

Narrowband From Scope to screen



Narrowband - From scope to screen

Planning

Target
Filters
Equipment



How to find a target / Location /
Composition
Narrowband or broadband
Focal length

Data Capture

Conditions
Software
On the go



Moon / Light Pollution / Wind / Seeing
Exposure length / Focus / Guiding
Checking exposure integrity

Processing

Calibration
Stacking
Photoshop fun



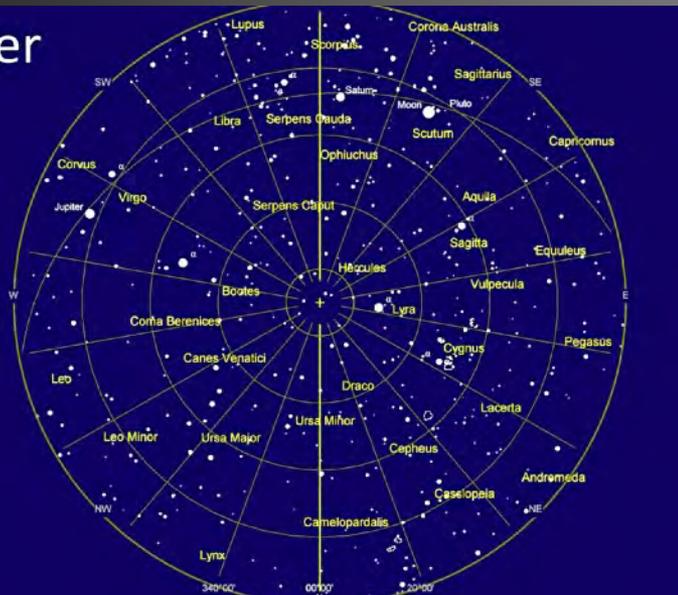
Flats / Darks / Bias
Increasing signal
Creating the colour image / colour tweaks

Planning

How to find a target

- ★ Why we need to think about what we are going to image and when.
- ★ What focal length suits the target - Telescope and camera sensor combination

Summer



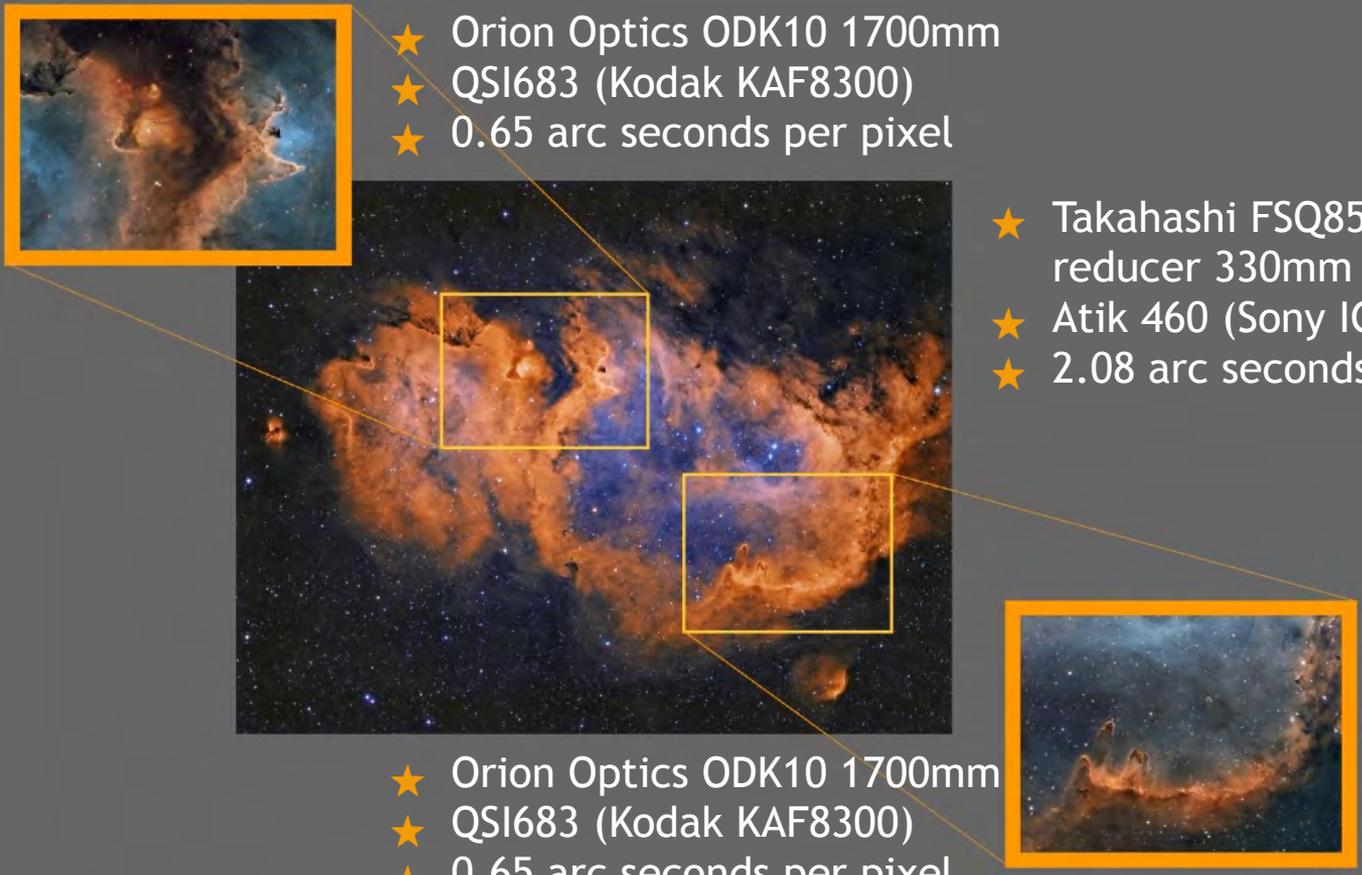
Winter



Planning

Focal length and image resolution

- ★ The impact of different equipment on a target



- ★ Orion Optics ODK10 1700mm
- ★ QSI683 (Kodak KAF8300)
- ★ 0.65 arc seconds per pixel

- ★ Takahashi FSQ85 0.73x reducer 330mm
- ★ Atik 460 (Sony ICX694)
- ★ 2.08 arc seconds per pixel

- ★ Orion Optics ODK10 1700mm
- ★ QSI683 (Kodak KAF8300)
- ★ 0.65 arc seconds per pixel

Planning

Composition of your image

- ★ Look around your image - Is there anything worth while nearby?
- ★ Don't always put your main focus in the middle
- ★ Consider balance

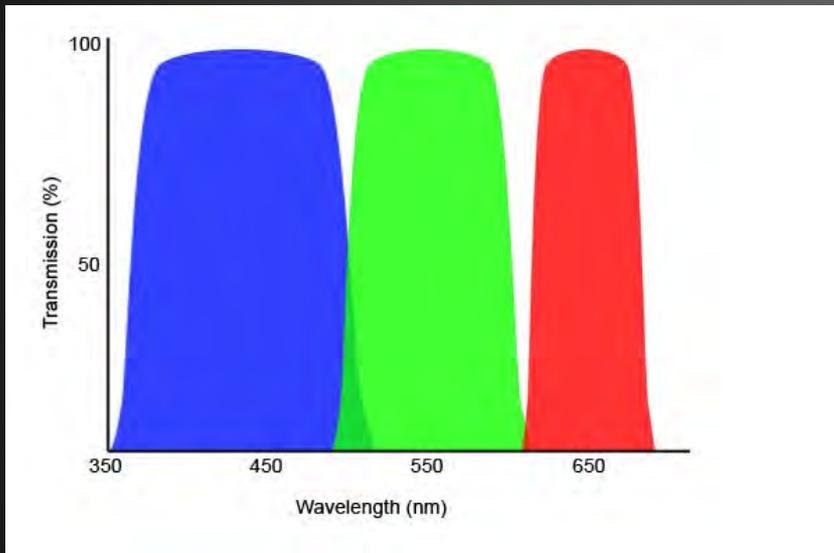


NGC 4565
IC5146

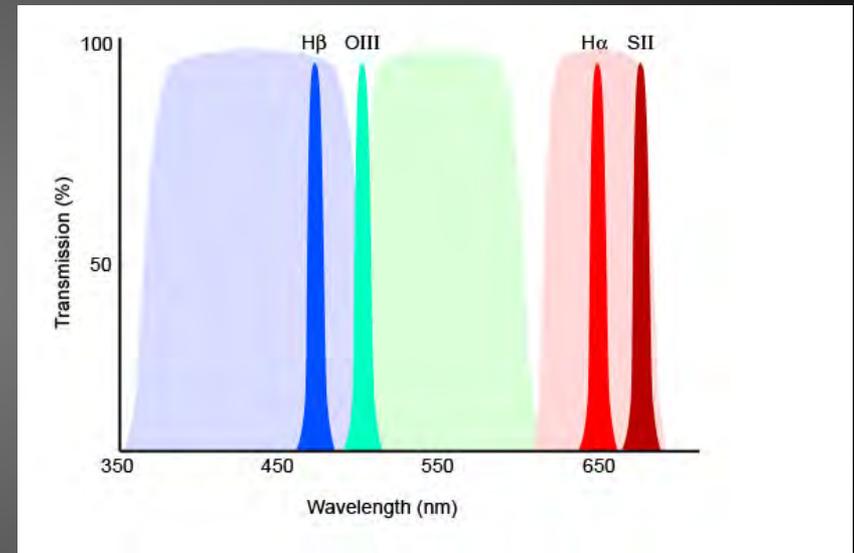


Planning Filters

RGB



Narrowband



- ★ What filters to use for what targets?
- ★ What are the benefits of different filters?
- ★ How does this impact on target selection?

Planning

A visual filter difference

HaRGB



H00



Data Capture

Conditions

Moon



Imagine how much a bright moon can wash out detail and stop you capturing the faint stuff

Light pollution



Your exposures times as well as overall detail will be affected

Filters can help with LP

Wind



Your mount needs to be rock solid when taking exposures - The wind can play havoc with this

Seeing



Haze and humidity can affect your data by decreasing the seeing, affecting guiding and quality

Data Capture

Exposure length

- ★ Contrast
- ★ Noise
- ★ Ease of processing

4 hrs - 24x10mins



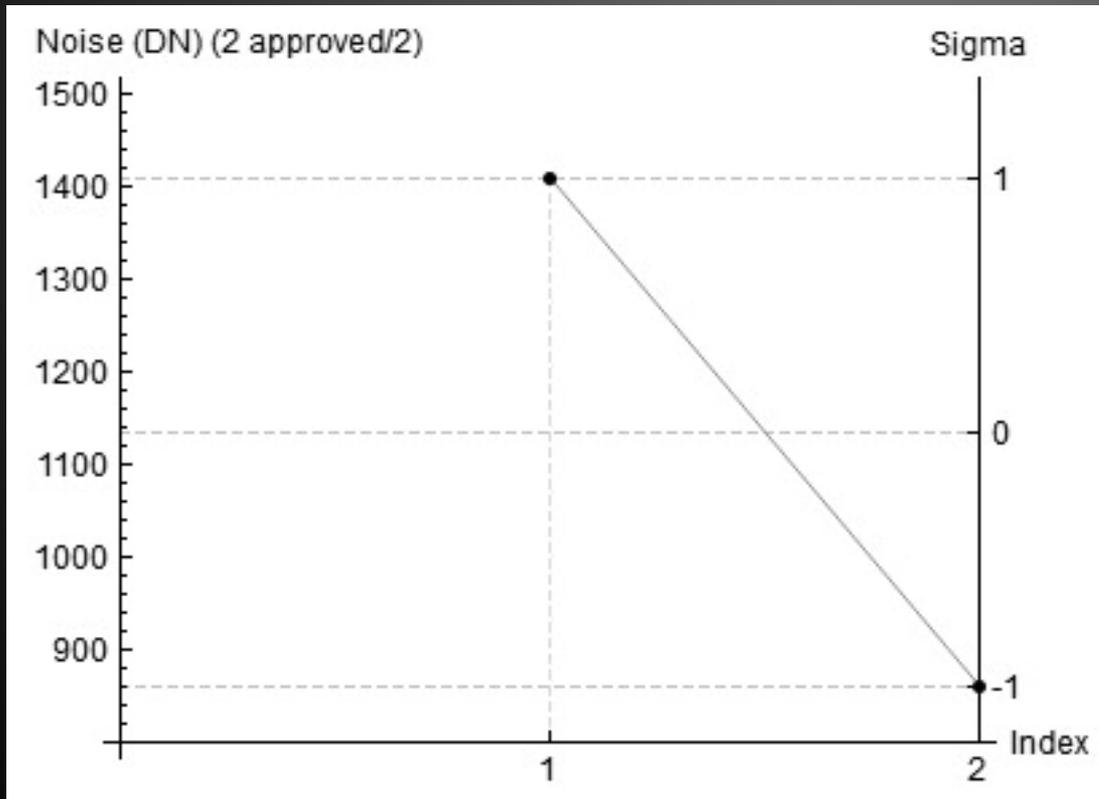
4 hrs - 8x30mins



Data Capture

Noise

- 10min subs 1)
- 30min subs 2)



10min subs

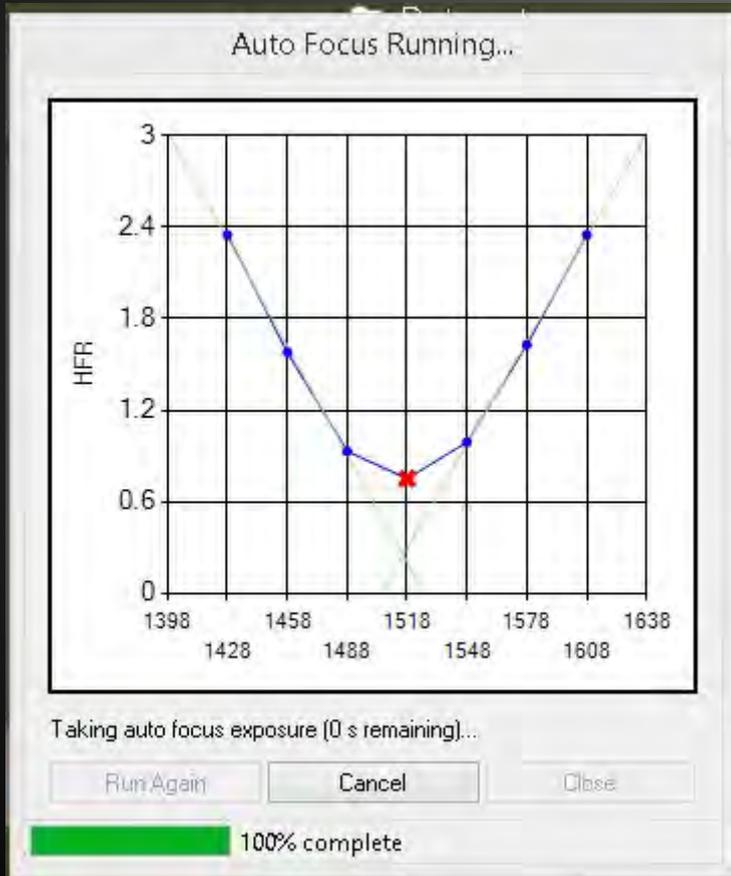


30min subs



Data Capture

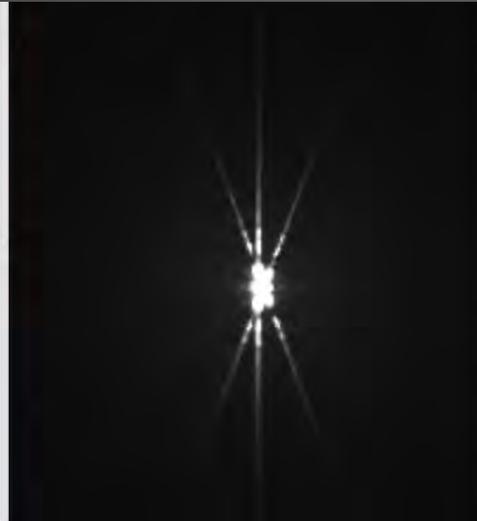
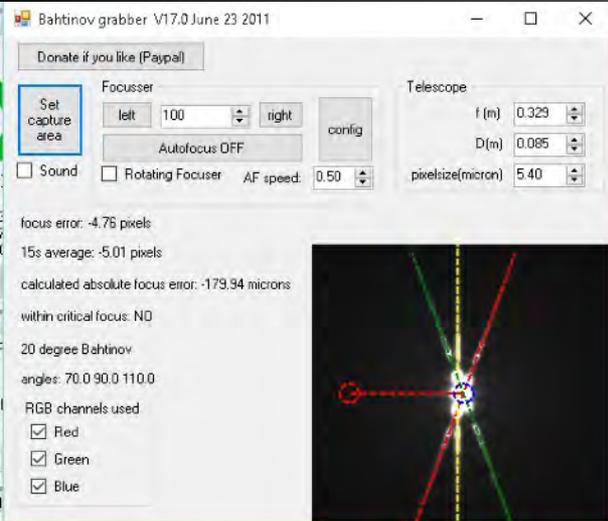
Focus



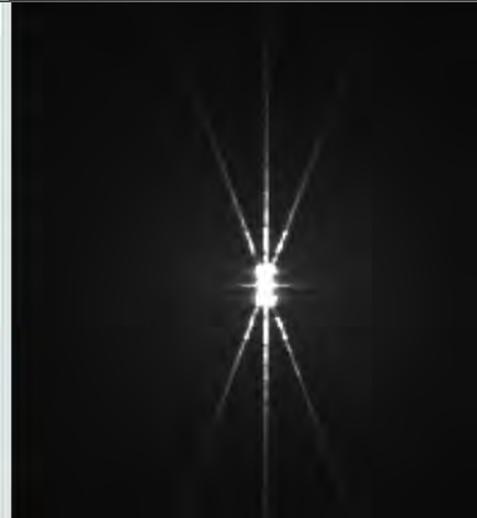
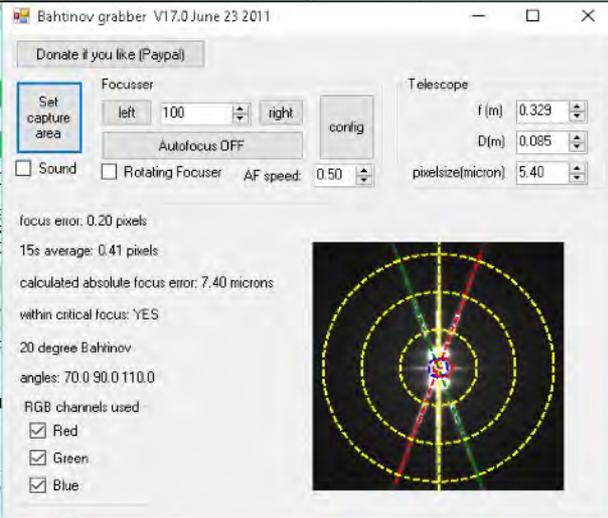
- ★ The V curve of automatic focus
- ★ A Bahtinov mask image
- ★ FWHM (Full width half minimum)

Data Capture

Focus



Out of focus



In focus

- ★ Bahtinov Grabber
- ★ Tells you when you are in critical focus
- ★ Manual focus and Bahtinov mask

Data Capture

Guiding

- ★ Off Axis guider or separate guide scope

What are we aiming for



An overall guiding figure (RMS) of less than either

- ★ The seeing
- ★ The image resolution of the imaging scope

Data Capture Software

★ Sequence Generator Pro

The screenshot displays the Sequence Generator Pro software interface. The main window shows a target list with 'M42' selected. A central dialog box displays target data for 'M42', including equipment like 'GSI CCD Camera' and 'GSI Internal Filter Wheel'. Below this is a table of events with columns for Event, Run, Type, Filter, Suffix, Exposure, Bin, Repeat, and Progress. The interface also includes panels for Environment Data, Focus Control, and various histograms.

Event	Run	Type	Filter	Suffix	Exposure	Bin	Repeat	Progress
1	<input checked="" type="checkbox"/>	Light	Ha	HA	1800	1x1	6	5/6
2	<input checked="" type="checkbox"/>	Light	Red	R	5m	1x1	50	0/50
3	<input checked="" type="checkbox"/>	Light	Red	G	5m	1x1	50	0/50
4	<input checked="" type="checkbox"/>	Light	Blue	B	5m	1x1	50	0/50
5	<input type="checkbox"/>	Light	None		0	1x1	1	0/1

Data Capture

Checking exposure integrity

Why



To ensure that each exposure is

- ★ Well focused
- ★ Well guided
- ★ If a mosaic - That they fit together

When



At the end of every session then you can add extra exposures into your run if needed

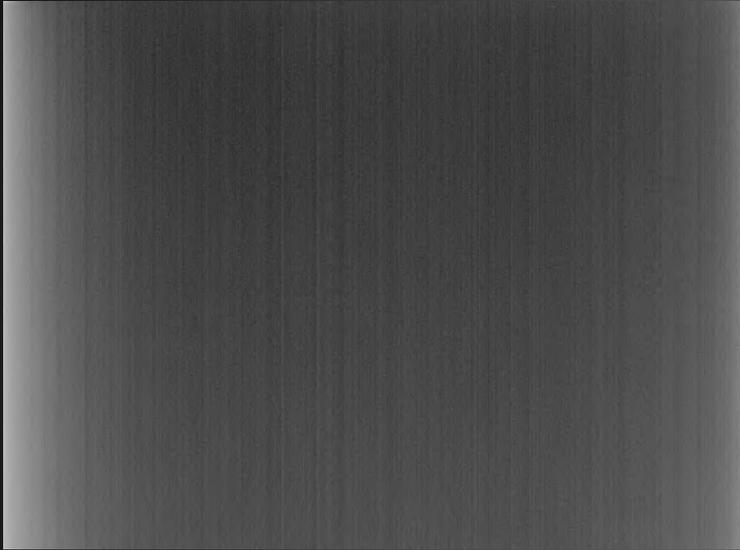
How



- ★ Data capture software (image checking)
- ★ Pixinsight (blink) or sub frame selector script

Processing

Calibration



Bias



Dark



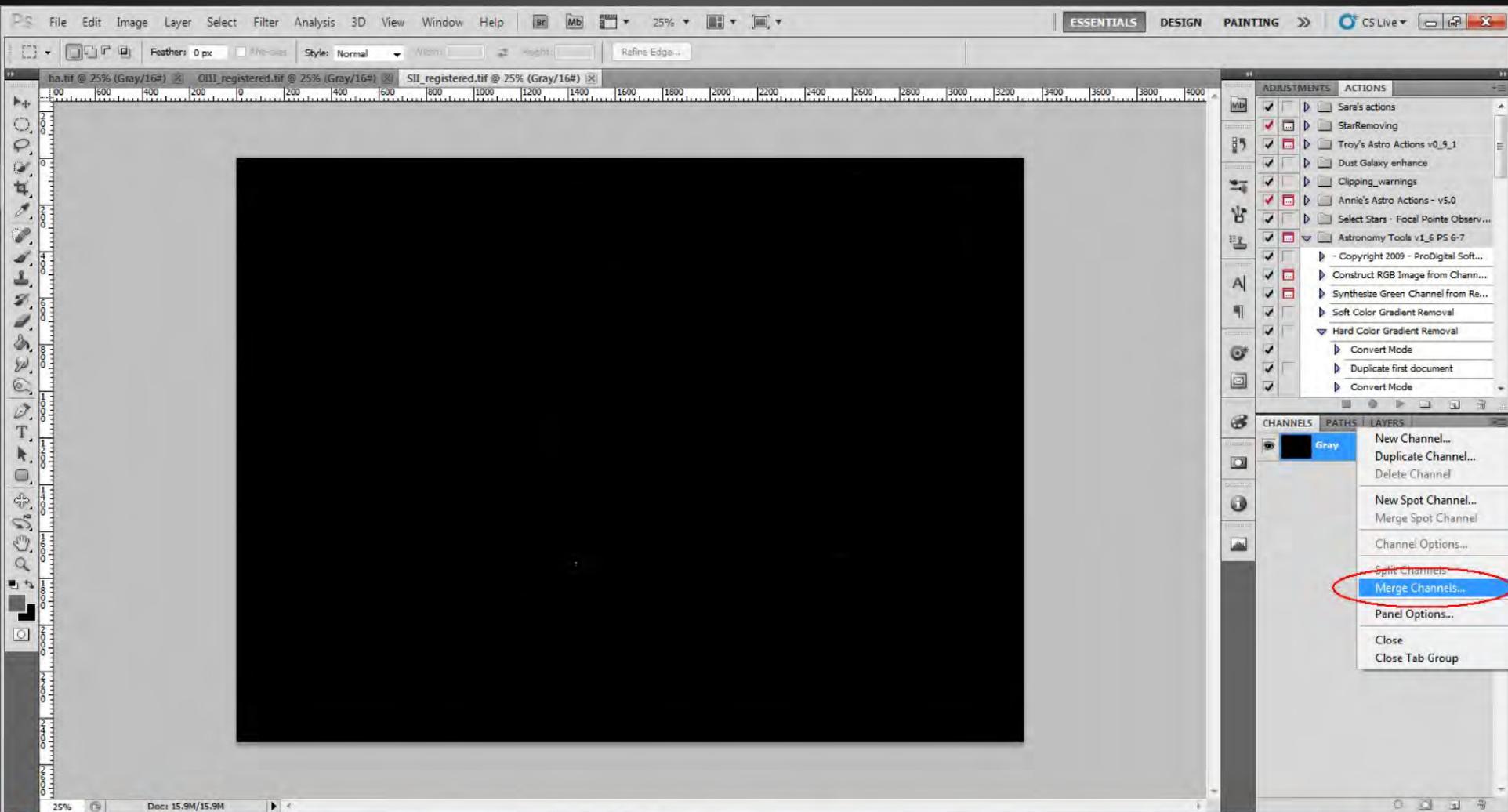
Flat

Processing

Stacking

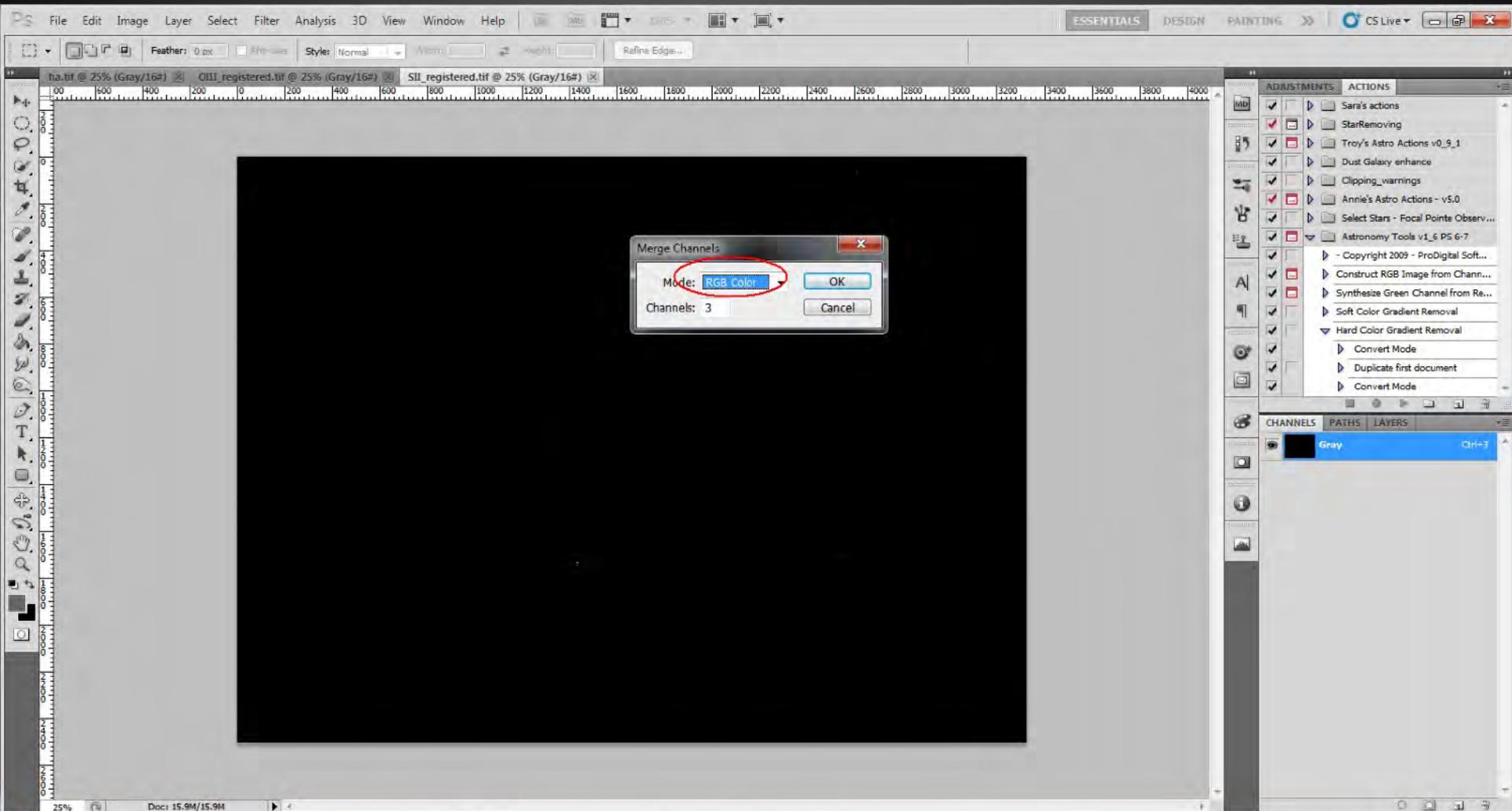


Processing Merging channels

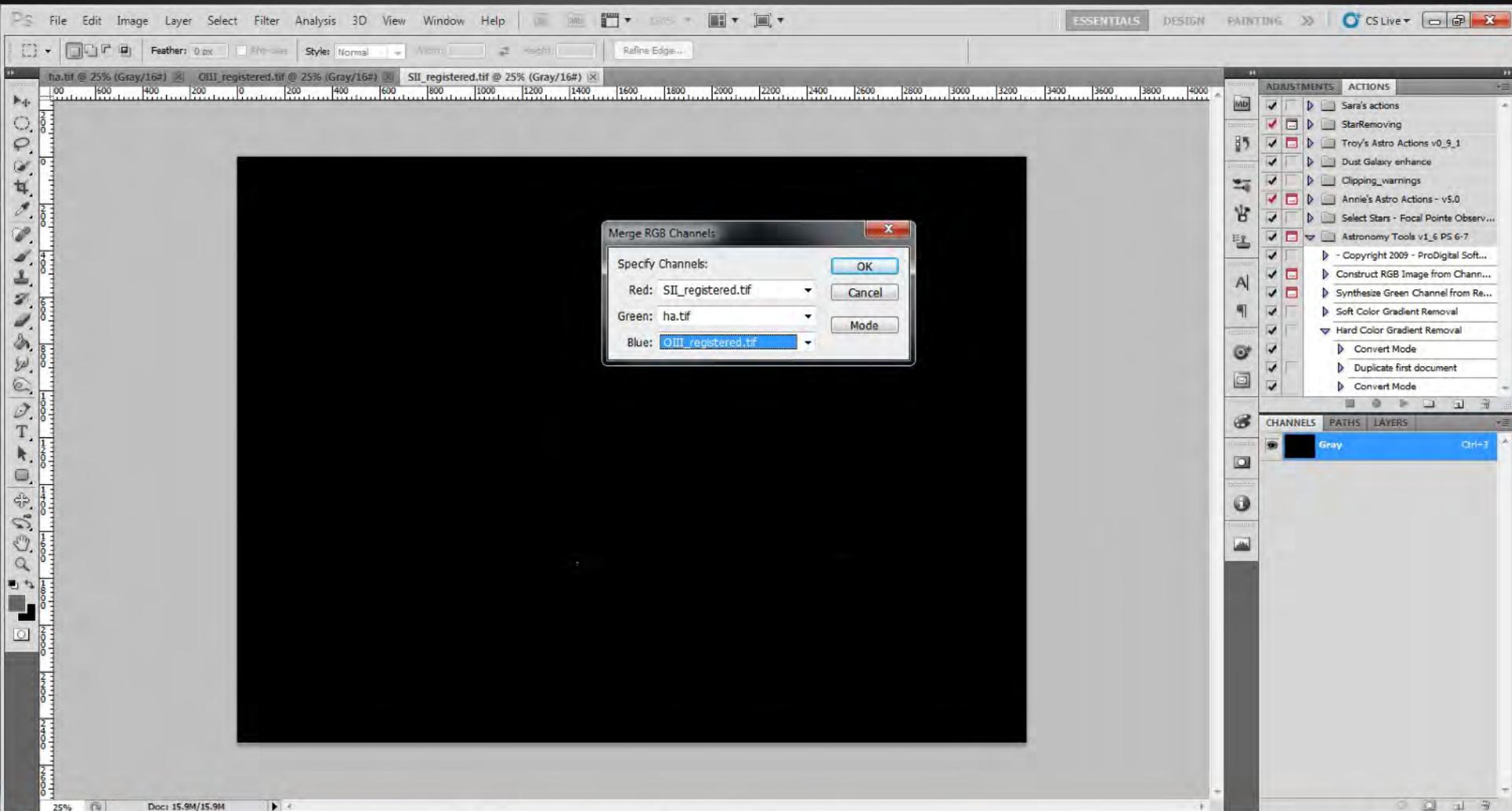


Processing

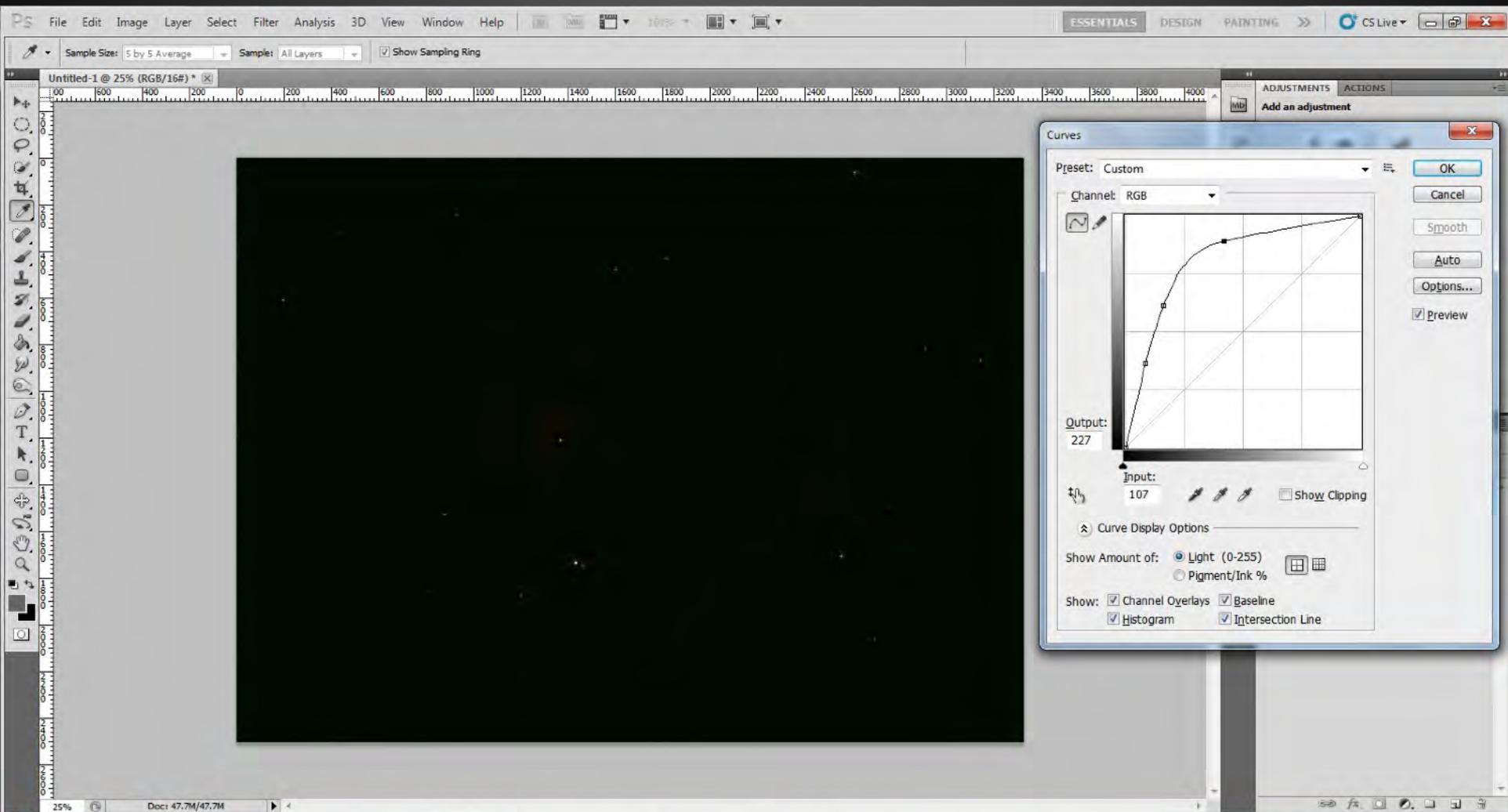
Merging channels



Processing Merging channels



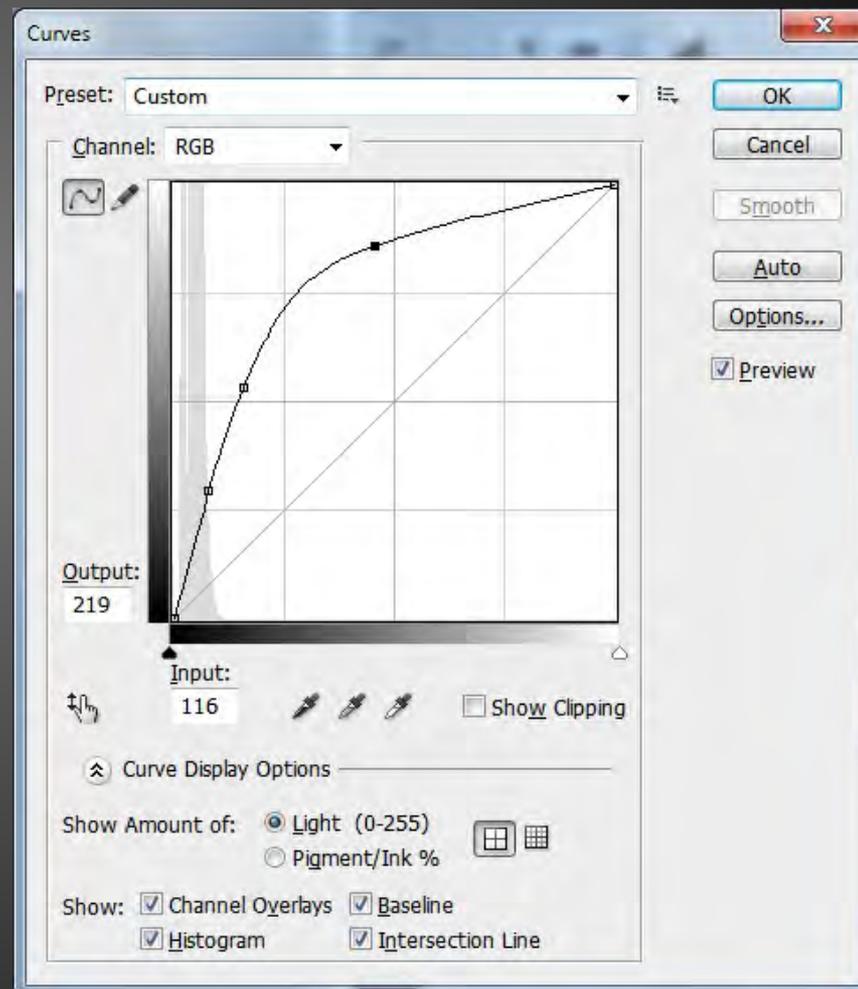
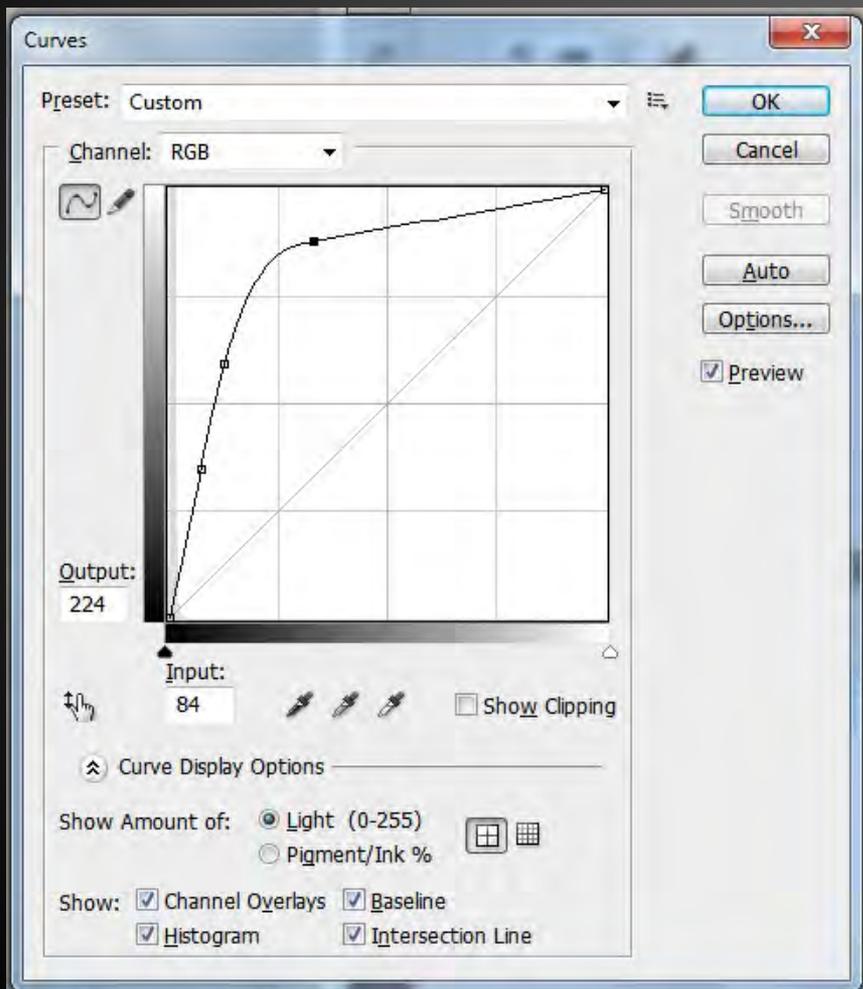
Processing Curves



Processing Curves

Curve 2

Curve 3



Processing Curves



Next steps

Levels to balance
the colours

Selective Colour
tool

Processing Levels to balance the colours

The screenshot displays the Adobe Photoshop CS5.5 interface. The main canvas shows a green, starry image. The **Levels** dialog box is open, with the **Channel** dropdown set to **RGB** (circled in red). The **Input Levels** histogram shows the distribution of pixel values, with the **Input Levels** sliders set to 0, 1.00, and 255. The **Output Levels** sliders are also set to 0 and 255. The **HISTOGRAM** panel is open, showing the **Channel: Colors** histogram and the **Red**, **Green**, and **Blue** histograms. The **Red** histogram shows a peak at the low end, while the **Green** and **Blue** histograms show a peak at the high end. The **Adjustments** panel on the right shows the **Levels** adjustment selected, with the **Background** layer selected in the **LAYERS** panel. The **CTRL + L** text is overlaid on the left side of the canvas.

CTRL + L

Levels

Prsset: Default

Channel: RGB

Input Levels: RGB, Red, Green, Blue

Output Levels: 0, 1.00, 255

HISTOGRAM

Channel: Colors

Source: Entire Image

Mean: 39.02, Std Dev: 16.21, Median: 37, Pixels: 130208

Level: , Count: , Percentile: , Cache Level: 4

Red

Green

Blue

Adjustments

Add an adjustment

Levels Presets, Curves Presets, Exposure Presets, Hue/Saturation Presets, Black & White Presets, Channel Mixer Presets, Selective Color Presets

CHANNELS **PATHS** **LAYERS**

Normal, Opacity: 100%

Background

Processing Levels to balance the colours

The screenshot displays the Adobe Photoshop interface with a green nebula image open. The Histogram panel is active, showing the 'Colors' channel. A red circle highlights the peak of the histogram, which is skewed towards the right, indicating a high concentration of bright pixels. The Adjustments panel on the right shows the 'Levels' adjustment is selected. The Layers panel shows a single 'Background' layer. The status bar at the bottom indicates the document is 'Untitled-1 @ 25% (RGB/16#)' and the zoom level is 25%.

HISTOGRAM
Channel: Colors
Source: Entire Image
Mean: 1542 Level:
Std Dev: 9.76 Count:
Median: 12 Percentile:
Pixels: 130208 Cache Level: 4

Red
Green
Blue

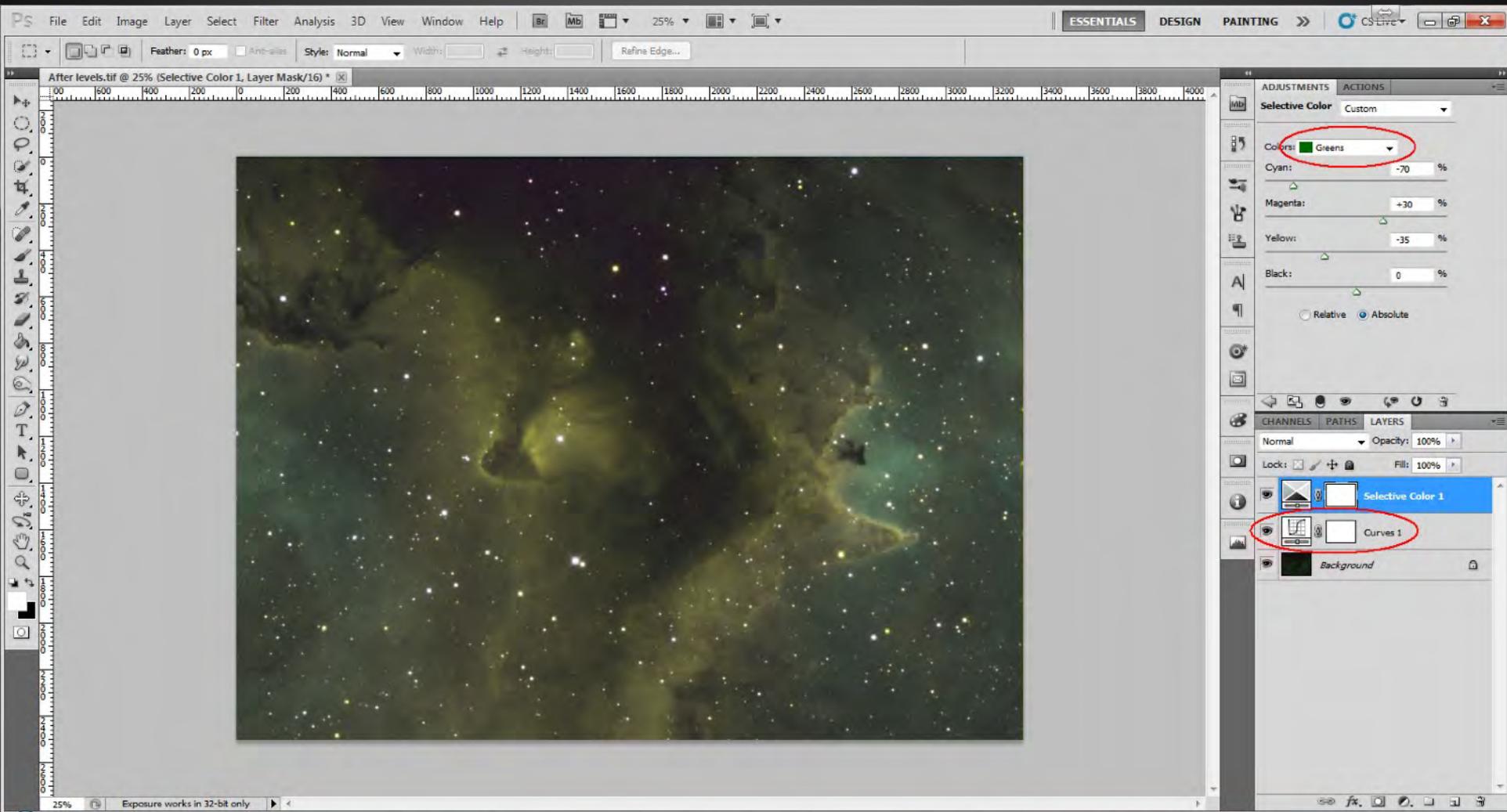
ADJUSTMENTS
Add an adjustment
Levels Presets
Curves Presets
Exposure Presets
Hue/Saturation Presets
Black & White Presets
Channel Mixer Presets
Selective Color Presets

CHANNELS **PATHS** **LAYERS**
Normal Opacity: 100%
Lock Fill: 100%
Background

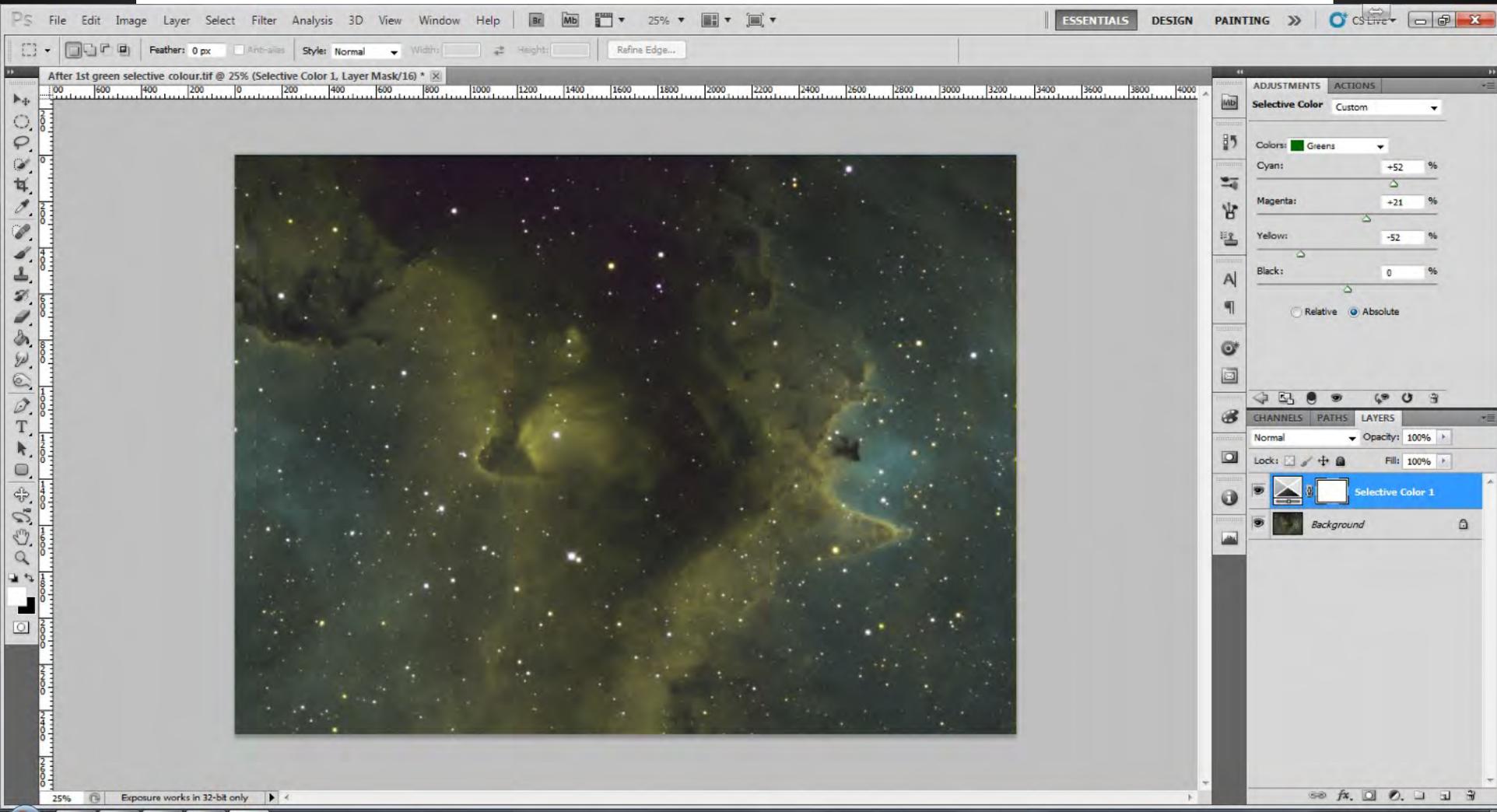
25% Doc: 47.7M/47.7M

Curves - A simple curve to see what you are doing

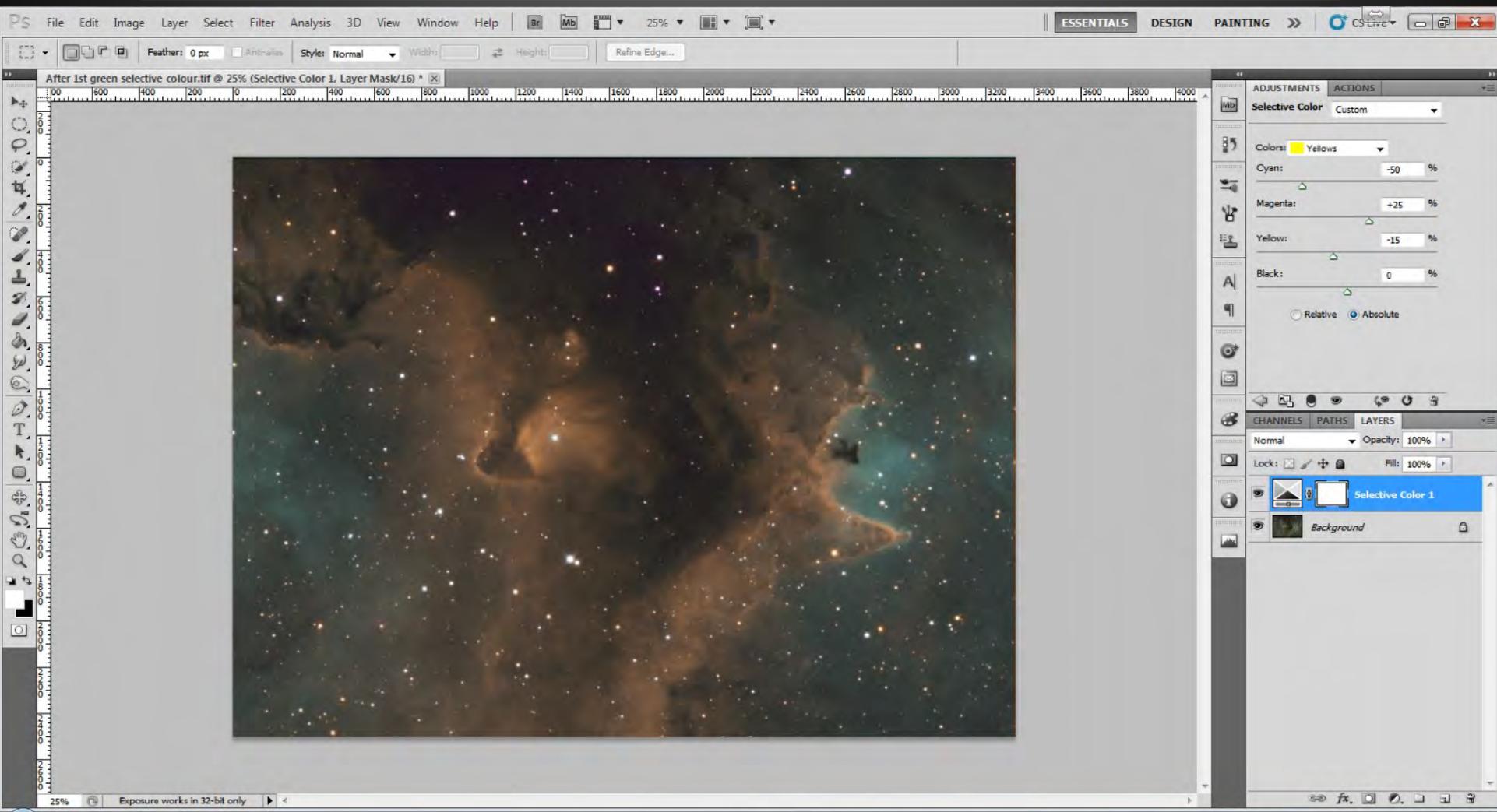
Green Selective colour - First process to change the greens to yellow without destroying the blue



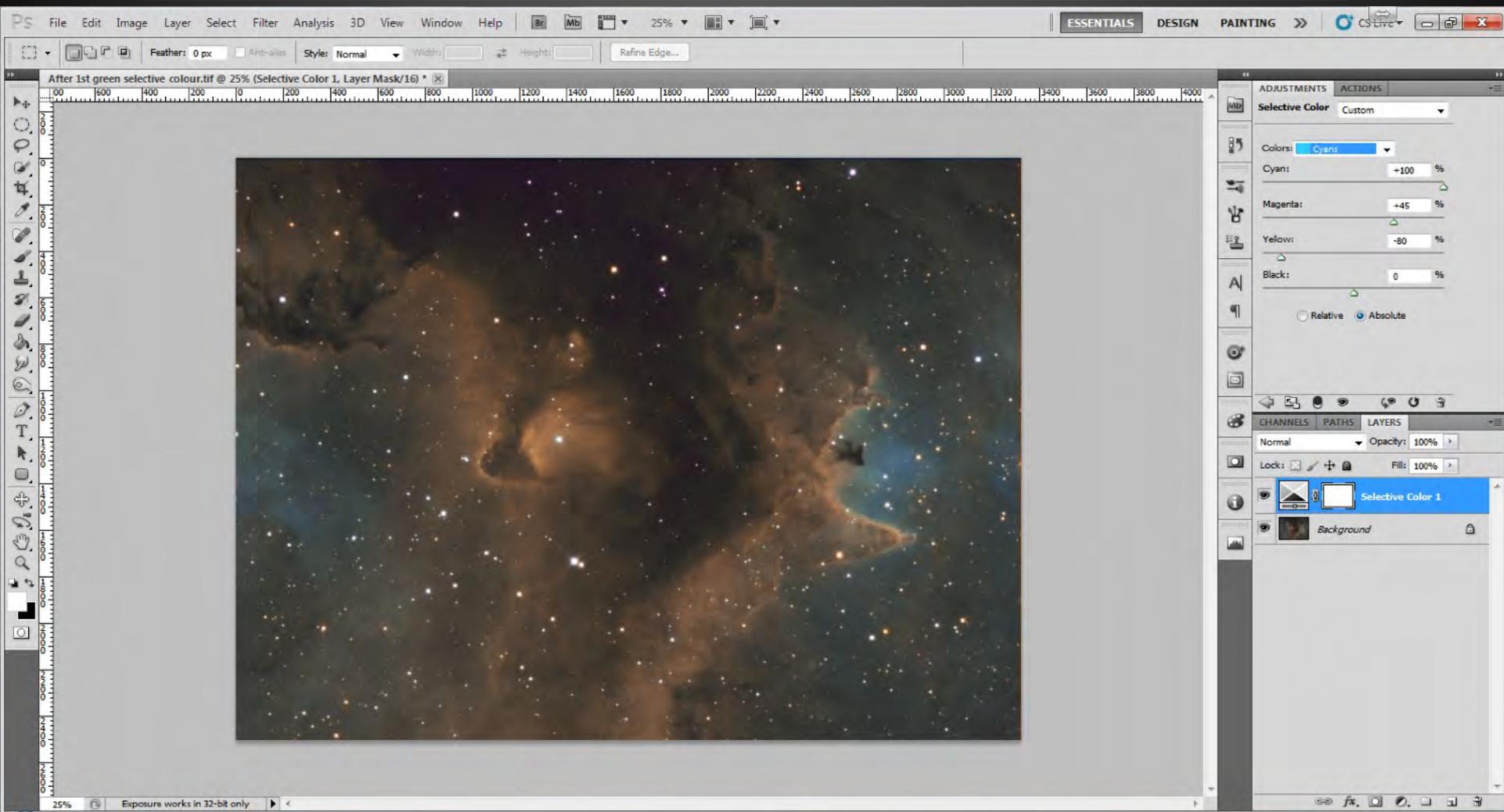
Green Selective colour - In danger of losing the blue - Lets consider green again.... Keeping the outer areas blue so that we can work with it later



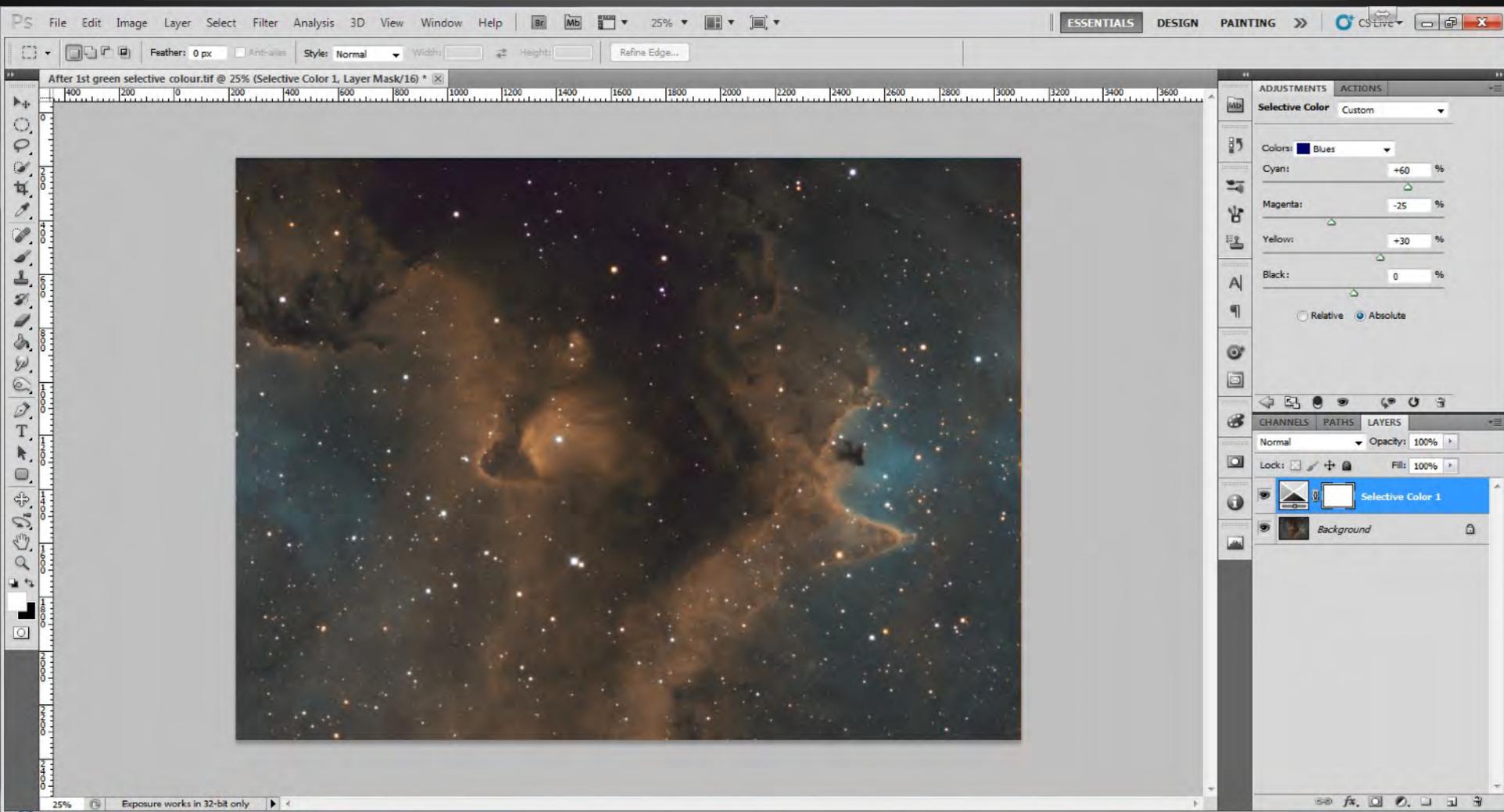
Yellow Selective colour - Working on making the yellows more orange



Cyan Selective colour - Working on the blue areas of the nebula - This can be tweaked further with blue selective colour as required.

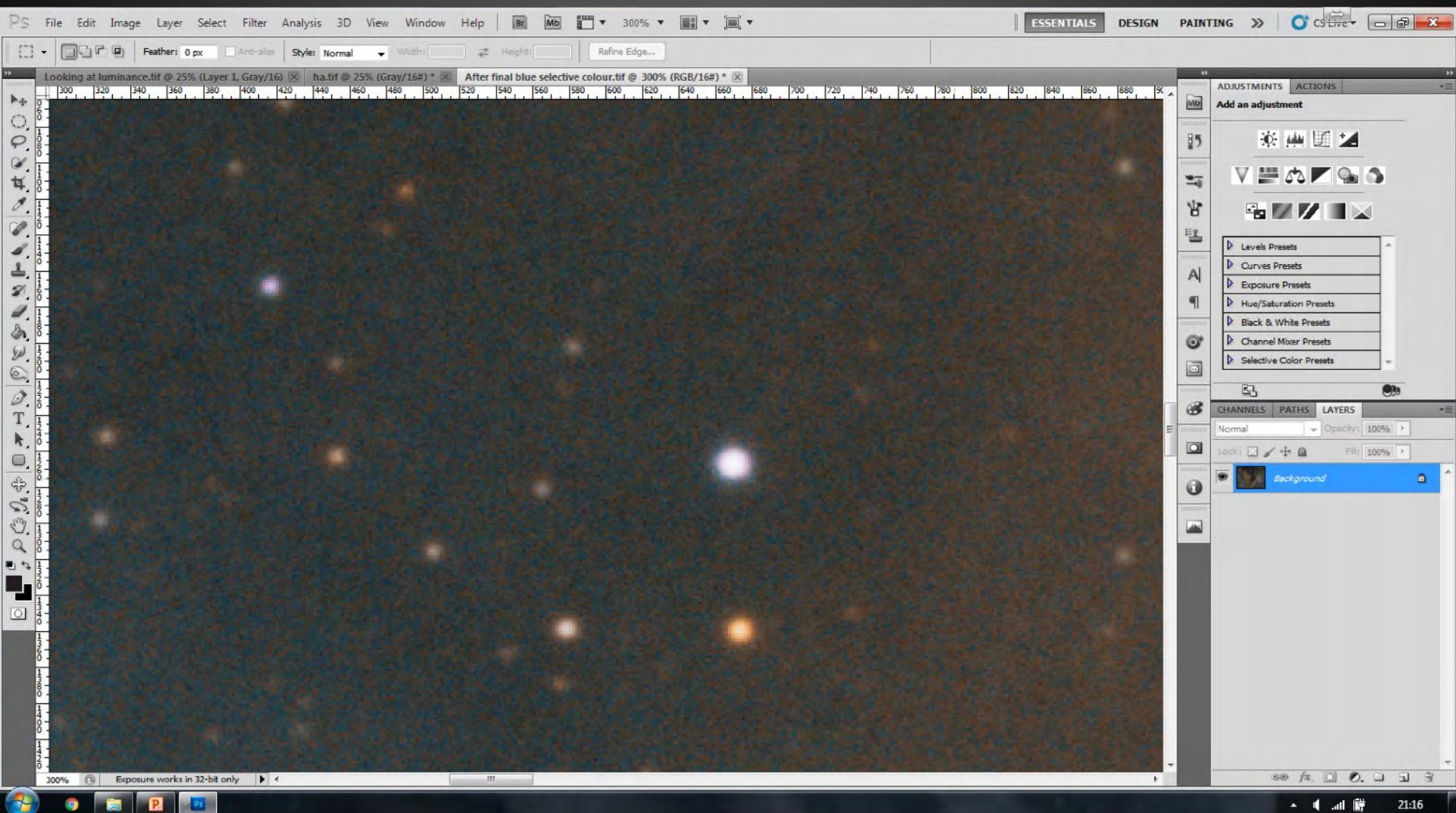


Blue Selective colour - Changing the blue to a lighter and slightly more cyan colour....



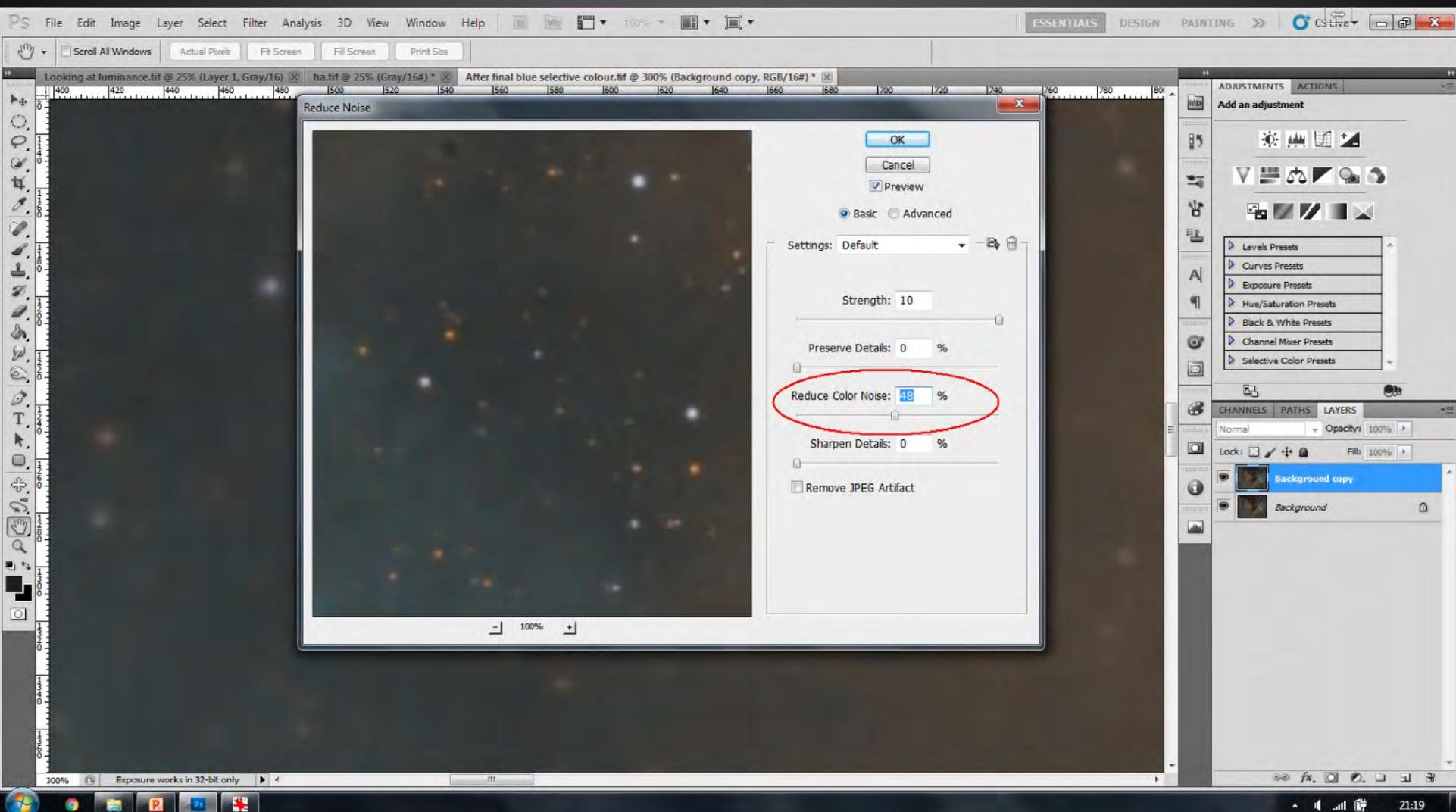
Processing

Preparing for luminance (noise)



Processing

Blurring the layer to combat noise



Processing

The difference once noise is removed



Processing

Considering the luminance

False
Luminance



How to create a false luminance

- ★ Use the image BEFORE any noise reduction
- ★ Desaturate the image by changing the mode to grayscale

Why a false luminance

- ★ It will include the details from ALL data channels. In some cases this is imperative

Luminance



Using a luminance filter you will get data in all visible channels.

- ★ Star bloat issues
- ★ Light pollution

Ha as
luminance



Data is only in the Ha channel - Lets consider if this is an issue.

Stars are smaller

Processing

Creating an Ha luminance

The screenshot shows the Adobe Photoshop interface with the following elements:

- Main Canvas:** Displays a grayscale image of a nebula. The top status bar shows three open files: "Looking at luminance.tif @ 25% (Gray/16)", "ha.tif @ 25% (Gray/16)", and "After noise red.tif @ 25% (RGB/16)".
- Curves Adjustment Windows:** Three "Curves" dialog boxes are open, each showing a curve for the Red, Green, and Blue channels. The curves are all set to "Custom" and show a similar S-shaped curve that darkens the mid-tones and brightens the highlights. The "Output" values for the curves are 227, 224, and 219 respectively.
- Right Sidebar:** Shows the "ADJUSTMENTS" panel with various adjustment options. The "CHANNELS" panel is visible, showing the "Background" layer selected.
- Bottom Status Bar:** Shows "25%" zoom and "Exposure works in 32-bit only".

Processing

Comparing the luminance

False luminance



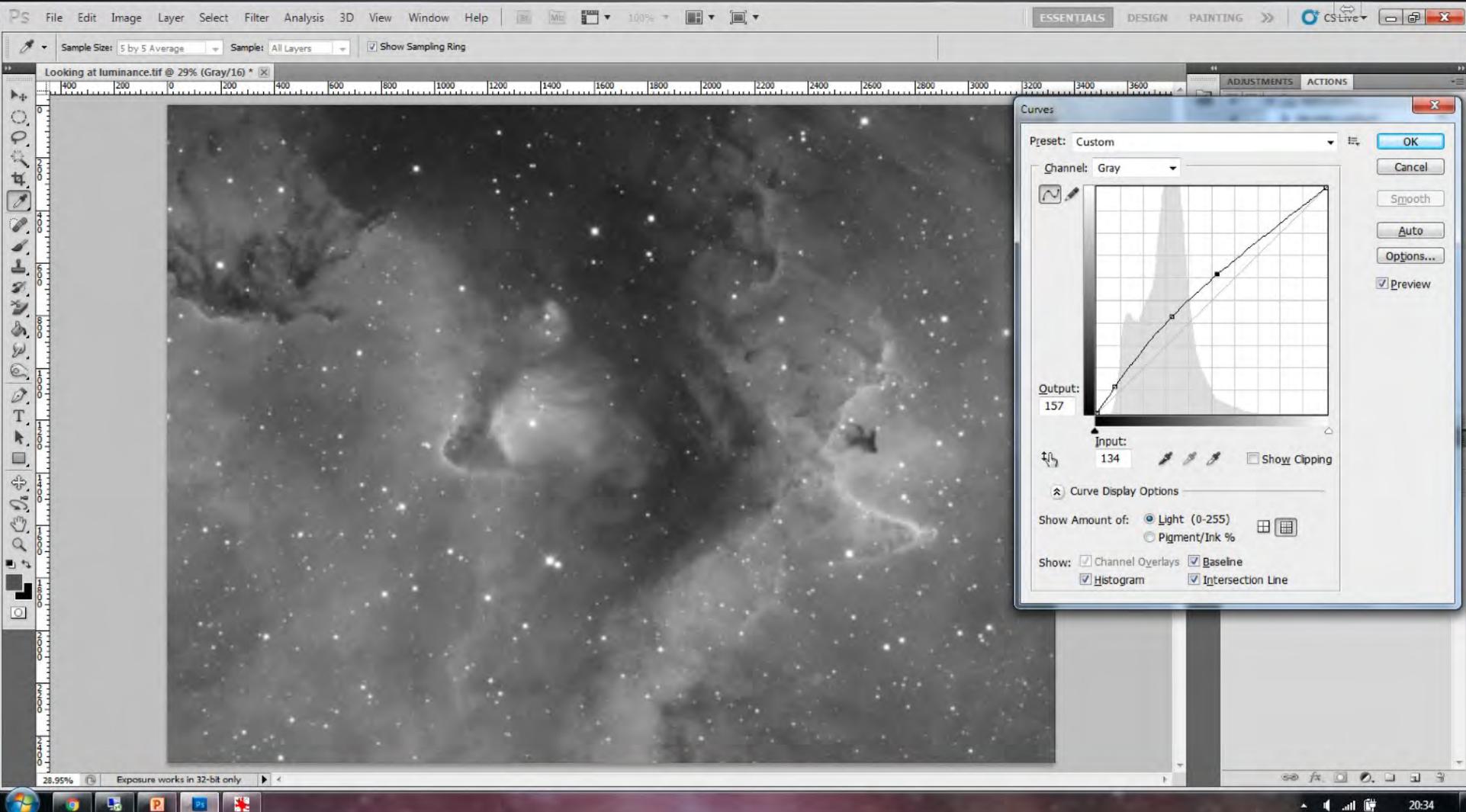
Ha only luminance



- ★ Very little difference between them.
- ★ False luminance has a little more noise
- ★ Ha luminance has smaller stars

Curves - Lighten the Luminance

Ensure that there is no clipping of the dark areas



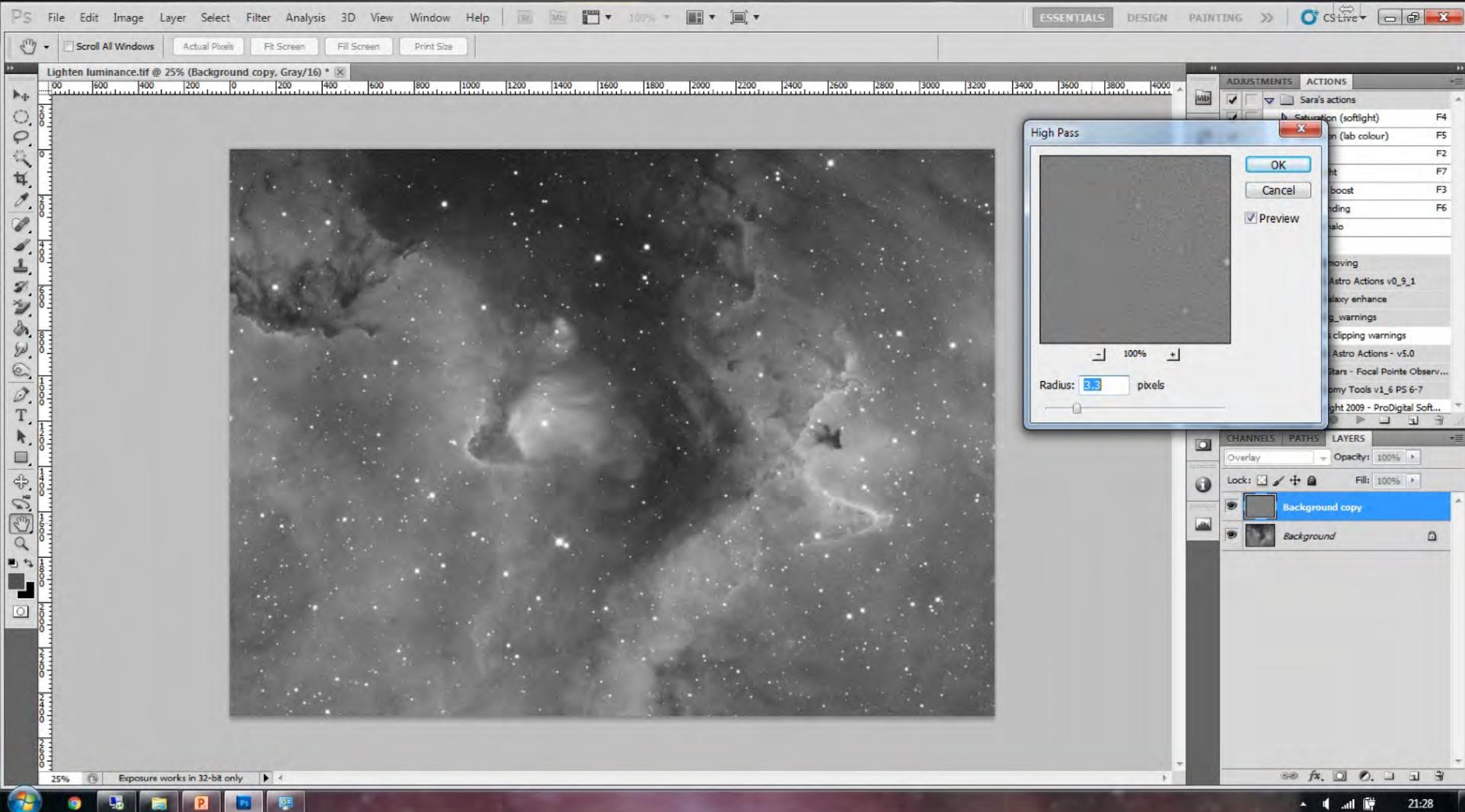
Duplicate the layer

Select 'Blend mode' overlay



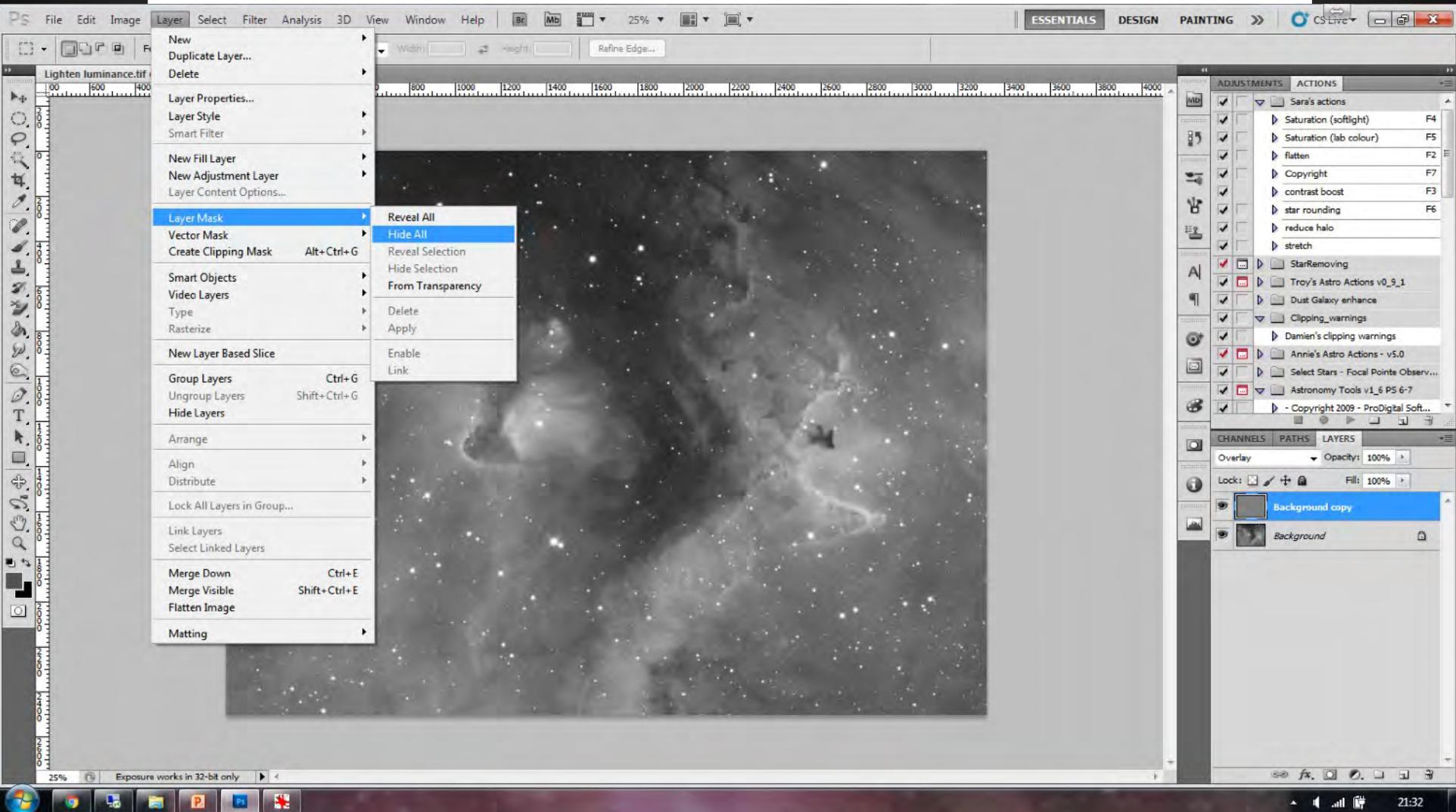
High Pass - Radius selection...

This can be tweaked in Opacity afterwards in a couple of ways

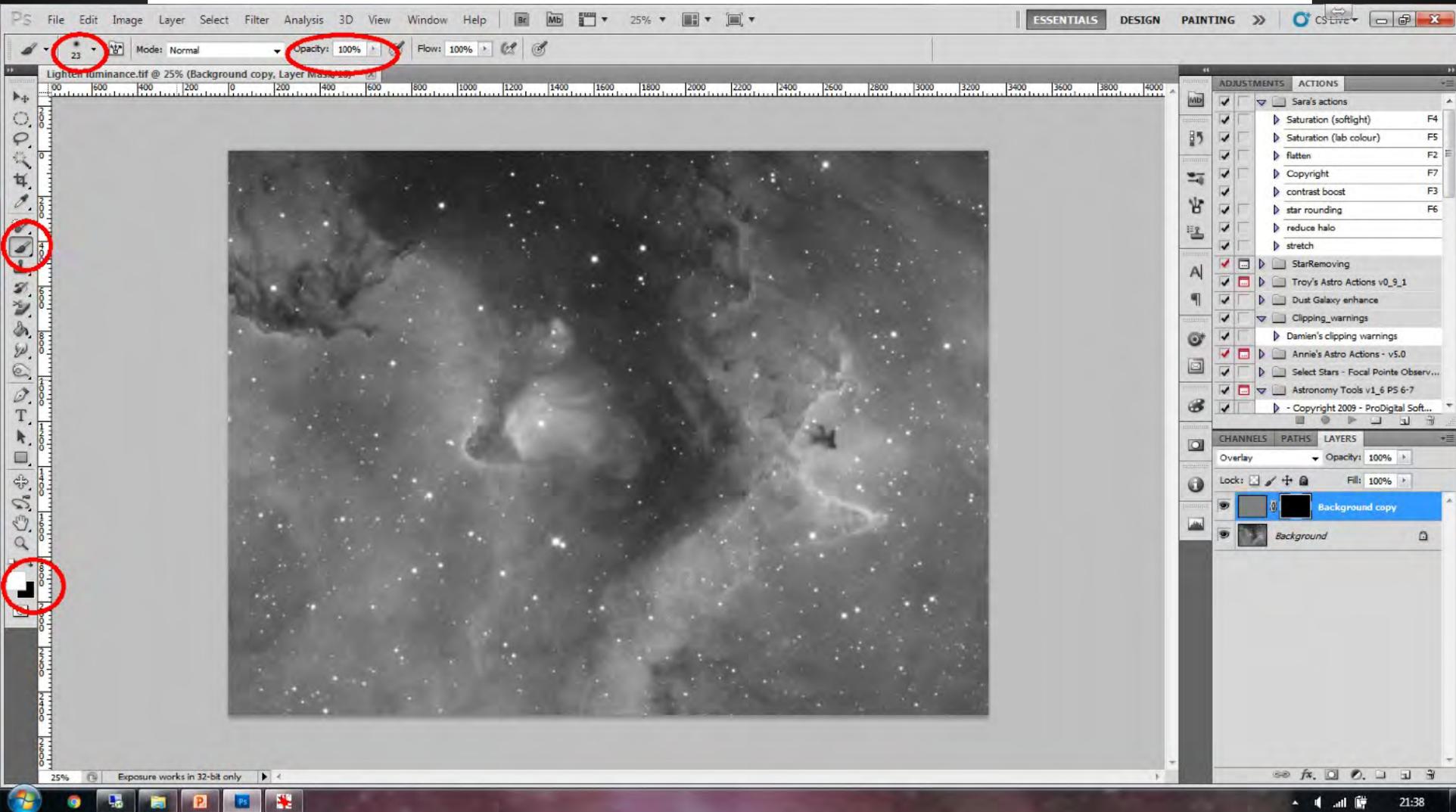


Layer mask - Hide

This allows us to sharpen up edge details and where the signal is the best

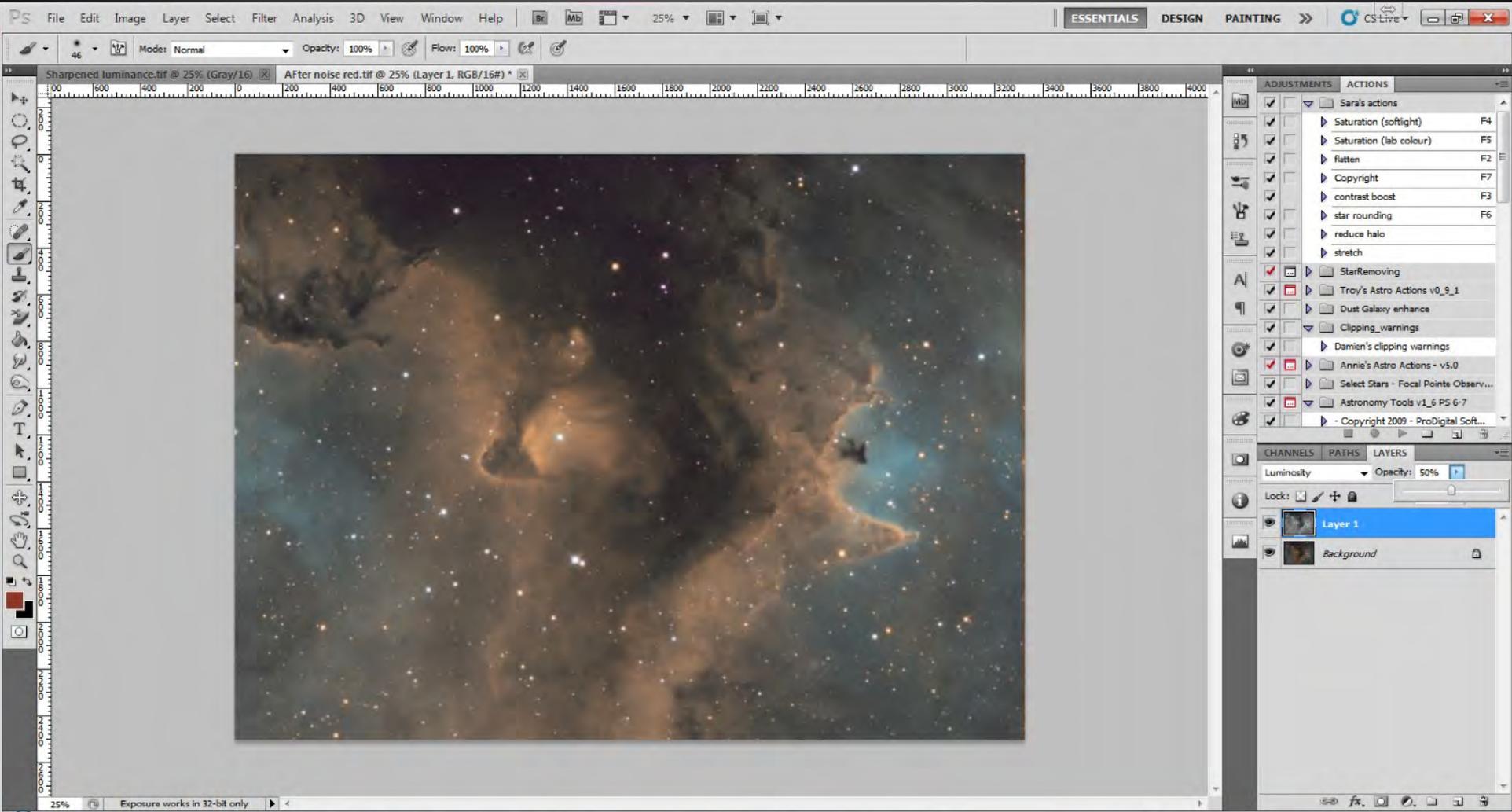


- 1) Background selection
- 2) Select brush
- 3) Select brush size
- 4) Select Opacity

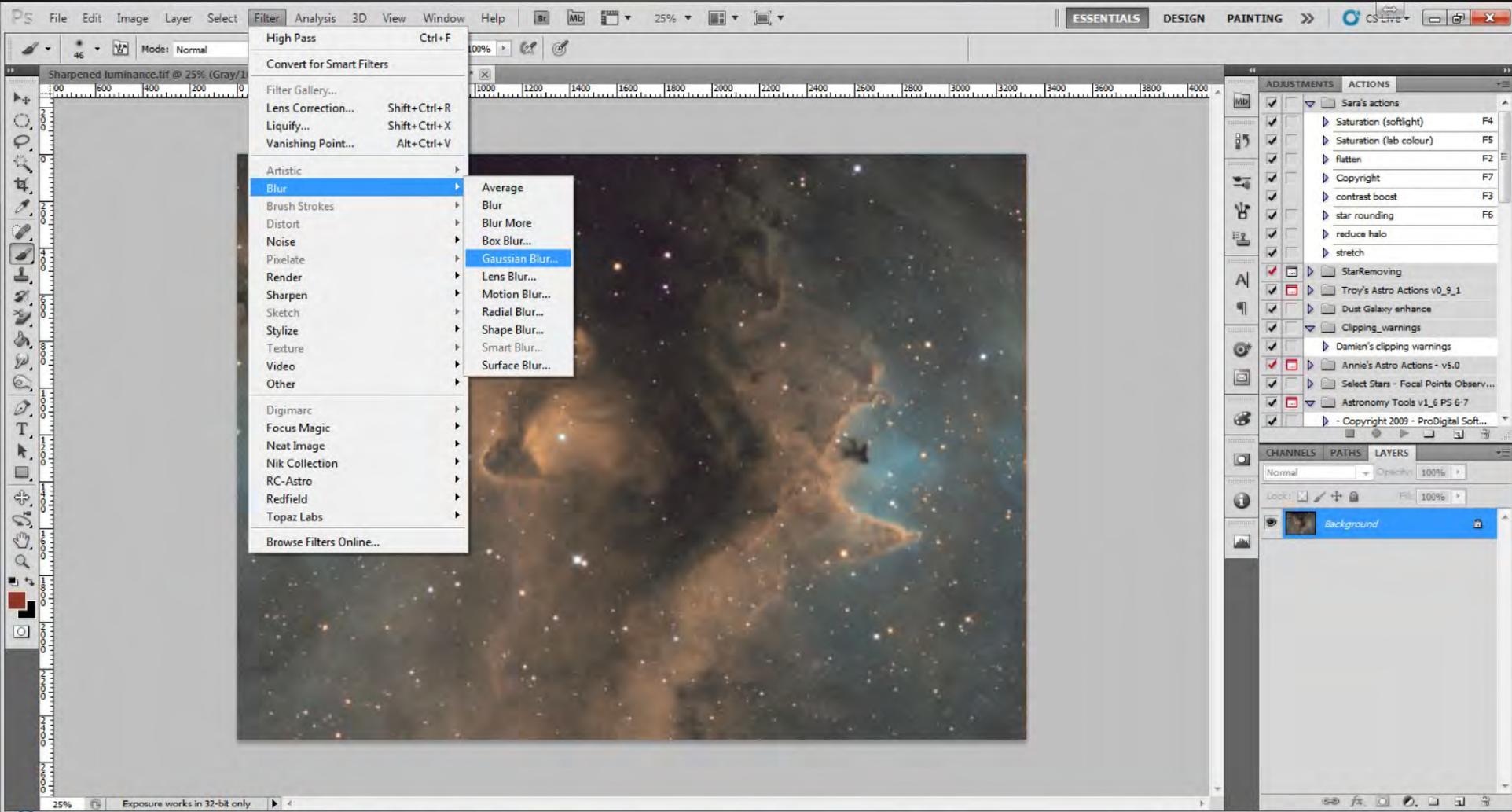


Copy the Luminance image and paste it onto the Coloured Noise reduced image.

Don't add all luminance at once

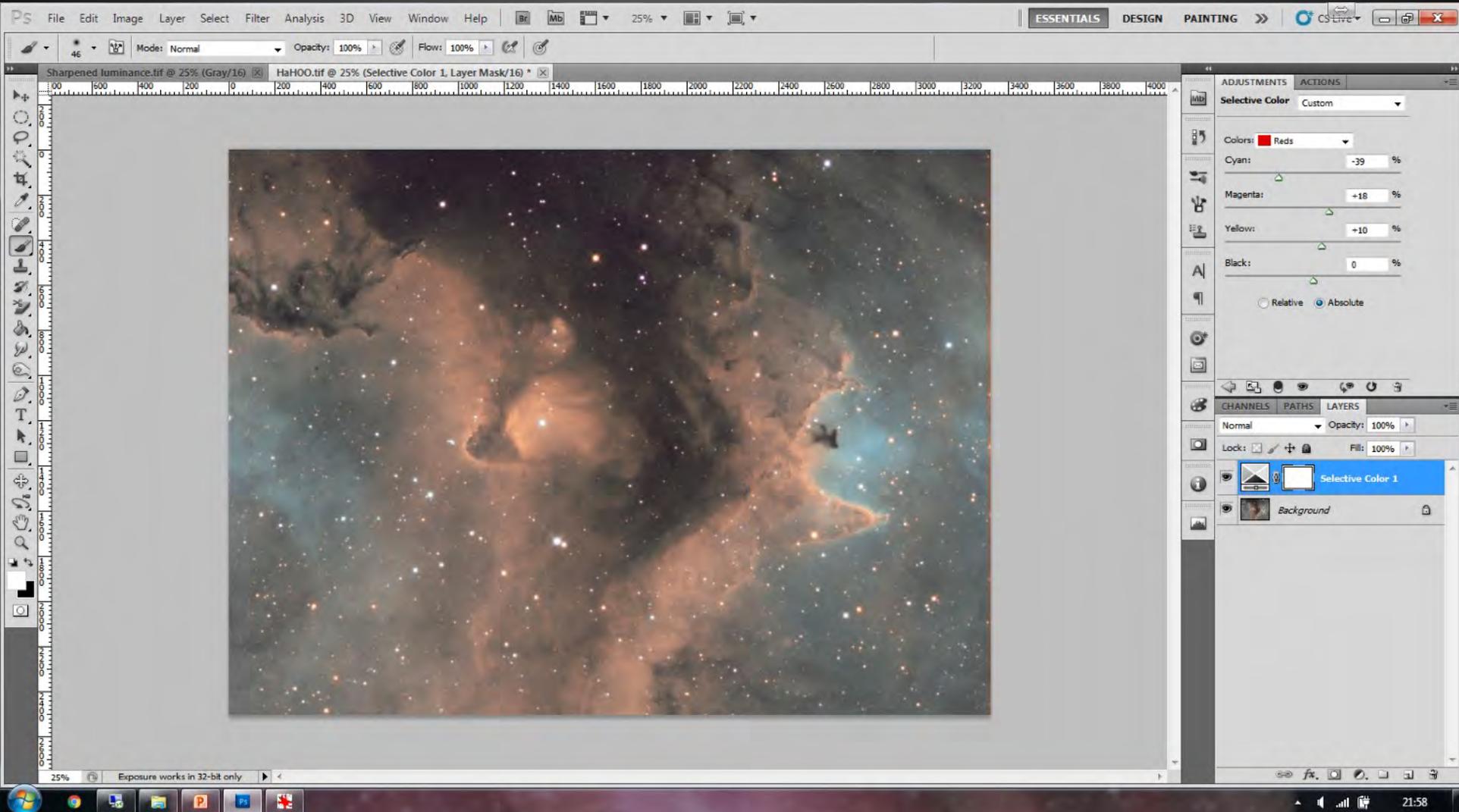


Iteratively add the luminance and blur in-between each iteration of about 0.9 pixels



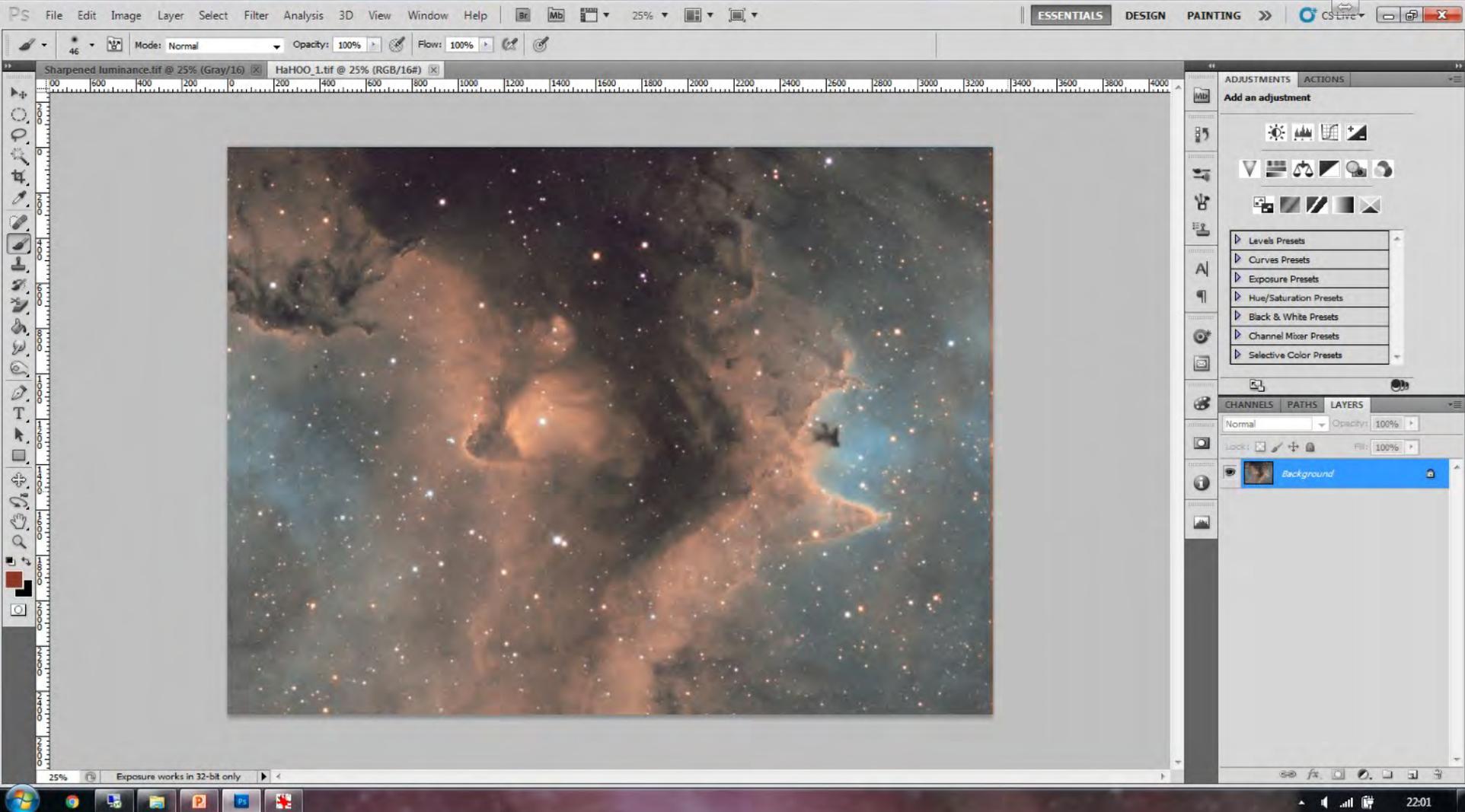
Once the luminance has been added to 100% opacity - Consider the colour again.

Red / Blue / Cyan



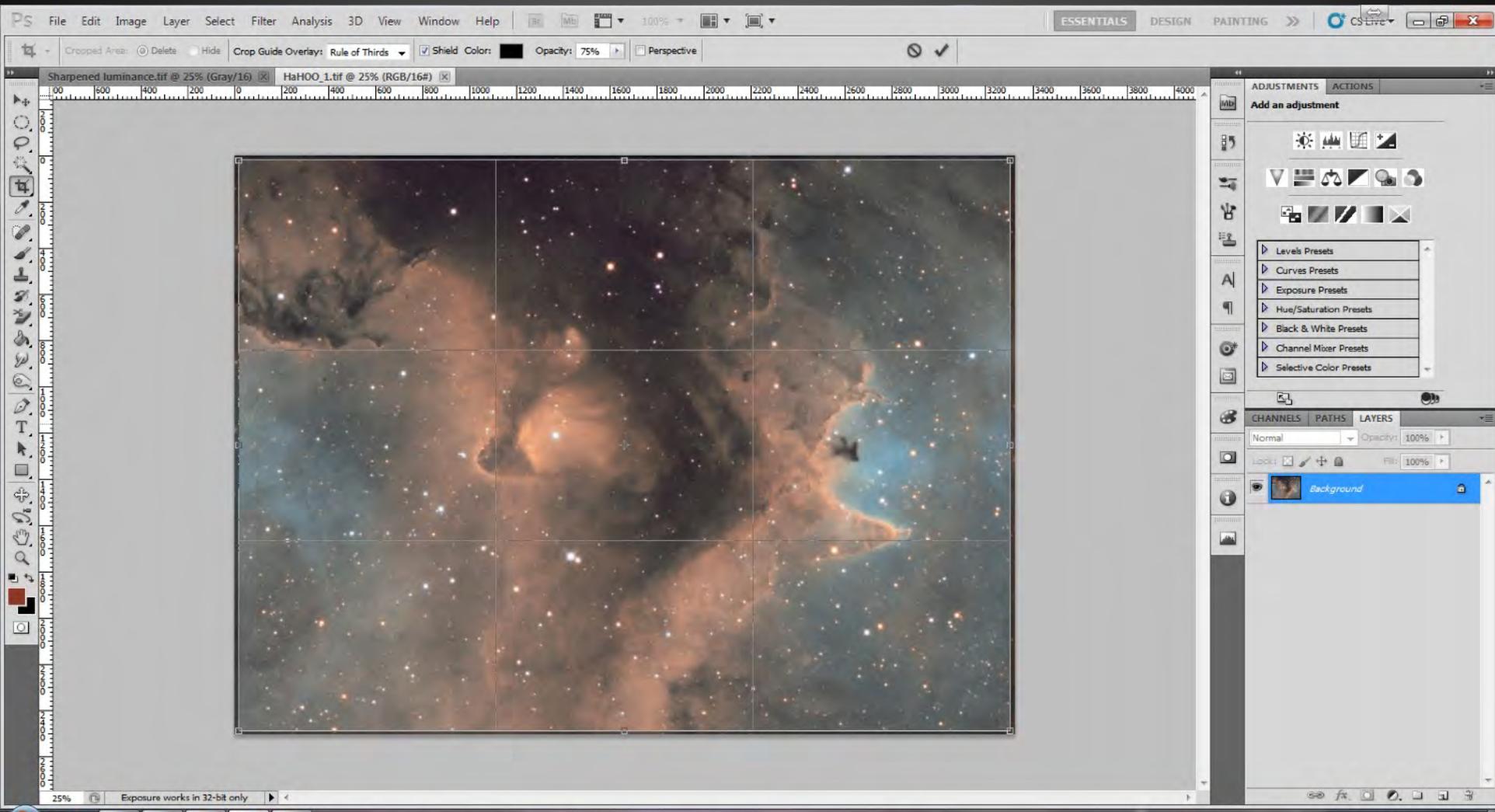
Processing

What is needed next

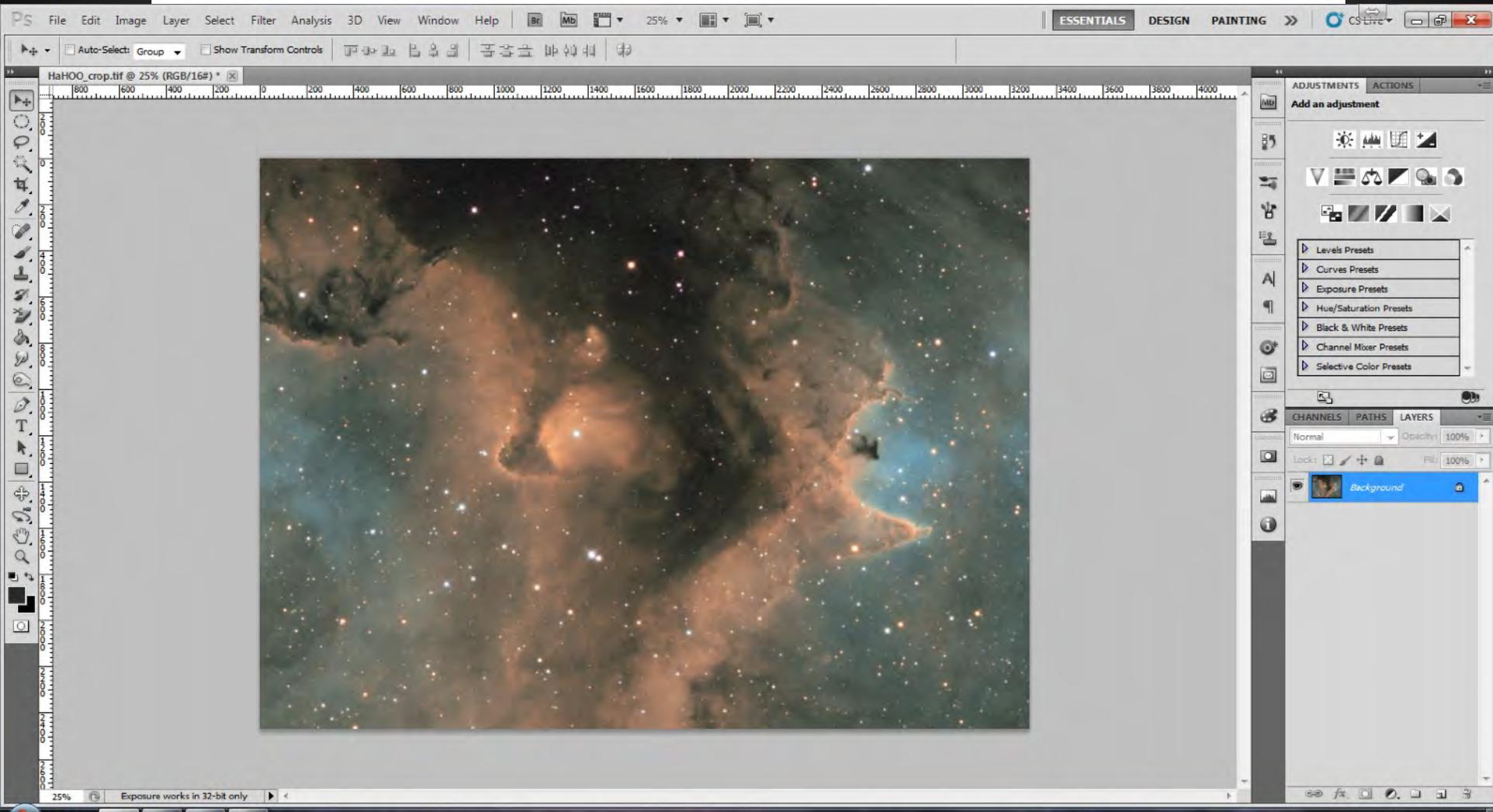


Processing

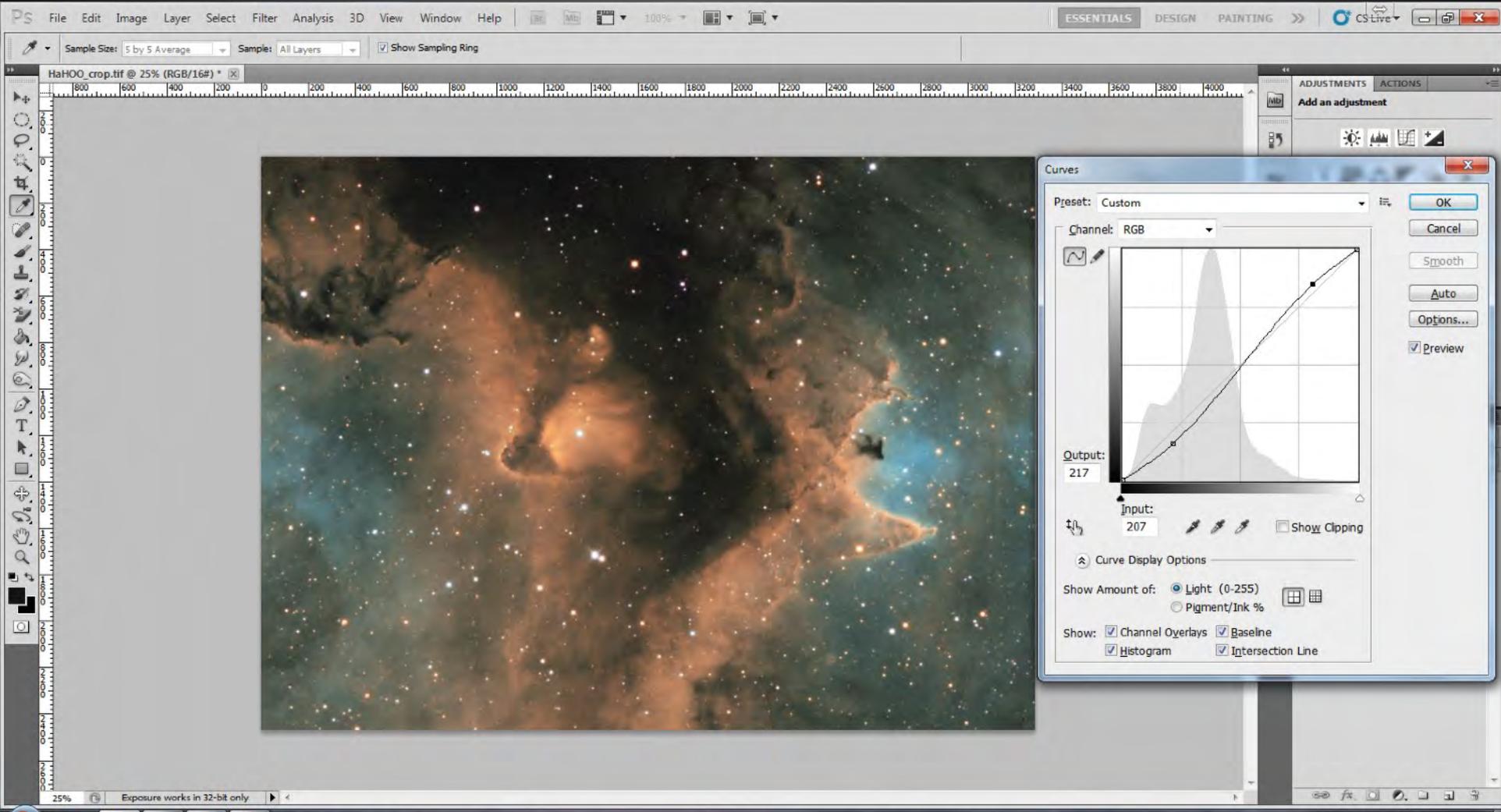
Crop the edges



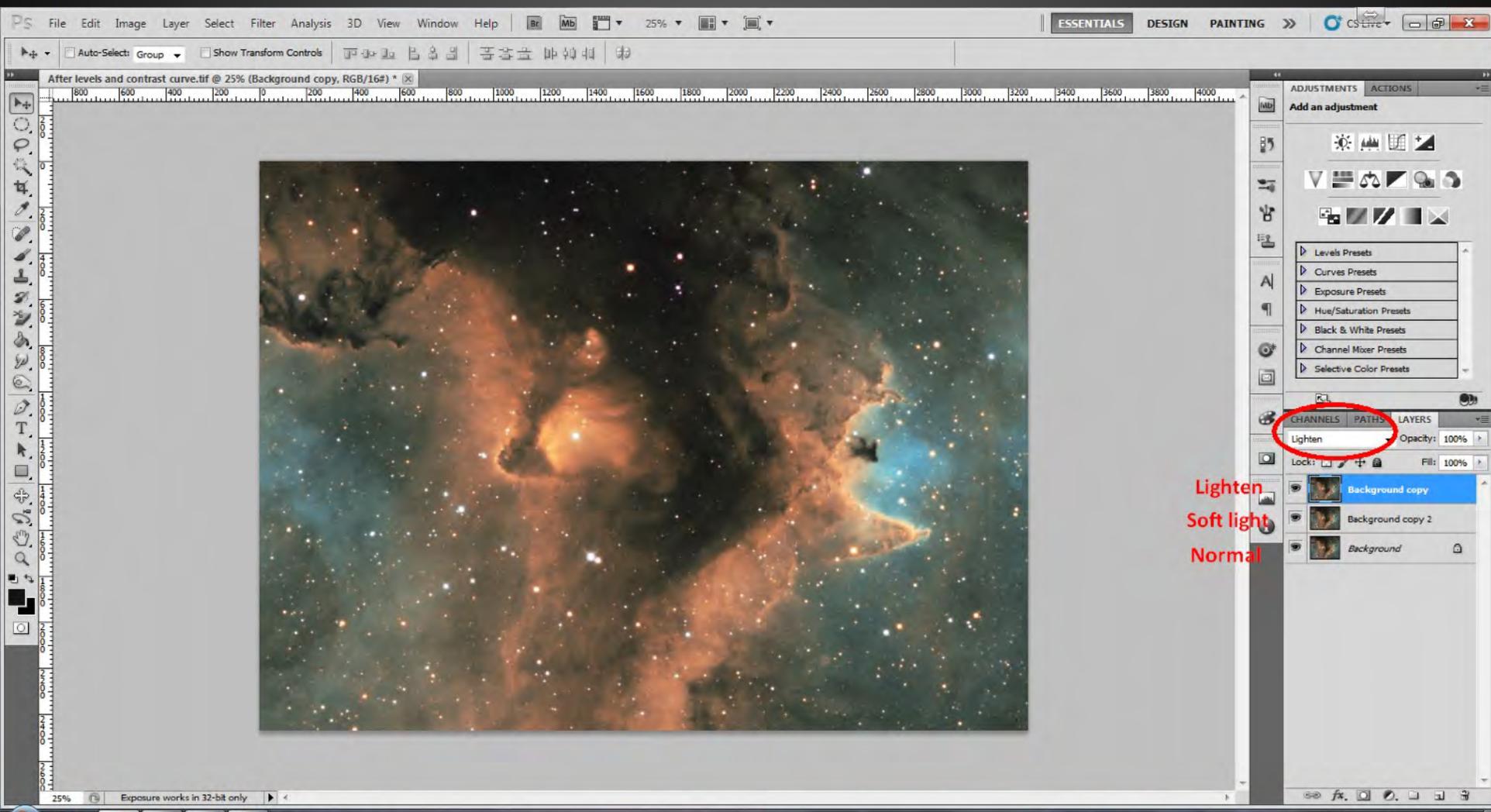
1) Move blackpoint on individual colours..... Attains a balanced histogram.



Contrast curve - Lowers the dark end and lightens the brighter areas.... Watch out for clipping



- 1) Create three duplicate layers.
- 2) Blend mode as shown
- 3) Flatten the complete image - Change opacity of the 2 upper layers to suit as required.

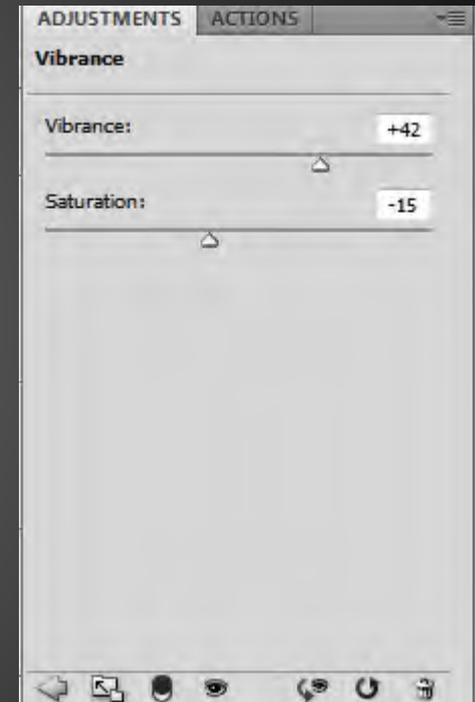
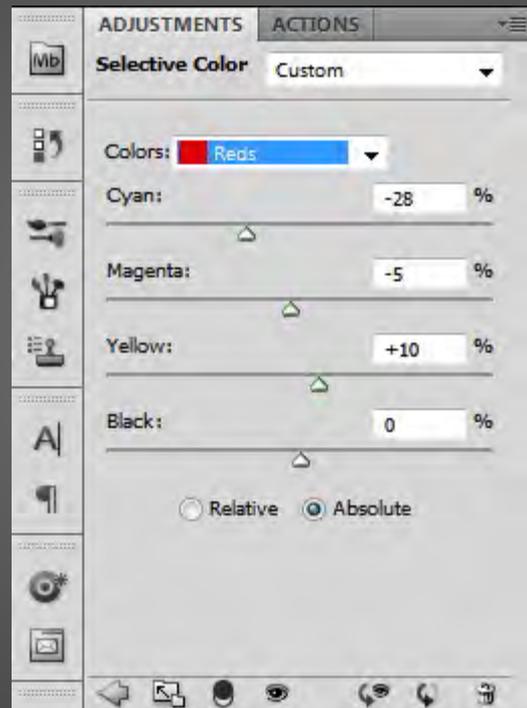
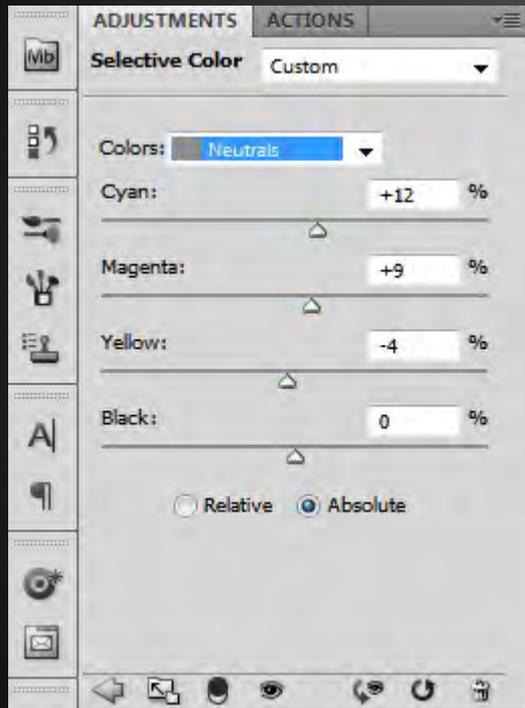


Processing

How to finally present your image



Processing Selective colour





2016 in pictures



Thank
you

CEDIC
2017

Sara
Wager

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