Astrophoto Processing Steps

Part 2

Now for the fun part...

We will need the following for this lesson:

1. Adobe Photoshop CS or CS2.
2. FITS Liberator v2.1
3. Photoshop Action “COLOR_COMPOSITE.ATN”
4. Your final images

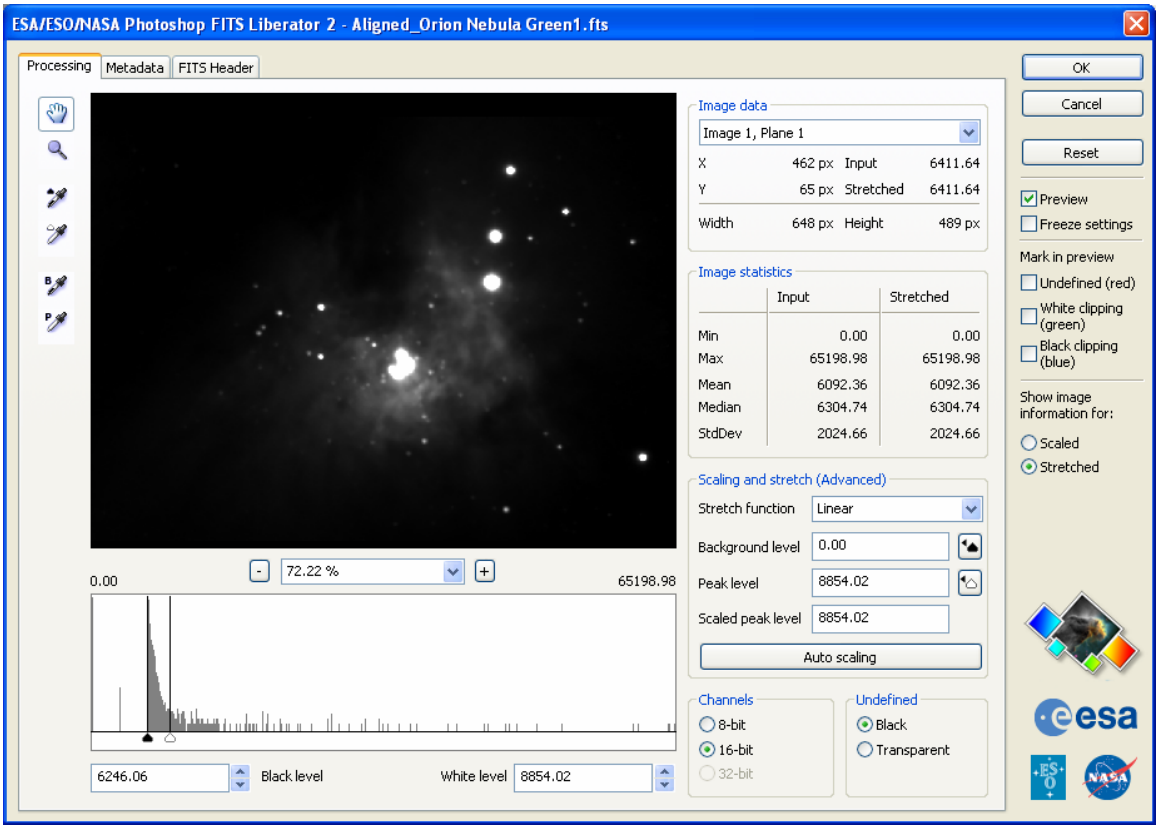
You can obtain the action and FITS Liberator at the following site for free:

http://www.spacetelescope.org/projects/fits_liberator/index.html

There is also a manual there that has a lot of what I am going to show you explained as well. Keep in mind that a lot of this process is going to be up to your tastes. I can show you the basic steps but most of this is going to require you to decide what looks good to you or doesn’t. There will be a lot of back and forth in this process to tweak the final image and this will take time, so be prepared. I have found that I tend to go back again and again on each image and re-tweak it because I either learned something new or was simply not satisfied with the previous image. Recommend you keep a Photoshop format file as well as a JPEG as you may feel the need to do the same. The Photoshop file will allow you to fine tune your results over and over.

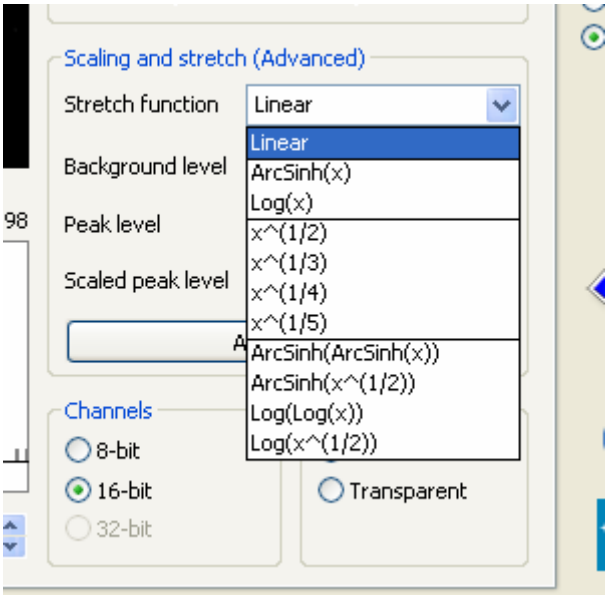
‘Nuff said. On with the lesson! ...

First be sure you have installed the action and FITS Liberator. Refer to the instructions online if you need help with this. Open Photoshop and open the first file you wish to combine. What you will get should look like this:

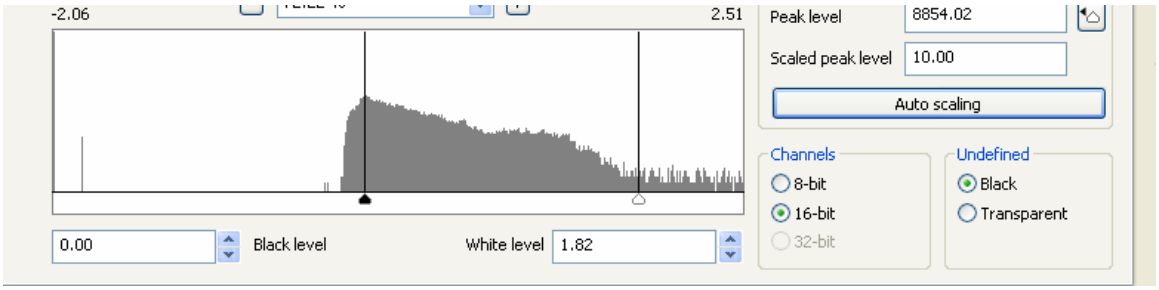


As you can see here, the image is inverted and looks different. Now what we need to do is choose a formula that makes our image look good and then adjust the other settings to tweak it further.

Start by choosing the formula like so:



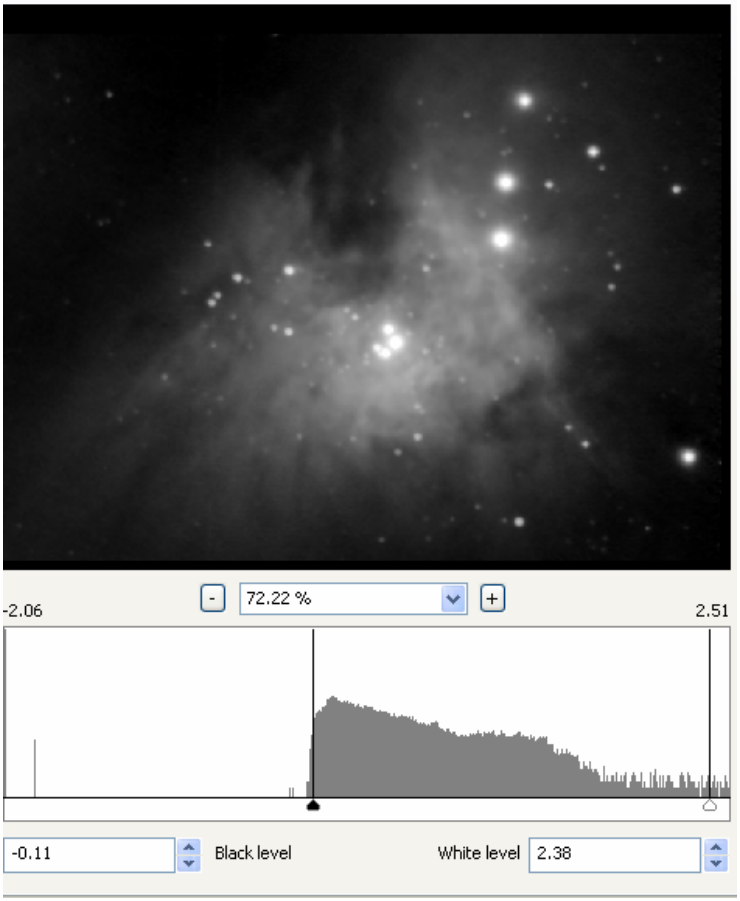
Then once you have found one that increases the brightness the most hit Auto Scaling.



The image histogram will now stretch out like above, though yours may look different. Now you need to adjust the white and black level sliders to make the image show the amount of detail you want. Be warned that some times you can make it too bright even though it looks good. This will be apparent when you try to create a multicolored image. This is one part you are going to have to experiment on.

What you are looking primarily to do is increase the fainter details without washing out or overexposing the brighter areas. See the examples below:

Right:



Center Too Bright:

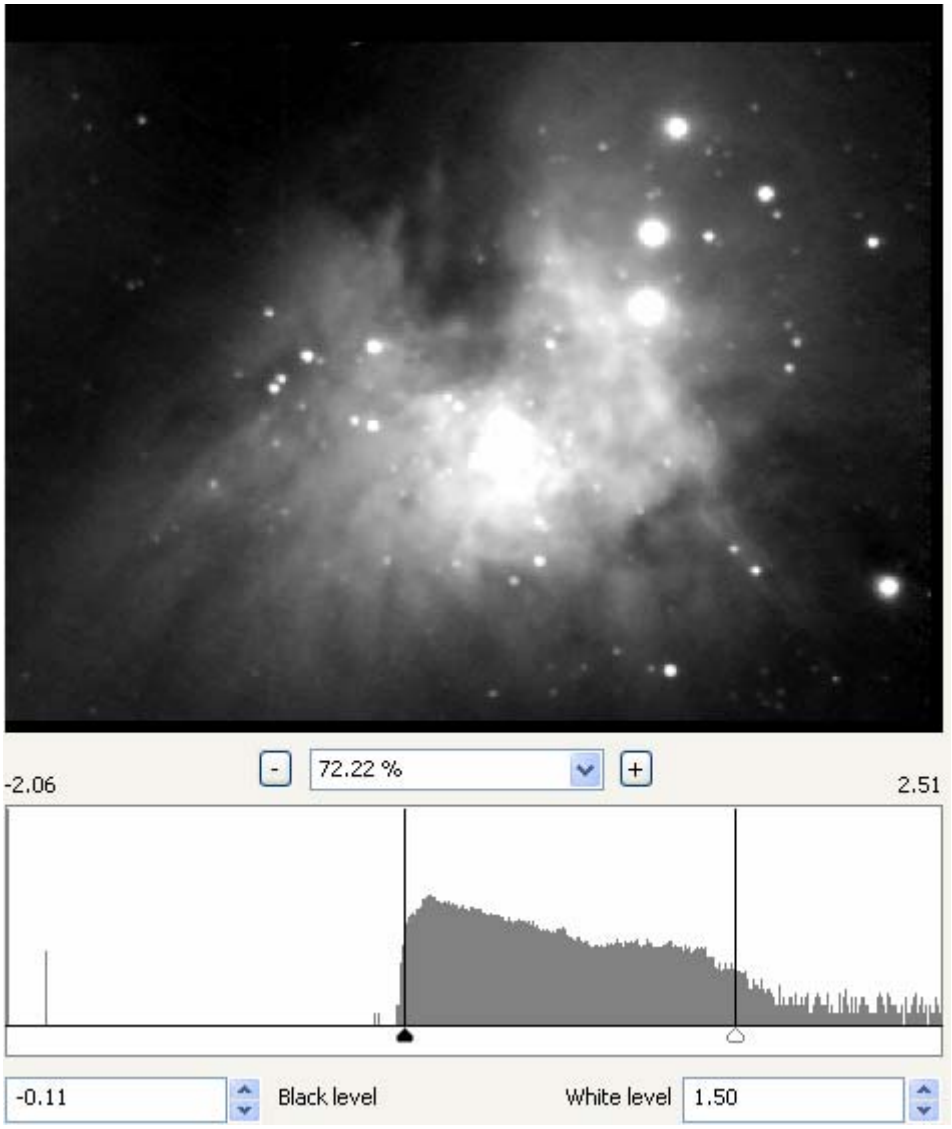
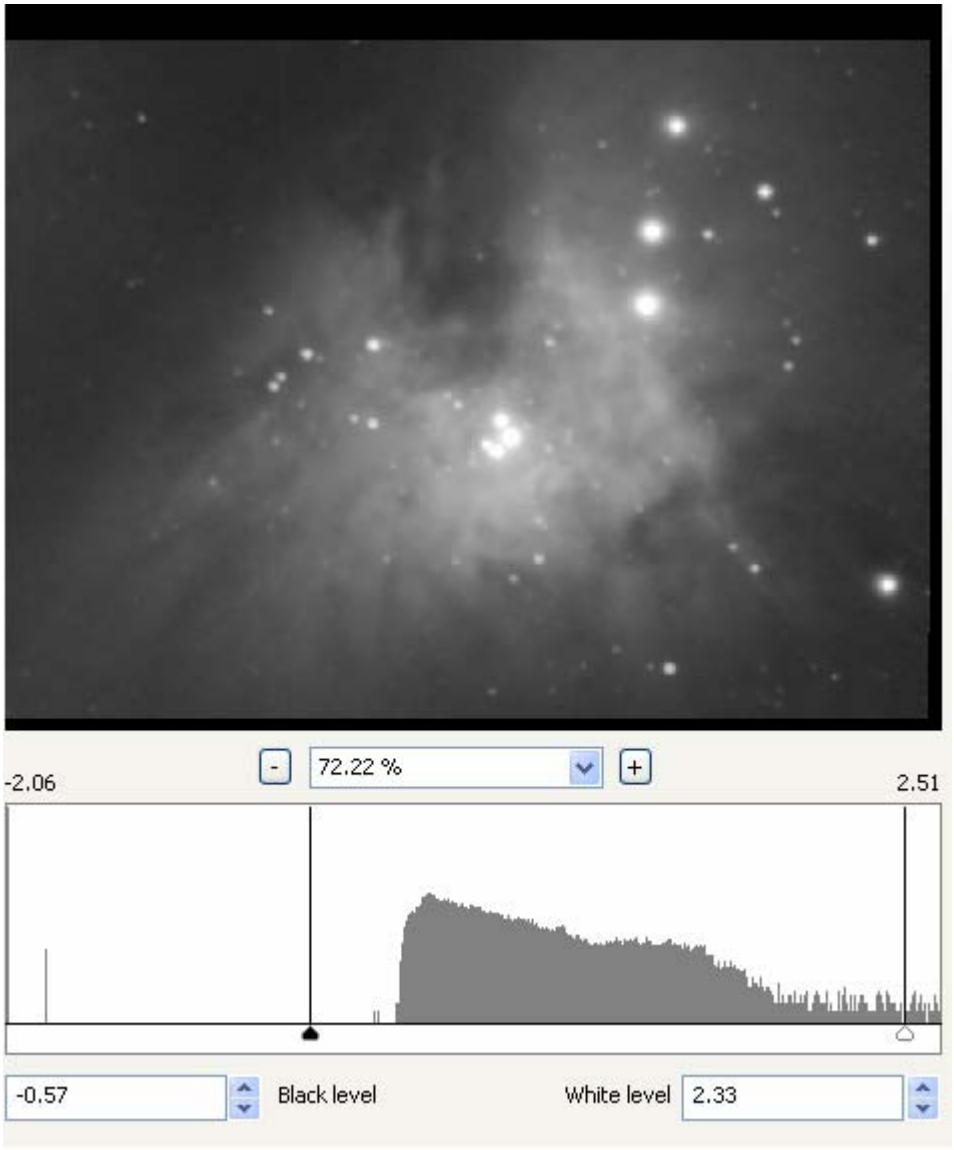
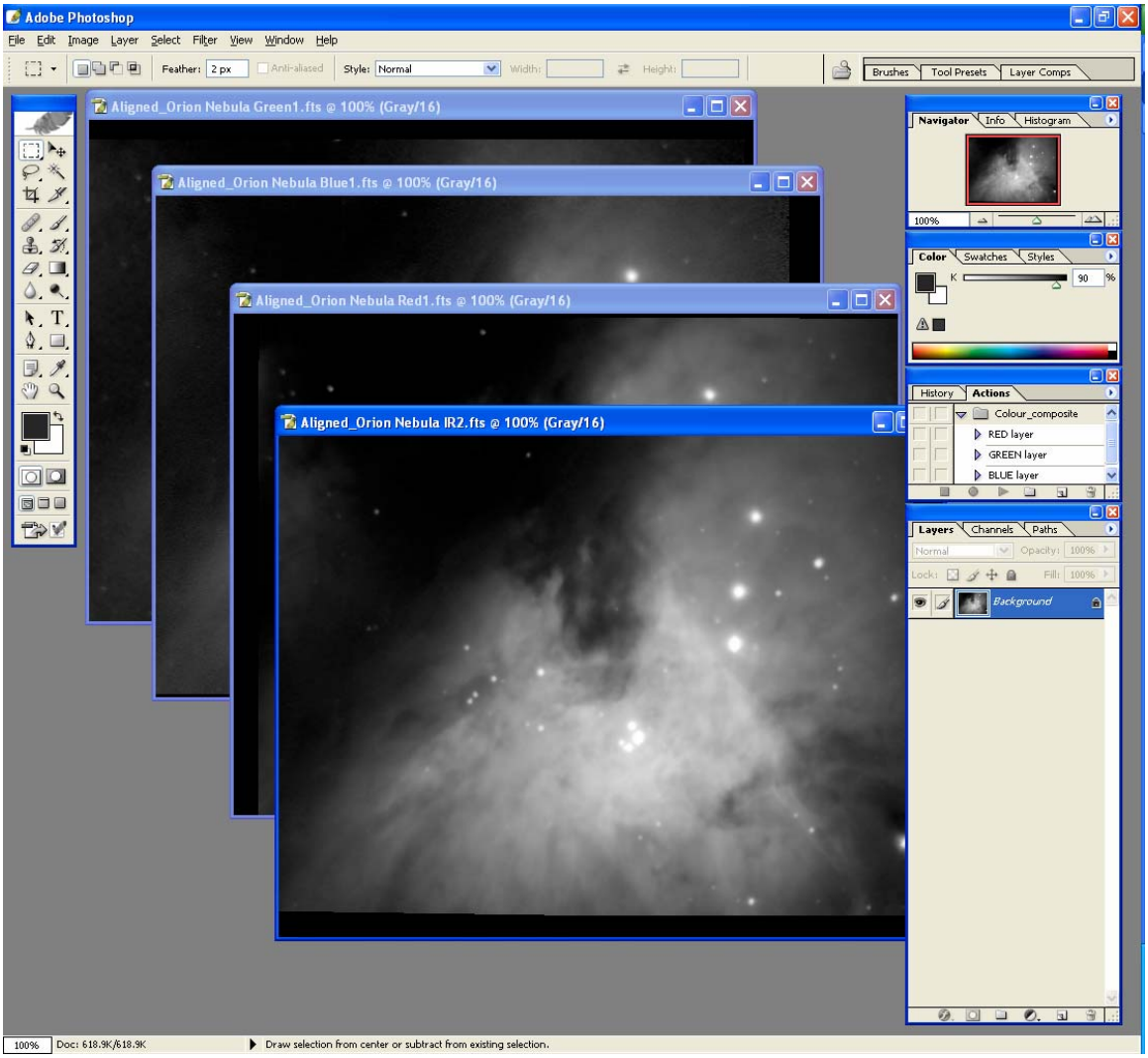


Image washed out:



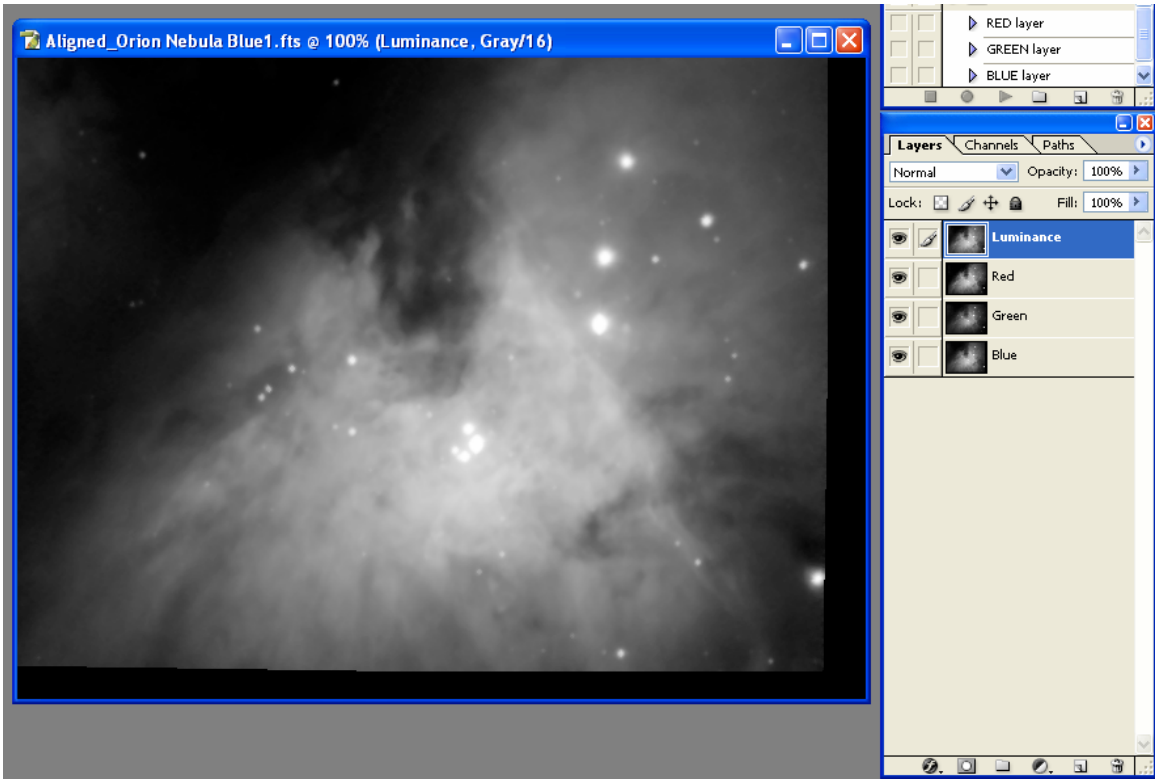
Try to balance the two to be pleasing but not overdone if you can. More processing will be done later on to increase areas of brightness and contrast to make it look better.

By now you will have opened all your images like so:



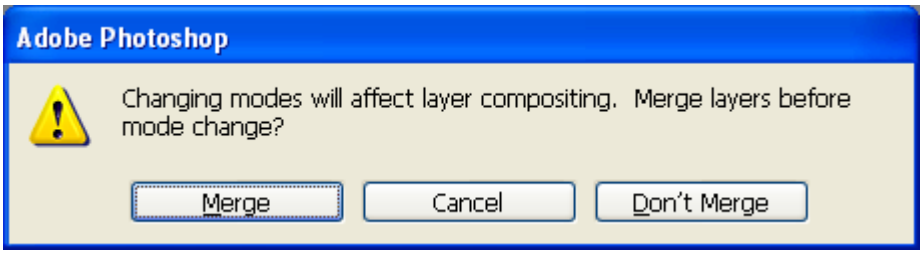
Now you need to combine the images into one. I suggest using the blue layer as your bottom layer. They should be arranged in the order of luminance, red, green, and blue. Once you have copied and pasted each image onto the blue layer, close the other images. Don't worry about saving them, you won't need them again. Be sure to label the layers in the layers panel on the right as you will need to know which color is which to process this image.

Now it should look like this:

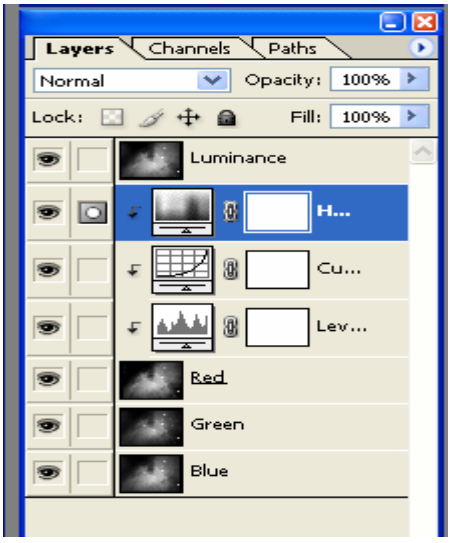


If you have not done so, load the color_composite action in the actions panel. It should look like this:

Start by checking the red layer in this action and highlighting it. Select the red layer in the layers panel then press the play icon on the bottom of the actions window. It will prompt you if you want to merge the layers or not, Choose: "**Don't Merge**".

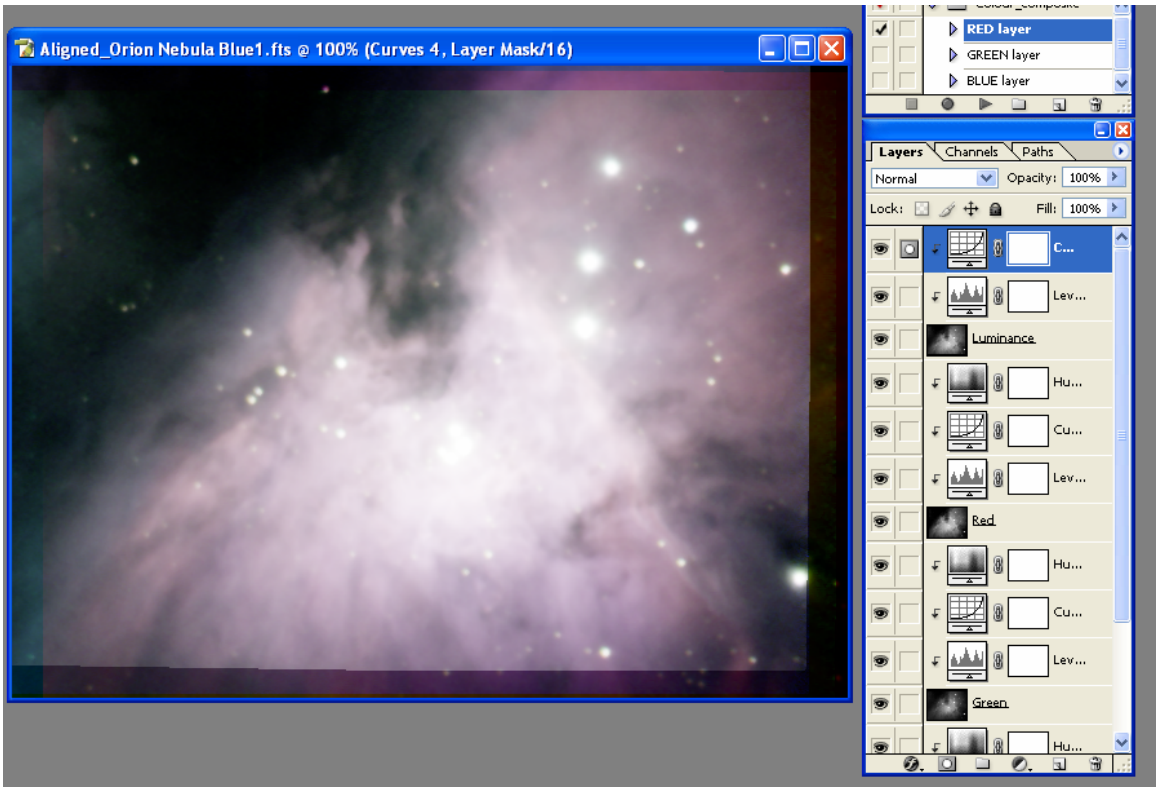


You will notice this placed a series of filters in the layers menu above the red layer.



Repeat this process for green and blue. Apply the red process for the luminance image last and delete the hue/saturation layer from the layers menu for this image only. This will make the luminance image B&W which is what we want.

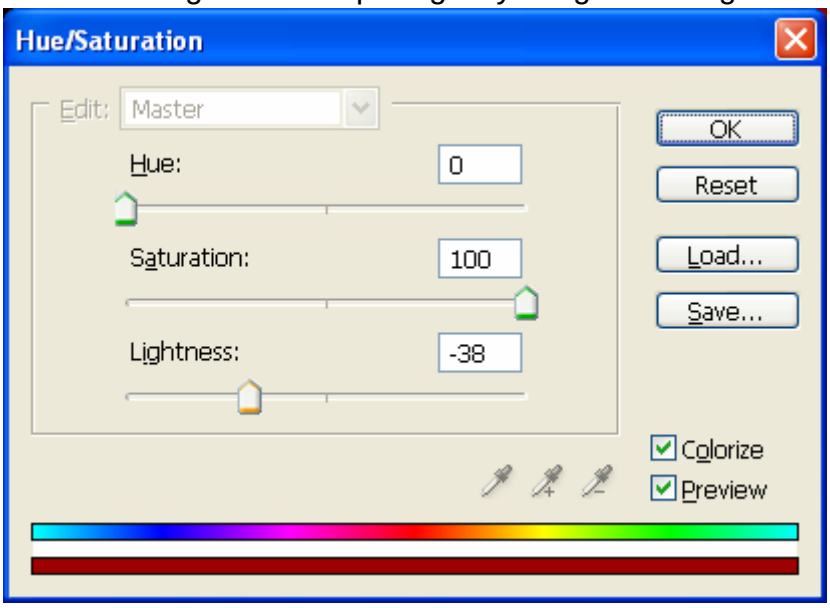
It should look like this when done:



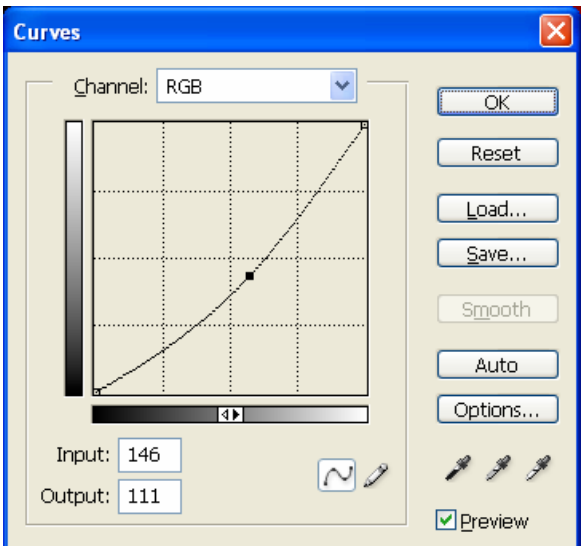
Looks like a mess doesn't it? Now we need to clean up the image. First you will notice the images all lined up but the edges on some areas overlap or are not fully covered. This means we need to trim the final image down a bit so we are going to lose some image area. With the color imager you won't have this problem as the camera will take all four colors at once. Where as with a B&W camera, or when you use filters, the image may move slightly or Change size. This is to be expected and we will simply have to crop the image down, but not yet.

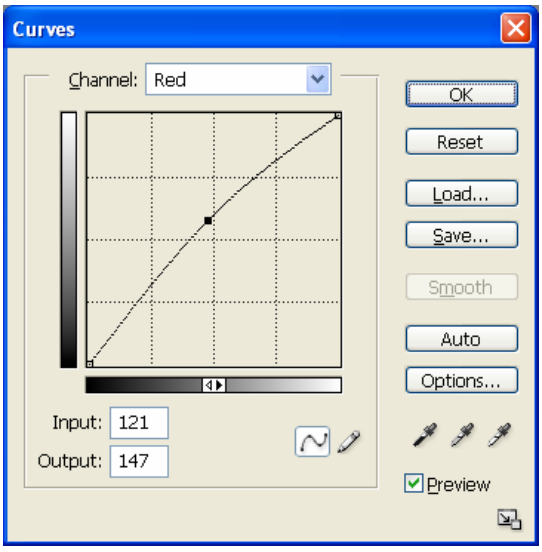
First turn off all but the red color and adjust this color like so:

Turn the lightness up slightly to get a brighter image.



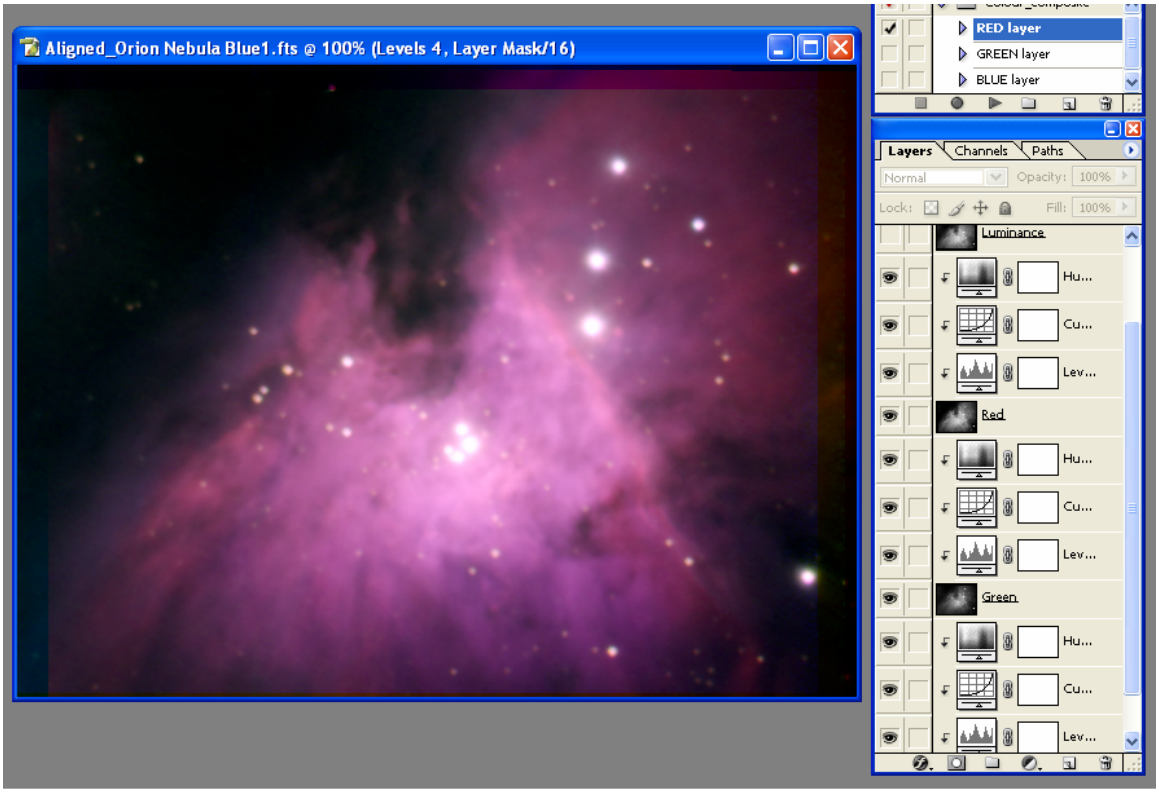
Then adjust the curves like so:





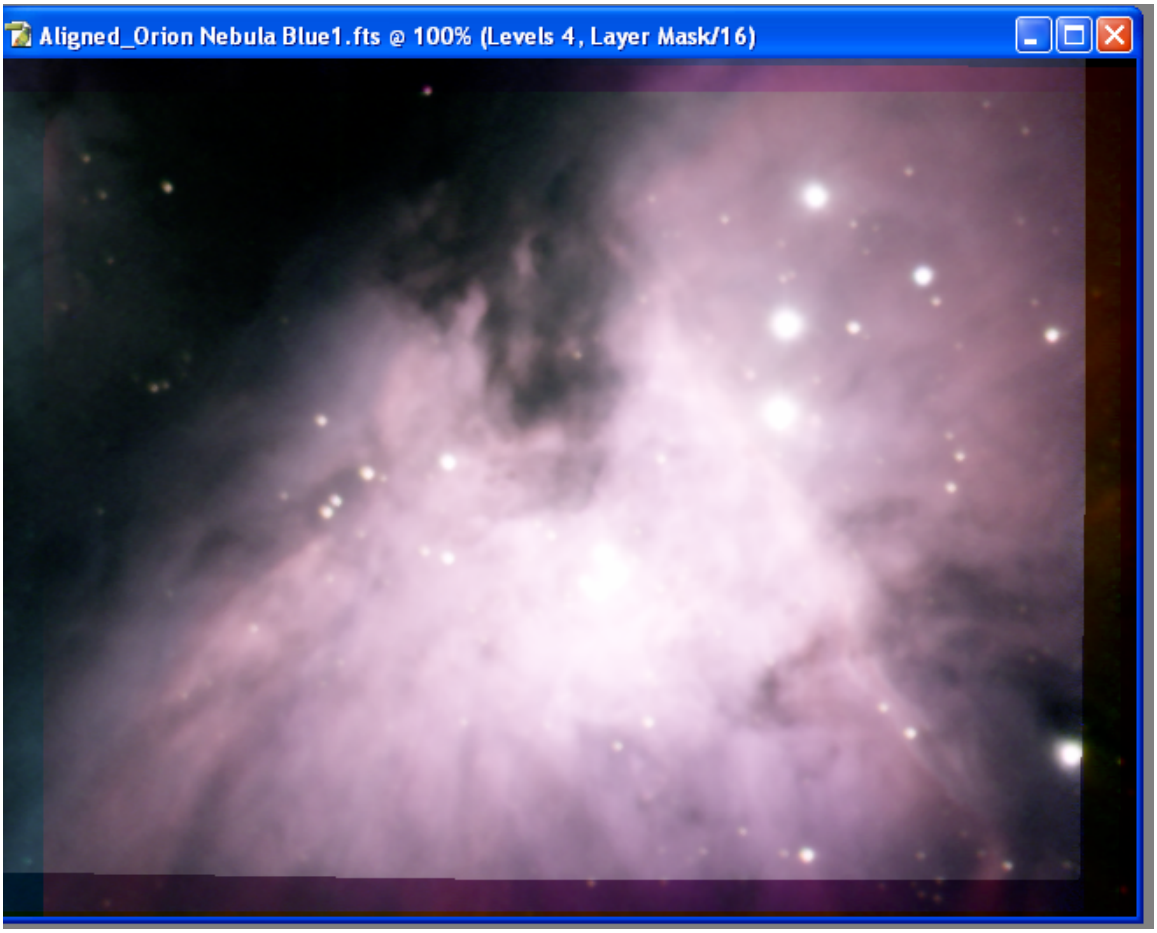
You will notice I turned the RGB down a fraction in the center and the Red up an equal amount. This is the starting point. Do the same for the other two colors green and blue. Leave luminance alone for now. We will use it later to add detail.

Here are the results of my attempt:



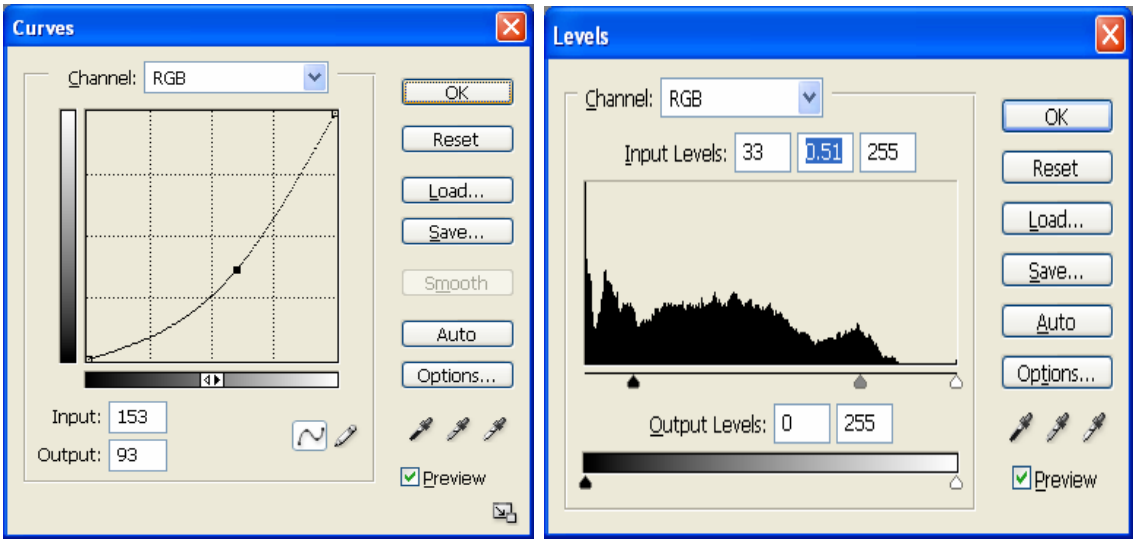
Notice the nice color we got from this. And this is without the luminance added in. The Center is not too bright and the outer edges and fainter areas have some definition, but not a lot.

Turning on Luminance will make it look something like this:

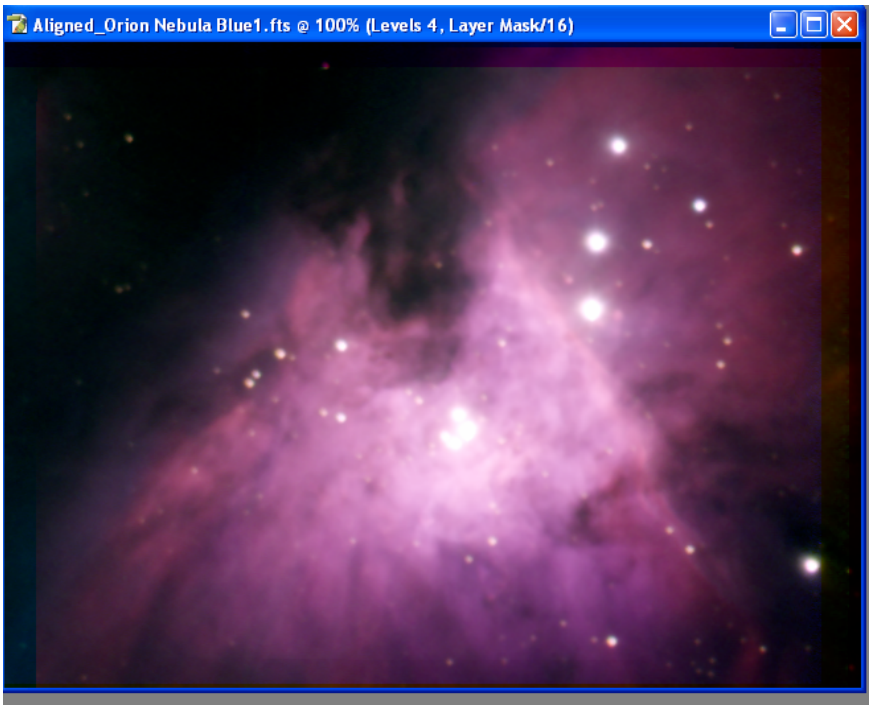


Pretty bright huh? OK let's clean that up a bit.

First dial down the curves and histogram a bit.

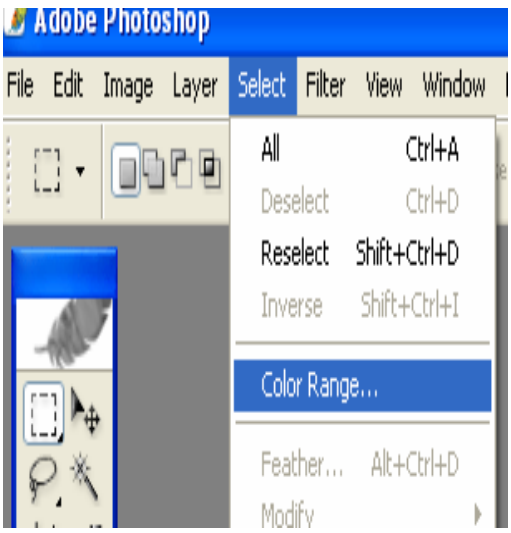


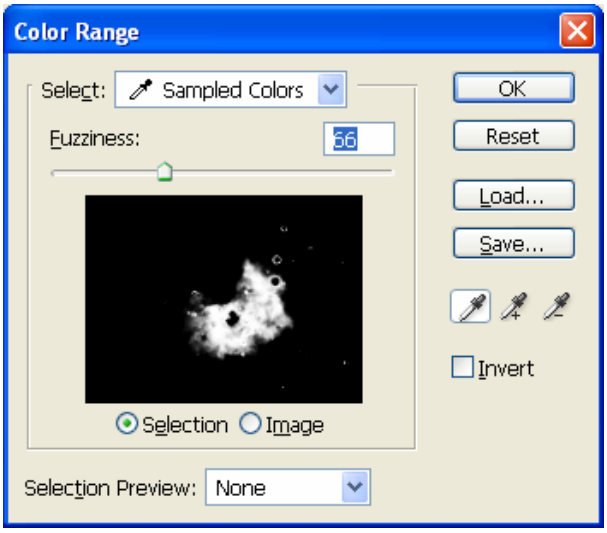
What we are trying to do is dim it down somewhat, but not totally. It should look somewhat like this:



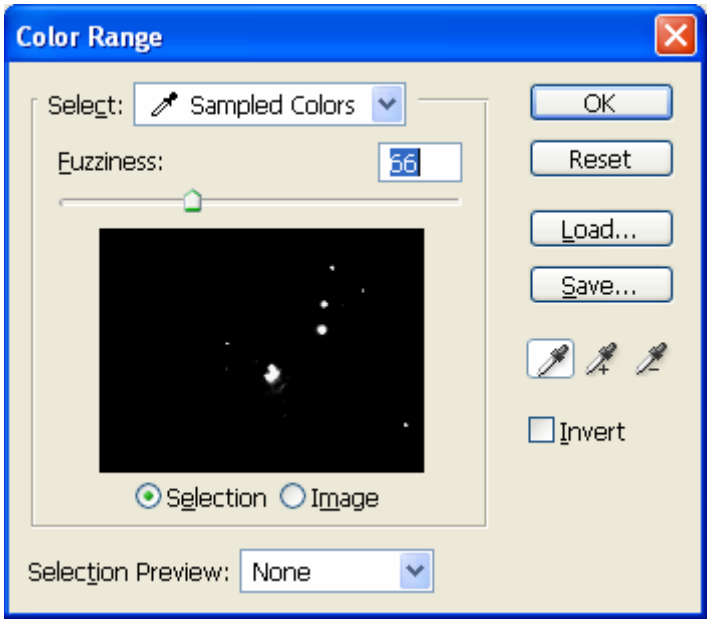
Note the center is still way too bright and the outer edges have gotten a little dark. Now we need to apply selective curves to the image. This is a bit tricky. Here's how it works...

First we need to open the Color range tool:



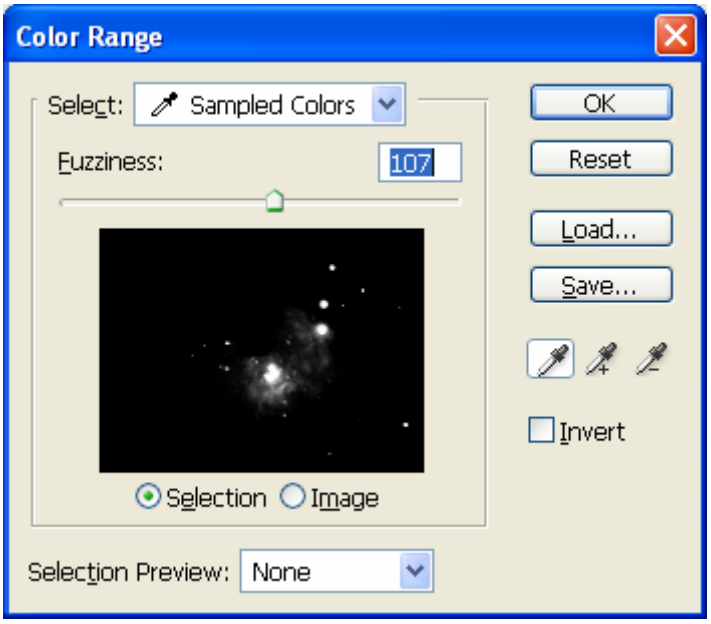


In this tool you will notice that a section of the image is white and a section is dark. Not click the brighter section in the original image, not this tool. In this case I am going to click the trapezium stars in the center. This is what I get:

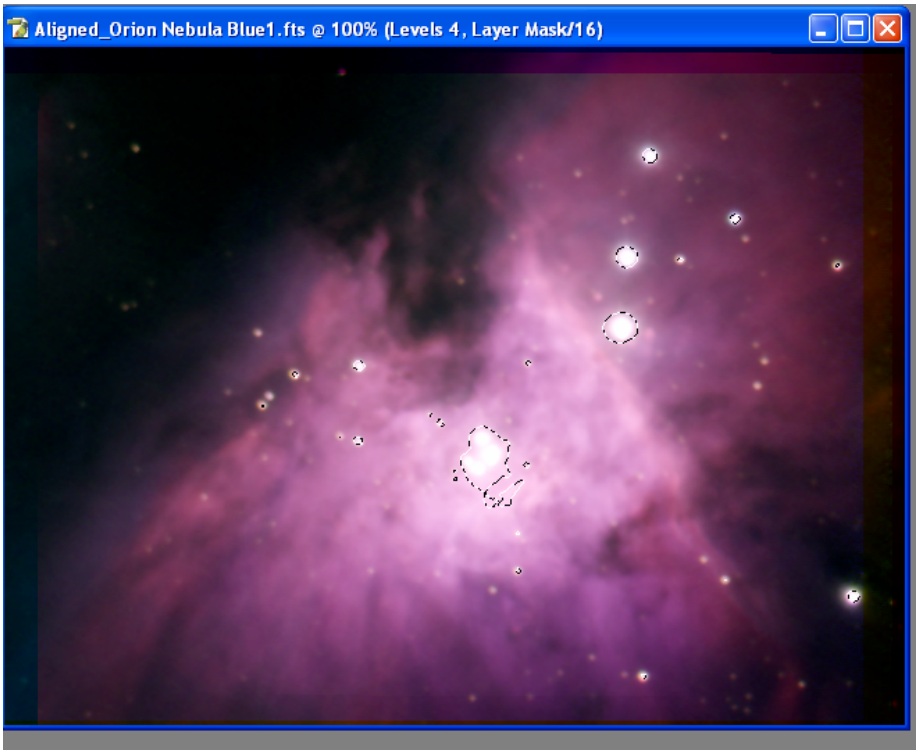


The tool now shows very little.

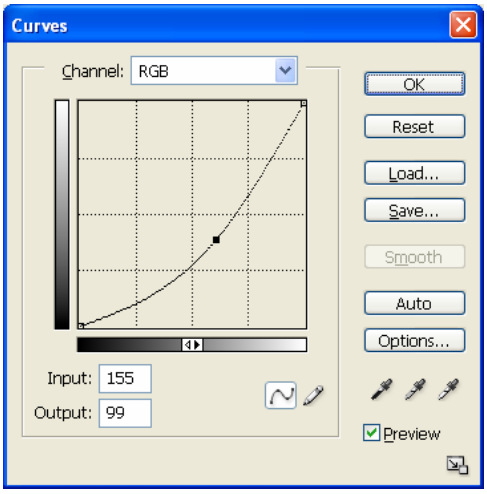
Adjust the fuzziness slider up a bit to bring the level of detail in this preview window up so we can see more of the center. In this case I don't want to do too much as I only want to select the center of the image bright area. Like So:

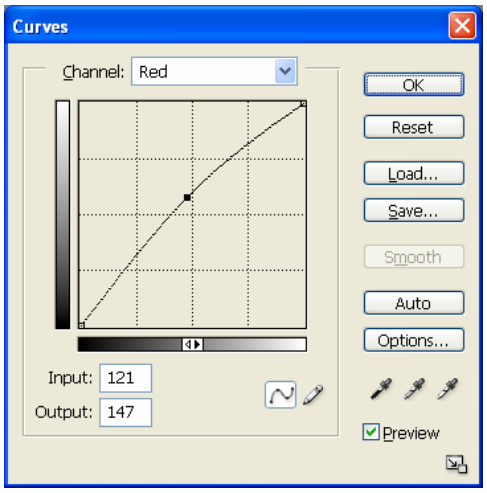


Now hit OK and this is the result:

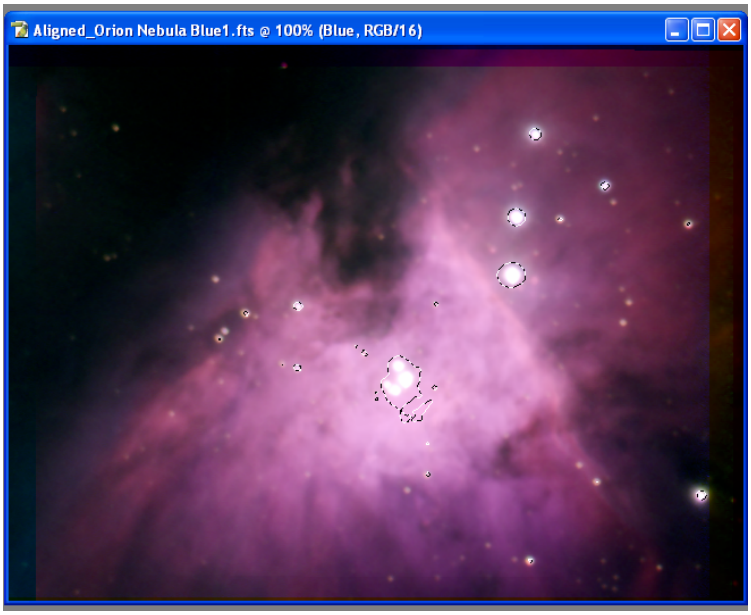


Adjust the Feather option under the select menu to 2 pixels to increase selection accuracy. Notice the highlights around only the brighter objects. This allows us to adjust the levels for only these objects. Clicking on the Select menu and choosing inverse would allow us to adjust everything but these objects. This can come in handy if we want to brighten the image but leave the really bright stars alone so as to not blur them. Let's leave this as is and adjust the curves on the luminance channel. Click the luminance channel in the layers panel and then click the image menu option from the tool bar. Then go to adjustments and curves and adjust like so:





Repeat this for the red, green, and blue channels till you see the center stars as individual points and not one blurred image. It should now look like this:



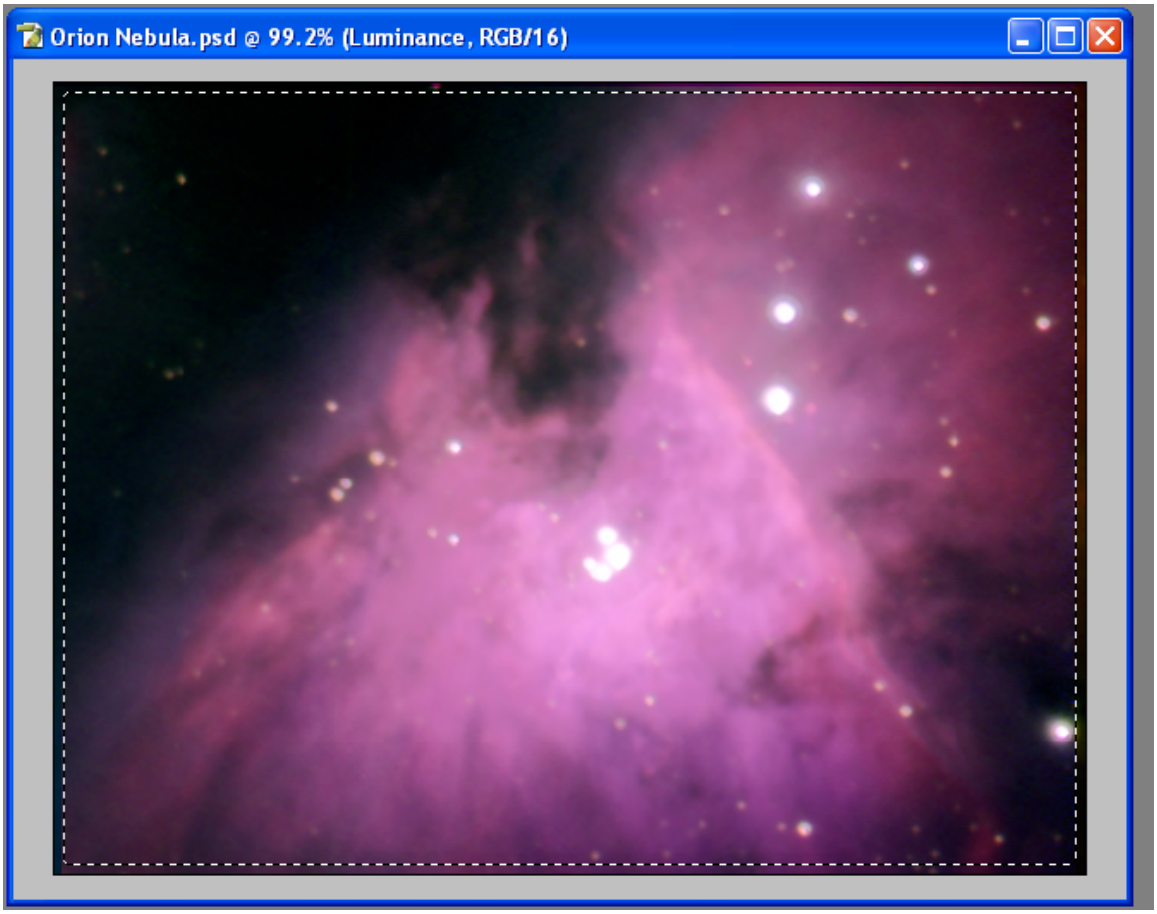
Note that now we can see the center stars nicely but we still need to increase the image brightness for the rest of the image to bring out fainter details. Now would be a good time to invert the selection like I mentioned and repeat the process for adjusting curve only this time increase them instead of decreasing. Like so:

You'll notice now that the center of the image got brighter again. So this time we will redo the color range and select for a bigger area of image to adjust. Then we will step back through adjusting the central stars till we get it right. It's a wash, rinse, repeat process and as I said it takes time...

The final process should look like this:

Now, we have the image the way we want, next we need to crop off the edges where the 4 colors don't line up. Again, if you used the Meade DSI or DSI 2 camera, which is a color camera, this step won't be needed, but users of the DSI Pro and DSI Pro 2 will need to do this.

The final step should make it look like this:



If you haven't already done so, now would be a REALLY good time to save your work. Also feel free to create a jpeg, bitmap, or any other file you wish from this image. Remember that when you initially save it, save it as a Photoshop file as it will keep all of the history and layers intact. You may need if you later decide to go back and redo it. For reference this is my 6th attempt at modifying this particular image.

I hope you've had as much fun learning this as I have in teaching it and remember, there is still a LOT more we can do to the images but this is good for a start.

Clear skies and Clean glass to all!