cluster
17	Epsilon Boo	14:43	27.3	3, 5	Double star
18	Xi Boo	14:49	19.3	5, 7	Double star
19	M5 Ser	15:16	2.3	6	Globular cluster
20	Mu Boo	15:23	37.6	4, 7, 8	Triple star
21	Delta Ser	15:32	10.7	4, 5	Double star
22	Zeta CrB	15:38	36.8	5, 6	Double star
23	Xi Sco	16:02	-11.2	-	Quintuple star
24	Beta Sco	16:02	-19.7	3, 5	Double star
25	Nu Sco	16:09	-19.3	4, 6, 7, 8	Quadruple star
26	M4 Sco	16:21	-26.4	6	Globular cluster
27	Alpha Sco	16:26	-26.3	1, 6	Double star
28	16-17 Dra	16:35	53.0	6, 6, 7	Triple star
29	M13 Her	16:40	36.6	6	Globular cluster
30	NGC6210 Her	16:42	23.9	10	Planetary nebula
31	M12 Oph	16:45	-1.9	7	Globular cluster
32	M10 Oph	16:54	-4.0	7	Globular cluster

(Continued from page 6)

hints of its spiral structure in a 10-inch at 80x. Its close companion, NGC5195, gives the appearance of a double nebula in wider fields of view.

16. M3 is the first bright globular cluster of the spring skies. It is partly resolved in a 6-inch and completely so in a 13-inch.

17. Epsilon Bootis, a 3.5-second pair, has yellow primary and a blue secondary. They can be split in good seeing with a 3-inch.

18. Xi Bootis, a yellow and red visual binary, (7-seconds) are easily split with modest instruments.

19. M5, a marvelous object in a 10-inch, rivals M13.

20. Mu Bootis is a fine triple star, being a wide double (108-seconds) whose fainter member is a close 2-second pair.

21. Delta Serpentis offers a fine white pair for a 3-inch. Separation is 4-seconds.

22. Zeta Coronae Borealis a 6-second double consisting of nearly equally bright bluish and greenish stars. Colours definite in a 6-inch.

23. Xi Scorpii is triple, part of a multiple system, a 1-second pair with another 8-seconds away. In the same field is the 12-second pair, Struve 1999. A 3-inch shows only four stars, a 6-inch at least is needed to split the close pair.

24. Beta Scorpii resembles Mizar, being a 14-second blue-white pair. It makes for an interesting colour comparison with Antares.

25. Nu Scorpii is a colourful double-double, a 2-second pair and a 1-second, 42-seconds apart. A 6-inch at least is needed to resolve all four stars.

26. M4 is large and easily resolved, best seen in larger instruments. These show many faint stars in apparent chains, giving a feeling of dark lanes crossing the cluster.

27. Antares is a beautiful, unequal double star, red and emerald green. Because it is only 3.5-seconds away and much fainter, the companion is difficult in 6 to 8-inch scopes. Even though it may not be resolved, the

(Continued on page 10)

1997 HAA Star Party

We have just confirmed our annual star party for the weekend of June 6-8 at the York Soaring Association's airfield.

"We'll also be watching the planes, going for glider rides or just hanging out and telling lies about the NGC objects we've seen!"

During the day, there are no formal plans. If it's clear and sunny, I expect there will be solar observing. We'll also be watching the planes, going for glider rides or just hanging out and telling lies about the NGC objects we've seen!

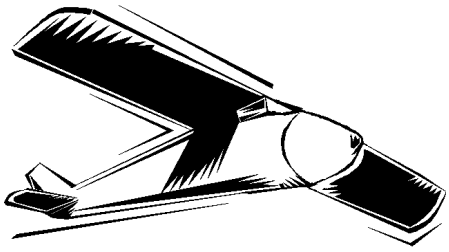
Overnight camping at the field is available.A charge of $3 per tent will go to the Soaring Association. There is no hydro for camping or for powering telescopes but hot showers and flush toilets are available. There are no cooking facilities at the field other than a fire pit. If you plan on using a fire to cook, make sure you bring firewood and a cooking grill.

If you don't like camping, but want to join us for evening observing, there's no charge to enter the glider field. It's only 1.5 hours to the York Soaring Association from Hamilton.

To reach the York Soaring Association from Hamilton: head north on highway #6 past Guelph and Fergus. Turn right (east) onto highway #9 just before Arthur. Turn right (south) onto Concession 5-6 Road. The York Soaring Association is on Concession 5-6 Road. Their laneway (which is quite long) makes a right turn at an old farm house & barn. Before you get to these buildings and the turn, there is an old garage on your left. The driveway into the camping area is along the east side of this garage.

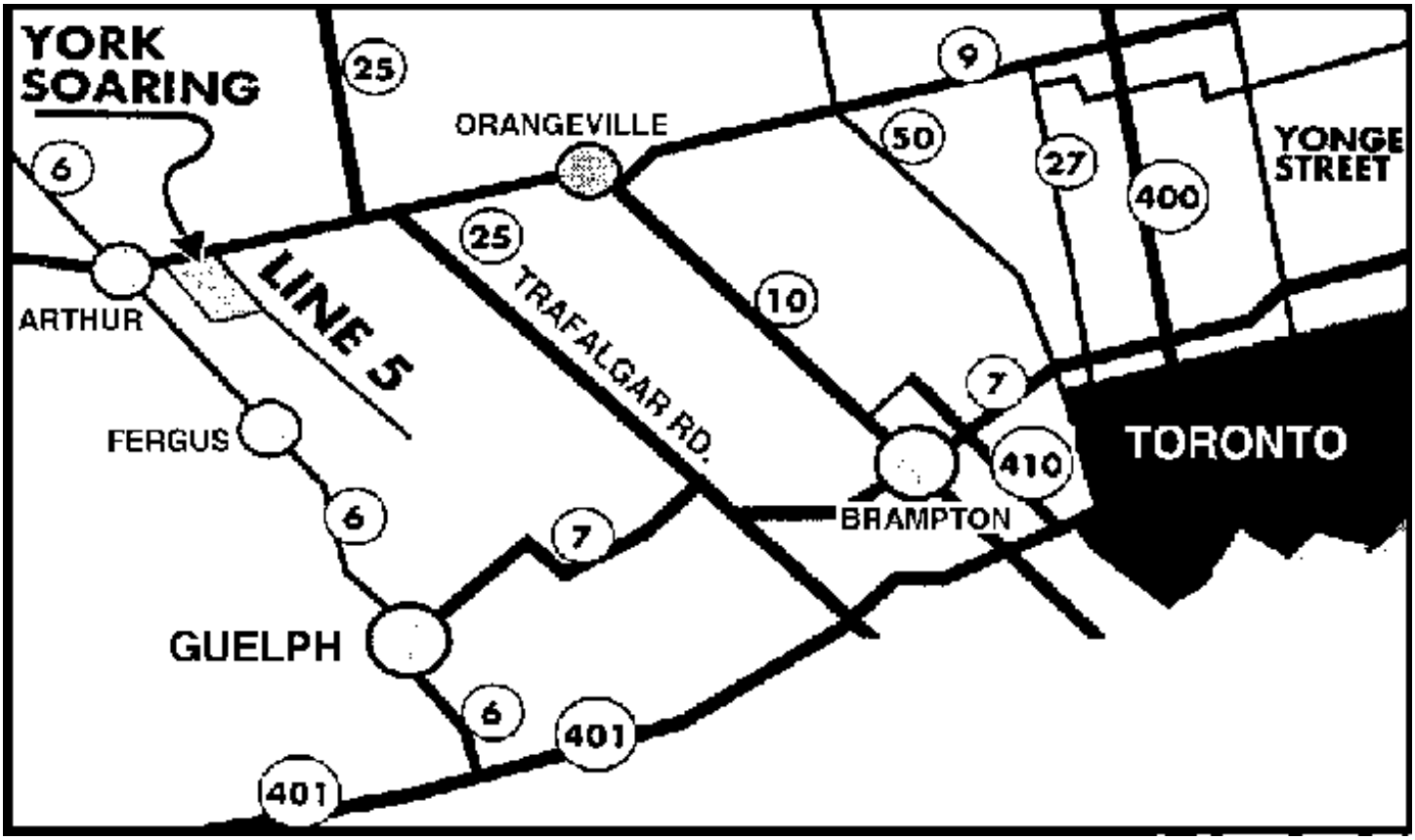
If you are interested and want to be on the email/phone list for confirmation, contact Ann Tekatch (905) 575-5433 or at **tekatcba@mcmail.cis.mcmaster.ca .**

As always, our star party is at the mercy of weather, flooding, earthquake and any other acts of nature! The



decision to cancel will be made at 3:00 p.m. Friday afternoon.

Hope to see everyone there!
Ann Tekatch



June Night Skies

Sojourn with Stones ...

(Continued from page 1)
to Chomsongdae was almost as fun as visiting the observatory itself. On my first visit, I got there just ahead of a busload of tiny septuagenarians. The ladies listened intently to their guide and then circled the tower once, their hands pressed prayerfully together. At the end of their circuit, they bowed deeply to the tower. I can only speculate wickedly about what they were praying for.

Denise Kaisler
kaisler@soback.kornet.nm.kr

Chomsongdae is a completely unique structure. No other observatory in the world looks like this.

Spring's Finest Sights ...

(Continued from page 7)
companion will show a green tinge to one side of the red primary.
28. 16 and 17 Draconis, 1.5-minutes apart form a triple, the brighter components are nearly equal, and the primary has a close companion.
29. M13, the finest northern globular cluster, hints at resolution in a 3-inch and resolves well in a 6-inch.
30. NGC6210 is a small but bright planetary nebula showing a featureless blue disk in smaller scopes.
31. and 32. M12 and M10 are similar globular clusters only a few degrees apart, the best of many in Ophiuchus. They appear granular in a 4-inch and can be resolved in a 10-inch.

Rob Roy
Observing Director
royrg@mcmail.cis.mcmaster.ca

CALENDAR OF EVENTS

♦ May 10,30,31,June 6,7 8:00PM	**BINBROOK OBSERVING SESSIONS** - Proposed observing nights. For confirmation or directions call Rob Roy (692-3245) or Ann Tekatch (575-5433)
♦ Friday, May 20, 7:30 PM	**COUNCIL MEETING** - At the home of Rosa Assalone. Call Doug at 525-9140 Extension 23186 if you are interested in attending.
♦ Saturday, May 24, 8:00 PM	**COSMOLOGY DISCUSSION GROUP** - Room B148 (next to the Planetarium) Burke Science Building, McMaster University. Topic will be "Reality". For more information contact Bill Tekatch at 575-5433 or **tekatcba@mcmail.cis.mcmaster.ca**
♦ Monday, May 26, 7:00 PM	**HAMILTON AMATEUR JUNIOR ASTRONOMERS** - Mac Burke Science Building, Rm B148 (beside the planetarium) Topic to be announced. For more information contact Rosa Assalone at 540-8793
♦ Thursday, June 5, 8:00 PM	**ROYAL ASTRONOMICAL SOCIETY OF CANADA Hamilton Centre** - General Meeting - McMaster University Medical Building Room 1A6.
♦ Friday, June 6, 11:59 PM	**EVENT HORIZON DEADLINE** - Please submit your articles and pictures to Stewart Attlesey, **attlesey@interlog.com** or modem (905)827-9105 or snail mail to 1317 Mapleridge Cres., Oakville, L6M 2G8
♦ June 6,7 and 8	**H.A.A. STAR PARTY** - York Soaring Association airfield near Arthur. Details and map are on page 8
♦ Friday, June 13, 7:30 PM	**HAA GENERAL MEETING** - at the Spectator Building auditorium. Speaker to be announced. Parking lot observing, weather permitting.