

The High Desert Observer

The Bulletin of the Astronomical Society of Las Cruces

February, 2009



President's Message

The International Year of Astronomy is underway and we have seen a great deal of activity already. We have been to Tombaugh Elementary School for a Star Party and had a successful SEA Share Fair at Mesilla Valley Mall. We are currently scheduled for at least 2 more school Star Parties. Including White Sands School and Dona Ana Elementary School. We have a combo Moon Gaze and Comet View on February 28th. We have members participating in educational presentations at various locations. We truly are serving our public, and I encourage you all to participate and do what you can to make this a truly informative and exciting International Year of Astronomy.

There is a need for volunteers to give Star Talks at White Sands National Monument this coming summer. The park naturalist has retired and he doesn't think the position will be filled until at least August. Apparently the Alamogordo Astronomy Club has not yet stepped forward to give any of these talks. Someone from El Paso will do a couple, but there are probably 7 or 8 more slots to fill. Talks are given on Friday nights when the moon and/or clouds does not interfere. It seems a shame to not offer these to the public since the sky there is quite good, all things considered. If interested, please call Cathy Denton at White Sands (679-2599, Ext. 231) to discuss it with her.

If you haven't had a chance to check out the amazing work that has been done by our local imagers you are missing some truly stunning images. I have seen images of some old familiar objects like the Orion Nebula presented with a dynamic range I have never before seen. These amateur shots rival the best professional shots I have seen of this beautiful stellar nursery. I have seen narrow band imaging reminiscent of some of the famous Hubble shots. The Rosette in any wavelength is still a Rose. I have enjoyed images of stunning objects I have never seen before in an eyepiece or an image. It is truly an interesting and talented group we are a part of.

Sadly I must now speak of the tragic loss of one of our most active members. Wirt Atmar had a heart attack & died on the morning of February 6, 2009. He was a regular member at our meetings and our Yahoo groups as well as a regular contributor to the *HDO*. He would quietly record, edit, and post the monthly ASLC meeting presentations. He would stir up controversy on the Yahoo groups, forcing us to open our minds and rethink what we thought we knew about many aspects of astronomy. And although I didn't always agree with him, I always appreciated and respected his participation and input. This is a tremendous loss to our society.

Your president and humble servant,

Jerry Gaber

The Astronomical Society of Las Cruces (ASLC) is dedicated to expanding members and public awareness and understanding of the wonders of the universe. ASLC holds frequent observing sessions and star parties, and provides opportunities to work on club and public educational projects. Members receive *The High Desert Observer*, our monthly newsletter, membership in the Astronomical League, including AL's quarterly *A.L. Reflector*. Club dues are \$35 per year. Those opting to receive the ASLC newsletter electronically, receive a \$5 membership discount. Send dues, payable to ASLC with an application form or a note to: Treasurer ASLC, PO Box 921, Las Cruces, NM 88004.

ASLC members are entitled to a \$10 discount on subscriptions to *Sky and Telescope* magazine.

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This Month's Observer

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Next Meeting

The next monthly meeting will be held February 27th at 7:30 pm in the usual place (Main Campus of the Dona Ana Community College, room 77). The speaker will be Steve Barkes. The topic will be the upcoming Messier Marathon

The 'Astro Tid Bits' group will meet at 7:00 pm.

Events

The next monthly dark sky viewing night will be held on Saturday, February 21st at the Upham site. For these and other events, please see the ASLC website for further information:

<http://www.aslc-nm.org>.

March Issue of the *HDO*

Articles for the March issue should be sent to Tony Gondola by the 10th of the month. Text should be sent as email (acgna@comcast.net) or as an attached Microsoft Word document. Images should be sent in jpg format.

If you have any questions about submitting materials for publication in the *HDO*, please don't hesitate to contact me at 571-5118 or via email. Thanks in advance! Tony Gondola, Editor, ASLC Newsletter

February 2009 Meeting Minutes

Call to Order: Jerry Gaber, President, Astronomical Society of Las Cruces (ASLC), called the meeting to order at 7:30 pm., 23 January, 2009, Rm. 77, Dona Ana Community College.

President's Comments: Jerry greeted and welcomed several new Club members, self-described "snow bird" visitors, and visitors from the El Paso Astronomy Club.

Secretary's Report: No minutes were recorded at the December 2008 meeting/holiday party. There was not an additional secretary's report.

Treasurer's Report: The treasurer was absent because she is recovering from recent surgery, therefore, there was not an update on delivery of the Meade solarscope. Steve Barkes has not proceeded with pursuing other sources of a similar scope as Janet Stevens still wants to contact Meade. Nils Allen reported that he had received a check from the Philip Herron estate for the Club's portion of the proceeds from the astronomy garage sale. He has provided that check to the treasurer. There was not an additional treasurer's report.

Observatory Committee: Rich Richins, committee chair, reported that there had been some effort on the part of the electrical engineer/contractor working on the plans for the observatory. Jerry Gaber stated that he, too, was waiting on an update, but that, after seven months, was considering contacting another source.

Old Business: Club Apparel: Nils still has Club t-shirts and denim shirts that haven't been claimed for sale. He needs a volunteer to put together another order for Club items.

There was no additional old business discussed.

New Business: Star Parties: Chuck Sterling, outreach coordinator, announced that the Tombaugh Elementary star party is the first week of February, details on the web site. Camino Real Middle School will be the first week of March, and Dona Ana Elementary was pending a confirmed date. The White Sands Schools star party will have to be rescheduled because of bad weather.

SCIAD Share Fair: The Club will be participating in this event on 07 February at Mesilla Valley Mall, 10:00 am to 2:00 pm. Several telescopes, solarscopes, and astronomical software packages will be on display.

There was no additional new business discussed.

Vince Dovydiatis offered a motion to adjourn and Rich Richins seconded. The business portion of the meeting was adjourned at 7:45pm by acclamation of those present.

Announcements: The 2009 AAVSO symposium will be held 19-21 May at Bear Lake, CA. Vince Dovydiatis and Chuck Sterling are planning to attend. Vince will be presenting a paper that he would like to "practice" on the Club at the April meeting.

NMSU Science Fair: Nils Allen reported that NMSU is looking for help with the Southwest Regional Science Fair from the Club, both as a potential sponsor and providing judges. Rich Richins suggested that the Club provide a prize for the state level science fair. Vince Dovydiatis also suggested providing a science/astronomy mentor-ship for the 2010 fair.

School Visits: Rich Richins has visited several elementary and middle schools and Bill Stein has visited Mayfield High School this academic year giving presentations.

New User's Workshop: Nils Allen reported that there was limited attendance at this year's workshop on 03 January. Three people came for assistance while Nils and Chuck Sterling were at Volunteer Park. Another person showed up after Nils and Chuck had left.

January DSO: Joseph Mancilla reported viewing at the Upham site last weekend was fantastic. The regular DSO on 24 January looks "iffy" due to weather.

Texas Star Party: TSP will be in April this year. Register early.

Messier Marathon: This year is the best chance in several years to view all 110 objects. Steve Barks will give a presentation at the February meeting in preparation for this year's Marathon.

There were no additional announcements made.

Observations: There were no additional observational reports offered.

Presentation: The speaker for the January meeting was Ann Owen, Club member. Her topic was "Sky Watchers of Adobe Canyon." During the past three years, she has conducted archaeoastronomy research at the Gila Cliff Dwellings National Monument. Adobe Canyon is a small NE/SW facing canyon that empties into the Gila River about a mile below Cliff Dweller Canyon. The mouth of the canyon is marked by a number of pictographs, which include negative handprints, deer or quadrupeds, a crescent moon, and a rectangular box. These pictographs are placed strategically around the mouth of the canyon to provide sun and moon watching stations. The canyon provides a natural calendar, which marks the rising summer solstice sun and the winter solstice sunset. During the past year, she has been documenting the entire sequence of rising and setting full moons, as well as rising and setting suns. Sun watching is known to be an important part of Southwestern Pueblo Indian activities. These sun-watching practices have been well documented in Chaco Canyon, but the nature and extent of these activities among the Mogollon have not been thoroughly researched until now. This presentation was recorded for playback via the Internet. It and other meeting presentations can be seen on the web at <http://www.aics-research.com/lectures/aslcnm/>.

The January 2009 monthly meeting concluded at 8:30 pm.

-Respectfully submitted by John McCullough, Secretary.

Benjamin Apthorp Gould and the Uranometria Argentina Star Catalog

By Fred Pilcher

Stellar cartography dates back to antiquity. Nearly all of the modern constellations visible from the mid northern hemisphere had already been devised three thousand years ago. The Greek astronomer Hipparchus produced the first comprehensive catalog of stars visible from his latitude. Others followed in the subsequent centuries. One of the historically most important for star nomenclature is the Uranometria published around 1600 by Johannes Bayer. This contained both a map and star list for each of 48 constellations recognized by Ptolemy. In these Bayer devised the Greek letter system of labeling the stars in each separate constellation approximately in magnitude sequence and thereafter shown in nearly all star atlases and catalogs. For larger constellations in which Bayer recognized more than 24 stars, he assigned Roman letters when he exhausted the Greek alphabet. These are still used, but less frequently.

Stellar cartography took a giant leap in accuracy of star positions with the invention of the telescope. The acknowledged father of modern stellar cartography is John Flamsteed, who at Greenwich Observatory (approximately 1680-1719) measured the positions of over 2000 stars, generally with arcminute accuracy. His *Historia Coelestis Britannica*, published posthumously, contains both a catalog of star positions and a giant star atlas with accurate plotting of stars and detailed mythological figures.

The *Historia Coelestis Britannica* is also a giant leap forward in stellar nomenclature. Flamsteed numbered stars separately, in sequence of increasing right ascension, for each constellation. These Flamsteed numbers remain in common usage today, appearing on most star maps and planetarium style computer programs which show stars to sixth magnitude or fainter.

There are significant gaps in Flamsteed's catalog. He omitted a number of fourth and fifth magnitude stars which are brighter than many stars which he included. *Sky and Telescope* calls these by such nondescript terms as "a fifth magnitude star located ..." Some constellation borders were very indistinct in Flamsteed's time. Modern constellation boundaries place some stars in different constellations from those in which Flamsteed assigned them. And south of declination -20 degrees many more stars were omitted, with no Flamsteed number stars at all south of about -35 degrees declination near or below the horizon at Greenwich.

Nicolas-Louis de Lacaille between Aug. 6, 1751, and July 18, 1752, at the Cape in South Africa devised new constellations to cover the entire southern sky and measured the positions of 9766 southern hemisphere stars. He also assigned a Greek letter system for each of his new constellations. As Bayer had done in the northern hemisphere, Lacaille continued with Roman letters for larger constellations when all Greek letters had been used up and many fourth and fifth magnitude stars remained. These latter are very useful for specifying naked eye stars but are now, regrettably, less used. By 1850 all of the 88 modern constellations were recognized, but with indefinite boundaries and many fainter naked eye stars lacking convenient number or letter designations associated with the constellations in which they were located.

The Bayer and Lacaille letter and Flamsteed number systems are ideal for labeling naked eye stars as far as they go, but beginning about fourth magnitude an increasing number of stars are omitted from all of these systems. The omissions are more frequent for the far southern hemisphere where no Flamsteed numbers are assigned.

The man who corrected this deficiency was Benjamin Apthorp Gould (1824-1896). Educated at Harvard College, he subsequently studied under C. F. Gauss at Gottingen, Germany, and became the first American to earn a Ph. D. degree in astronomy. He founded the *Astronomical Journal* in 1849, using the German *Astronomische Nachrichten* as a model. After serving in the U. S. Coast Survey and as acting director of the Dudley Observatory in Albany, New York, he was invited by Argentina to establish a national observatory at Cordoba, becoming its first director. There he completed his greatest work, the *Uranometria Argentina*, published in 1879. This is a catalog of all of the 7786 stars south of declination +10 degrees which Gould considered to be magnitude 7.0 or brighter. His positions were almost universally accurate within a few arcseconds, and his magnitude determinations before the invention of the photoelectric photometer generally were accurate within about 1/2 magnitude, although with some tendency to be systematically faint. Hence the *Uranometria Argentina* has an almost complete listing within its declination range of stars with modern photoelectric magnitude determinations of 6.5 or brighter. In the process of preparing the *Uranometria Argentina*, Gould called attention to the many bright southern Milky Way stars now known as Gould's belt. Very important for the subsequent history of astronomy he defined, in 1875 coordinates, the boundaries of all constellations within his declination range. With only a few exceptions these were accepted by Delporte in 1930 when his definition of constellation boundaries was permanently adopted by the International Astronomical Union. Delporte utilized constellation boundaries in terms of 1875 coordinates in large part because it was the coordinate system of the *Uranometria Argentina*. Today, modern constellation boundaries are defined in 1875 coordinates and because of precession, are no longer parallel to meridians of right ascension and small circles of declination.

Within the *Uranometria Argentina* the stars are numbered separately for each constellation in sequence of increasing right ascension, as in Flamsteed's catalog a century and a half earlier. The Gould numbers are an analogue of Flamsteed numbers, and south of +10 degrees declination a much more complete and uniform listing. Unfortunately Gould numbers have almost disappeared from 21st century awareness. I first learned of them from the *American Ephemeris and Nautical Almanac*, more recently renamed the *Astronomical Ephemeris*, where some forth magnitude stars with highly precise positions were identified by numbers followed by G. The brightest example is 65G Centauri, unlettered by Lacaille and too far south for Flamsteed. On a visit to the southern hemisphere as I was learning to identify in the sky such bright stars as Alpha and Beta Centauri, he also identified 65G Centauri and some others by their Gould G numbers. He recognized that Gould numbers are as useful as Flamsteed numbers for specifying fainter naked eye stars. Many other stars with no short designations other than Gould numbers are visible to the naked eye at dark sky sites, or closer to the city with small binoculars.

I wish to make available to 21st century star lovers the Gould number scheme. To achieve this I am slowly transcribing the entire Gould *Uranometria Argentina* star tabulation into digital format. In addition to Gould's epoch 1875 coordinates and imprecise magnitudes, I am including in this digital tabulation the modern magnitudes and spectral classes, epoch 2000 coordinates, and HD and SAO numbers. This information should identify each star. A digital presentation makes these data readily available for incorporation into planetarium style programs and future star atlases. To date I have entered 46 of the 66 constellations lying partly or entirely south of declination +10 degrees into this listing, and posted a downloadable version onto the website:

<http://www.UranometriaArgentina.com>

As I complete the listing for additional constellations I will add these to the web file. Readers are invited to download this file, manipulate it digitally, and utilize the data in ways which I may not have foreseen. The data entry is entirely by hand, and errors of transcription are inevitable. I will welcome being informed of any errors which users may find so that I may correct them.

Imaging M42 (Great Orion Nebula) from Start to Finish

By Chuck Sterling

Astronomical Society of Las Cruces, New Mexico

During January 2009 I set up a scope in my back yard in Las Cruces, New Mexico and captured several images of the Great Orion Nebula. After some relatively simple processing using readily available software tools, the final image turned out quite pleasing to me. It is not, repeat not, perfect. And “pleasing” is a very subjective thing.

I was asked to document the procedure used. I will be doing some of this from memory, so may fail to get some details exactly right. But this process is subjective enough that I would not expect anyone to follow the routine exactly with respect to numeric settings, although it would be helpful to do all the steps and in order to avoid getting lost.



Hardware

First of all, the camera used is a Canon 350d DSLR camera with its infra-red filter replaced with a clear filter. This allows deep red color to be recorded much better than with an unmodified DSLR camera, in particular the H α wavelength of 653.6 nm. For imaging emission nebulae such as M42, which is rich in this color, the modified camera is perhaps not necessary, but it helps a lot.

The telescope is an Orion 6" f/5 reflector billed as an imaging scope. Since reflectors typically exhibit coma near the edges of the field of view, a Baader Multi-Purpose Coma Corrector (MPCC) is attached to the front of the Canon camera. A light pollution filter is attached to the front of the MPCC since I did this imaging from a relatively light polluted site, my back yard in Las Cruces, NM. If you image from a very dark site, a light pollution filter may not help and so could be omitted. This filter is a 2" Antares LPR filter. Another good choice, perhaps better, is the IDAS LPS-P2 filter.

I use an Orion 100mm or 80ED refractor piggybacked on the reflector for autoguiding with a Meade DSI-Pro camera and Craig Stark's

PHD Guide program. The mount is a Celestron CGE. My laptop computer is an inexpensive Toshiba back-to-school special running MS Windows XP Home with 1.25GB memory. To connect all the stuff together I use a powered PCMCIA two-port USB card with two active USB extender cables. One goes to the Meade DSI alone. The other goes to a powered four-port USB hub that connects to the Canon camera, a DSUSB bulb interface for the Canon, a FCUSB focus controller, and a USB/serial adapter that connects to the CGE handbox for autoguide commands.

Software

I use Mike Unsold's Images Plus software to acquire images and do the initial processing. Images Plus 2.0 camera control is used for this Canon camera; there is another version for newer Canon cameras with live view and some other features. Images Plus 3.75 is used to process the raw images. It is sufficient to output quality images on its own, but in this case I used Adobe Photoshop CS3 to finish it up.

Getting Started

Do a good polar alignment. It does not have to be perfect, but should be darn close. You're not going to be taking very long exposures, and for an object this bright perhaps only two minutes or so will suffice. A small error in alignment is acceptable and will never be noticed in short duration images.

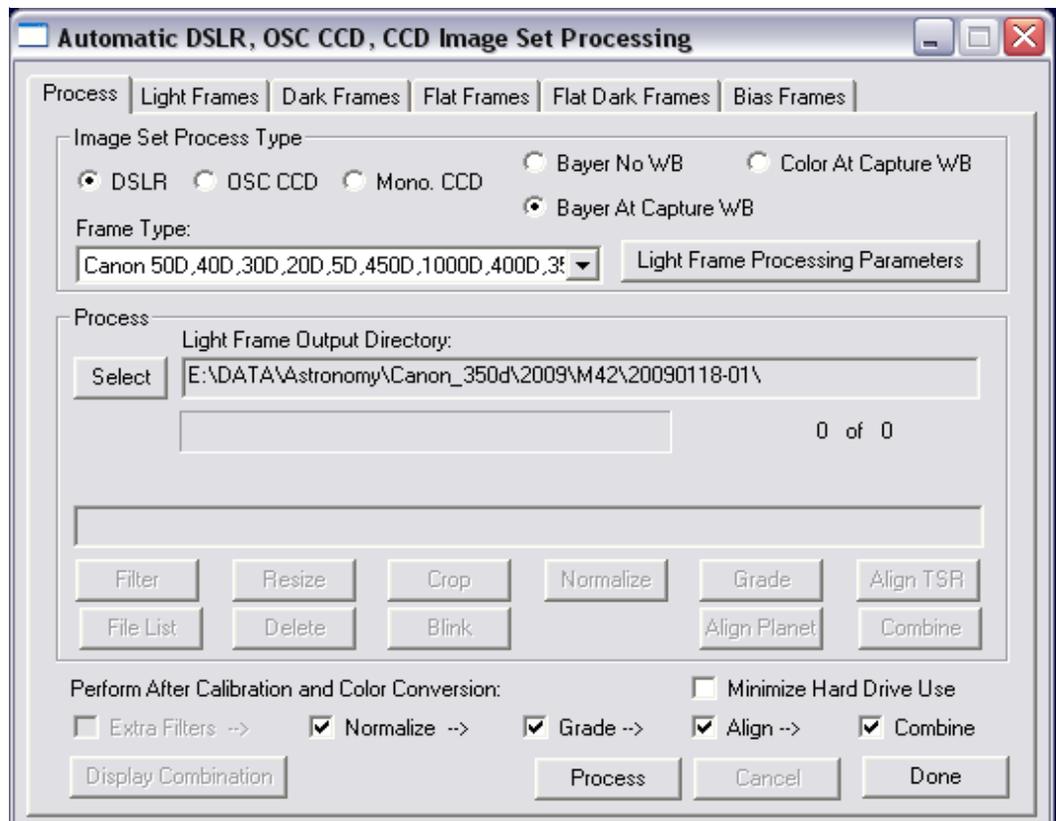
I use Images Plus to check focus. The focuser on the reflector has a small motor attached which is controlled with a Shoestring Astronomy FCUSB and Focus Pal software. This is pretty basic stuff, but it allows you to focus without touching the scope and bouncing it around. During the night, recheck focus at least once per hour as the scope cools down; if you don't you will have lousy focus toward the end of the session and will have images you cannot use.

PHDguide is a free autoguide program from Stark Labs that is so easy to use there is practically no learning curve at all. One trip though the documentation should do it. It just works.

Okay. Time to take pictures. I exposed 30 images at 120, 30, and 5 seconds. More would not be a mistake. The more images you have to work with the better your finished image will be. Generally you will throw away about 10% of the images when Images Plus grades them for star shape and size, and in this case it means I will stack up only 27 of each set. I did shoot some at 300 seconds, but they were way bright and I did not use them. I also took ten dark frames for each exposure time.

In Images Plus 3.75, the initial processing can be fully automatic once light and dark frames are selected. It will also handle flat frames and flat dark frames, but I did not use any.

Here's the basic setup:



The check boxes at the bottom select automated processing, which I use. The specific methods used are selected with the “Light Frame Processing Parameters” button, but the defaults are okay. Mike suggests to use “Min Max Excluded Average” as the combination method; I sometimes will select “Median,” but the difference is slight.

Light Frame Auto Process Parameters

Raw, Bayer Conversion, Intermediate Output File Type

16-Bit TIFF 16-bit FITS Lossless 16-bit FITS

32-bit Float FITS Same As Input (Not DSLR Raw)

DSLR Raw Conversion Parameters

Converted File Prefix:

Dark Calibration Parameters

Automatic Master Dark Frame Matching

Adaptive High/Low Pixel Reduction

With Dark Subtract Without Dark Subtract

Normal Aggressive Very Aggressive

Bayer Conversion Output File Color Type

RGB Green Green = red, blue frame size

Red Blue Prefix:

Extra Filters

Bloom, High, Low Pixel Reduction:

Noise, Hot Pixel, and Background Reduction

Normalize All Light Frames In The Set To

Image Set Maximum Image Set Average

Image Set Minimum Specify Target Values

Average Background Level Average Std. Deviation

Use Average Standard Deviation From Image Set

Star Shape and Size Grade

Max Allowed Eccentricity

Use Best Percentage of Set Auto

Auto Star Alignment

Meridian Flip Wide Brightness Range

Mirror Flip Short F.L. - Small Stars

Combination Methods

Average Min Max Excluded Average

Median Minimum Maximum

Sigma Clipped Average Sigma Clipped Median

Standard Deviation Clip Factor:

Adaptive Add

Combined File Name (No Extension)

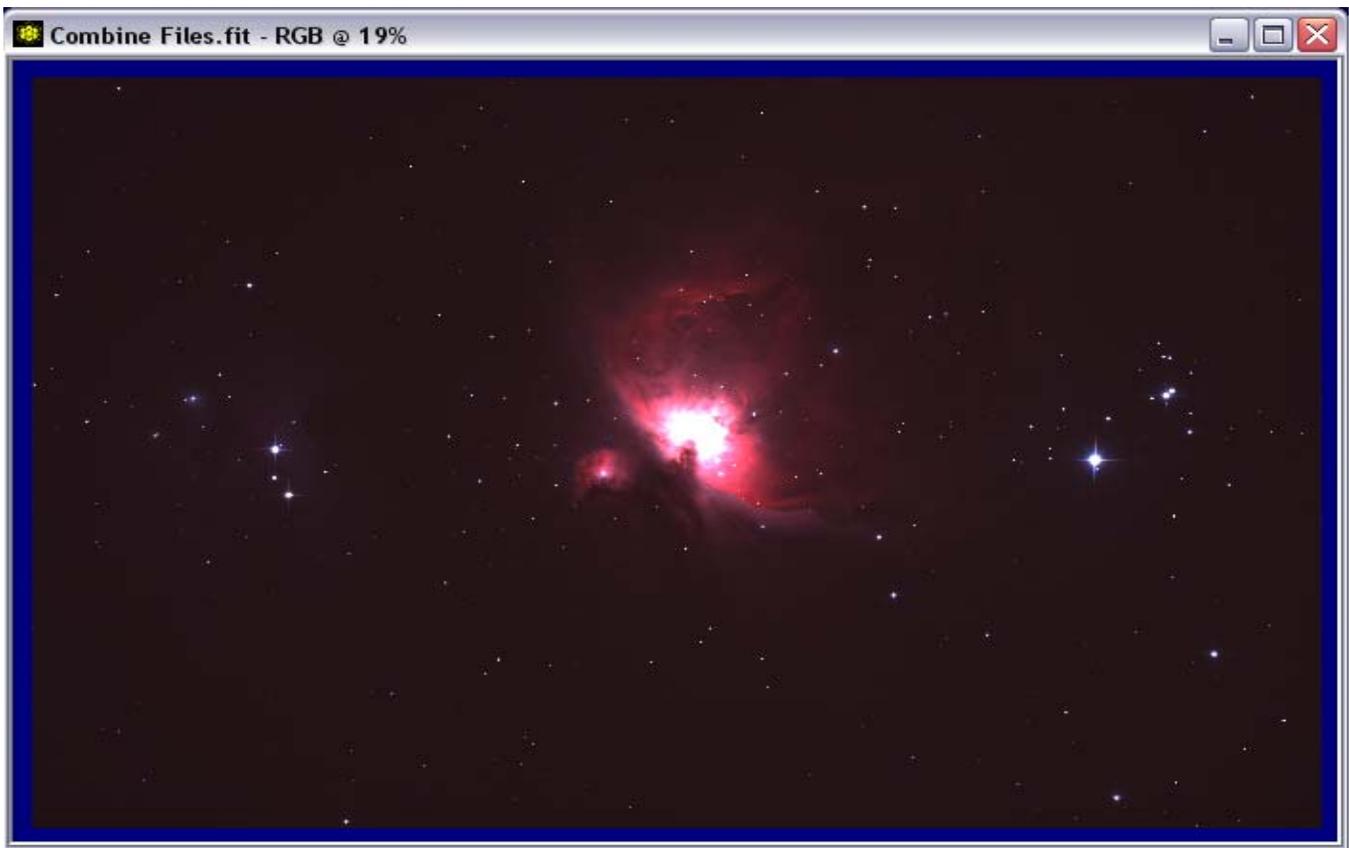
So, you process separately the 120, 30, and 5 second image sets. The “Display Combination” button will let you see the result when processing for each set completes.

Adjusting the Stacked Images

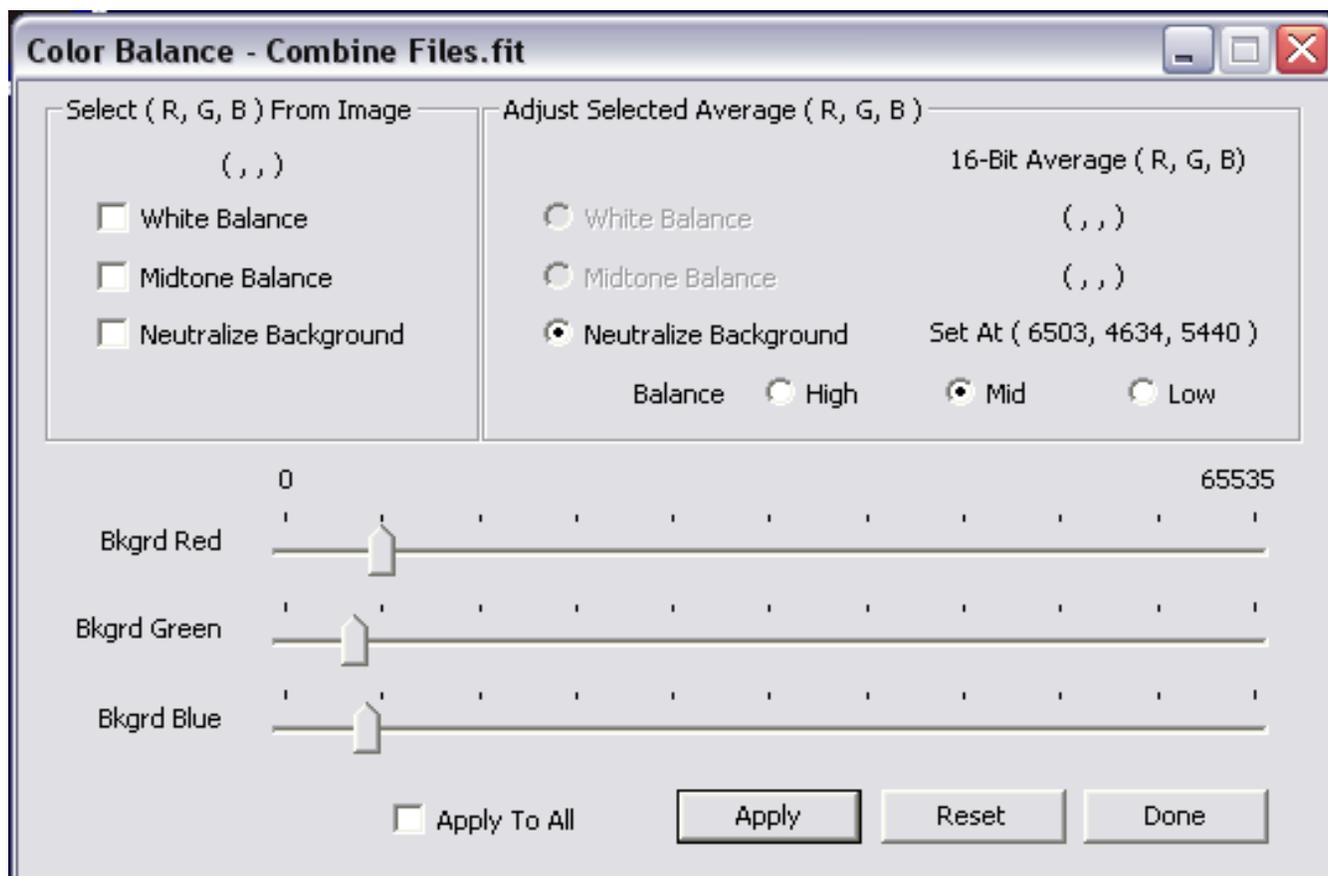
Now the fun begins, and this is where personal preference will play at least some role in how you process your images.

Be sure the stacked image is open, either having been selected with the “File,” “Open” dialog or with the “Display Combination” button mentioned above. The procedure I follow here is one developed by Mike Unsold. I’ll run through the procedure for the 120 second result. The same will work, albeit with slightly different numbers, for the shorter exposures.

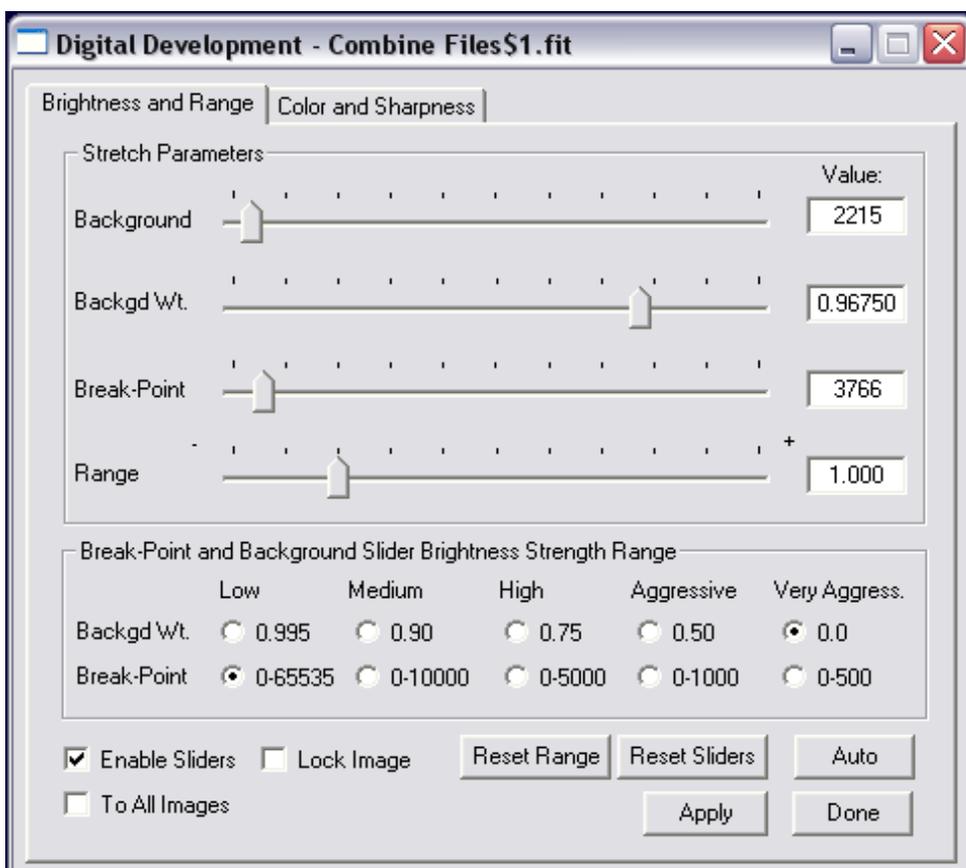
The initial result:



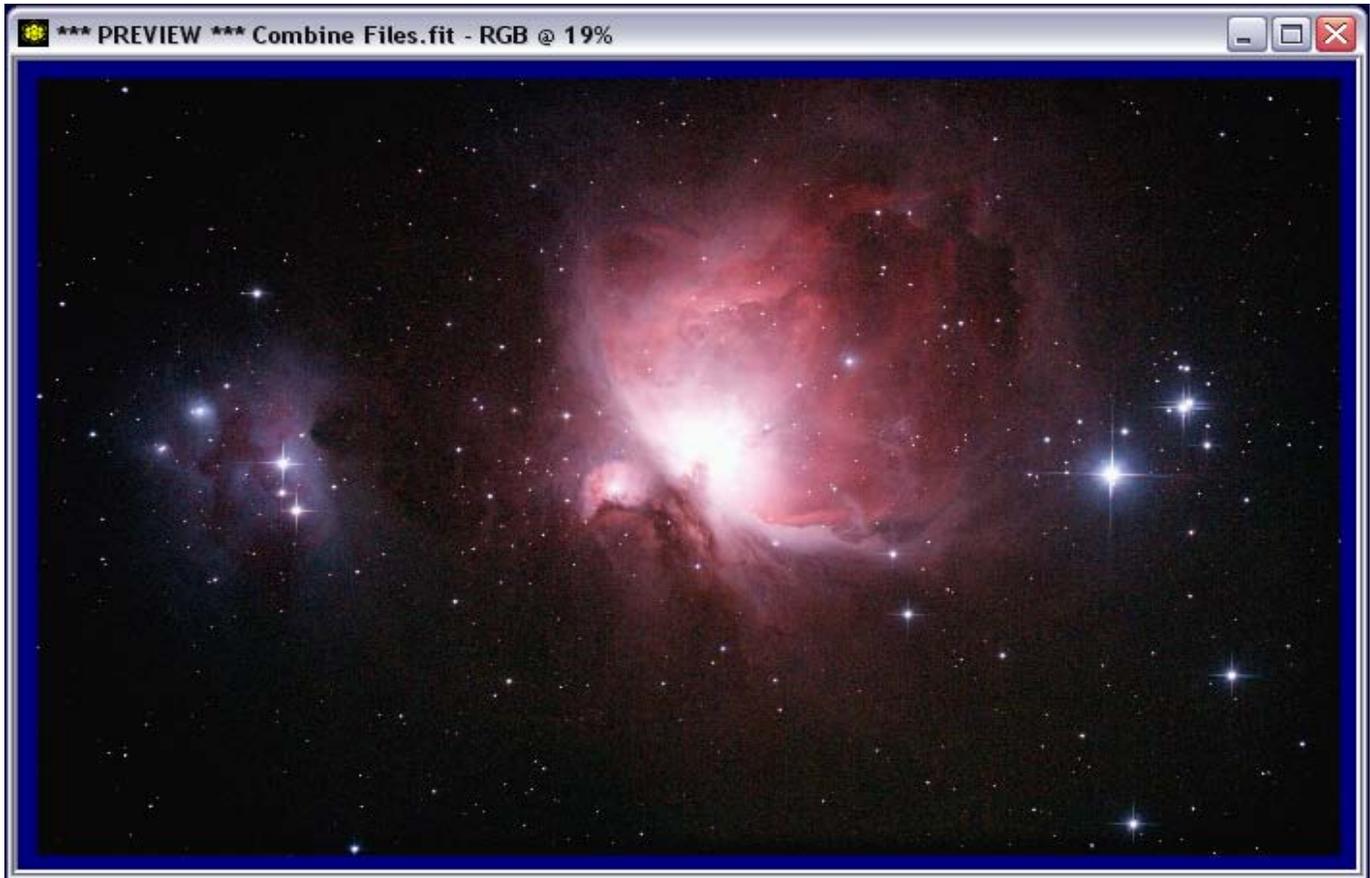
Balance the background. In this light-polluted environment we probably will not have a good color balance due to skyglow that gets past the LPR filter. We can take it to any tint we wish, but the default is grey, and we know that the sky around M42 has some red in it, so we will lean it a bit toward red:



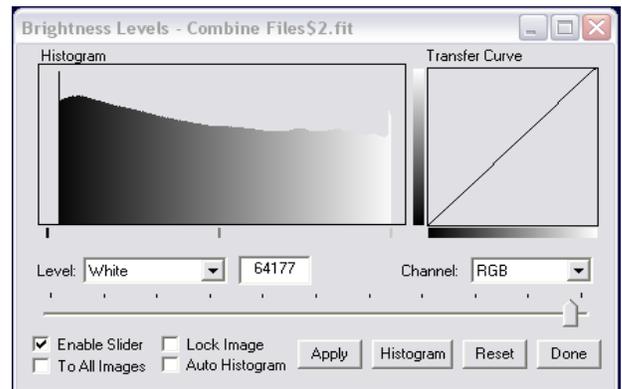
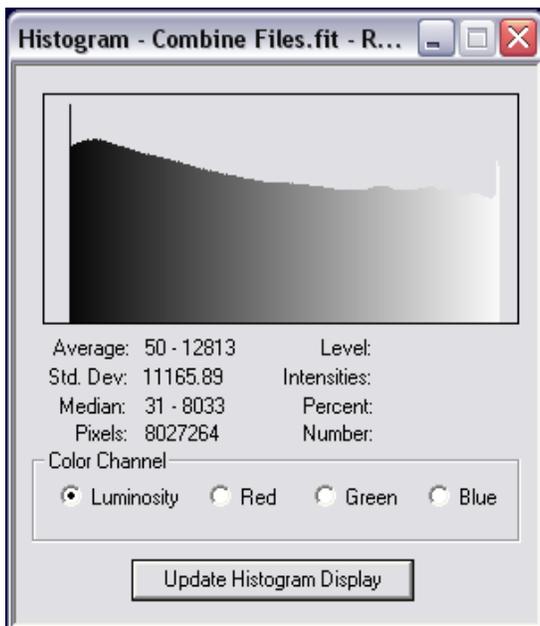
The difference in this case is hardly visible, so we continue without displaying it here. The next step is digital development.



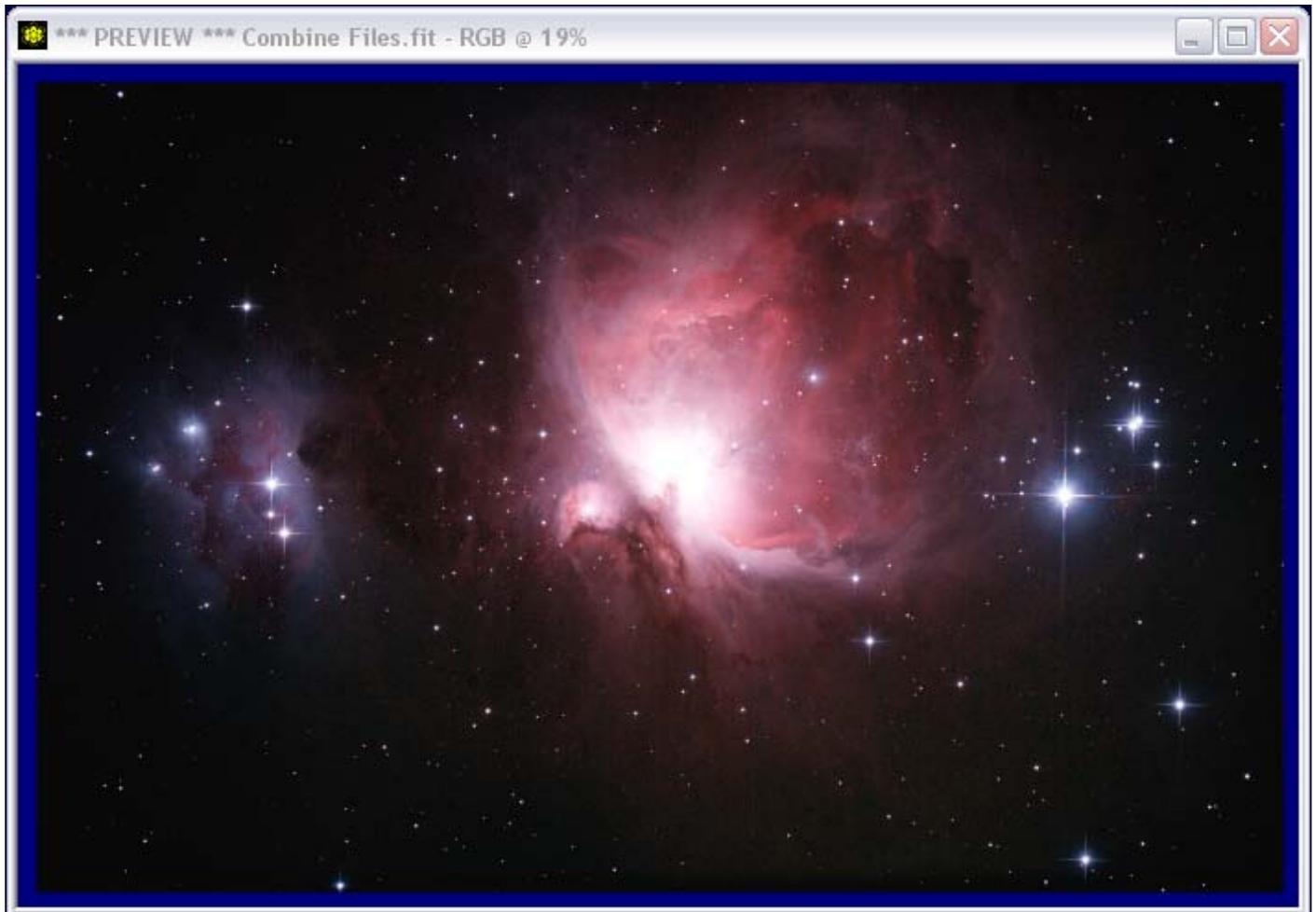
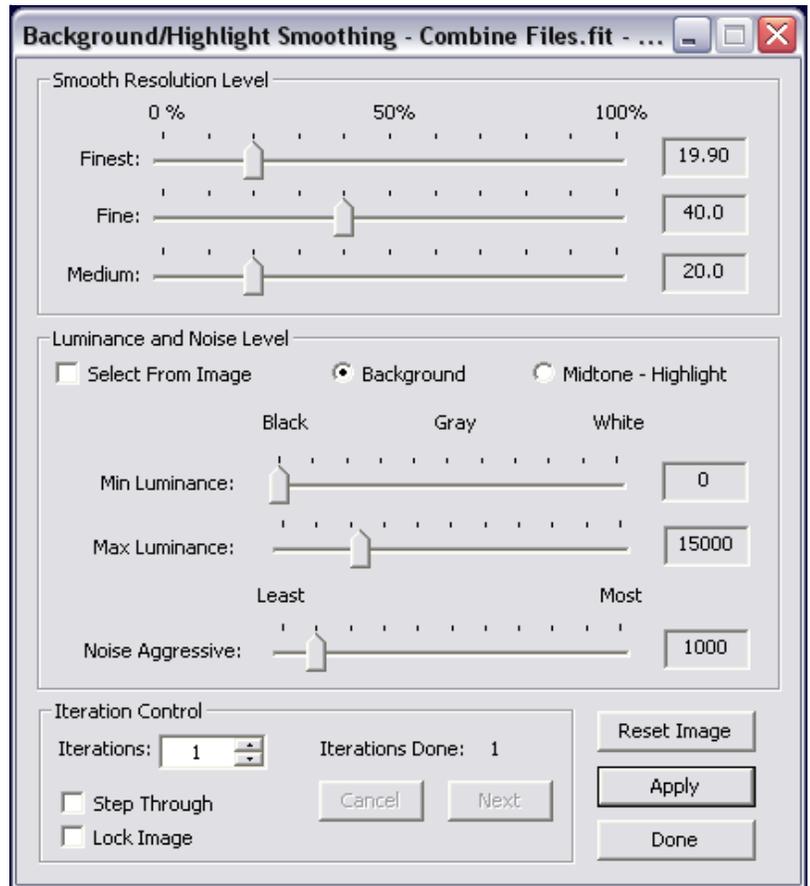
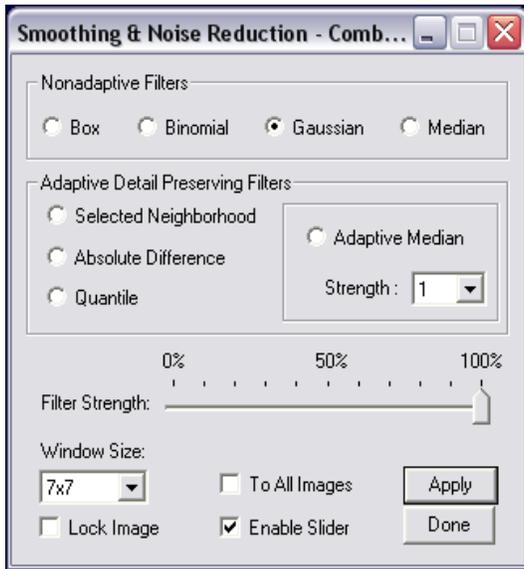
Here, the difference is obvious.



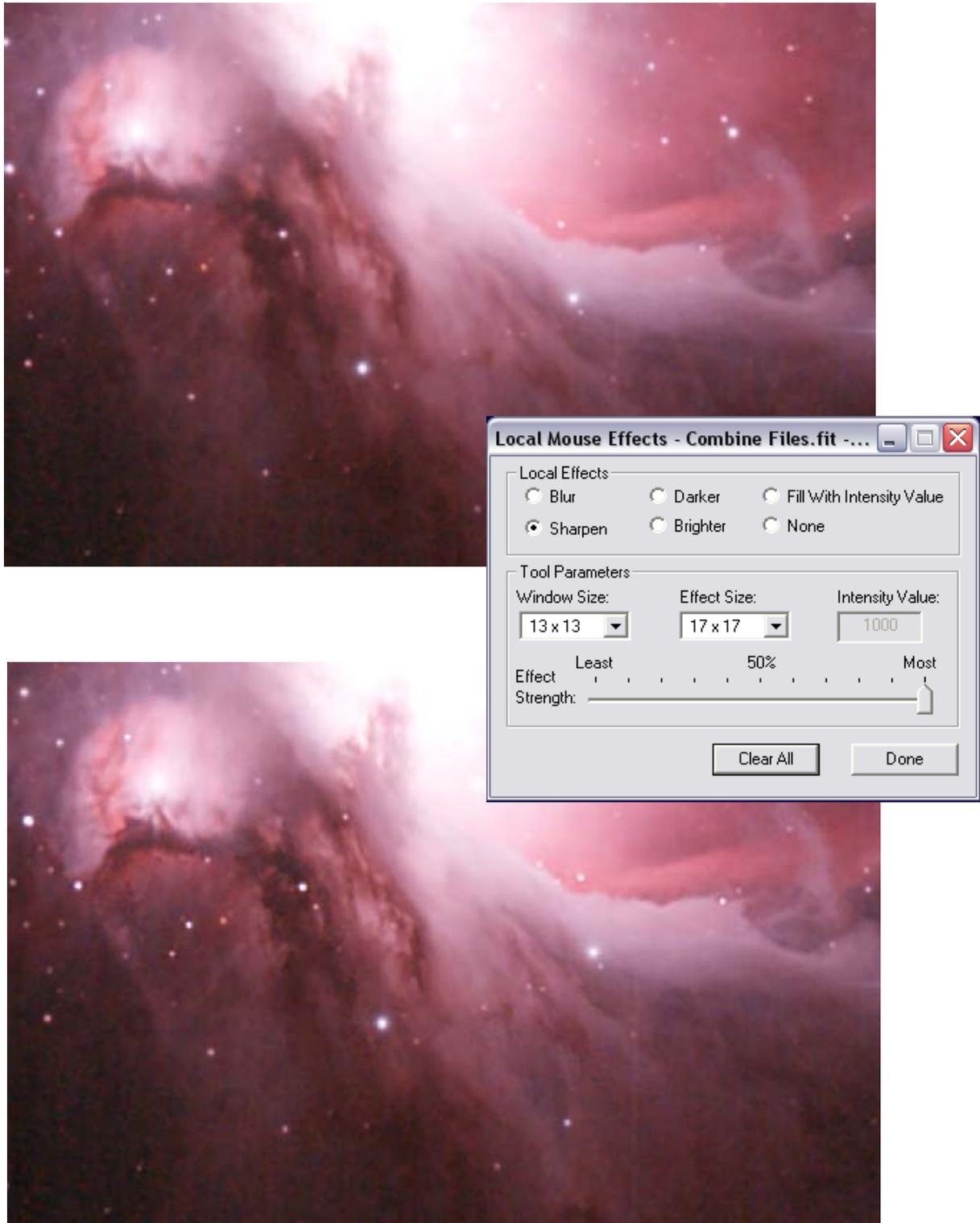
Now, let's take a look at the histogram. Use levels to stretch the white point.



Now, let's smooth the image some.



Now, you can do some sharpening of details using mouse controlled local sharpening.



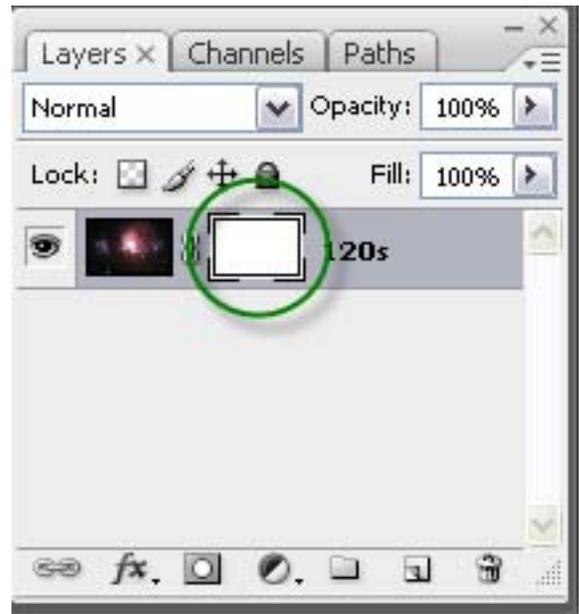
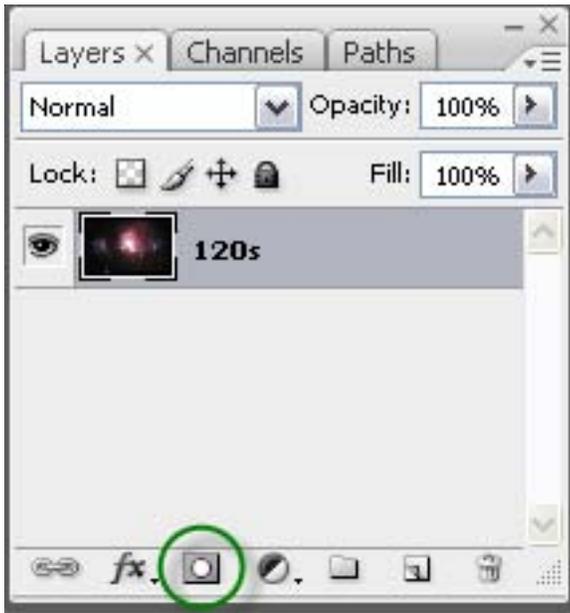
And you're pretty much done with this one. Save it as .fit and .tif files, and move on to the next sets.

Next comes the Photoshop routine, but first, use Images Plus to do a Translate, Scale, and Rotate alignment of the three images you produced above. They will probably not be exactly aligned, and for the next steps they must be. You find this under “Image Set Operations” or you can just press “Alt-A” and select the files. Choose three stars for alignment and let ‘er rip. You will then have three new .fit files. Open them and do a “Save as” for each one as a .tif file which can be opened by Photoshop.

First, open the 120 second .tif file.

Rename the layer to something other than Background, say, 120s.

Now create a layer mask.



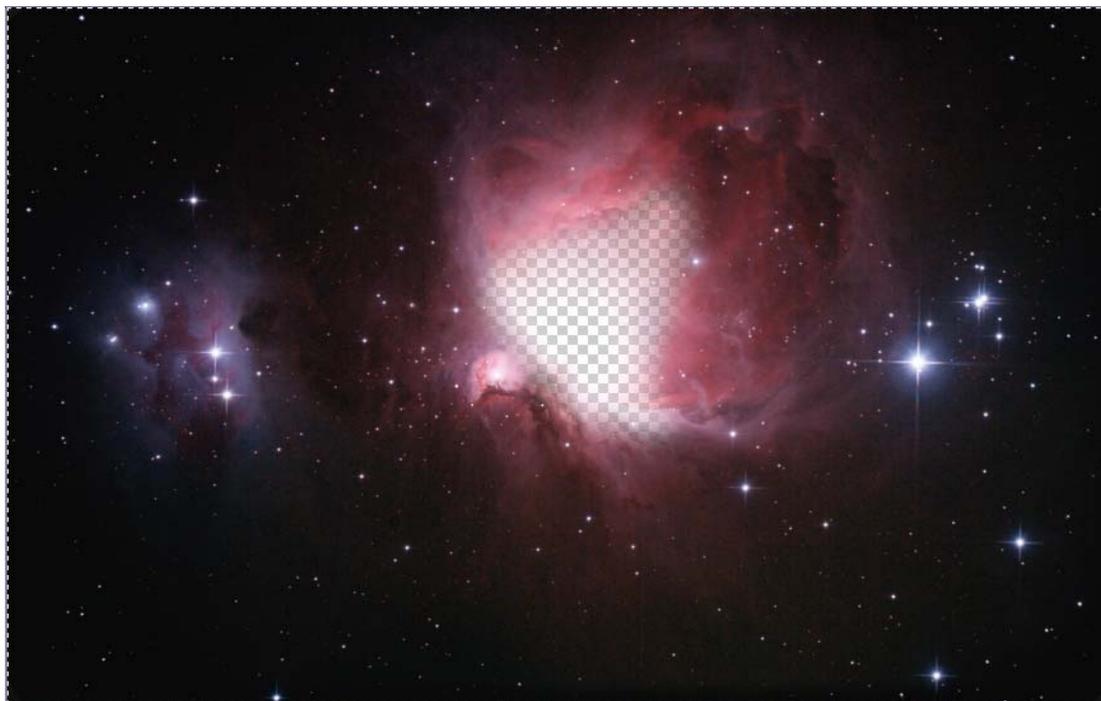
Click in the image. Press Control-A to select the entire image, then Control-C to copy it, and Control-V to copy it into a new layer.

Hold down Alt and click the layer mask icon to make the layer mask visible, then click in the layer mask. Press Control-V to create a grey scale image copy in the layer mask.

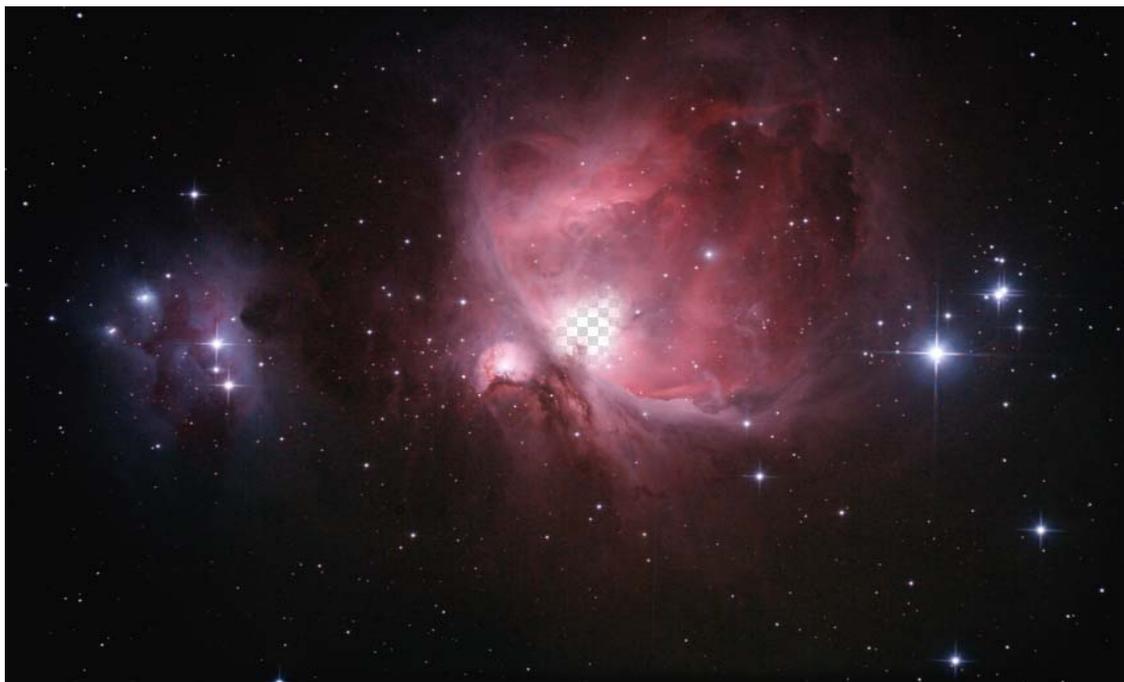
Blur the layer mask image quite a bit. I used a Gaussian blur of about 30 pixels.

Finally, delete the new layer.

What we want to do is suppress the brightest part only, the area of the trapezium. So, I selected an eraser tool, a large blurry one, and removed everything except the bright trapezium area. Then invert the layer mask (Control-I). When I removed the copied layer, I was left with the image with a hole where the trapezium is.

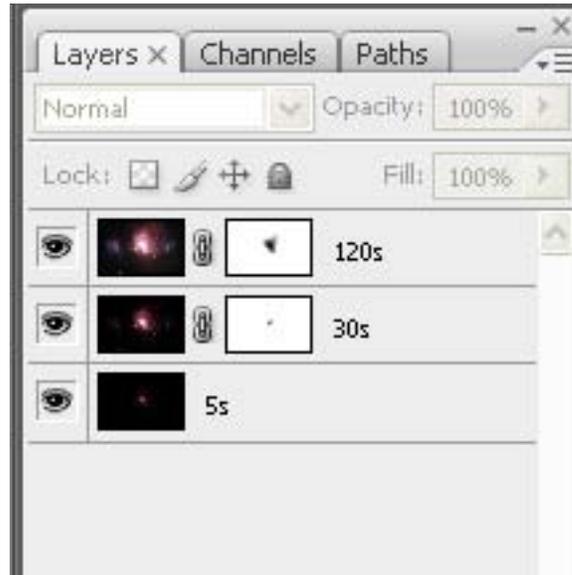


Next load the 30 second image, and use it to create a new layer under the 120 second image. You do that by copying the loaded file into the 120s using the move tool with Control and Shift held down (centering the new layer). Move the new layer below the 120s layer by highlighting it and dragging it with the mouse. You can rename the new layer if you want, say, to 30s. Then you can delete the 30 second image. Finally, create an inverted layer mask just like you did for the 120 second image, but with a smaller blocked area.



And then use the 5 second image to create a third layer, move it to the bottom of the stack of layers, and you are nearly finished.

This is the layers list:

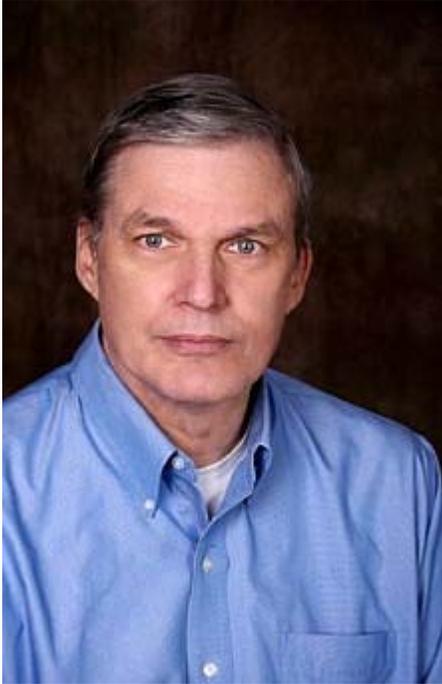


Here is the resulting image:



You have a fairly complex image here. Multiple layers and masks make for a very large tif file. What I did at this point was save this image intact, then save it under another name with the layers flattened. That way, if I wanted to go back and tweak the layers or masks some, I still had that version handy. And I could use the one-layer version to publish to the web or whatever. I also saved a .png version while I was at it.

That's it...



Wirt Atmar

1945 - 2009

“Wirt was such an intelligent, thoughtful person & dedicated member — we are certainly going to miss him.”

“I’ll miss him stirring up the pot as the self-described ‘curmudgeon’ of the ASLC Imaging Group. While not everyone agreed with his conclusions, he presented some compelling arguments, and got you to think beyond just putting out a pretty image, and really looking at the information that was captured.

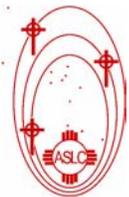
You made a difference, you made a contribution, and you’ll be missed Wirt!!”

“Wirt could always be counted on to make us think and open our minds to new ideas.”

“I will certainly miss Wirt. He gave me some valuable feedback on a paper that I was working on. It was not related to astronomy at all but his comments were very insightful and helpful. I’ll miss the conversations about ET as well. What a loss for us all.”

“He has been one of the big contributors to ASLC over the nine years I’ve been with the club and we’ll most certainly miss his intellect, energy, and passion for science.”

ASTRONOMICAL SOCIETY of Las Cruces
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