

# Event Horizon

October 1996

Volume 3 Issue 11

## Beginner's Luck

**T**he burning desire to try my hand at astrophotography began at the Hamilton Amateur Astronomers' second birthday celebration in November, 1995. We had invited a very special guest speaker and honorary club member, Terry Dickinson. I was overwhelmed by the slides he showed us. Right then and there I decided that I had to try for myself.

Astronomy books soon informed me that my fancy, autoexposure, autofocus camera was

totally unsuitable for astrophotography. The decision to do or die came when I saw an ad on the Internet's 'Astromart' for a Nikon F plus most of the adapters and gizmos necessary for astrophotography. After some negotiation, a deal was struck and I jumped in with both feet.

I told a friend that a Nikon was on the way and mentioned that the Olympus OM-1 was also a good astrophoto camera. She had one of those, hadn't used it in ten years and wanted to sell it. In just a matter of

days I had gone from one camera to three. Although there is supposed to be an air of majesty in using a Nikon, the OM-1 was in near mint condition, had a faster 50mm lens and accessories for it are generally less expensive.

Lurking around local flea markets and camera shops, I found a

*"After many hours of calibrating the focuser, learning how to and practicing polar aligning (that in itself is another whole chapter) and PEC training the drive of my scope, I was finally ready."*

couple of bargain-priced lenses for the OM-1, a 21mm wide-angle and a 135mm telephoto. The last two essentials, a bright focusing screen and a right-angled viewfinder, were purchased by placing ads in rec.photo.marketplace.

I never did like the autofocus feature of the wonder camera. It always seemed to be searching for a sharp focus and was next to useless in low light levels. I now had three Olympus lenses. Maybe there was an autoexposure, manual focus camera for my day-to-day household shots? This would make the growing collection of lenses more useful and thereby justify the blows to the rapidly dwindling budget.

More reading and I found that

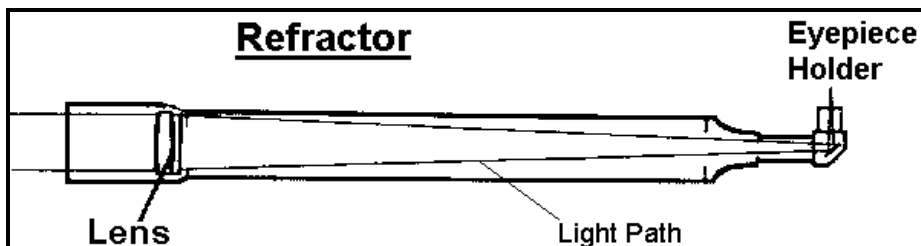
*(Continued on page 4)*

## Scattered Thoughts on Light: Or How to Improve Your Newtonian

**T**hose of you who have ever had a chance to look through an Astrophysics refractor at the Moon or a planet have no doubt been impressed by the high contrast provided by such a beast. This is due to the relatively easy way in which a refractor can be effectively baffled. The baffling prevents rays entering the telescope from a largish angle (like bright sky light, moonlight, and the well-known

neighbour security light) from reaching the eyepiece, and thereafter, the eye. Observers are usually completely ignorant of how big an effect this can be and how much more contrast they would have if they practised "safe observing" and put a few baffles on before going out for a night under the stars.

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## Editorial

**T**his is the eleventh and final issue of Event Horizon for the membership year. If you want to continue receiving our publication, be sure to renew your membership right away. We will not be mailing out the November issue to you unless you are a member. Some people may think that I have split the article on Nagler Eyepieces as an extra enticement for you to join again but it just worked out that way... Really, I wouldn't do that to you. The savings in magazine subscriptions shown on page 10 more than covers the cost of membership and that alone should make the decision to join an easy one.

The end of the membership year normally results in a reorganization of most of the duties for the councillors, including the position of editor. I have decided that this job is too much fun, so you are stuck with me for another year.

I agree with Ann about this having

## Chair's Report

**I**t has been a great honour for me to serve as your chair this past year. I've been involved in the local astronomy scene for six years and this year has certainly been the most rewarding.

And what a year it has been! We started it off with Terry Dickinson; were treated to the comet of the century (decade? year?); and we finish it up in anticipation of the next comet of the century (decade? year?). Our membership is topping 160 and still growing. We're in great financial shape. Community organizations and the press look to us for astronomy education and information on the latest celestial happenings.

To coin a phrase: The Hamilton Amateur Astronomers have "arrived"! Where do we go from here? The

been a great council to work with this year and I think that Ann has done an especially good job as chair. It will be difficult to replace all the fine people who will not be able to serve on the council for the coming year.

In the next membership year I would like to start an "Ask the expert" column. If you have any astronomically related questions that you have been unable to find an answer to, please send them to me via one of the methods listed in the Calendar on page 10 under the topic of Event Horizon Deadline. We have members with knowledge on just about any aspect of astronomy you can imagine who will be happy to share their expertise with you.

Stewart Attlesey  
stewart@io.org

enthusiasm and great ideas keep flowing at our gatherings and council meetings. I expect next year to be even more active than last year. I'm looking forward to being a part of the largest independent Canadian astronomy club!

One of the ideas that has really taken off is our junior group, HAJA (Hamilton Amateur Junior Astronomers). If you have kids, bring them to a meeting - I guarantee they'll love it. Rosa has been overseeing HAJA since Raechel left and she's bringing new excitement to the group. It's great fun to watch the kids explore new worlds and concepts. It also gives me a chance to visit with them and their parents. A large part of any club is the social interaction it offers to its members and I really enjoy going to HAJA meetings for that reason.



**E**vent 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

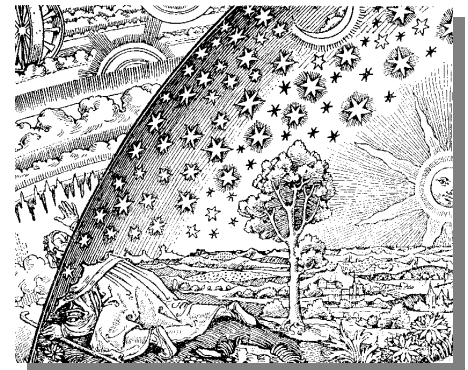
The cost of the subscription is included in the \$15 individual or \$20 family membership fee for the year. Event Horizon is published 10 times a year.

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(Continued on page 7)

# Scattered Thoughts on Light ...

(Continued from page 1)

Why is a refractor so simple to baffle? It is because the light cone goes only once down the tube and gets progressively more narrow as it approaches the focus. Typically the manufacturer of a refractor will add a series of blackened rings with progressively smaller holes in the center that stop light that bounces in off the tube walls from ever getting to the eyepiece. The principle is simple, just make it bounce around until it gets tired. With a decent black paint, flocking paper, or black felt, 5 per cent (or less) of the light will survive each reflection. Angling the rings so they point towards the objective after coming out of the tube wall does wonders to force the light to bounce many more times - and possibly right back out the front!

tube extension, you cut down the angle from which these rays can arrive. Mask the outer 1/2-inch of your tube - That is, make a ring of blackened cardboard or board that extends into the open aperture a small distance - not enough to cut off light to the mirror (unless, of course, your mirror has a turned-down edge!) This prevents rays of light entering at a very shallow angle from getting into the tube. If you are at the designing stage, you can design in an over-sized tube which can be much more effectively baffled in this and other ways.

Line your focuser's tube - It is a sad fact of life that the focuser eyepiece tube is usually shiny and hence practically attracts stray light into the eyepiece! If you have a over-sized focuser, try the mask-the-outer-bit on

progress of stray light into the telescope.

Design modification - the very common cylinder is a very poor design

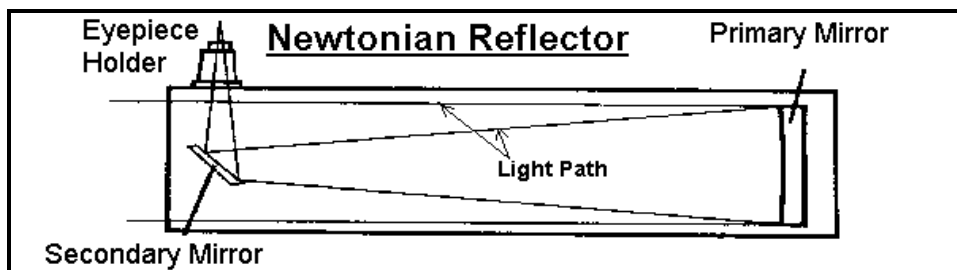
*"...there are a large number of small improvements that can be made which will add up to dramatically improved stray light control..."*

for minimizing stray light. If you actually wish to do a bit of lunar and planetary work and are building a scope from scratch, you might want to consider angled walls that have the largest cross-sectional area near the primary. A little angle goes a long way to re-directing errant light.

Lest you think these are all small improvements, let me point out that large fraction of the design effort of scopes like the HST and the Gemini 8m telescope goes into effective baffle design!

Join me on the dark side - together we will rule the galaxy!

Doug Welch  
welch@physics.mcmaster.ca



All well and good for a refractor, but what can be done for a reflector? The difficulty of using the refractor approach is immediately apparent: the converging light cone occupies a subset of the volume used by the incoming light!! So what to do? It turns out that there are a large number of small improvements that can be made which will add up to dramatically improved stray light control - and therefore improved contrast. Let me go through these. Most of these modifications require nothing more than felt and cardboard!

Extend the front of your tube - Many Newtonians have the eyepiece very close to the top of the tube. This means that a very large angle of sky/neighborhood can see the eyepiece tube - even when the telescope is pointing quite far away. By making a

Shadow the part of the tube opposite the focuser - In many cases, the eyepiece tube and eyepiece can see a large angle around the diagonal mirror. If that is being illuminated by stray skylight - boom, down goes your contrast. Make a small light dam around the region your eyepiece can see and make sure the region is well-lined with felt. A second possibility is to actually recess this region outside the normal tube wall diameter.

Shadow the entrance to the focuser - A similar trick that will prevent upstream or downstream stray light from getting into the eyepiece tube.

Put blackened ridges or masks inside the tube - preferably angled - Again the principle here is to stop the

## Did You Know That..

**P**icking out a planet against the glare of a star is like trying to spot a 100 watt bulb next to a 100 billion watt searchlight.

Rob Roy

# Beginner's Luck ...

(Continued from page 1)

what I wanted was an Olympus OM-2s. Rec.photo.marketplace came through again. I now had my astrophoto OM-1 plus three lenses and an auxiliary OM-2s. The budget insisted, this time, that the autoeverything camera and the Nikon had to go- they did- no tears- no lost sleep. Note that I hadn't taken a single astrophoto yet. In the middle of the buying and selling frenzy I had also obtained a wedge and had spent some time modifying it and beefing it up.

THEY said that focusing a telescope-mounted camera can't be done satisfactorily through the viewfinder. Accessory focusing devices were readily available commercially, but as long as the corner hardware store had a good stock of plumbing parts.... After much experimenting with homemade ground glass screens, razor blade knife-edges and Ronchi gratings, I finally settled on a 12mm circular knife-edge for my DIY focusing device. An adapter for mounting the tripod head to the scope had to be made and fitted as well.

After many hours of calibrating the focuser, learning how to and practicing polar aligning (that in itself is another whole chapter) and PEC training the drive of my scope, I was finally ready. Slide film was recommended to start with and Ektachrome P1600 was supposed to be a good choice. The Milky Way shots Mr. Dickinson had shown eight months

earlier had blown me away, so I decided to start there.

I took piggybacked 5 minute exposures of the Milky Way from Lacerta to Scutum with all three lenses

*"What if everything comes out totally black or way overexposed?" "What if there are star trails and jiggles all over the place?"*

while guiding through the scope. I found that the scope had learned its PEC training lessons so well, that no drive corrections had to be made for any of these exposures. The proverbial THEY had also advised me to stay away from prime focus photographs until I had mastered the art of piggybacking. I couldn't wait or resist. I put on the knife-edge focuser, carefully focused on a moderately bright star and then took a 10 minute exposure of M11 through my 8" f10 SCT.

I was frustrated at not being able to find a suitable guide star for M17, but remembered that the scope had just done its thing without any help from me. I just sat back and enjoyed the overall view for the next 10 minute exposure. The 21 day-old Moon then rose and except for a couple of photos of it, that ended my first session- 9 exposures in all.

The next opportunity presented itself at Starfest '96 in Mount Forest, Ontario, where I took more piggybacked photos of various sections of the Milky Way. I didn't feel very inspired, however, as a little voice in the back of my mind kept nagging, *"What if everything comes out totally black or way overexposed?" "What if there are star trails and jiggles all over the place?"* Starfest netted only an additional 6 shots - total, a mere 15.

*"This is going to take forever."*

*"There are 36 exposures here."* I couldn't stand it any longer. I had to know. At \$19.54 a roll, I wasn't about to waste the second half, so I went into a dark closet, opened the camera and cut out the piece of exposed film. I placed it in a canister, taped very visible warnings on the latter, and took it in for developing.

Five days later I picked up the slides, took them to the car and sat there, afraid to look. "This is silly!" "You're going to have to look!" Gingerly opening the envelope, I took a peek. I couldn't believe my eyes-stars! Later, close examination revealed zillions of perfectly round, focused stars, beautiful colours, a few excellent exposures, but not a trace of a star trail. It wasn't long before I was on the phone unabashedly begging the club's chairman to let me show my first slides at the next meeting.

It took hours, but I eventually identified constellations, stars, nebulae and asterisms like the coat hanger. My wife even found her own, "Sally's Snail Trail," a conga line of faint stars wending its way through a dark lane of the Milky Way, extending from Cygnus to Aquila. She cautioned, though, that it was not to be called "Sally's Slime

## 1997 RASC Observers Handbooks

**W**e have ordered 25 copies of this annual publication. The cost will be \$13.

To reserve your copy, contact Ann Tekatch @ 575-5433 or email: tekatcha@mcmill.cis.mcmaster.ca. If they aren't in by our October meeting, they will be available at the November meeting.

## Cosmology Corner

**T**he next cosmology group will be Saturday November 23/96 at 8:00 PM. We will finish discussing "The Age of the Universe" and start our new topic "Chaos".

Bill Tekatch

# Nagler Eyepieces

**T**hanks to Rob Roy for passing along the following article.

EQUIPMENT TALK by Todd Gross  
6/24/96 - The entire NAGLER line!

I have been playing "catch-up" after a hiatus in astronomy for many years. As many of you know, I have furiously tried out an unusual number of visual astronomy products, mainly eyepieces in the past 2-3 years..... so much so that I have been encouraged to share my experiences about equipment on the net. I have tried all Naglers, Panoptics and Superwides. I have also tried out numerous scopes, binoculars, and 3+ bino-viewers.

In this edition of "Equipment Talk" I will go over all the Naglers from 4.8 on up.

The Televue Nagler is perhaps one of the most sought after eyepieces ever, and with good reason. The wide 82 degree field is nearly flat.. That is, images are sharp just about to the edge.. considering how large an 82 degree field is.. that is amazing.

Al Nagler, the creator of this line of eyepieces, calls the feeling one gets when viewing through them, a "space-walk". This is something new to visual astronomy, but it is real. The effect is this: When viewing through a Nagler, particularly from 9mm on up through 20mm, you can never really take in the whole field at one time. The result is that you have to move your eye and/or you head around to take in the whole view. While this can be disconcerting at first, when you are relaxed, and casually observing, you can really get a warm feeling of being able to "look around" at different parts of space without having to move the scope!

The disadvantages of the Nagler eyepieces are few, but they do have some drawbacks. On bright objects, there is a "some" loss of contrast between the object, and the sky. Some observers say that this loss in contrast, compared to let's say a straight Plossl, will be within the object as well, so that Jupiter for instance, may not show up quite as darkly banded. I have found this to be minimal.

The other disadvantages lie

within specific eyepieces, and I will go over those below.

A huge advantage in dealing with Televue eyepieces, by the way, is that they can be returned for repair! I have sent in a useless 9mm Nagler, and had it returned in just over a week, good as new. The repair was reasonably priced considering the cost of the eyepiece.

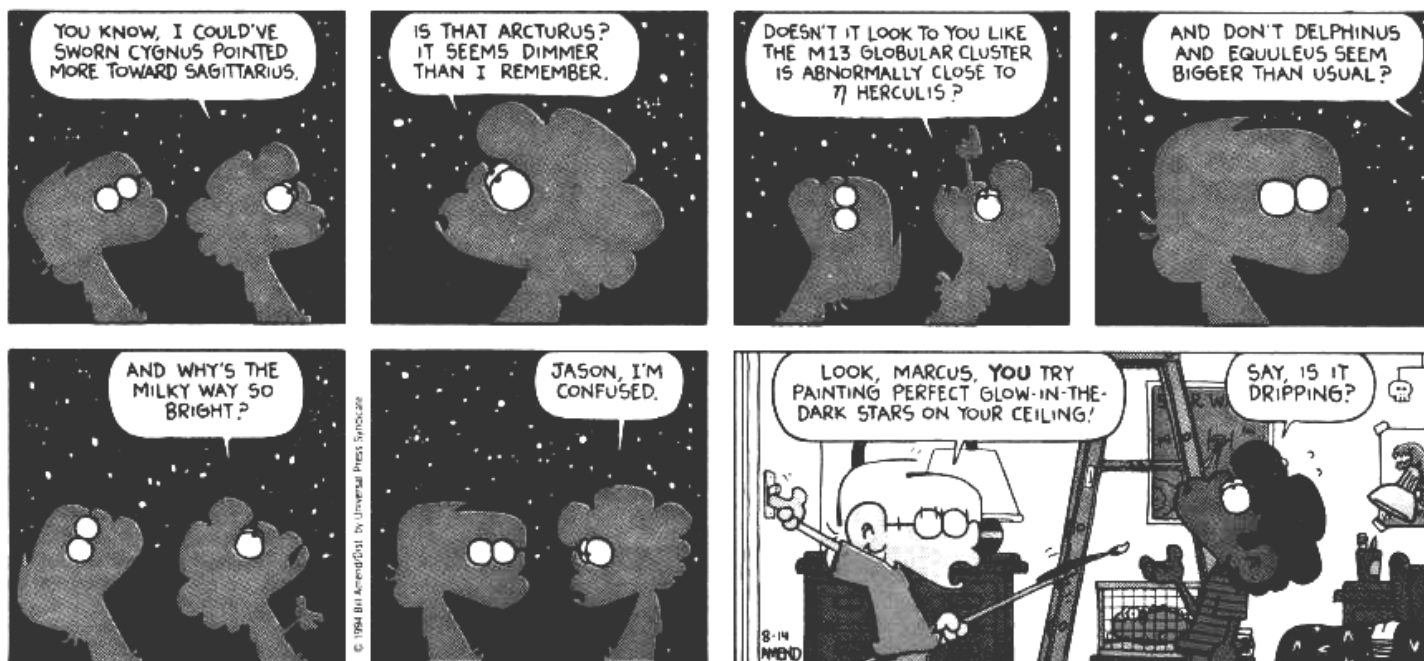
Here is a summary of the Nagler line:

## 1. The 4.8mm Nagler.

This eyepiece exhibits short eye relief, approximately 7mm. It also does not give much of that "space-walk" feel compared to the longer focal lengths. Views are sharp though, if you can keep the lens clean. The field is very wide, but not as comfortable as viewing with the longer Naglers. The latest version includes a full eyecup rather than the "horn" type previously supplied, and I believe a grip ring.

## 2. The 7mm Nagler.

*(Continued on page 8)*



# Observations of Comet Hale-Bopp

**A**s recently as October 5th., I had the pleasure of observing what may be next year's Comet of the Century: Comet Hale-Bopp.

No one could see the comet naked-eye on the night we were observing, but in binoculars, it appeared as a triangular fuzzy patch located about halfway between the bright stars, beta and eta Ophiuchi, in the constellation Ophiuchus. (If you have no idea where Ophiuchus is, it's a very large and unspectacular constellation above and to the right of the teapot asterism in Sagittarius.)

Through a 12.5" reflector, the comet looks very much like a milkweed seed or badminton bird. It has a bright head and a very pronounced but relatively short, wedge-shaped tail. The view had a three dimensional sense to it and I can imagine the comet flying through space with a conical tail behind it! We will only be able to view Comet Hale-Bopp for another month or so before it slips below our horizon. Get a look at it while you can. I'm sure it will be significantly brighter when it reappears in our sky early next year. We have a chance to watch a bright comet develop as it nears our inner solar system. Don't miss this opportunity!

Ann Tekatch  
tekatcha@mcmaster.cis.mcmaster.ca.

## Comet Hale-Bopp Orbital Elements

Perihelion Date (T): **1997 04 01.14561**

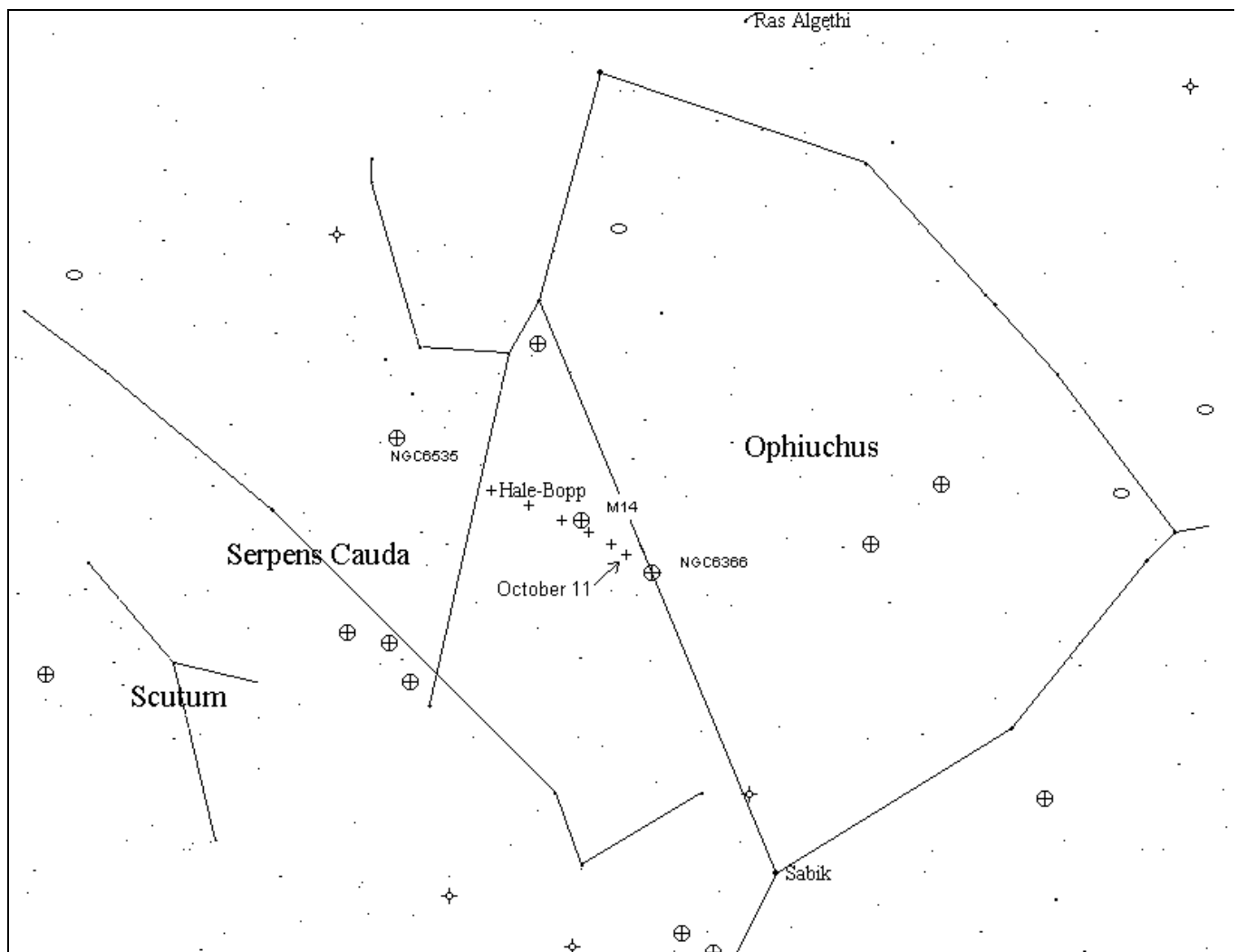
Perihelion Distance (q): **.9140971 AU**

Argument of Perihelion (w): **130.59227**

Ascending Node: **282.47087**

Inclination: **89.42807**

Eccentricity: **.9950784**



**Positions of Hale-Bopp starting on October 11 and marked at 7 day intervals**

## Mt. Kobau Star Party

Please note that this is a personal story, and not a representative star party report - look for that in the [RASC] Bulletin.

Is there such a thing as a typical Kobau? At least there were no nasty surprises this year. Bruce McCurdy and I tag-team drove the 14 hours overnight, with Merv and Harris in the van behind us. We stopped at 3:30 am to let Harris catch a few winks (since Merv didn't drive at night), and about a minute after he fell asleep, a huge truck passed by and blared its horn. Startled us pretty bad, but poor Harris said he almost lost it. Bruce drove so gently up the one hour dirt obstacle course (road) that I actually slept most of the way.

Transparency was only 90% what Kobau could deliver, about mag 6.7 naked eye. On a number of the nights Sagittarius was lost in cirrus. Four out of the five nights I observed until dawn. There's something special about staying up to watch the sunrise with the smell of sagebrush in the air - but it sure is hard to battle the heavy eyelids!

Unfortunately for the planetary observers, the legendary steady skies did not materialize this year. Instead we had pretty windy conditions each night - on one occasion Ben Gendre managed to catch my wind break as the wind pulled two retaining 12-inch spikes out of the ground. Early arrivals on the Saturday before re-galed us with the tale that the wires on the communications tower were humming louder than the wind in the trees!

Thanks go to Terry Nonay,

*"Transparency was only 90% what Kobau could deliver, about mag 6.7 naked eye."*

who brought the club's 18-inch for me to host for the run. I don't mind the touring, because it gives me the opportunity to recharge my "wow" batteries with the likes of the Veil in the O III and the dozens of H II regions in M33. I was able to get a lot of personal observing in, and because of the less than spectacular conditions, I concentrated on the so-called "non-existent" star clusters of the NGC. I succeeded in identifying some 15 of them.

I did some nice nebula

observing up in Cass, that huge IC 1805 etc complex, and IC 405 (Flaming Star) and IC 410 in Auriga, comparing views without and with O III and H Beta filters. The surprise is that the Flaming Star is a HUGE area with the H-Beta. The Cass nebulosities are quite impressive in this aperture - I'll have to go back with the 12.5-incher to compare to my usual level.

I had a nice time running through central Aquila while searching for some clusters. I've acquired a newfound fascination in this region with all the dark nebulae that are just rampantly tunneling across the wonderful Milky Way starfields. I don't think I'll waste much time down in Sag-Oph-Sco on my knees looking for greyed-out pale blobs just off the horizon when I've got this splendor within easy reach and it is so much more beautiful!

We saw tons of meteors in the days following the Perseids, seeing streaks from all the various radiants. Must look into those possible upilon Pegasids - there do seem to be a number coming from Pegasus. Again, I missed the bolide of the week, only seeing the amazed looks on my friends' bright white faces.

Next year Kobau was voted to happen on the first of August weekend. At just over 3 hours of darkness per night and a 5 night maximum run to counterbalance a 26-28 hour round trip, I'll be passing, sad to say. However, I may be able to drop in on the Nova Scotia Star Party while on holiday.

Alister Ling  
watcher@freenet.edmonton.ab.ca



## Chair's Report ...

(Continued from page 2)

Many of our planned observing events were cancelled this past year because of the weather. I would like to take this opportunity to refute my reputation as a weather jinx! I know that the weather deteriorated late last fall and hasn't been very good since, but it's just a coincidence! It had nothing to do with me taking over as Chair. Really. It's not my fault. I had nothing to do with it!

Our council is the finest one I've ever served on and I have been overwhelmed by their support and guidance. During my term as chair I

was also grateful for the kind words, encouragement and help from my fellow HAA'ers. Thank you, everyone, for making the year so very special to me!

Ann Tekatch  
Chair

P.S. Please note that our November meeting will NOT be on the usual second Friday of the month, but, rather, on November 15.

## Nagler Eyepieces ...

(Continued from page 5)

This eyepiece has a more reasonable 10mm eye relief. Also supplied with a very stiff, roll-down, full eyecup (like the 4.8mm) which is very effective, even more effective than the 9 Nagler and up. However, it doesn't roll down easily, and makes it somewhat harder to go from glasses to without glasses, and back. The view is very pleasant and wide, much more comfortable than the 4.8, and a bit more of that "space-walk" feeling. You only have to move your eye around, and not your whole head to take in the full 82 degree view. On most scopes, this is a fantastic planetary eyepiece. Both the 4.8, and the 7mm Naglers are pure 1.25" eyepieces, and are suitable for 1.25" diagonals, and/or binoviewers.

### 3. The 9mm Nagler.

This is the first in the series to exhibit the Nagler's more typical qualities. This eyepiece is a small 1.25"/2" hybrid design. It is a 1.25" eyepiece with a 2" "skirt". It fits more securely in a 2" diagonal, but works just fine in a 1.25". The eye relief is better, approximately 12mm. The "space-walk" feeling is full blown. The design of this and many of the Nagler's has changed so many times over the past few years it is mind blowing. From buying them second hand, and trying to match them for a bino-viewer, I have been driven nuts trying to keep track of the excellent alterations. The latest 9mm Nagler (and I believe all the others on up from here) features an easy to roll down eyecup, a contoured barrel (like the 7 and 48 versions feature too - apparently to prevent eyepiece falling accidents), a grip ring, and a new placement of the top element..right on the plane of the top of the eyepiece (not at all recessed) allowing for a more comfortable eye relief, but a higher probability of eyelash contact.

### 4. The 11mm Nagler:

No longer being produced, this eyepiece is considered a "collector's item", and draws big bucks on the second hand market. No, I have never tried one, but apparently it does not come with an eyecup. The 11mm Nagler is the Nagler 1 style, like the 4.8, 7, 9, and 13. From 9mm and up there is a slight "kidney bean blackout" effect, but it really isn't noticeable until you reach 13, which we will discuss shortly. I have not heard that this Nagler is any "better" than others despite the high price it draws. It is considerably heavier than the 9mm, and also apparently is a 1.25/2" eyepiece.

### 5. The 12mm Nagler "2":

When you get up around 13mm, the Nagler 1 design exhibits a more pronounced "kidney-bean" blackout effect discussed below. Therefore, Televue created a new design, similar to the 1st, which allowed the Naglers to go all the way up to 20mm, without any of the problems associated with the earlier design. The only trade off, is eye relief. While the relief is limited, the placement of the top element right at the plane of the eyepiece makes for very comfortable night-time viewing without glasses, even with the eyecup rolled up. However, with glasses, it is somewhat tight, and you will lose some of the f.o.v. I have sold, and re-purchased this eyepiece many times, always "missing" the huge panorama, and yet sharp planetary images. I could be mistaken, but the field of view seems even larger than 82 in this particular model. I use this eyepiece especially for observing globulars in an 8" or 10" SCT. Perfect mid-high magnification eyepiece to see the whole globular, yet break down the stars! This eyepiece is quite heavy, and also features a 1.25/2" hybrid design. I would recommend a 2" diagonal to hold it for security. I had trouble, by the way, seeing the whole field by day...for some reason it was easier to take in at night, must have something to do with pupil size.

[This article will conclude in the

November issue of *Event Horizon*. - Editor]

## Beginner's Luck ...

(Continued from page 4)

Trail." The comet, Hale-Bopp, showed up in two photos. A Perseid meteor and a satellite were close neighbours in another.

The slide show was a success. I learned much about exposures, how to distinguish meteor trails from satellite tracks and why the beautiful red swan in my photograph never looks that colour in my scope. The highlight of the evening for me, however, was a remark by one of the club's veterans. "Those were the finest astrophotos I've ever seen," even if he did add, "- by a beginner."

You might ask why I would want to take the seven millionth photo of the Milky Way? It's been a real challenge, it's been fun, but most important of all- I did it, and it's mine. Beginner's luck? Well, it did take eight months of planning and preparation to get my first photograph.

Rob Roy  
royrg@mcmaster.ca



# *November Night Skies*

# Magazine Discounts for HAA Members

**A**s a member of the Hamilton Amateur Astronomers you are eligible for subscription discounts for the following magazines:

Sky & Telescope: \$37. U.S. funds per year (12 issues)

CCD Astronomy: \$30. U.S. funds per year (4 issues)

Astronomy Magazine: \$30. U.S. funds per year (12 issues)

If you are interested in subscribing to any of these magazines or wish to renew an existing subscription at club rates, please contact -

Ann Tekatch at 575-5433  
email:tekatchba@mcmaster.ca

## Doug's Stuff for Sal

**T**his month's special (in time for Hale-Bopp!) Bell and Howell LUMINA 10x50 binoculars \$175 (EWA 420 ft at 1000 yds)

Also:

- (2) 8" Pyrex blanks \$65 each
- Metal detector \$75
- Super 8mm Canon camera \$50
- 300mm f.l. f/4.5 Dimension telephoto \$75
- 6" mirror kit \$75
- Tele-extender \$5
- Keychains

FAX/Phone line-splitter \$7 each  
\$50

Don't see what you'd like? Ask me!

Doug Welch

(905) 525-9140 x23186 (work)  
(905) 524-0848 (home)  
(905) 525-9140 x24559 (Messages - Dept Office)  
(905) 546-1252(FAX)  
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## CALENDAR OF EVENTS

◆ Tue. October 15, 1996, 7:00 PM

**HAMILTON AMATEUR JUNIOR ASTRONOMERS** - Mac Burke Science Building, Rm B148 (beside the planetarium) The topic is "The Constellations" For more information contact Rosa Assalone at 540-8793

◆ Fri. October 18, 1996, 7:30 PM

**COUNCIL MEETING** - At the home of Charles and Patti Baetsen. Call Ann at 575-5433 if you're interested in attending.

◆ Thu. November 7 1996, 8:00 PM

**ROYAL ASTRONOMICAL SOCIETY OF CANADA Hamilton Centre** - General Meeting - McMaster University Medical Building Room 1A6

◆ Fri. November 8, 1996, 11:59 PM

**EVENT HORIZON DEADLINE** - Please submit your articles and pictures to Stewart Attlessey, [stewart@io.org](mailto:stewart@io.org) or modem (905)827-9105 or snail mail to 1317 Mapleridge Cres., Oakville, L6M 2G8

◆ Fri. November 15, 1996, 7:30 PM

**HAA GENERAL MEETING** - at the Spectator Building auditorium. The speaker will be Ivan Semeniuk.

◆ Sat. November 26, 1996, 8:00 PM

**COSMOLOGY DISCUSSION GROUP** - Room B148 (the room beside the planetarium,) Burke Science Building, McMaster University. We will finish discussing "The Age of the Universe" and start our new topic "Chaos".