

Basic Image Processing Techniques

USING GIMP

David Richards

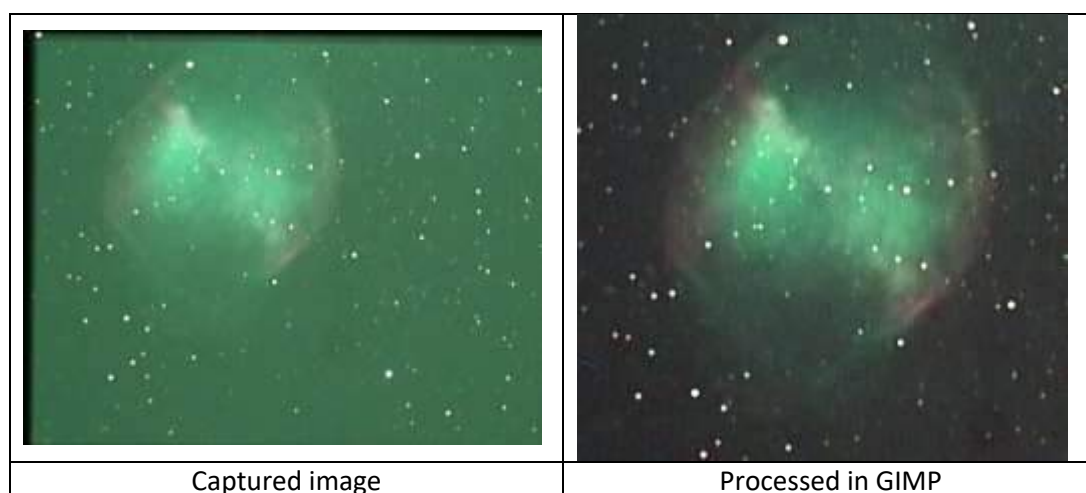
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1 Introduction

This document is a brief outline of several techniques used to process a captured image using GIMP. The image processed in the examples was captured by a Revolution Imager 2 camera. The image was produced as 368 frames in a SharpCap Live Stack session by SharpCap Forum user *@donstim*. The image used in this document can be found in forum post:

<https://forums.sharpcap.co.uk/viewtopic.php?f=12&t=1132> .



The captured image has three areas to be considered:

1. The colour-balance – this can be addressed by image processing software such as GIMP (free/donation), FastStone Image Viewer (free/donation), PhotoShop (~£10 per month subscription) and others.
2. The shape of the histogram – this needs to be worked on at image capture time.
3. Stacking artefacts at the left and top of the image.

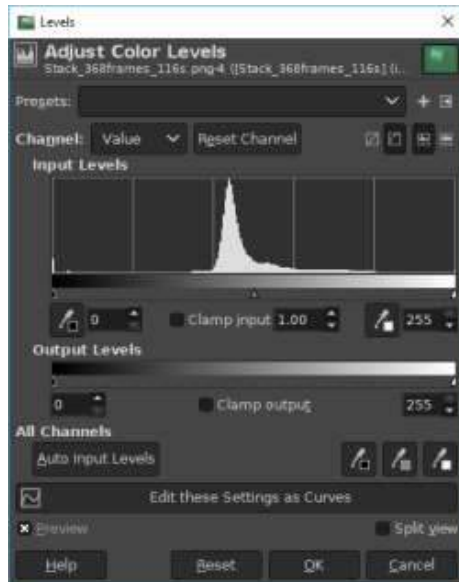
There was no requirement to use *Curves* in GIMP to stretch the image.

Download GIMP from <https://www.gimp.org/> . GIMP 2.10 (preferred) can handle 16-bit images. [Note: Gimp 2.8 will convert 16-bit images to 8-bit and thus reduce detail].

There may be different techniques which can achieve the same result. Please use whatever works for you.

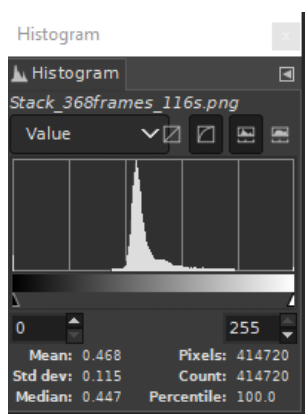
2 Getting Started

1. Start GIMP and drag and drop the image to be processed onto the GIMP workspace.
2. Choose *Colors > Levels*.

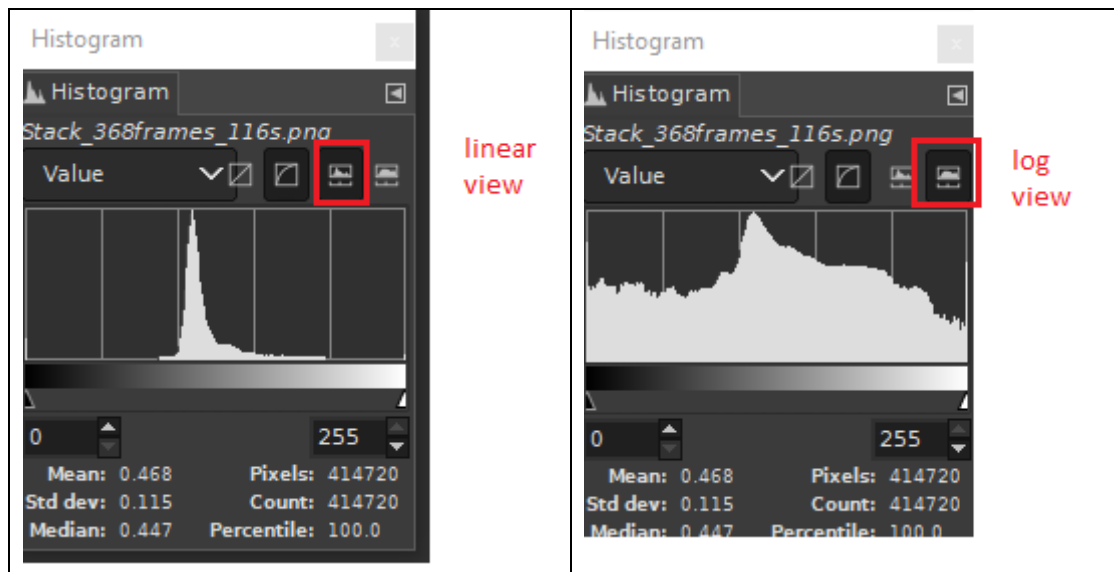


3. The histogram is also required. If the histogram is not visible, then from the menu select:

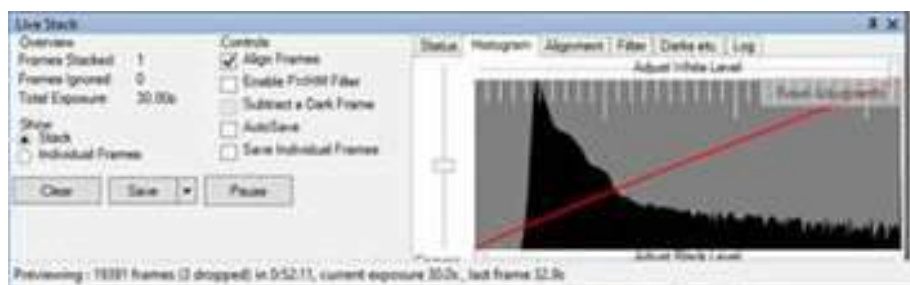
Windows > Dockable Dialogs > Histogram



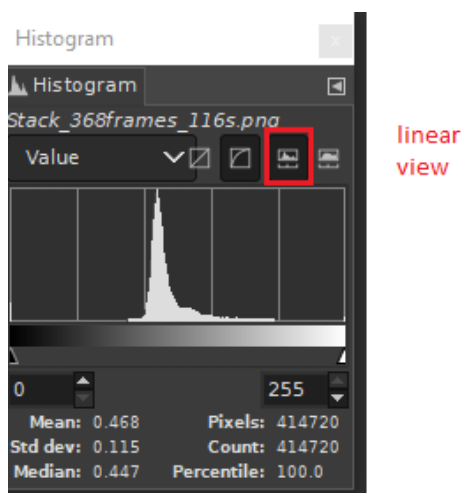
- The histogram can be displayed in 2 ways – *logarithmic* and *linear* using the buttons shown.



- The *log view* shows that the histogram is hitting both the left-hand and right-hand side. With Live Stack or conventional imaging of a deep sky object, at capture time, aim for a histogram shape as shown below.



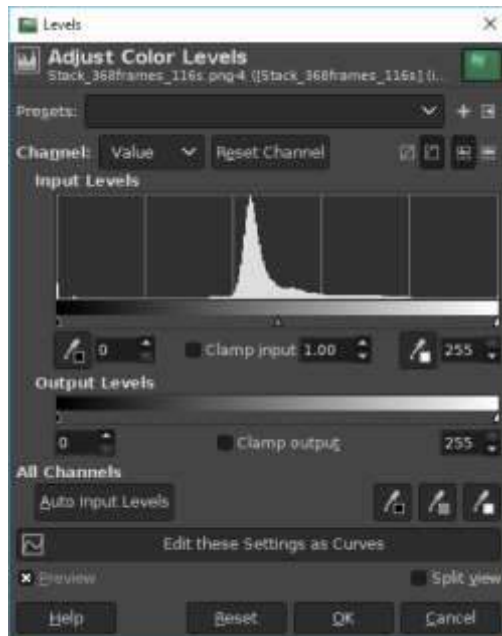
- For the next steps, set the histogram to *linear mode*.



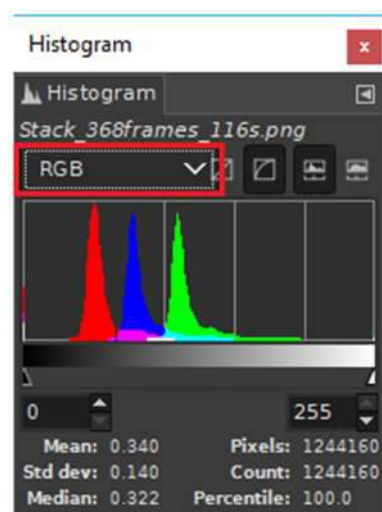
3 Balance Colour levels

These steps describe how to address colour balance issues.

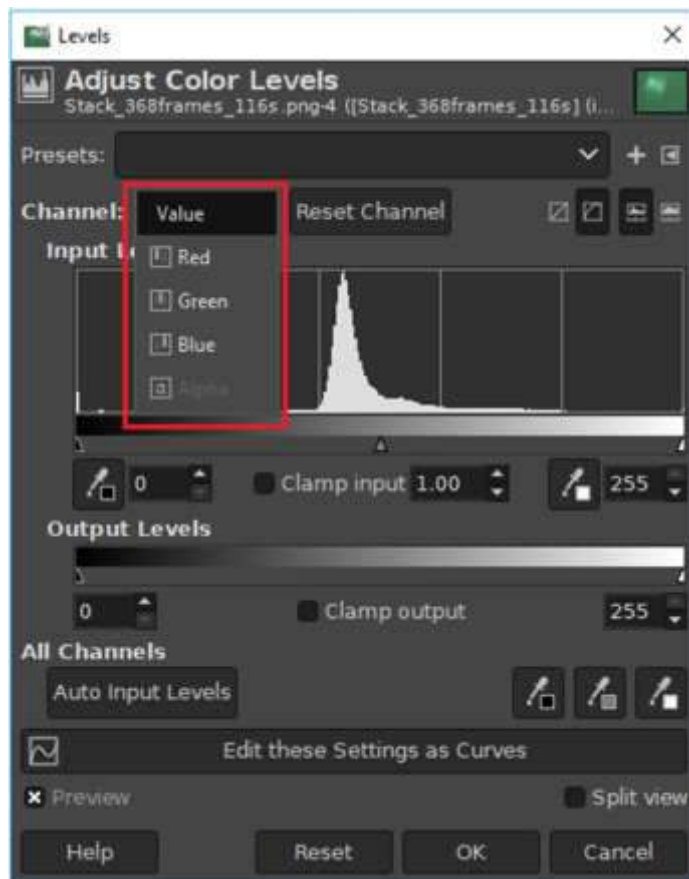
1. From the menu, select *Colors > Levels*.



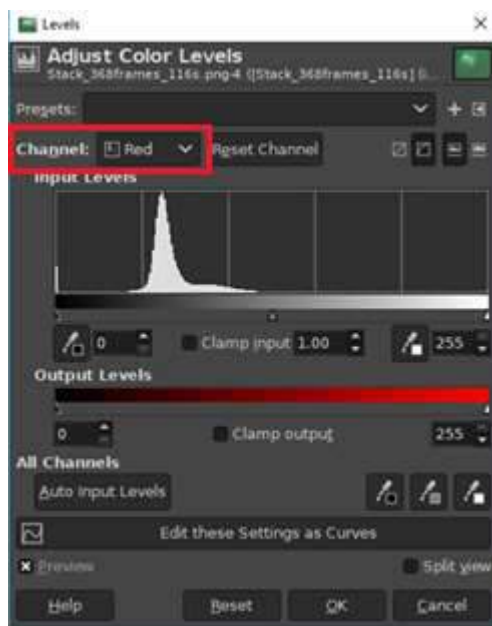
2. From the histogram select *RGB*. This demonstrates the lack of colour balance as the Red, Green and Blue histograms should be stacked on top of each other.



3. In levels, the *Channel* dropdown is used to select the colour to work on.



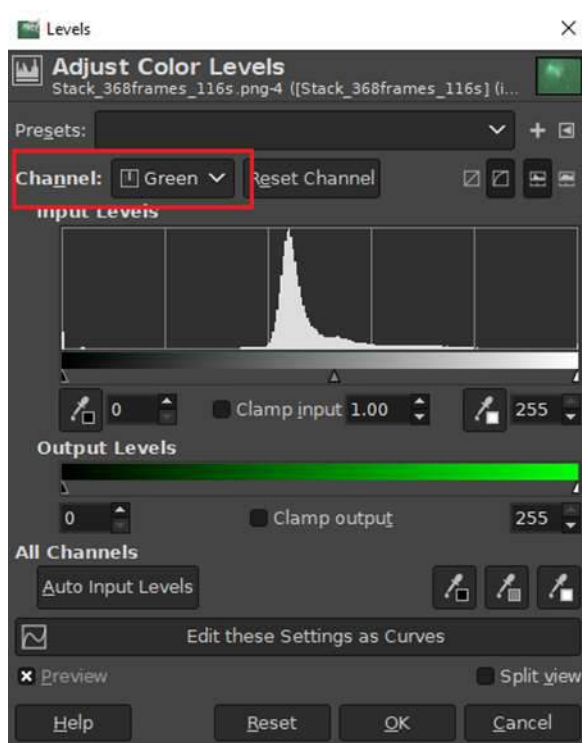
4. In the *Channel* dropdown, select **Red**.



5. Adjust the **red** channel.

A screenshot of the 'Adjust Color Levels' dialog box. The 'Channel' is still 'Red'. The left input level slider has been moved from 0 to 14, which is highlighted with a red rectangle. The output level remains at 255.	A screenshot of the 'Histogram' window. It shows three histograms for Red, Green, and Blue channels. The Red histogram is the leftmost and tallest. A red arrow points to the first vertical white line on the x-axis, which represents the 20% percentile.
Move the left-hand slider to the right	Until the red histogram is at 20% (first vertical white line from left)

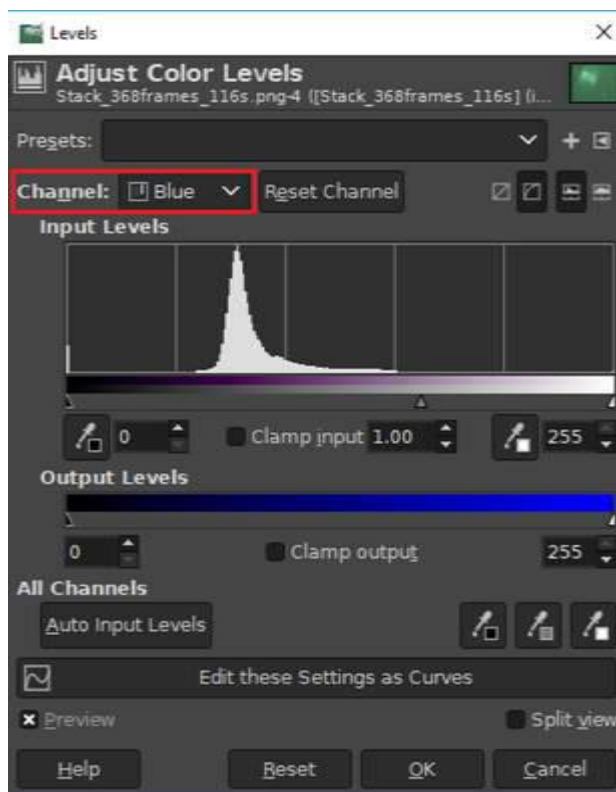
6. In the *Channel* dropdown select **Green**.



7. Adjust the **green** channel.

A screenshot of the 'Adjust Color Levels' dialog box. The 'Channel' dropdown is set to 'Green'. The left-hand slider of the 'Input Levels' histogram is moved to the right, indicated by a red box and an arrow. The 'Preview' checkbox is checked, and the 'Split view' checkbox is unchecked.	A screenshot of the 'Histogram' dialog box. The 'RGB' histogram is shown, with the green channel highlighted in green. The red channel is highlighted in red. The histogram shows the distribution of pixel values for each channel. The 'Mean', 'Std dev', 'Median', 'Pixels', 'Count', and 'Percentile' statistics are displayed at the bottom.
<p>Move the left-hand slider to the right</p>	<p>Until the green histogram overlays the red histogram</p>

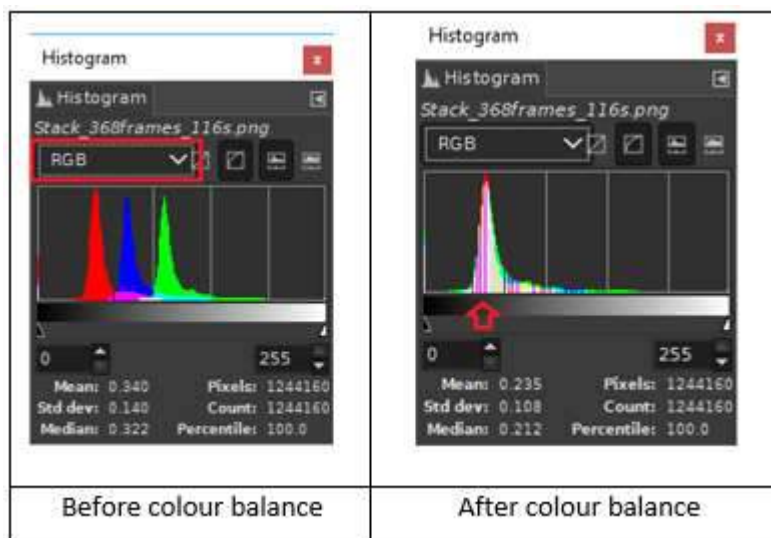
8. In the *Channel* dropdown select **Blue**.



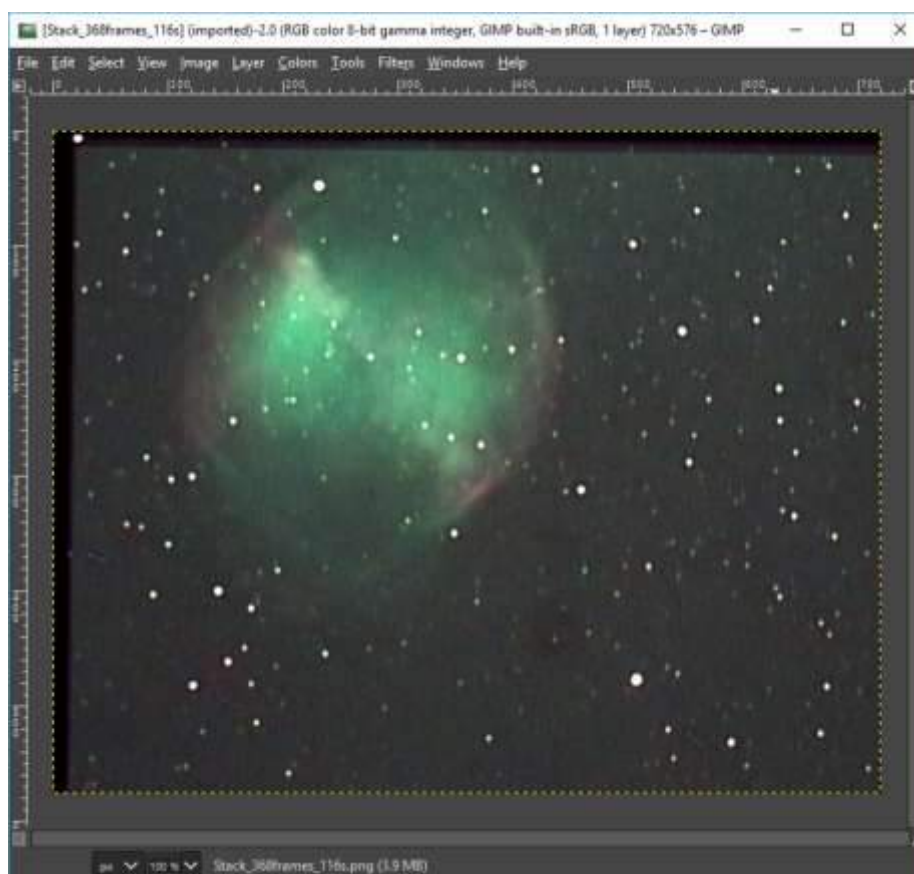
9. Adjust the **blue** channel.

A screenshot of the 'Adjust Color Levels' dialog box. The 'Channel' dropdown is set to 'Blue'. The 'Input Levels' histogram shows a single peak. The left slider of the 'Input Levels' is moved to 86, which is highlighted with a red rectangle. The 'Output Levels' slider is set from 60 to 255. The 'All Channels' section has 'Auto Input Levels' checked. The 'Preview' checkbox is checked, and the 'Split view' checkbox is unchecked. Buttons for 'Help', 'Reset', 'OK', and 'Cancel' are at the bottom.	A screenshot of the 'Histogram' dialog box. The 'RGB' dropdown is selected. The histogram shows three overlapping peaks: red, green, and blue. The blue peak is the tallest and is highlighted with a red arrow. The 'Input Levels' slider is set from 0 to 255. The statistics table shows: Mean: 0.235, Std dev: 0.108, Median: 0.212, Pixels: 1244160, Count: 1244160, Percentile: 100.0.
<p>Move the left-hand slider to the right</p>	<p>Until the blue histogram overlays the red & green histograms</p>

10. The colour channels are now in balance.

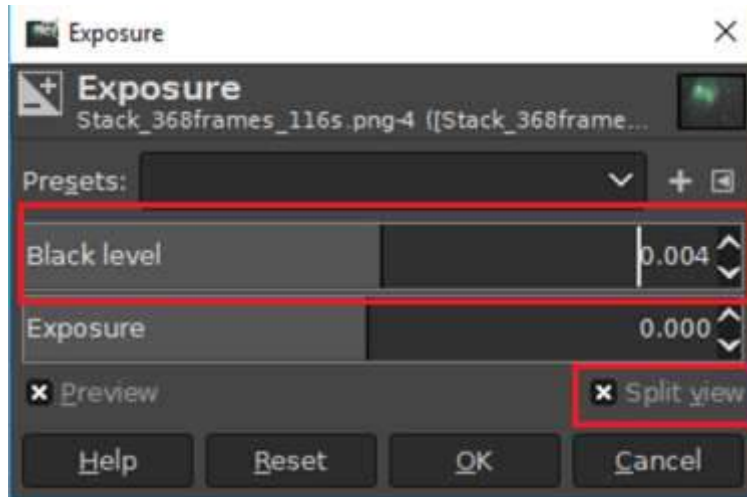


11. The green cast has been removed.

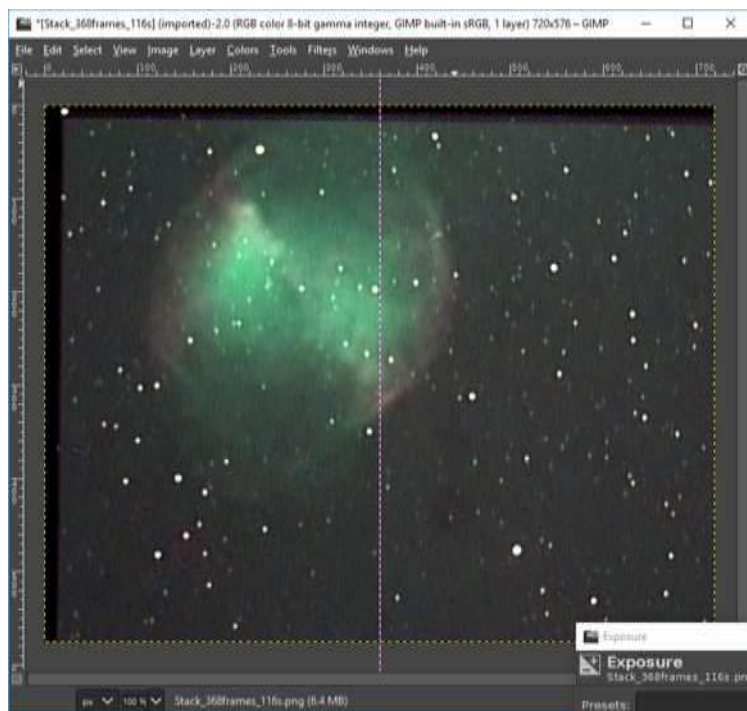


4 Adjust the Black Level

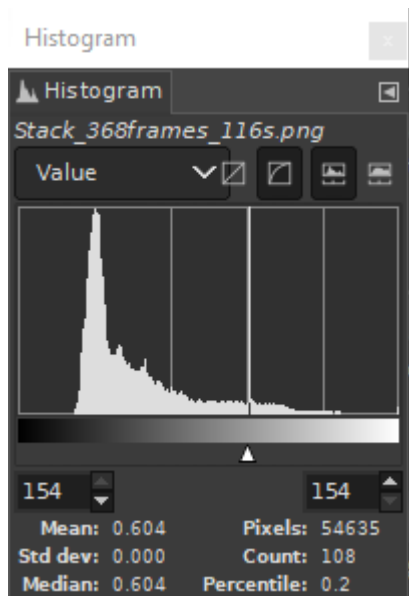
1. From the menu select *Colours > Exposure*. Click the *Split View* – the screen to the left-hand side of the vertical dotted line is after adjustment has been made, the right-hand side is before adjustment.



2. Adjust *Black Level* to taste – it needs to be less than black because the sky is not black.

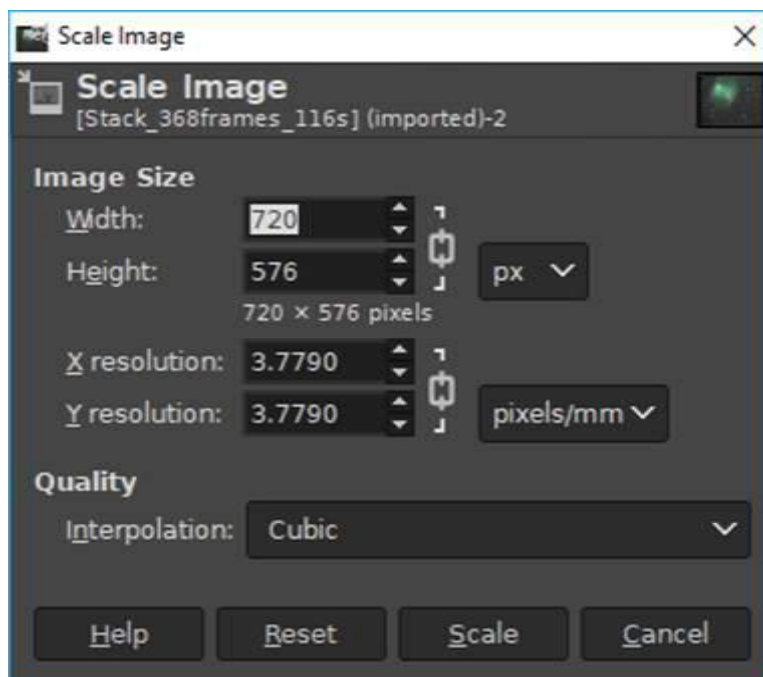


3. When doing this, keep an eye on the histogram to ensure it does not touch the left-hand side (black level clipping which would result in the loss of faint data).

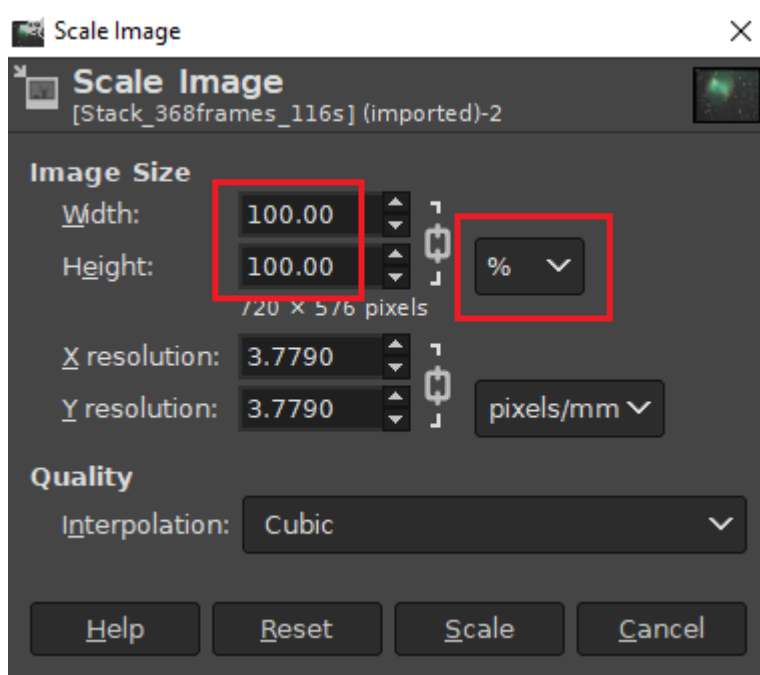


5 Scale the image

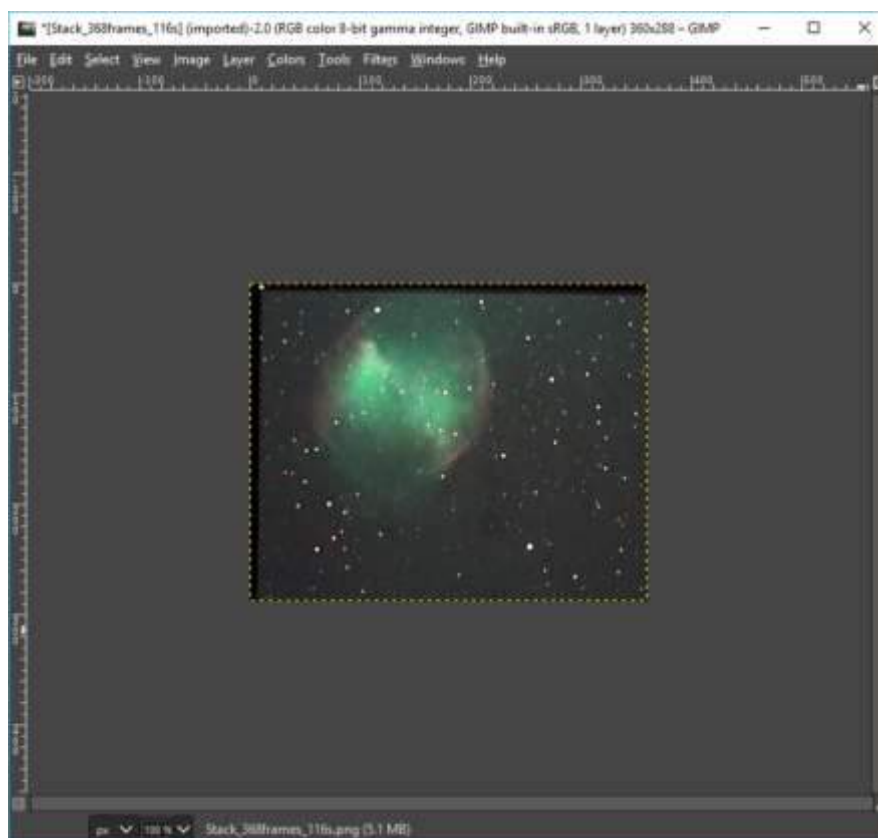
1. From the menu, select *Image > Scale Image*.



2. Choose % and set the *Width* and *Height* to 50



3. This results in 'tighter' stars.

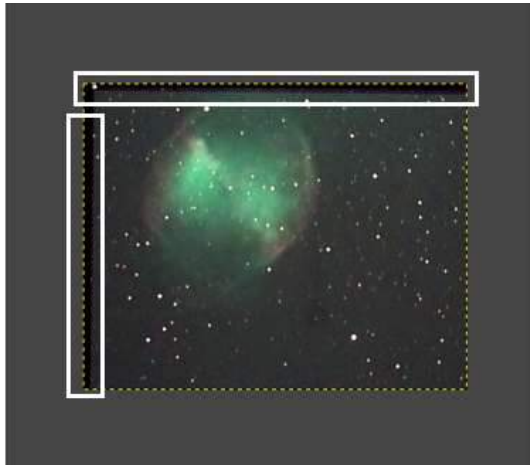


6 Crop Stacking Artefacts

The black lines at the top and left of the image are artefacts and have several possible causes:

- Less than perfect polar alignment
- Less than perfect tracking
- Less than perfect stacking

The first two can be addressed at the start of a session and will help with the third.

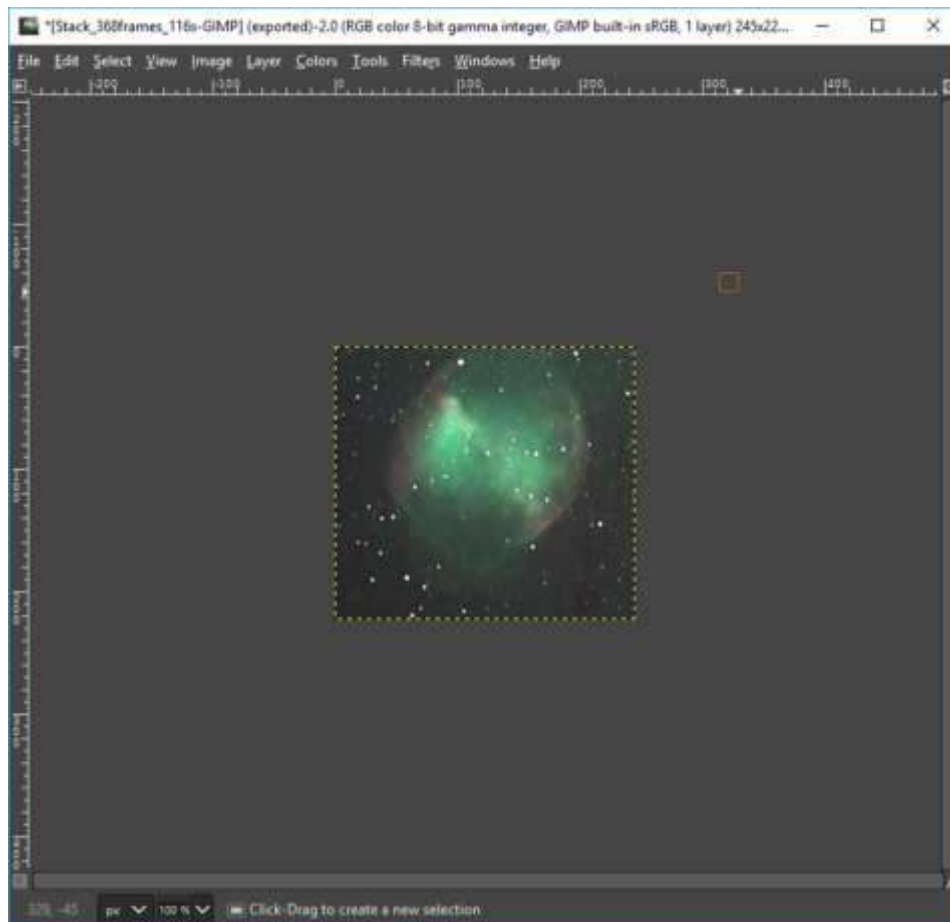


1. If the *Toolbox* panel is not visible, then from the menu select *Windows > Toolbox*.



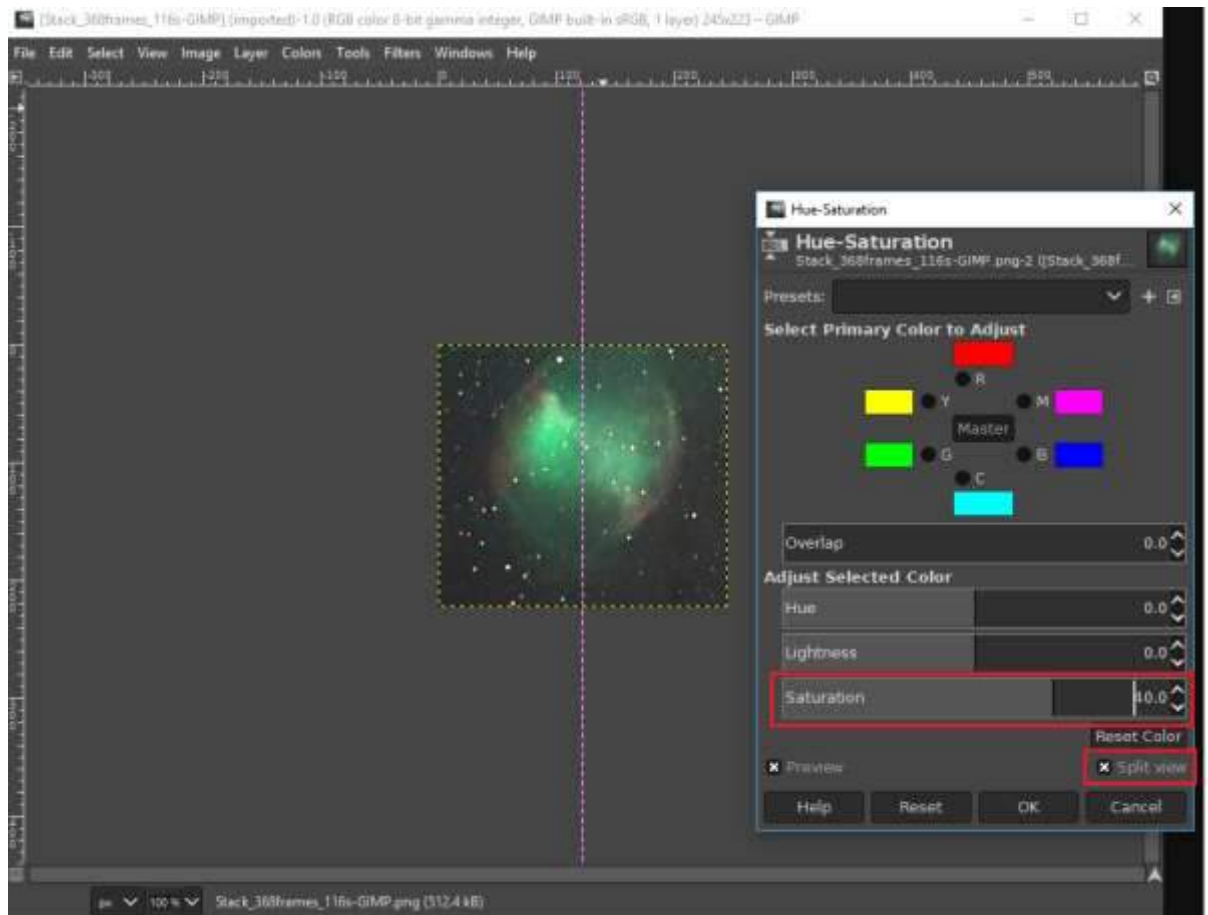
2. Use the *Rectangle Select Tool* and drag a suitable rectangle on the image leaving out the stacking artefacts.
3. From the menu select *Image > Crop to Selection*.

4. This is the final cropped image.



7 Adjust Saturation

1. From the menu, select *Colours > Hue-Saturation*.
2. Check *Split View*.
3. Adjust the *Saturation*. A figure up to 40 can improve the image.



8 Save the Processed Image

1. From the menu, *File > Save* will save the image in GIMP format (an XCF file) for future editing.
2. From the menu, *File > Export As* will save the file in a format such as PNG or JPG.