

# Event Horizon

September 1997

Volume 4 Issue 10

## Using Eyepiece & Photographic Nebular Filters

Note: This article was obtained from the web and may be viewed at <http://www.netcom.com/~regina-r/astro.html>

**N**ebular filters -- whether for visual use in conjunction with an appropriate eyepiece, or for photography -- make handy accessories for the observer's toolkit. In this article, we discuss the advantages, and drawbacks, of each type.

Narrowband nebular type filters for improving contrast on certain types of non-stellar deep-sky objects, are discussed frequently in the newsgroup sci.astro.amateur and advertised in the catalogs of such manufacturers as Lumicon and Orion Telescope Center, prominent manufacturers / dealers for numerous models; and the largest amateur telescope makers often sell their own "house brand" of eyepiece filters. We thought it might be useful to add our perspective on the use of filters, to provide a middle-ground between the unreservedly enthusiastic advertising claims of retailers, and the conflicting opinions of diverse amateur users.

Like "high end" audiophile gear, eyepiece filters of each type and brand have their enthusiastic advocates, as well as their firm denouncers. What is the general truth about them that few would really dispute? In trying to answer this question, we offer the following article, based on information originally published in our software programs REDSCOPE and EYEPIECE 2.0.

**Warning:** Not all eyepieces (especially

very inexpensive or oddball ones) have appropriate and accurately cut threads for eyepiece filters! DO NOT FORCE the filters onto your ocular if in doubt! The good-to-excellent quality range 1.25" and 2.0" barrel eyepieces sold by the above-mentioned companies, as well as other fine astronomical specialty dealers, will provide the best results.

### NEBULAR FILTERS FOR DEEP-SKY OBSERVING & PHOTOGRAPHY:

Four general types are of greatest use to amateur observers:

- Light Pollution Filters;
- General Narrowband Nebular Filters;
- Oxygen Nebular Line Filters; and
- Hydrogen-Beta Nebular Line Filters.

Each will be discussed in turn, from information in our software program EYEPIECE. The chart below of visible light wavelengths and filter performance will help illustrate the various nebular lines of deep-sky objects that may be viewed or photographed, and their transmission by

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## Nova East 97

**O**n the Labour Day weekend I was fortunate to be vacationing on the east coast and able to attend the Halifax RASC's Star Party, Nova East, held at Fundy National Park. The party ran from Friday to Monday, although I had to leave early Sunday evening to be able to drive home by Monday night. It was a small party attended by about 50 amateur astronomers, children and spouses. The site is a great place for a star party, with incredible dark skies and lots to do during the day.

This star party was quite different from the others I have attended this summer, with an emphasis on public education. Members of the

club gave very general, illustrated talks on astronomy to the general public on Friday and Saturday night. This was followed by public viewing sessions at the observing site in one of the campgrounds. These viewing sessions were very well attended with people of all ages going from scope to scope viewing the different objects. Groups of teenagers seemed especially fascinated. They also hosted solar viewing sessions during the day. One person had a special filter to show solar flares. When I looked there were two large flares visible, the first time I had seen this other than in a photograph.

On Saturday the group held their annual golf tournament at the

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# Editorial

**T**he end of the club year is approaching and it is time to start thinking about joining the HAA council. It doesn't involve a lot of work and you can ask any council member and they will tell you the same thing - it is an enjoyable experience. All clubs need people to run things and all club members have a responsibility to help out where possible. It is also important to get new people with fresh ideas on the council. (Not that anyone on our council is "stale" yet.) A variety of positions are becoming available, so give it some thought.

Summer will soon be over but not the observing. Getting dark earlier just means that there is more time for observing (and eating donuts and lying about what we saw afterwards). I keep wondering what is keeping most of you from joining us at our observing sessions. If you have any helpful

suggestions on what it would take to get you out please pass on your comments to any of the council members.

I don't especially like to split an article between issues but it was necessary with this month's article on *Using Eyepiece & Photographic Nebular Filters*. Thanks go to Steve Waldee for allowing us to reprint his article.

The "Expert" is taking a break from answering questions this month. (Actually, the truth is that the questions that are still to be answered are tough ones.)

Stewart Attlesey  
 attlesey@interlog.com



**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 a minimum of 10 times a year.

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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 the time of evening twilight and Jupiter's setting time. Times are Eastern Daylight Savings up to Oct. 26. Thereafter, times are back to Eastern Standard Time.

JUST A REMINDER!!!!!!

Sep. 21 Callisto \*---> 20:13

Sep. 21 Ganymede \*---> 22:25

!!! Double crossing visible from dusk to 20:13 !!!

!!! Callisto will also occult Europa this evening!!!

Oct. 3 Io 00:57--->\*

Oct. 4 Io 19:26--->21:44

Oct. 5 Europa 19:50---> 22:39

Oct. 12 Europa 22:26--->01:15 Oct. 13

Oct. 20 Europa 01:01--->\*

Oct. 20 Io \*---> 20:04

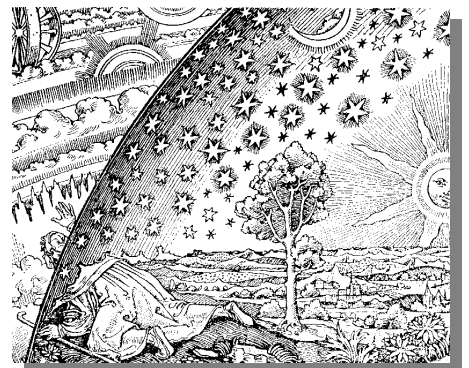
Oct. 27 Io 18:43EST--->20:59

Oct. 30 Europa \*--->18:45

For other events, such as eclipses, occultations and transits of satellites search the table in the "RASC Handbook" or "Sky and Telescope". At the beginning of October check between 23:00 and 06:30 UT. At the end of October between 23:00 and 04:30 UT. Jupiter is setting about 1 hour earlier every two weeks. To get your local EDT subtract 4 hours from the UT shown for each event. After Oct. 26 subtract 5 hours to get your local EST.

### *Monthly In-Sights*

(Continued on page 3)



# Nova East ...

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Fundy National Park Golf Course. I did not attend this, choosing instead to take the kids and visit some of the other sites near the park, such as Hopewell Rocks, St. Mary's Shorebird Reserve, and an open quarry to do some rock hounding. The skies on Saturday looked doubtful for good observing later, but they did clear around 10pm and gave us 2 hours of observing before clouding over completely.

Sunday's activity was a strenuous 9 km hike down into a river valley, rockhopping along the river to some beautiful clear potholes, just perfect for a swim, and then back out. Eleven of us participated in the activity, and all made it out in one piece. We were thankful to have a surgeon along, as the possibility for some broken bones seemed great! Four of us did get stung by some sort of weird, easily provoked forest bee. Just brushing by the foliage it was on seemed to enrage it and it attacked. The skies again looked iffy for observing, but we did manage to observe, despite being able to see only ¼ to ½ the sky at any given time.

There was a wide range of scopes at the party. Dave Lane was there with his 18" Dobsonian, there was a homebuilt 17.5" Dobsonian, and one person stayed up until 3am Friday morning to finish his 15" Dobsonian in time for the party. A visitor from Maine brought his son and his 6" Newtonian, but left his 18" Obsession at home. There was a 12" LX200 and various smaller versions, many smaller refractors and reflectors and three 90mm Maksutov's, one was a Meade and one was a Questar. They were getting ready Sunday night to do a direct comparison of the three, unfortunately I had to leave before it got dark.

The farewell dinner for everyone, included in our registration fee, was a corn and hot dog roast Sunday night. This was followed by the door prize draw, with lots of great

prizes. The top prize was a copy of *The Sky* software (which I did not win!). All in all it was a great party with lots of activities and a small group of friendly amateurs willing to share their party and their knowledge with a very new amateur astronomer.

Marg Walton



## Rob'serving Report ...

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Standard Time (UT-5hr=EST)

### September

- 16@dawn- Mercury at greatest western elongation, 18 deg.
- 18@07:05- Occultation of Saturn by Moon (southern Ontario)
- 21- Double shadow transit on Jupiter.
- 22- Aldebaran 0.3 deg. south of Moon.
- 22@19:56EDT- Vernal Equinox.

### October

- 5- Crescent Moon near Venus and Mars.
- 9@midnight- Saturn at opposition and nearest Earth.
- 15- Hunter's Full Moon.
- 19- Moon occults Aldebaran in early morning.
- 21- Orionid Meteor Shower peaks ~7pm.
- 26- Venus and Mars only 2 deg. apart.
- 26@2am- Fall back to Eastern

- Mercury- best views in 3rd. week of Sept. Not visible most of Oct.
- Venus is low in the southwest evening twilight. Sets about 1.5 hours after sunset.
- Mars is difficult to see in the evening twilight.
- Jupiter is near the meridian in the mid-evening and sets after midnight.
- Saturn rises at sunset and is visible all night. Rings span 45" and are tilted 10 deg. to us.
- Neptune & Uranus are a few degrees west of Jupiter.

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

## The Orbiting Gourmet (Part 3): Navel Gazing

**A**h, the humble orange. That most succulent of educational tools.

You people who have been following this series of articles probably think that this time, I've completely flipped. But I'm serious!

When people hear that someone is involved with the HAA, they'll usually come out with something like "Y'know, I've always wondered..." or "This is probably a dumb question, but..." I've always found it a pleasant job to answer people's questions in a way that'll satisfy them and bring them back for more. But how to do this?.

Enter: the orange. Sweet, juicy, and useful for explaining anything from gravitational lensing to black holes.

Take the moon, for example. People often don't know why it changes shape over the course of a month. You can try explaining this using a pen and paper, but not everybody will get it. This is especially true of kids, who have a harder time making the leap from a 2-D picture to the 3-D reality.

What you do is this: Hand the curious person an orange and put them in a room with a single focused light source -- a halogen flashlight, or one of those desk lamps that uses incandescent bulbs. If you're using the latter, get as bright a bulb as you can find. A normal 60 W bulb won't cut it. Explain that the light represents the Sun, the orange represents the moon, and the person's head, well, that's the Earth (this should be good for a joke or two, Grant). The person's eyes are two people standing on the night side of the Earth.

Have your hapless subject stand facing away from the light, with the orange in the right hand, held

straight out to the side and at eye level. At this point, he or she will see what people usually call a "half-moon" and astronomers call "first quarter".

Next, the person holds the orange out in front with both hands. This is a full moon if the face of the orange is fully illuminated, or a lunar eclipse if the orange falls within the shadow of the person's head. Held in the person's left hand, the orange enters "last quarter", a phase that people don't usually see because the moon is up during the wee hours of the morning.

It's impossible for many people to hold an orange (or anything else!), directly behind them at eye level. But this is the configuration for "new moon". Explain that people rarely see a new moon because it's only up during the day. The illuminated back portion

of the head represents the day side of the Earth and since most of us don't have any eyes back there the orange will be impossible to see. Schoolteachers and people with young kids may be able to mysteriously sense the orange without looking.

Depending on your knowledge and the enthusiasm of your subject, you can go far with this demonstration. Not only will it make the explanation unforgettable -- you can share the orange afterwards. Try that with a plain old rubber ball !

Denise Kaisler  
kaisler@soback.kornet.nm.kr

### HAA Sweatshirts & T-shirts

**T**he good news is that you haven't missed your opportunity to get your very own official HAA-wear!

The bad news is that's because I haven't ordered them yet!

Unfortunately, I didn't manage to get our order organized over the summer <insert excuse here>. But, now that those lazy days of summer are past, I will be putting an order in to Otmar Eigler and we will hopefully see HAA-wear in time for Christmas (if not sooner).

Stay tuned!

Ann Tekatch

### 1998 RASC Calendars

**W**e have received a sample copy of the Royal Astronomical Society of Canada's 1998 Observer's Calendar and, once again, it's a beauty!

These colour calendars show breath-taking astrophotos taken by Canadian astronomers. Also featured are details on Canadian star parties, the daily phases of the moon and all significant astronomical events.

Last year we quickly sold out of these calendars and had to place a second order. At \$7. each, they're sure to sell quickly again this year. To reserve your copy, call or email me by September 30/97.

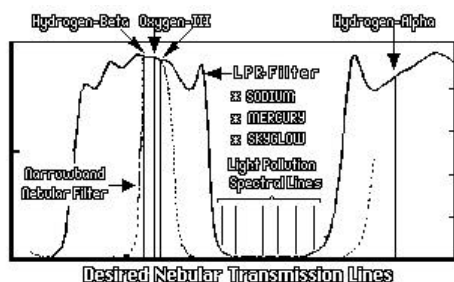
Ann Tekatch  
575-5433  
tekatcha@mcmail.cis.mcmaster.ca



# Using Nebular Filters ...

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specific filters (which, simultaneously, cut off unwanted light wavelengths.)



## BROADBAND LIGHT-POLLUTION-REDUCTION (LPR) FILTERS:

This eyepiece or camera lens filter has a relatively minor effect on the bandwidth of visible light: it enables enhanced results in viewing or photographing images of celestial objects whose faint light is obscured by the stray photons from street lamps and from the dim but perceptible skyglow caused by excited atoms in earth's atmosphere.

The typical broadband LPR filters have high transmission (which should ideally achieve better than 90% efficiency) at all visual light wavelengths except in a region centered around 560 nanometers, which contains the frequencies of the yellowish light of sodium- and mercury-vapor streetlights, and airglow. Other wavelengths radiated by oxygen and hydrogen are little unaffected by an LPR filter, and views of gaseous clouds like the *Crab*, *Lagoon*, and *Orion Nebulae* are somewhat enhanced in detail and contrast; photos of these objects may be recorded with longer exposures before the skyglow "washes out" the background with stray light.

Since LPR filtering is broadband and relatively gentle, the light of stars, clusters, and galaxies which radiate a wide range of visible colors (and generally appear faint white or grey to the eye) will be quite clearly

seen, often with contrast enhancement as well. Sky fogging of photographic exposures will be reduced, permitting exposures as much as three times longer than without an LPR filter: our DOS freeware program *EYEPIECE* will help you calculate the exposure times and sky fogging factor for appropriate Messier objects (see the end of this article for free download instructions.)

## GENERAL NARROWBAND NEBULA FILTERS:

One of the most versatile of the contrast enhancing visual nebular filters, a narrowband nebular line filter has a narrower bandwidth than an LPR filter. Typical light pollution filters will transmit all but a narrow band of wavelengths that reduces light pollution and skyglow, while the nebular line filter blocks a broad band of wavelengths while passing only a narrow range, peaking sharply just above 500 nanometers (in the bluish-green wavelength range of light).

Those light wavelengths transmitted by the general nebular filter are radiated by ionized oxygen and atomic hydrogen, which fortunately happen to be in the blue-green light region to which the dark adapted human retina is most sensitive. Some extended nebulae, like the *Veil* in Cygnus, are spread over such a wide area of the eyepiece field that they are often invisible to novice astronomers, or may never seem to resemble in an eyepiece view -- even employing the largest of scope apertures -- remarkable long-exposure observatory photos. However, a narrowband nebular line filter, even under moderately light polluted skies, will enhance images of such nebulae with a clarity and contrast not otherwise obtainable. A number of different brands are available: if possible, obtain a filter with a high transmission factor in the bandpass region (at least 90% is desirable).

In heavily light polluted skies, the nebular line filter can make the difference between a nebula being


utterly INVISIBLE or being unmistakably VISIBLE, even with scopes as small as 80mm aperture. Of course, the exit pupil should be in the proper range for effective filter use, as shown by our program *EYEPIECE*.

## OXYGEN NEBULA LINE FILTERS:

A contrast enhancing deep-sky visual filter (currently made by Lumicon Company and Thousand Oaks Optical), the oxygen line filter has its high transmission region tuned to pass the light wavelengths radiated by doubly ionized oxygen near 500 nanometers: the so-called "forbidden lines" of radiation that can occur in the near vacuum of deep space but not under earthly conditions of higher pressure. The oxygen line filter dramatically reduces skyglow, while transmitting wavelengths emitted by

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## The Pacific Observatory

 Our company, The Pacific Observatory, has just relocated to Ontario. We host astronomy speakers, host public stargazing evenings and produce and show multimedia presentations.

We are bringing Terence Dickenson to Brock University on Saturday October 18, 1997 at 7:30 to speak and show his astrophotography. Tickets are \$8.50. For more information we have 2 sites on the internet (identical) detailing the event:

<http://www.itcanada.com/~saturn>  
[http://www.vaxxine.com/pacific\\_observatory](http://www.vaxxine.com/pacific_observatory)

Carol Legate  
 John Nemy  
 The Pacific Observatory  
 (905) 892-4531

# A Delphinus Delight

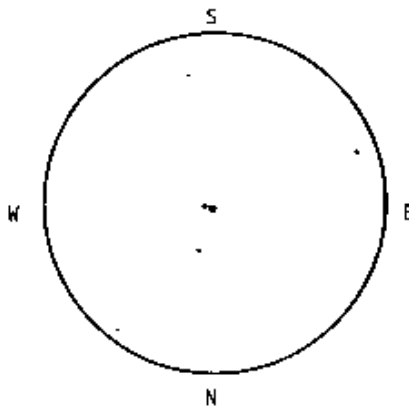
**L**ying high overhead and stretching southward during September evenings is the very distinct 'Summer Triangle' marked by the three bright stars of Vega, Altair and Deneb. Altair is the southernmost star of this triangle representing Aquila the flying Eagle. If you scan to the northeast of Altair you'll see a faint diamond-shaped pattern of stars. This is the constellation of Delphinus the Dolphin. This diamond-shaped asterism is sometimes referred to as Job's Coffin, but there is some confusion as to the historical background of this name. The northeastern most star which marks the Dolphin's nose is one of the finest visual binaries visible in the early autumn. This star has the designation of Gamma Delphini, and it is easily resolved by low power telescopes.

Gamma Delphini glows with the combined brightness of a 4th magnitude star. This binary system consists of two subgiant stars with spectra of G5 and F8. The individual magnitudes are 4.3 for the primary and 5.2 for its companion. The total luminosity of this system is about 30 suns.

As far as sizes go, the primary is 4 times larger than our Sun and the companion is about 2.5 solar diameters. Distance estimates place this pair over 100 light years away.

In a small telescope the two stars appear to be separated by 9.6" at a P.A. of 268° or almost due west of the primary. This duo was originally discovered by F.G.W. Struve in 1830. Since that time the two stars have been closing on each other with a slight 5° change in P.A. and a decreasing separation. The most appealing feature of this pair is the fine colors these stars present. At low power 35x in my 3" telescope I see a golden yellow pair. But at higher magnifications (50x-

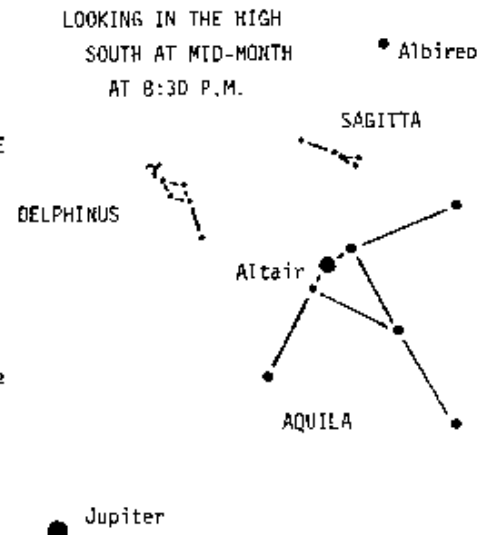
75x) when the companion is placed further away from the primary I see it has a slight greenish emerald tint. Do you notice this change in hues with your telescope, and if so at what powers?



Gamma Delphini in a 3" telescope at 60x.

Gamma Delphini should repay you with its interesting colors during this early Autumn season, so spend some time and study this fine Delphinus delight

By Jeff Brydges



## For Sale

**P**entax SP Spotmatic with  
 50 mm - 1:1.4 lens  
 28 mm - 1:3.5 lens  
 200 mm - 1:4 lens, assorted hoods & filters.  
 \$ 400.00

Margaret Walton  
 margw@icom.ca  
 905-627-7361

**E**dmond Newtonian 4 1/4" Reflector with 2 eyepieces (10mm and 25mm Plossl)  
 \$325  
 80mm finder scope - great spotting scope, with 20mm eyepiece giving 11 power (twin to the finder on the 17" at the Hamilton Centre's observatory)  
 \$150

Minolta 35mm SRT101 camera - mirror

lockup, no battery - perfect for an astrophotographer

\$125

Bellows with slide duplicator- also perfect for an astrophotographer

\$125

6" f/8 Meade mirror

\$120

Or, make an offer on anything - as long as they go to good homes

John Gauvreau  
 24 - 122 Hatt St.  
 Dundas, Ontario  
 L9H 6Y4  
 627-7882

# Using Nebular Filters ...

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ionized oxygen: planetary nebulae are particularly enhanced.

In addition, the oxygen line filter provides the highest possible contrast enhancement for viewing many types of large diffuse nebulae in sites that suffer from extreme light pollution. The oxygen line filter is, however, not designed for photographic use, since its "filter factor" of attenuation will increase exposure times beyond a useful range, and will block wavelengths to which most film types are sensitive.

## NARROWBAND HYDROGEN BETA LINE NEBULAR FILTERS:

The hydrogen-Beta filter (currently made by the Lumicon Company, as well as Thousand Oaks Optical), is designed to enable the visual astronomer to accomplish the almost hitherto impossible task of actually seeing the faint and elusive Horsehead dark nebula near the star Zeta Orionis in the constellation Orion. In years past, numerous experienced observers (such as the late Walter Scott Houston) reported observations of the Horsehead with small richfield telescopes, but in this era of urban sprawl and light pollution, the task is becoming difficult or even impossible.

The name "hydrogen-beta" refers to the Balmer Beta nebular emission line of light wave energy at 486.1 nanometers radiated by atomic hydrogen (excited atoms of hydrogen in

the low pressures of deep space). This filter has a very sharp high transmission response to the blue-green light of this specific frequency: the Beta line is the weaker line of atomic hydrogen, the stronger being the h-Alpha or Hydrogen I line in the red color region, centered at 656.3 nanometers. Unfortunately, the human eye can see very little of weak red light, so the rich reddish hues of a hydrogen nebula radiating at 486.1 nm are largely undetected by eye through a telescope, though they register strongly on film. However, the weaker blue-greenish h-Beta line is much more readily detected by eye: thus, for example, the energy radiated by the nebula IC-434, located behind the *Horsehead* dark nebula, along our line of sight, will show up to the eye (under the best viewing conditions) as a faint greyish smudge, with the *Horsehead* being a dark (or darker) spot against the faint glow. This non-linear detection of color wavelengths by the dark adapted human eye is called the "Purkinje" effect, after its discoverer, the 19th-century Czech physiologist J. N. Purkinje. To see the *Horsehead*, the blue-green hydrogen-Beta wavelength from IC-434 can be detected, as can the dark cloud of interstellar matter arranged in front of it, if all "competing" skyglow is reduced. The authors of this website have observed the *Horsehead* in Moonless, clear skies of at least 5.8 to 6.0 limiting magnitude (preferably darker), with this filter employed in scopes as small as 3 - 4 inches in aperture, by following the recommendations of the program EYEPIECE for exit pupil size in carefully selecting an eyepiece for appropriate magnification, when the object is nearest the meridian and above the rough air at the horizon.

In addition to the *Horsehead*, the hydrogen-Beta filter can also enhance the contrast of a few other extended objects like the *California Nebula* in Perseus, faint "H-II" regions in the arms of some bright spiral galaxies like M33, or the Cygnus



Horsehead, Eyepiece Simulation, 17.5" Scope in Dark Sky, With Hydrogen-Beta Filter

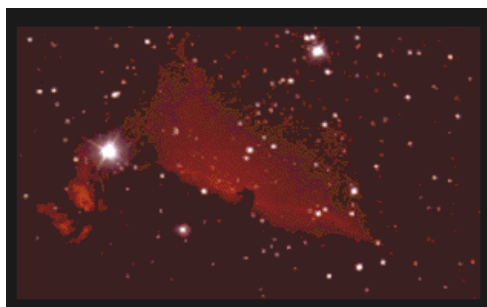
objects the *Cocoon Nebula* (IC-5146) and the nebulosity of *Campbell's Hydrogen Star* (PK64+5.1, a planetary nebula surrounding star BD +30° 3639 at 19h 35m RA, +30° 31m DEC.)

The h-Beta filter is NOT a photographic filter: it is intended strictly for visual observations at the eyepiece.

## PHOTOGRAPHIC TESTS OF FILTERS:

Years ago, when one of this website's authors (Waldee) was the manager of a consumer science products dealership, we produced a "point of sale" display for the company, to try to illustrate the efficiency of various forms of eyepiece nebular filters, by photographing a light polluted region of sky where we conducted the visual tests of filters that will be described below. The prints and negatives for this display were long ago lost, so on the evening of 7-6-97, we repeated the test and provide the results for your inspection. Many astrophotographers have tested the efficacy of filters with guided exposures in order to show the improvements and reduction of skyfogging (we especially recommend the article *Filters and Light Pollution* on Chuck Vaughn's *Astrophotography Webpages*); but our own specific test with a fixed camera tripod setup was intended simply to show the reduction

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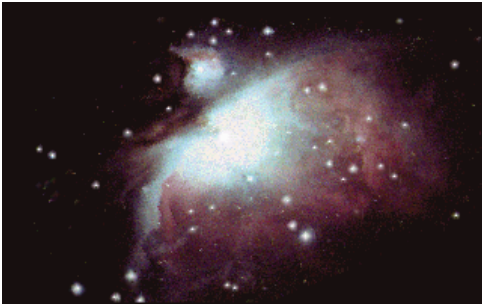


Horsehead, by Ryan Wood: 8" f5.2, Kodak Ektapress 1600, 40', Lumicon DEEP-SKY[tm] Filter.

# Using Nebular Filters ...

(Continued from page 7)

of light pollution. We constructed a small metal hood for the 50mm f1.7 lens of our camera, that fitted closely



M-42, Ron Wood: 8" f5.2, Hypered Kodak Ektapress 1600; 30'; Lumicon DEEP-SKY[tm] Filter.

over the lens, cutting off all light except through a 27-mm aperture that was fitted with threads for 1.25" eyepiece filters. This changed the focal ratio of the system to about f/4, still fast enough to attain skyfog limit in a few minutes with color-rich Kodak 400 print film. However, a vignetting of the negative was caused by this adapter, so we have cropped the scans of the photos to contain the exposed region of each frame, and just a bit of the dark region around it.

The exposure times were 15 minutes in each case. The site was one of the viewing venues we employ for astronomical observing, at over 3,000 feet of elevation above sea level in the mountains north of Santa Cruz, California. Lights at the horizon are from the populous areas of Gilroy and Morgan Hill, and in the unfiltered picture are extraordinarily bright and intrusive in the long exposure! A number of other "unidentified flying objects" may be visible: more on these below.

In this exposure, the brilliance of low- and high- pressure sodium vapor streetlights is terribly evident. In addition, at the right of the horizon, a trail is visible from the rising planet Jupiter, as are some fainter startrails.

Though we did not take special note of



15-Minute Exposure at f/4, No Filter.

them by eye while the picture was being exposed, the camera unerringly captured numerous "UFOs": trails of airplanes taking off from a south Santa Clara county airport! All in all, it is hard to imagine that any decent deep-sky observing can be done at this venue, but we manage to accomplish a lot when fog comes in to blanket the worst of the light pollution, by observing away from the strongest source of light, or by using filters on extended nebulae.

Using a standard "light pollution rejection" filter [similar to a Lumicon DEEP-SKY[tm] or Orion "SkyGlow"[tm)], which primarily suppresses the yellowish wavelengths of sodium- vapor streetlights (plus some high atmospheric airglow), this 15



LPR Filter, 15-Minute Exposure at f/4.

minute exposure captures a lot of reddish radiation in the h-alpha range from the city lights, but loses most of the awful yellow pollution wavelengths. Sadly, however, the effect by eye is not NEARLY so dramatic: in fact, it is rather subtle, provided just the right exit pupil is chosen for the best effect. Do not expect to view nebulae with

extraordinary contrast enhancement with an LPR filter: but some improvement will be evident by eye. The increased photographic exposure time is the best service provided by this type of filter, though for visual use, it can provide a slight contrast enhancement on some globular clusters, and on bluish reflection nebulae (such as the faint glow around some of the bright stellar members of M-45, the *Pleiades*, or part of M-20, the *Trifid* nebula.)



Narrowband General Nebular Filter: 15-Minutes at f/4.

With the addition of a standard visual narrowband nebular filter, primarily centered on hydrogen wavelengths (similar to a Lumicon "UHC"[tm] or an Orion "UltraBlock"[tm] model), we see a less-strong transmission of reddish h-alpha wavelengths, combined with the greenish-blue light to which the dark adapted eye is most sensitive, resulting in a slightly less reddish cast than the LPR filter picture above; note that the star trails have nearly disappeared, along with much of the nasty skyglow. This type of filter is not intended for photography, but is designed to help obtain high contrast on emission nebulae such as M-8 (the *Lagoon Nebula*) or M-17 (the *Omega Nebula*, below), both in the constellation of

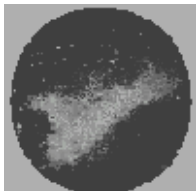
(Continued on page 10)



# *October Night Skies*

# Using Nebular Filters ...

(Continued from page 8)  
Sagittarius.



M17 the Omega Nebula

Note: we do not currently have the server space to include the test photo made through the oxygen line filter: however, it was similar to the hydrogen filter except for a slightly fainter registration of a somewhat more purplish color.



Hydrogen-Beta Nebular Filter: 15-Minutes at f/4.

The Hydrogen-Beta filter [in this case, a Lumicon "H-BETA"[tm] model] cuts off even more light, transmitting a very narrow region right at 486.1 nanometers, the precise hydrogen- Beta wavelength. As you can see in this photographic test exposure, very little light is recorded from the streetlights at the horizon, though the trail of Jupiter is just visible at the top right of the image. This filter -- though NOT for photography -- is very efficient at eliminating almost all light pollution and skyglow, but unfortunately works well visually for only a few kinds of emission nebulae: thus it should be a choice for the dedicated amateur who has progressed beyond the other types of filters, and who believes that the study of such objects as the *Horsehead* and *California Nebulae* justify the cost. However, it does work as advertised, and permits one to see the faint nebulae, provided that the observing conditions are propitious, and the telescope / eyepiece can provide the exit pupil necessary (shown in our software program EYEPIECE and in the data sheets for the filter.)

Again, these tests above are not indicative of the visual performance of the eyepiece filters, but instead a demonstration of their general cutoff effects in reducing light pollution. The eye's sensitivity to faint light, and the film's response to visual wavelengths, are strikingly different .

*EYEPIECE 2.5 Light Edition*, the author's DOS freeware program for calculating the appropriate exit pupil for filter use, is available *ONLY* over the Internet. Consult the "Download Info & Sites" page at the WALDEE-WOOD ASTRONOMICAL SOFTWARE website at:

<http://www.netcom.com/~regina-r/astro.html>

from which you may download the software from US or European servers.

Yours,  
Steve Waldee

Next Month: This article will conclude with Visual tests of filters.

VISUAL TESTS OF FILTERS:

## CALENDAR OF EVENTS

- ◆ Monday, September 15th, 7:00PM
- ◆ Friday, September 19, 7:30 PM
- ◆ Saturday, September 20, 8:00 PM
- ◆ September 26, 27
- ◆ Thursday, October 2, 8:00 PM
- ◆ Friday, October 3, 11:59 PM
- ◆ Friday, October 10, 7:30 PM
- ◆ Monday, October 20th, 7:00PM

**HAJA MEETING** - McMaster Burke Science Building, room B148.

**COUNCIL MEETING** - At the home of Ann and Bill Tekatch. Call Doug at 525-9140 Extension 23186 if you are interested in attending.

**COSMOLOGY DISCUSSION GROUP** - Room B148 (next to the Planetarium) Burke Science Building, McMaster University. Topic will be "Introduction to Cosmo logy". For more information contact Bill Tekatch at 575-5433 or [tekatchba@mcmaster.ca](mailto:tekatchba@mcmaster.ca)

**BINBROOK OBSERVING SESSIONS** - Proposed observing nights. For confirmation or directions call Rob Roy (692-3245) or Ann Tekatch (575-5433)

**ROYAL ASTRONOMICAL SOCIETY OF CANADA Hamilton Centre** - General Meeting - Spectator Building auditorium.

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

**HAA GENERAL MEETING** - at the Spectator Building auditorium. Speaker to be announced. Parking lot observing, weather permitting.

**HAJA MEETING** - McMaster Burke Science Building, room B148.