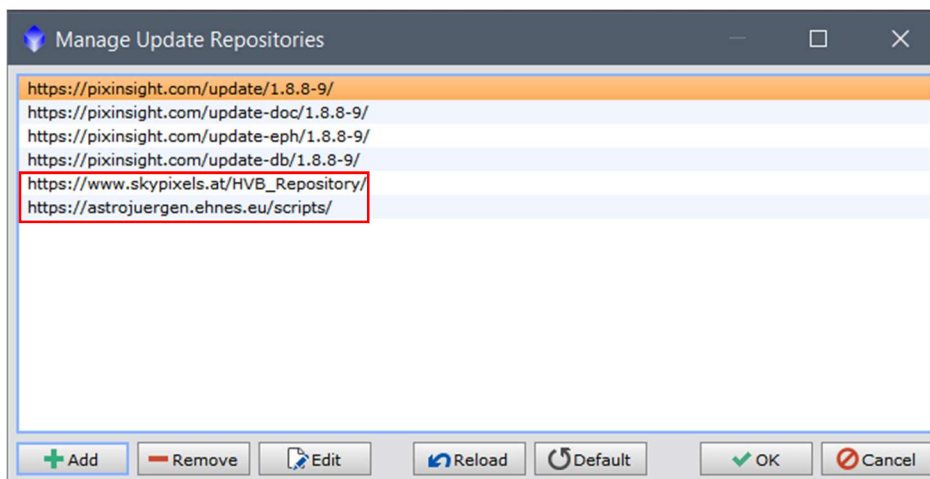
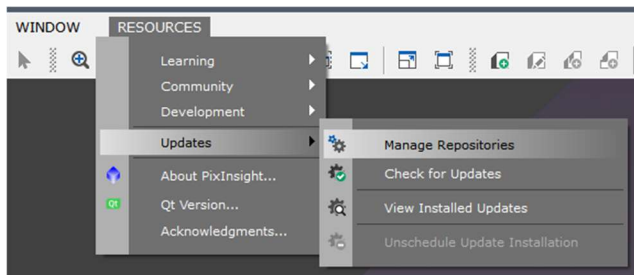


Embedding the stars from the RGB in the filter image (e.g. CLS) with PixInsight (version 1.8)

For some steps in this sequence additional scripts are needed, but they are not decisive for the final image.

Procedure:

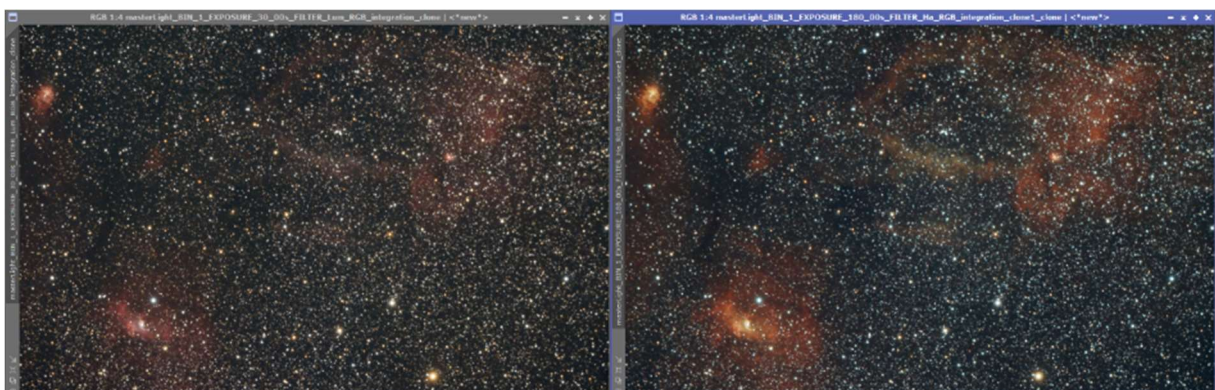
Via 'Resources' - 'Updates Manage Repository' take over the last two entries shown in the picture.



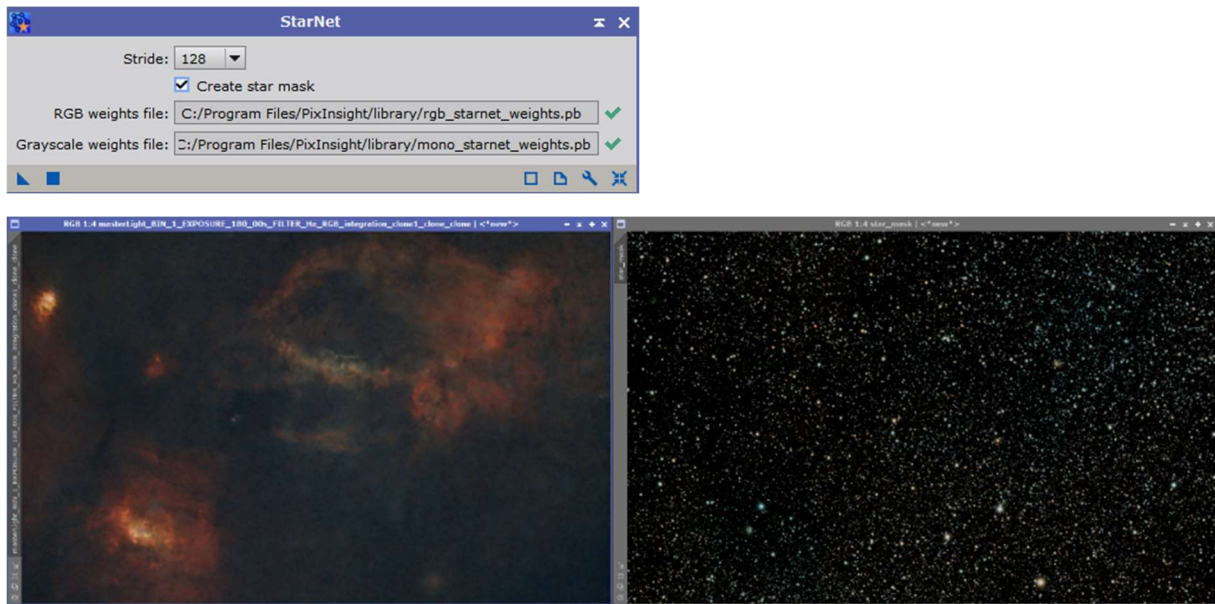
Then click on 'Updates' - 'Check for Updates' and restart Pixinsight. The new scripts will be installed automatically.

For this process, the stretched image of the RGB capturing (instruction 3) and that of the filter processing (instruction 5) are opened in the PixInsight program.

On the left the RGB capturing, on the right the filter capturing:



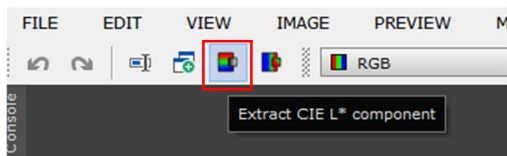
First, the filter image is cloned (dragging the image tab with the label onto the workspace) and the 'Process' 'StarNet' is started.



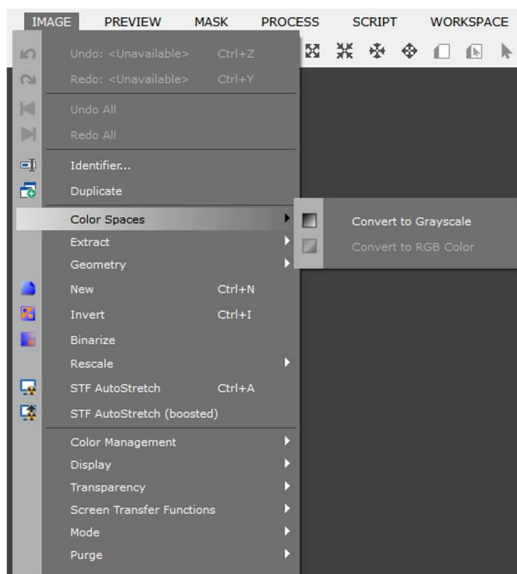
A star mask and a nebula mask are generated via the 'Process' 'StarNet'.

Afterwards the brightness information is extracted from the image, because for the generation of the star mask no color information is needed. It is only of interest at which position the stars are located.

Click on this icon to do so:



Or use 'Image' 'Color Spaces' to convert the image to a gray image.

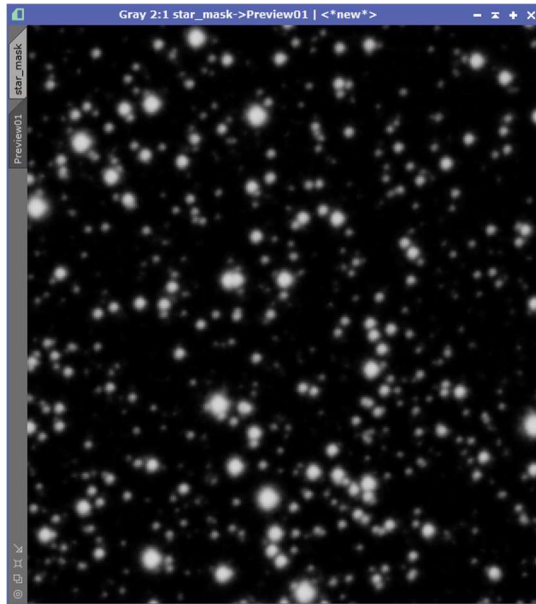




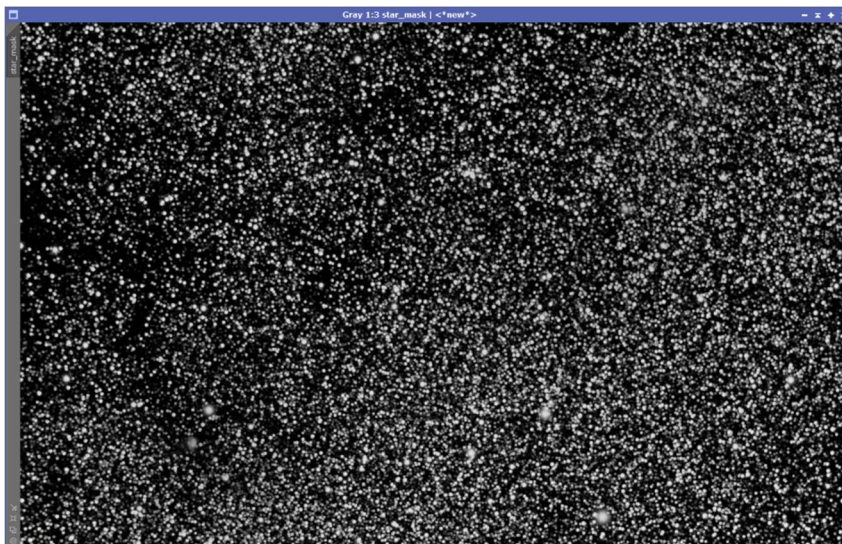
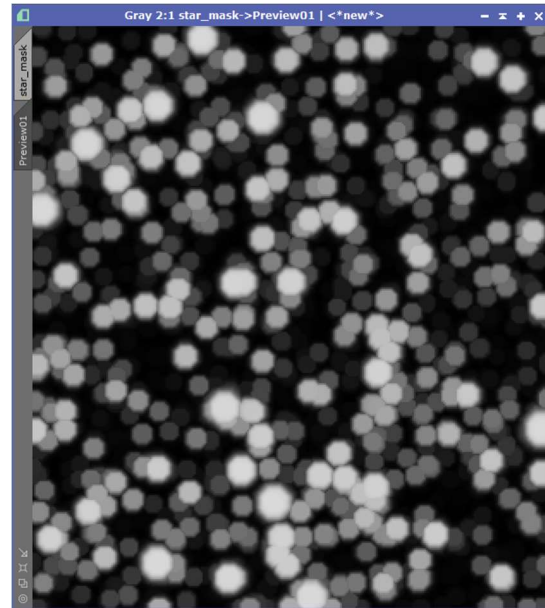
In order to include also very small stars in this process, the stars of the star mask are magnified with the 'Process' 'Morphological Transformation'.



Before:



After:



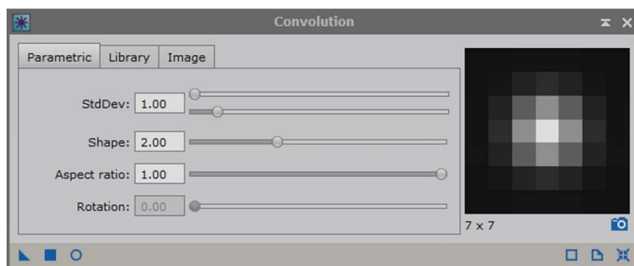
This process can be used to indirectly control how starry the image becomes. A comparison without magnification is shown at the end of the process.

This star mask is now placed over the pure filter image without the stars. Thus only the positions of the stars are processed.

The stars in the RGB image can be processed beforehand by applying the 'Process' 'ColorSaturation' to the RGB image. You should not pay attention to the fog, but only to the star colors.



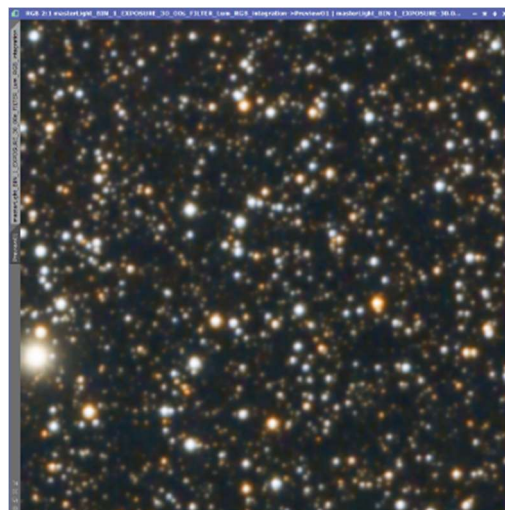
With the 'Process' 'Convolution' the stars can be softened a bit if necessary.

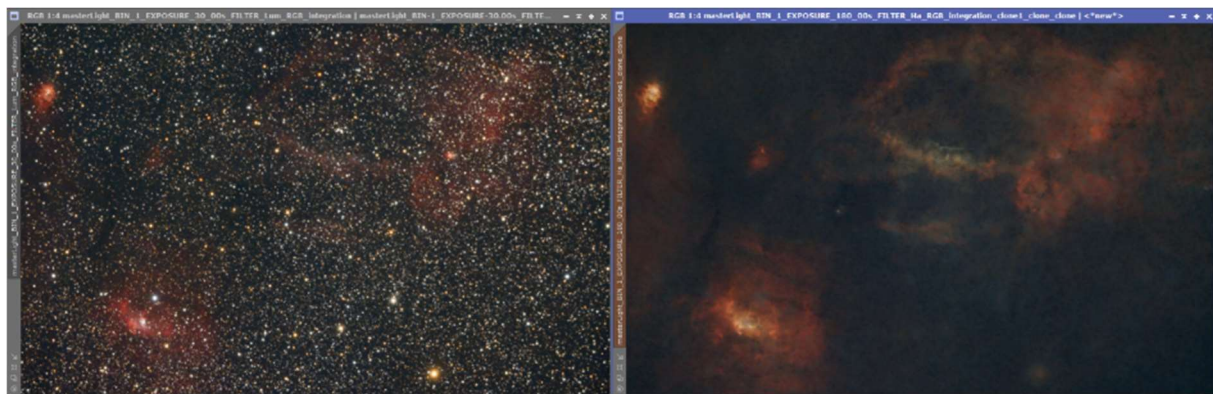


Before:



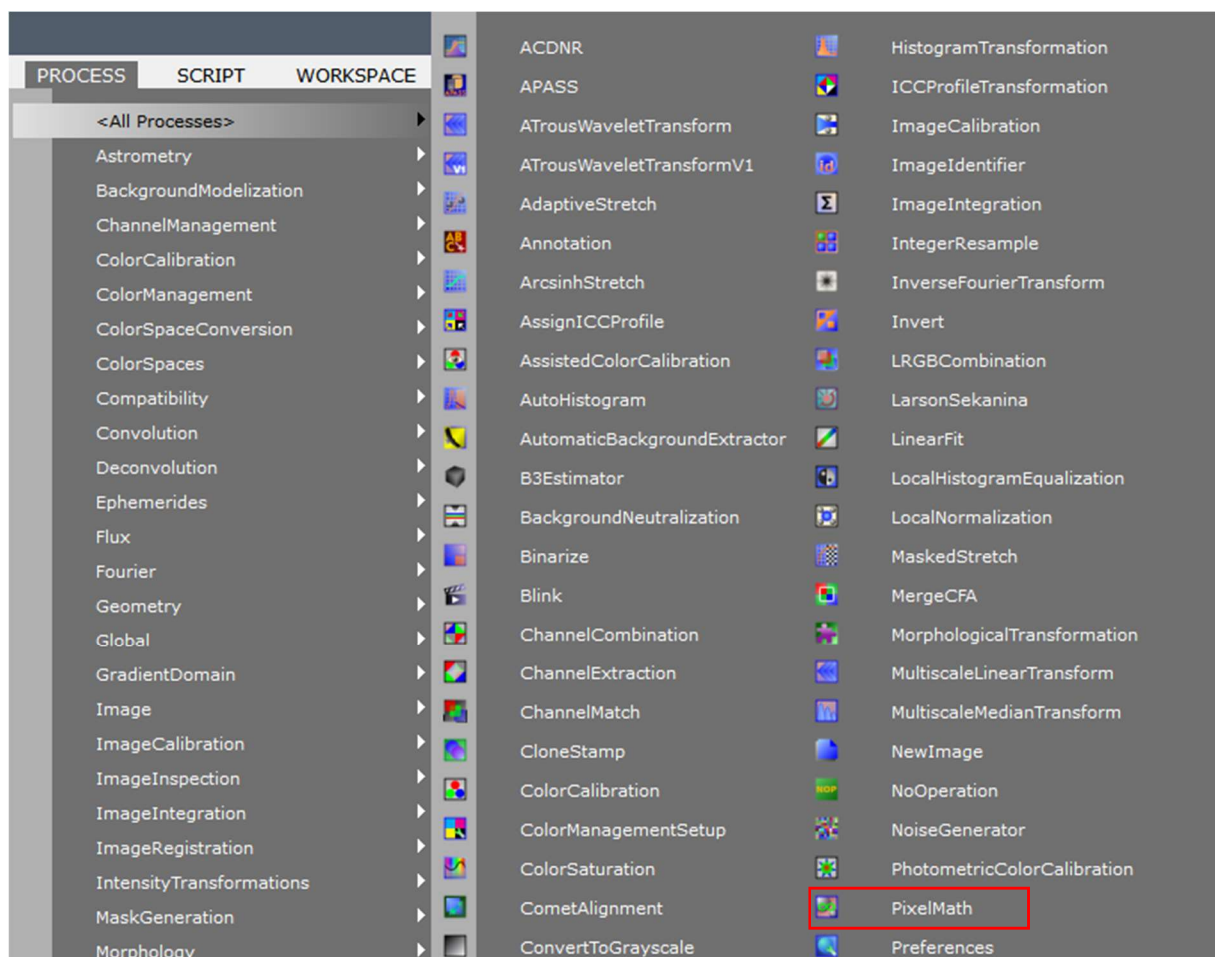
After:

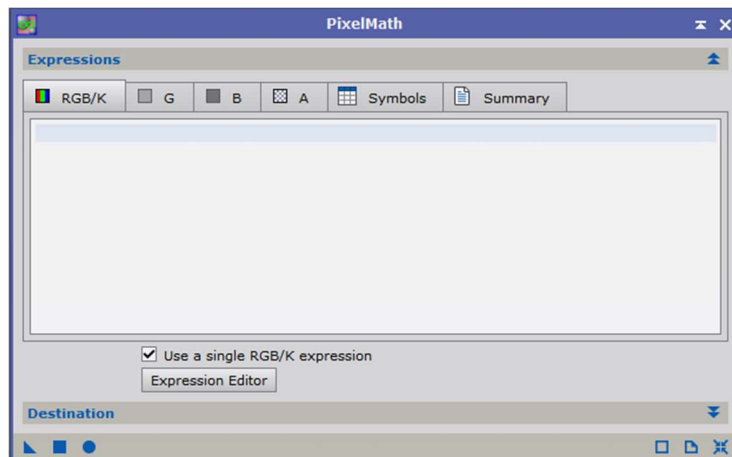




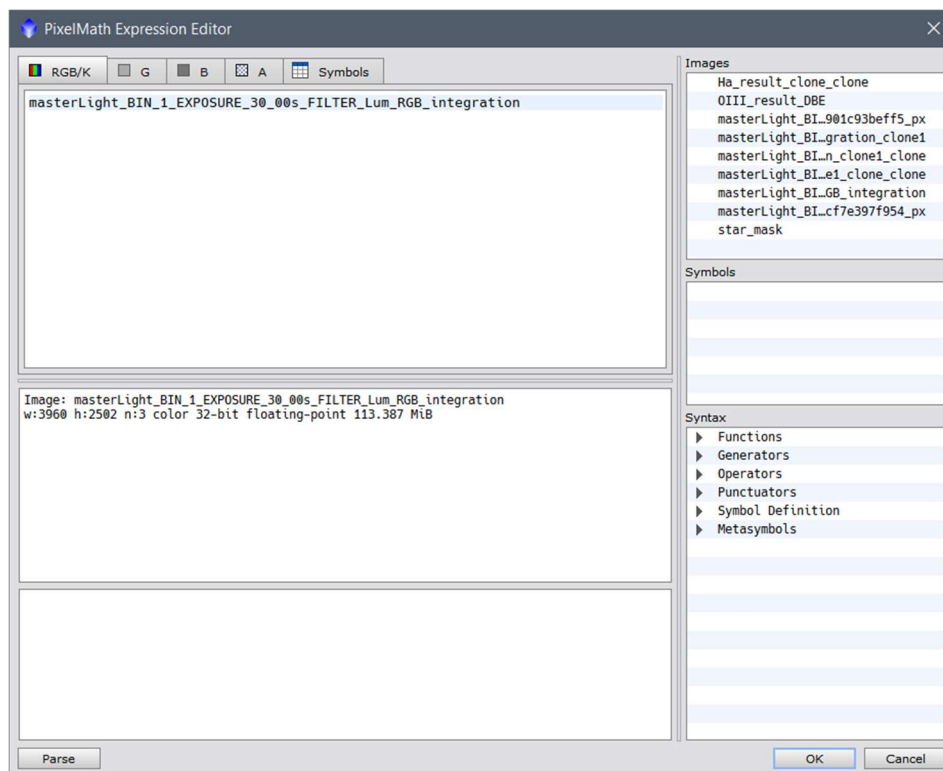
On the left the RGB image with color saturated stars, on the right the filter image with activated star mask in the background, where the stars have been magnified.

Now the 'Process' 'PixelMath' is started.

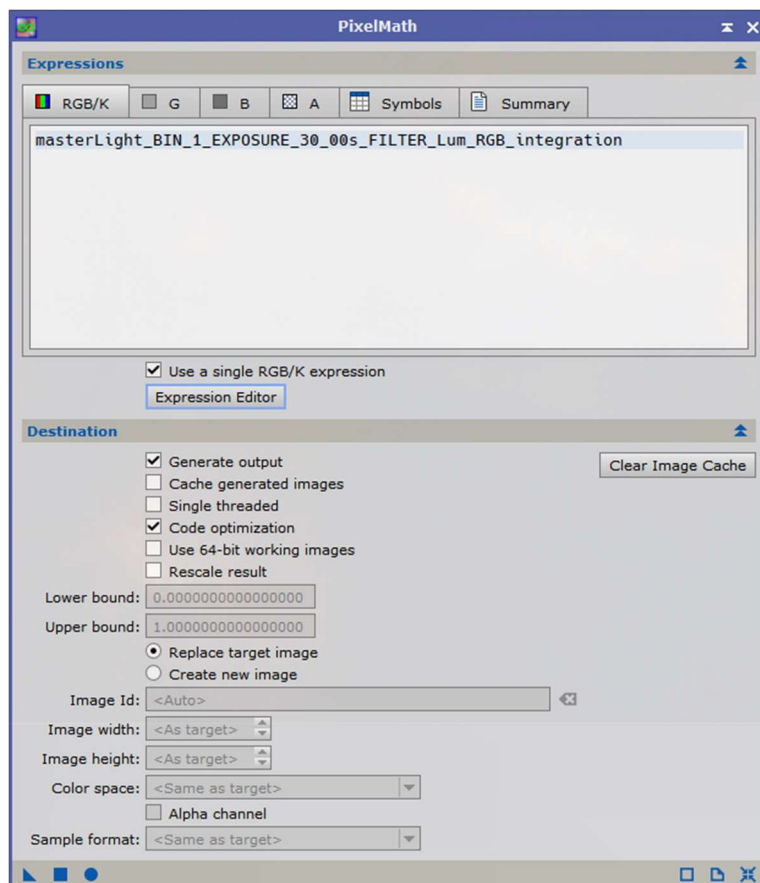




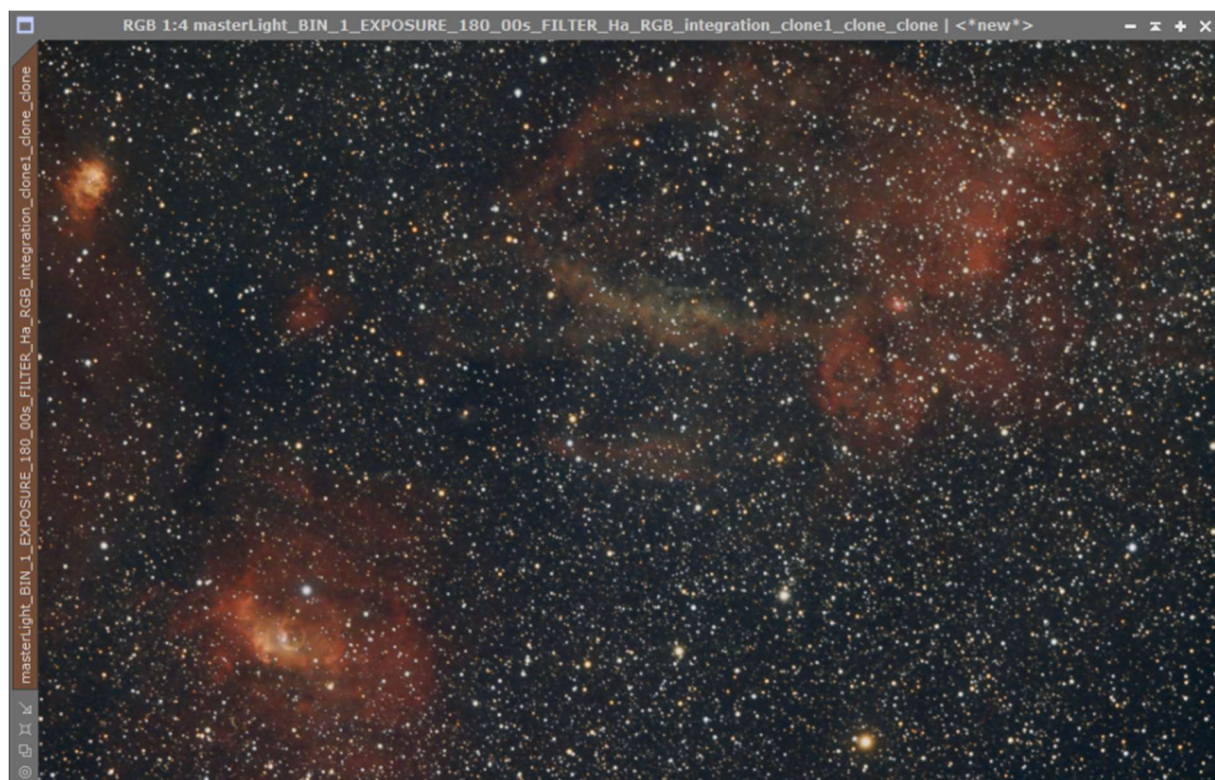
Via the button 'Expression Editor' the RGB image is selected with a double click and the selection is confirmed with 'OK'.



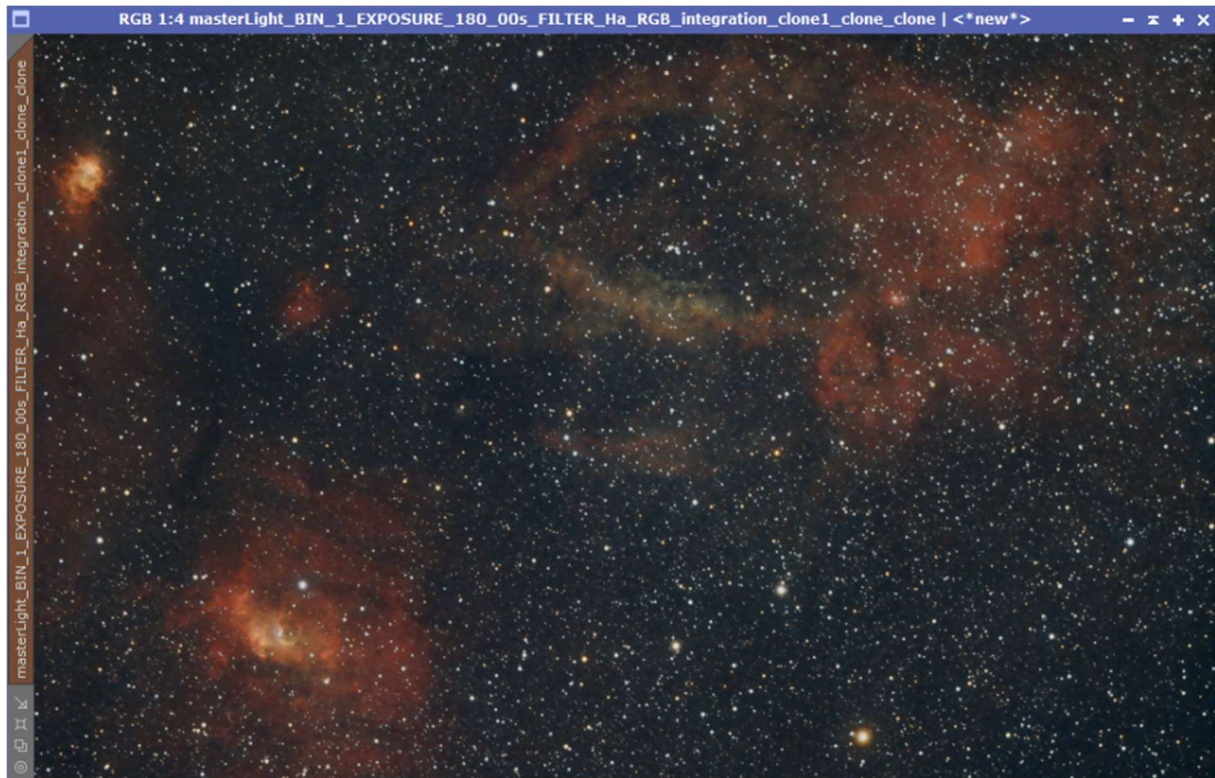
The values under 'Destination' can be left as they are, and the blue triangle is used to apply PixelMath to the filter image.



The result is the filter image with the RGB stars:

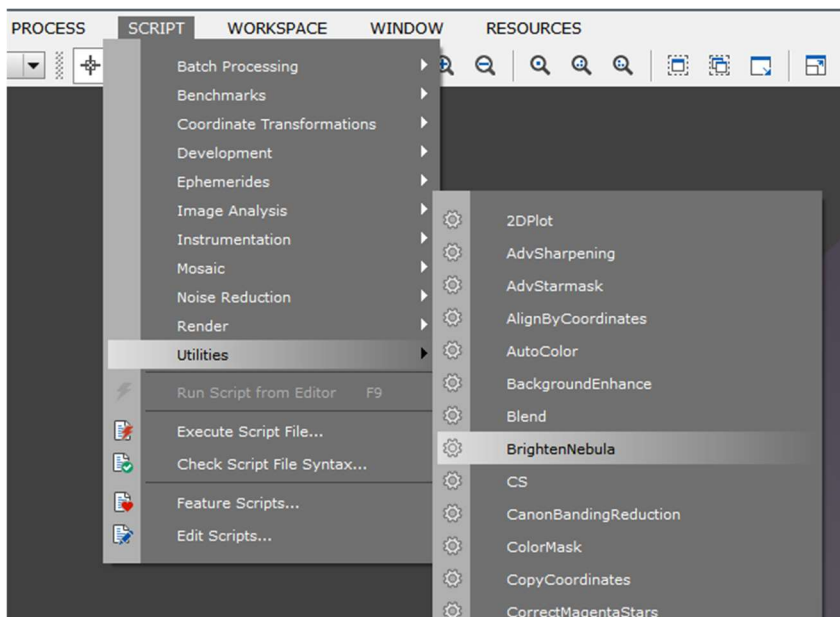


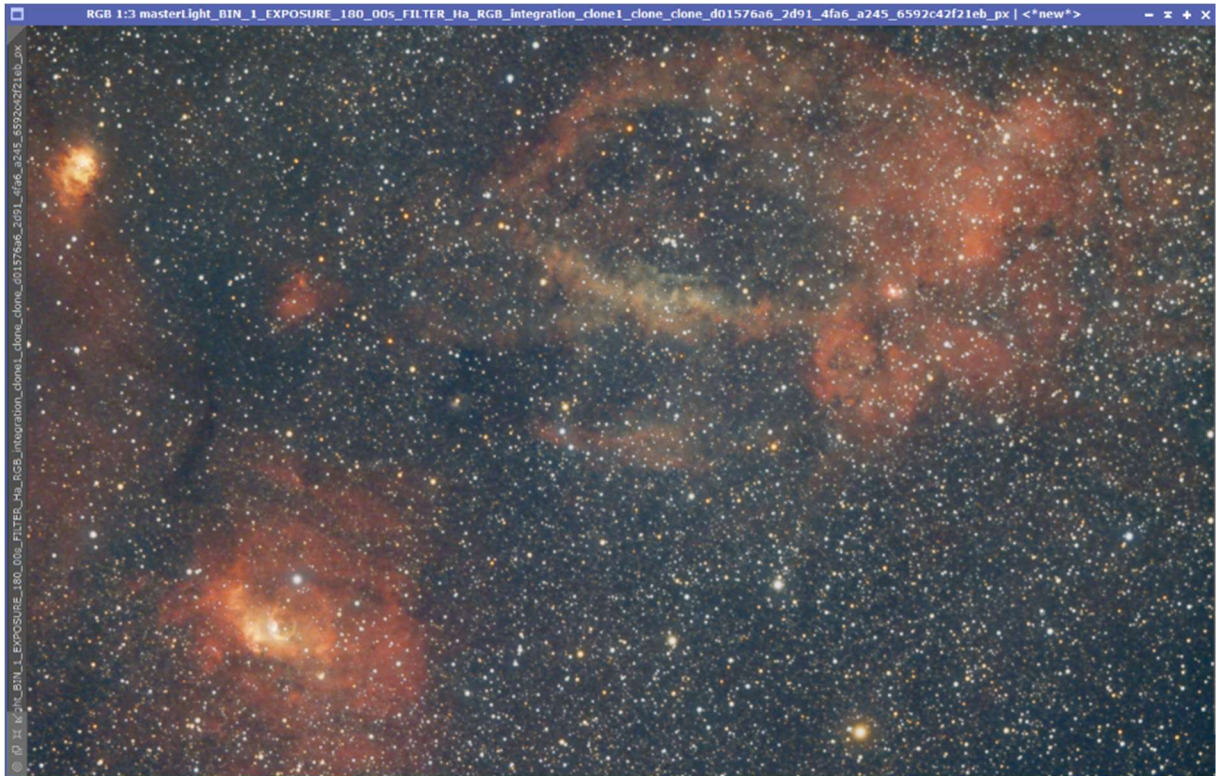
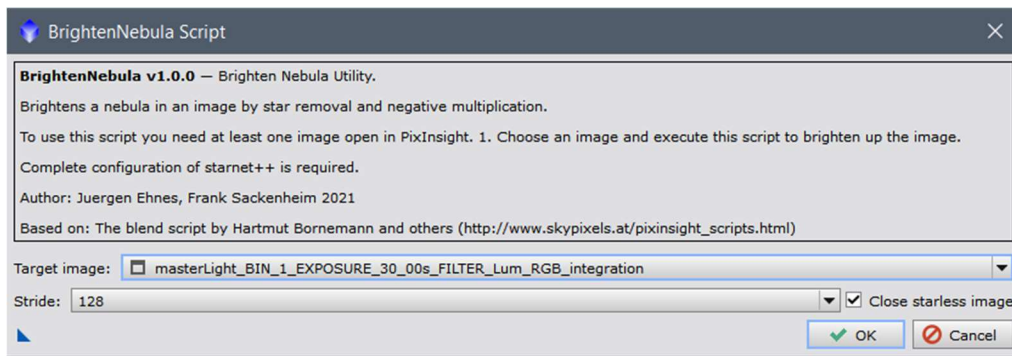
Without magnification of the stars from the star mask, the following image would have been created, sometimes giving decent results.



There are now two variants of the filter image with RGB star colors, which can then be further processed like the normal filter image in instruction 5.

To lighten the nebula a bit, the script 'Brighten Nebula' can be applied to the image. Under certain circumstances, however, the image may become too bright and not give a better result.

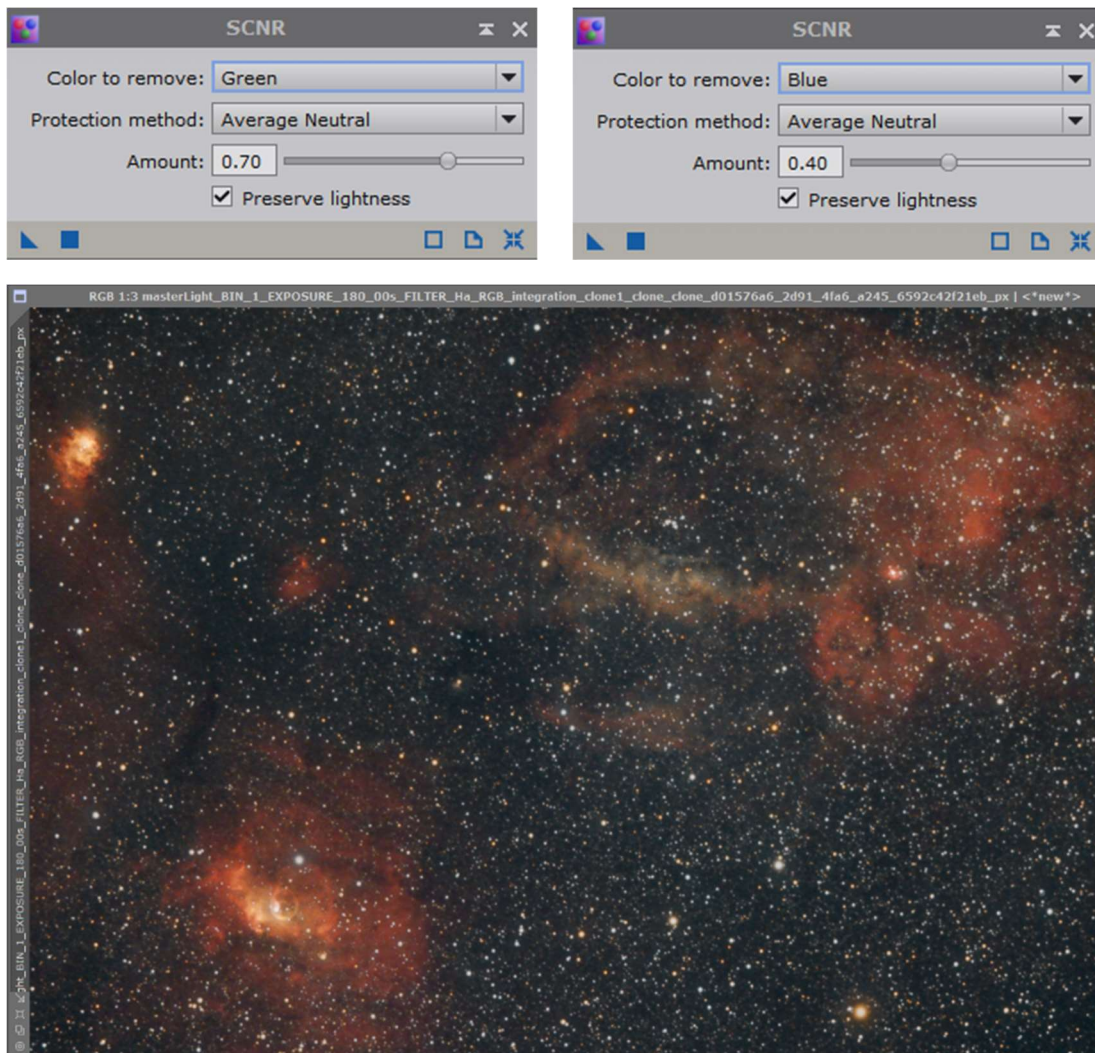




If this step is decided on, the image can be adjusted again somewhat via a 'histogram transformation' using the sliders.

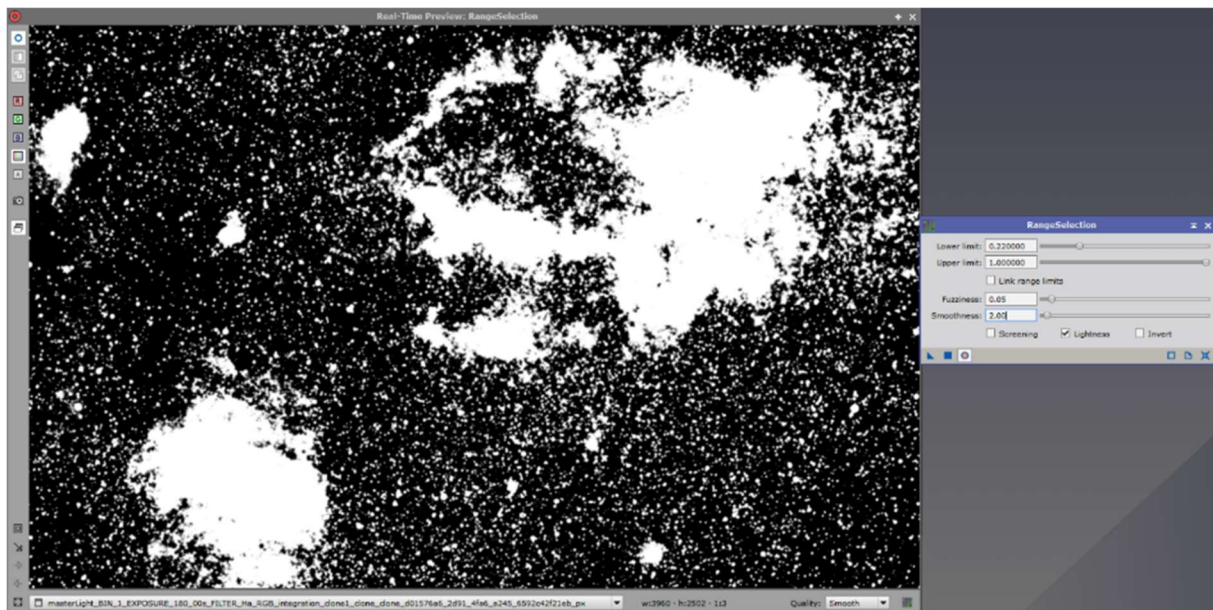


In addition, green and blue tints can be decimated using the 'Process' 'SCNR'.

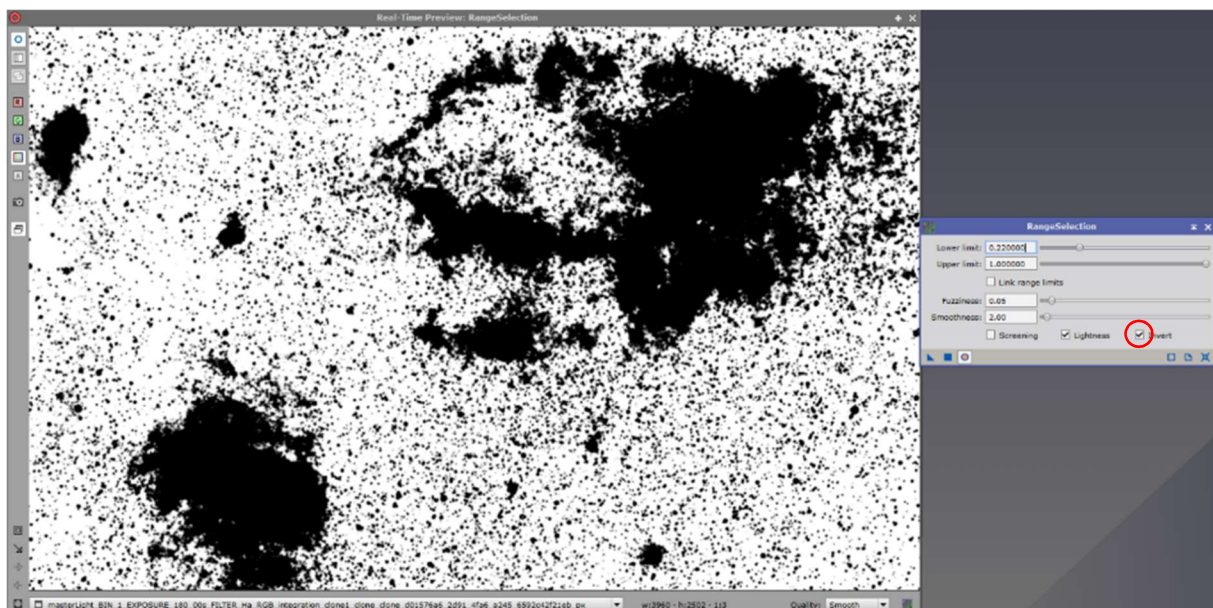


The background and the nebula should now be processed separately from each other. The goal is that the background loses a little of its blue cast and the nebulae appear a little more intense.

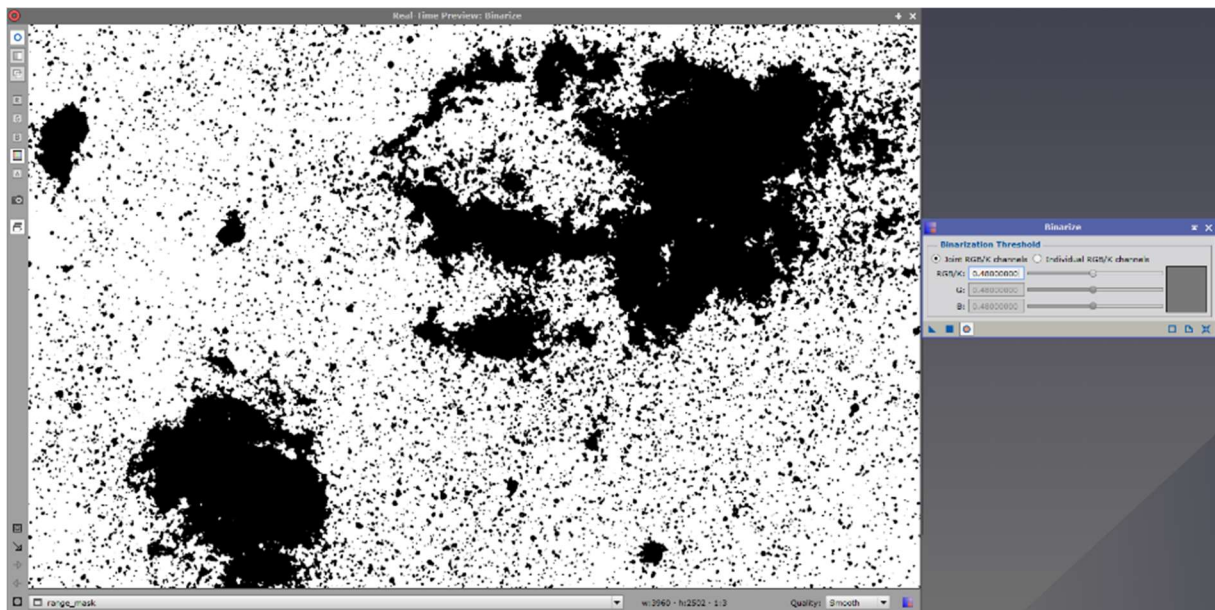
Since this is a stretched image, a 'RangeSelection' must now be performed. Here you can use the sliders to separate the background from the object and create a mask. By inverting the mask several times, either the background or the objects can be edited.



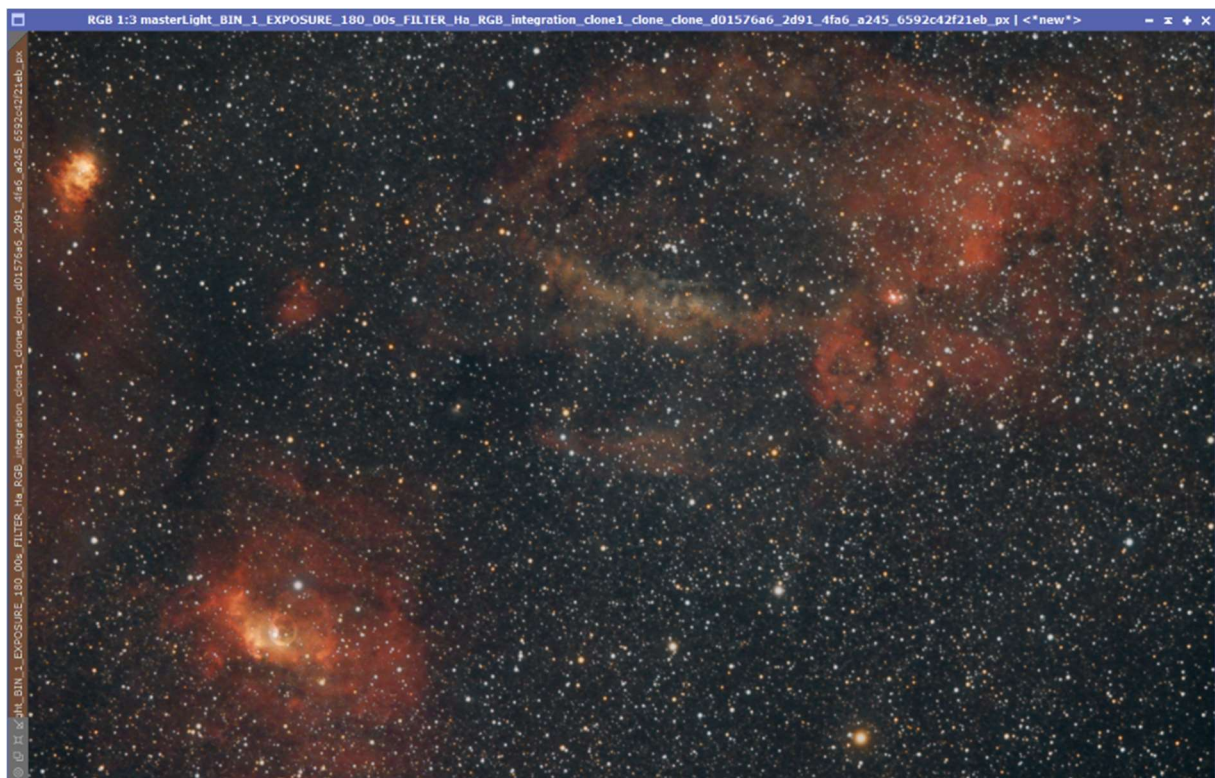
It applies again: everything that is white allows further processing, everything that is black blocks processing. In this case, the nebula area and the stars can be processed. If the mask is inverted, the background can be edited.



The 'RangeSelection' is now applied to the image. If the mask is to be adjusted a bit more, the 'Process' 'Binarize' helps. The mask consists only of black or white and can be changed via this process, which only knows binary values (0 or 1).



Now apply the mask to the image again by dragging it under the side name tab and coloring the tab brown. Use the menu point 'Mask' to hide the mask, if it is activated.



Since the mask last had a white background and black nebulae and stars, the background is processed first.

Select 'Process' 'CurvesTransformation' for this. With this process the colors and the saturation can be controlled by curves. For this purpose, the image can now be adjusted in the preview (red circle below) by dragging the corresponding curves until a satisfactory result can be seen. This process produces different results depending on the color desired.

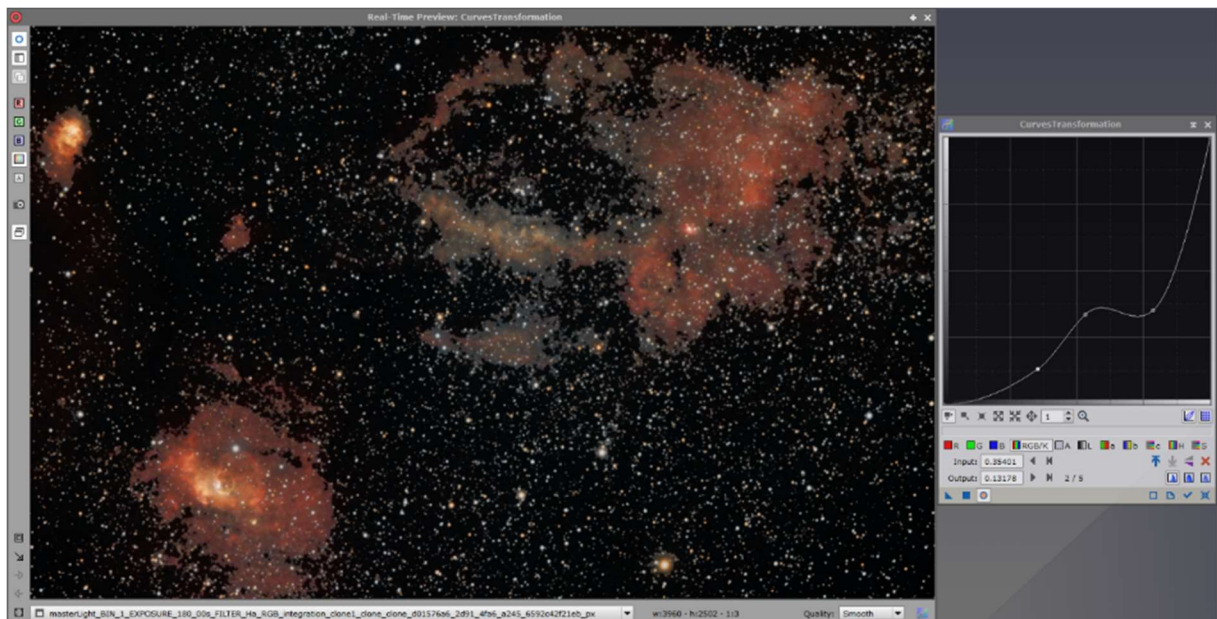


Selection of the color curves
or saturation to be processed

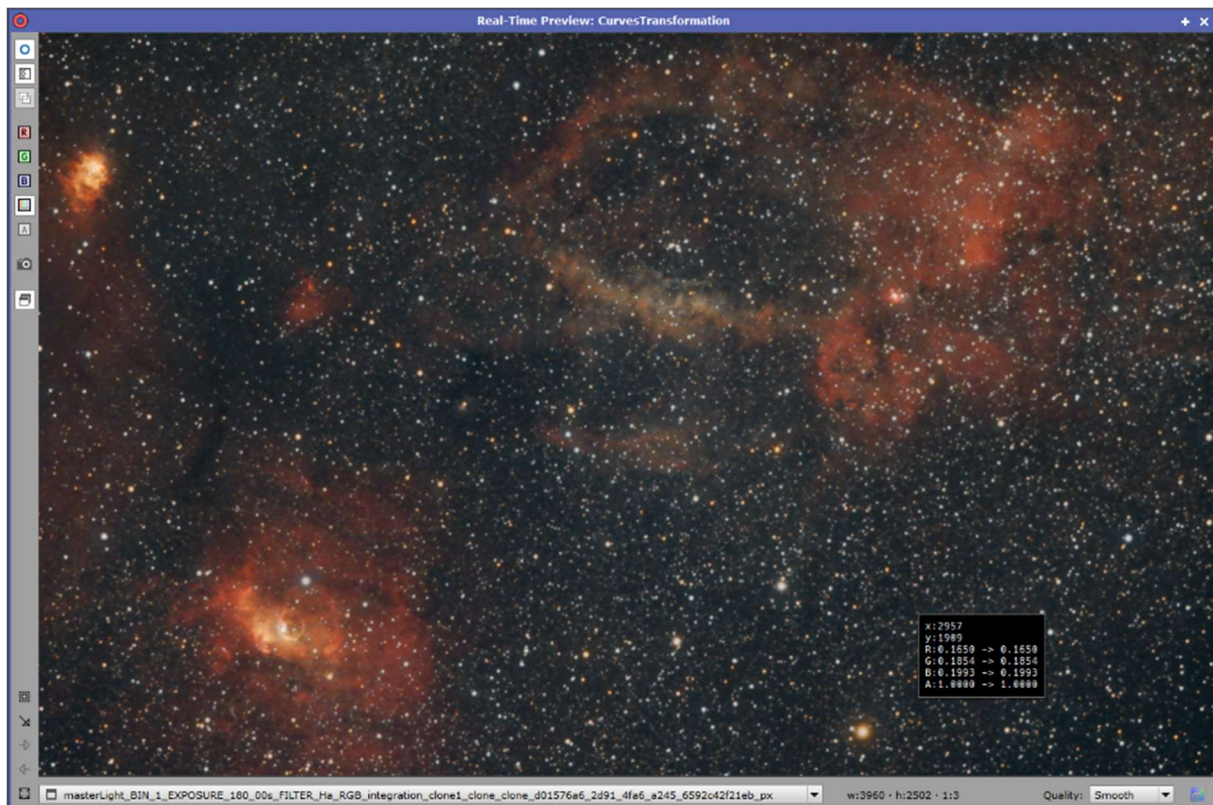
Resetting the current curve

Resetting all curves

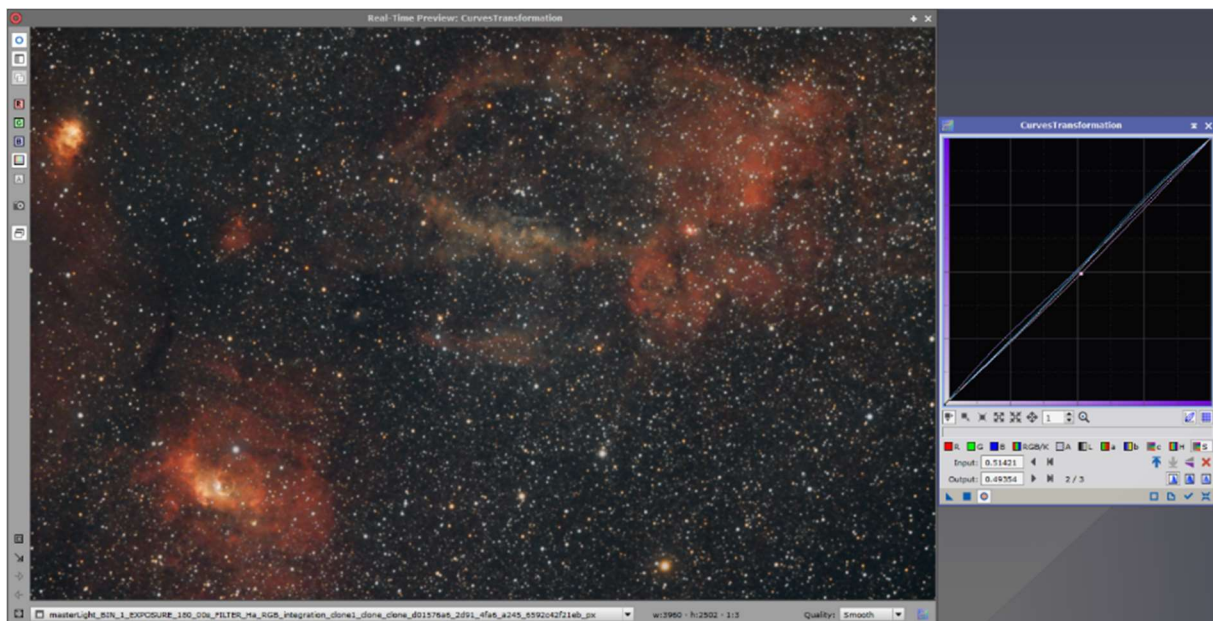
One or more points can be set as anchor points. Attached is an exaggerated picture:



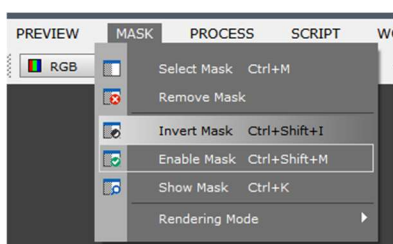
With a long mouse click of the left button on the preview image (or the original image), the current color values can be displayed at the location of the mouse pointer.



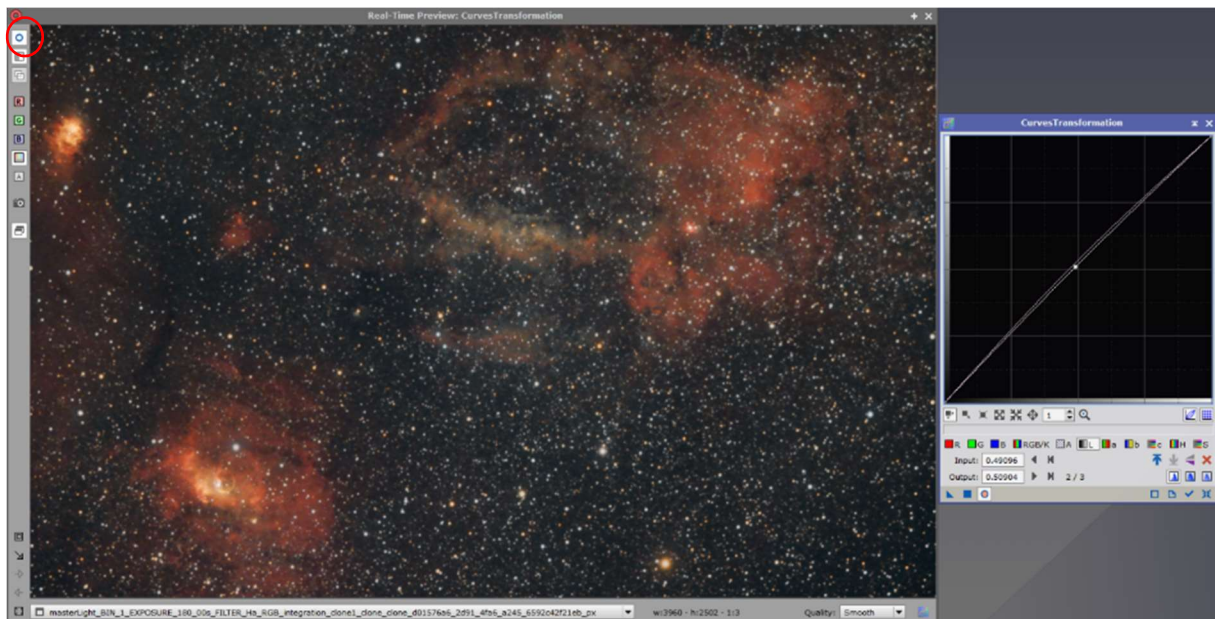
For the background, small changes were made to various channels. Here, not too much should be exaggerated.



Now the mask can be inverted to activate the nebulae and stars (and no longer the background) for processing.



First, the saturation is increased slightly and the luminance is adjusted very slightly.



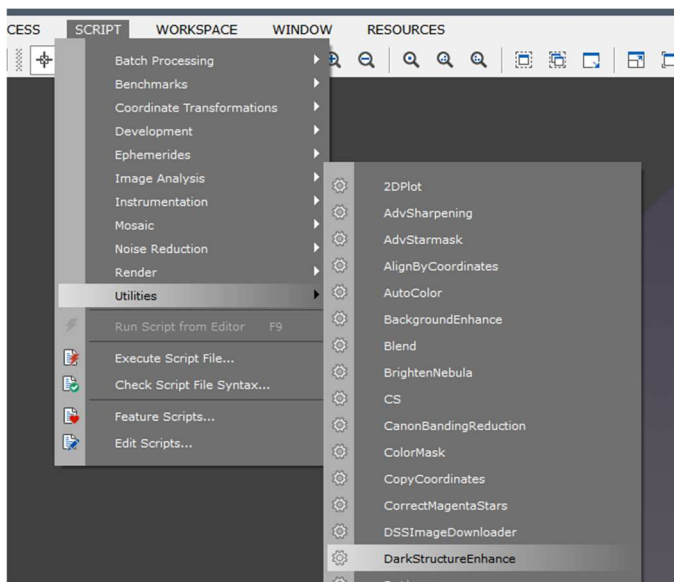
Use the circle in the upper left corner of the preview to switch between the before and after result.

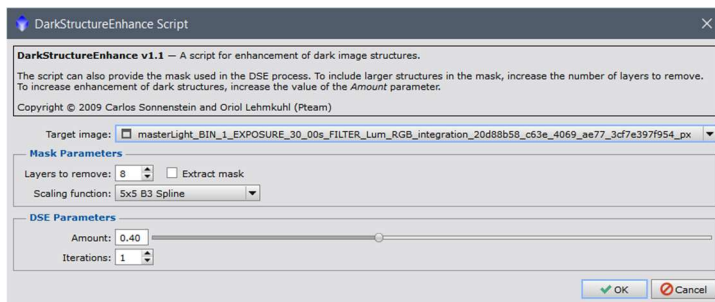
Afterwards the mask can be deactivated.

In this variant of the workflow, the stars do not have to be reduced in size. In the 'Process' 'PixelMath' they have already been created more discreetly.

The 'Process' 'LocalHistogramEqualization' did not lead to a better result for this image and is omitted.

To make small dark areas appear a bit stronger, the script 'DarkStructureEnhance' is executed.





Before:

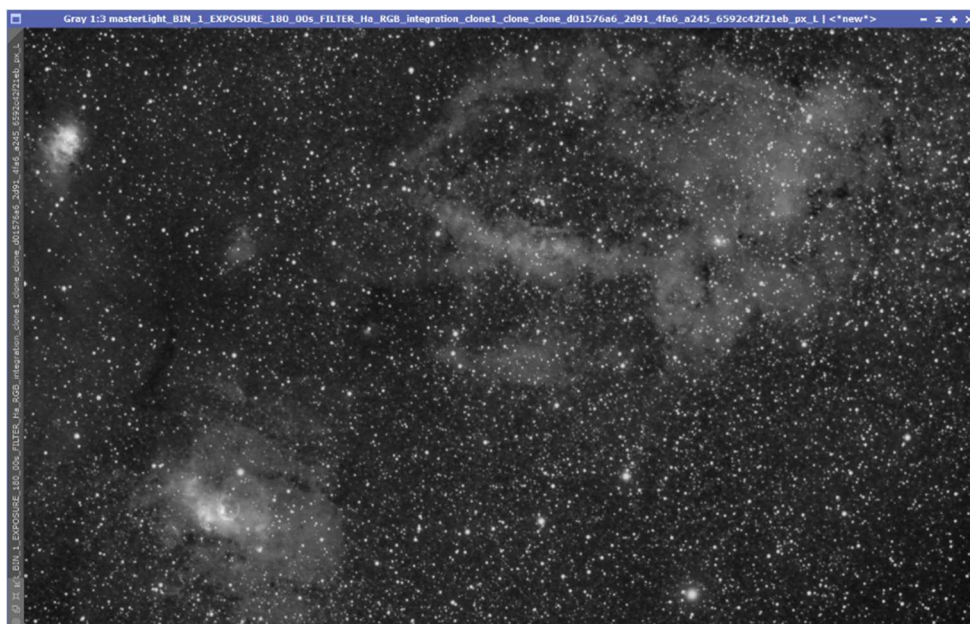
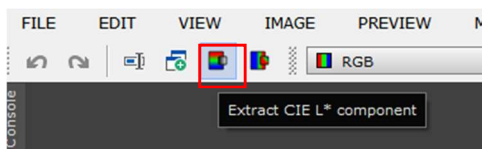


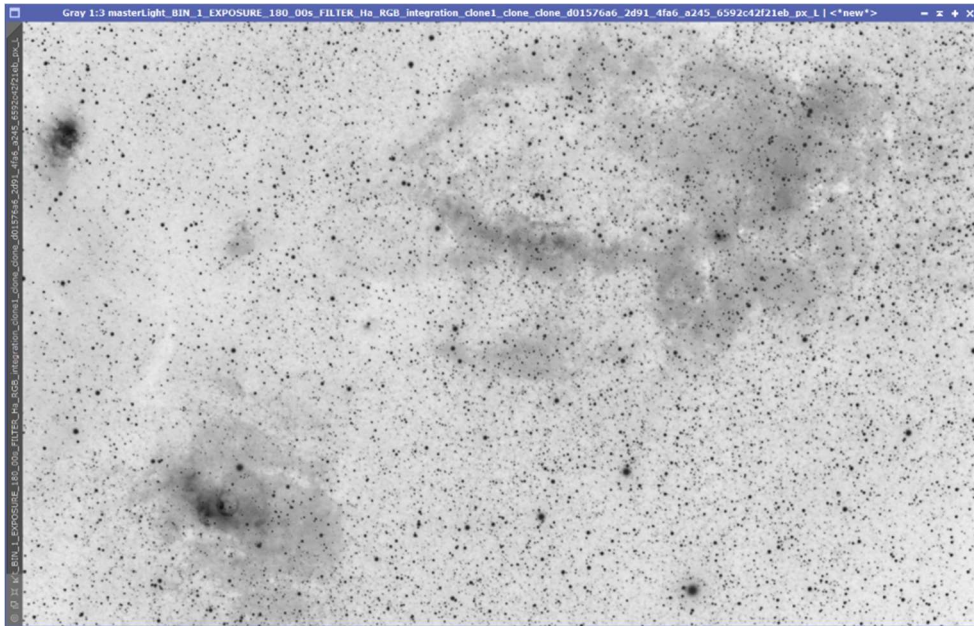
After:



The processing steps have again created artifacts and noise in the image. To soften these somewhat, the 'Process' 'TGVDenoise' is used for non-linear image processing (non-linear, because the image is already stretched). For denoising, a mask (in this case a luminance mask) is always used, which must be created beforehand as follows.

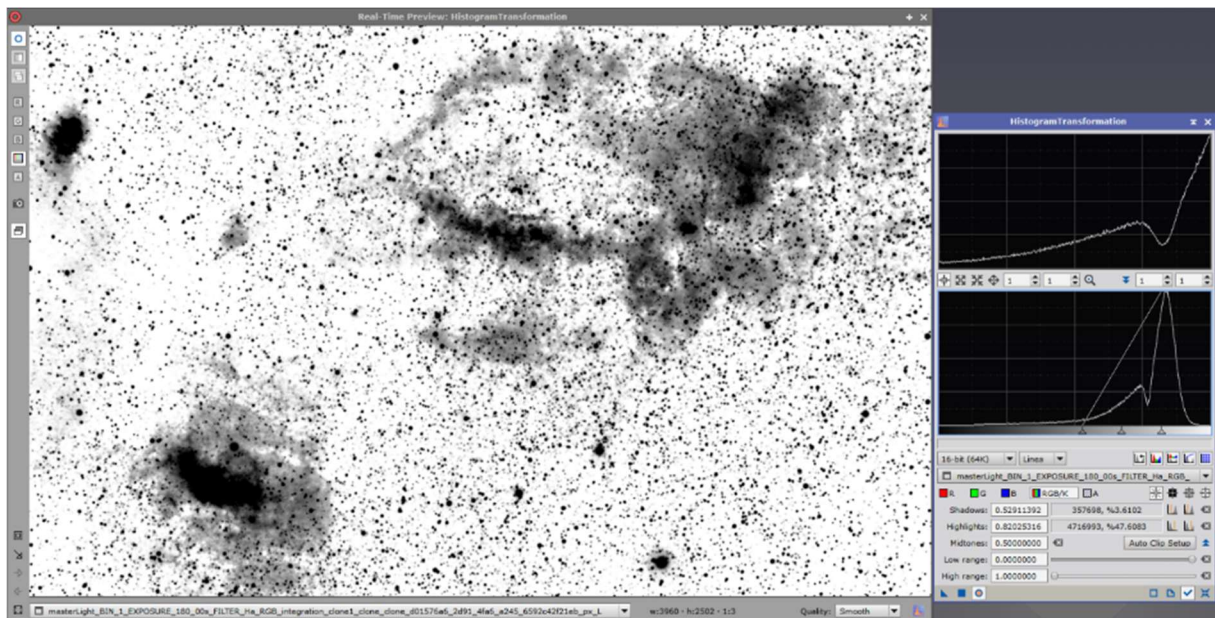
For this it is important to make a clone of the image again and extract the luminance via this icon and then invert it:



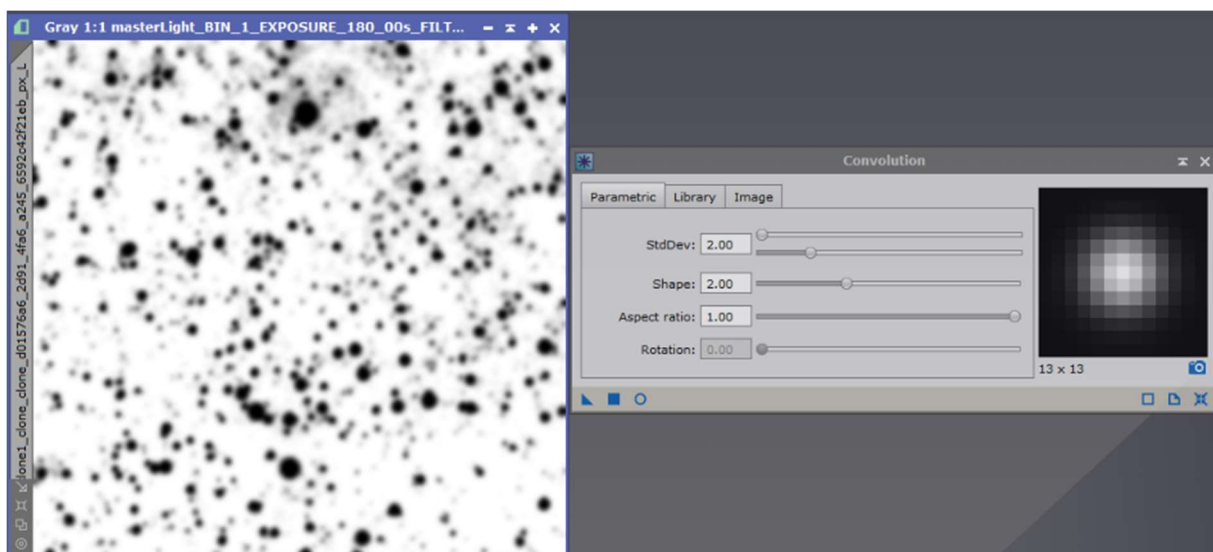
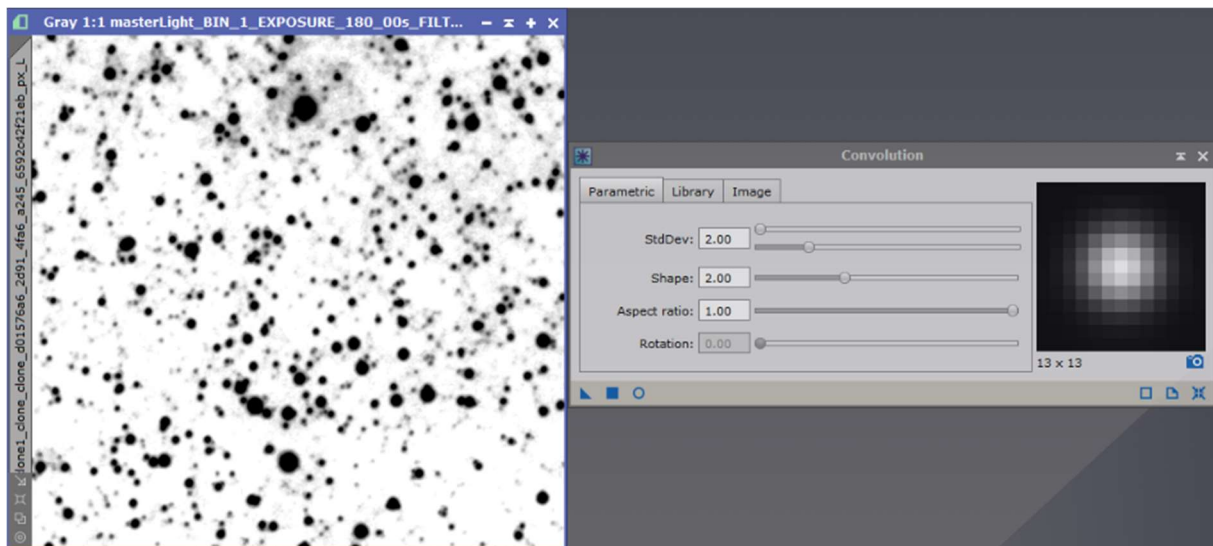


And again: everything that is white allows editing, everything that is black blocks it.

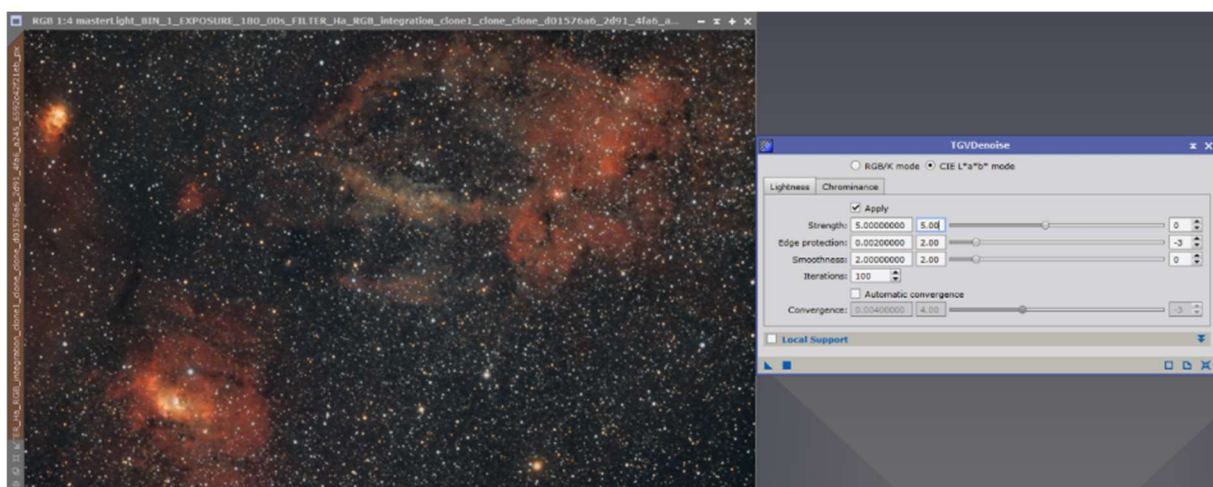
After that, the gray part of the background has to be transformed via the 'HistogramTransformation' so that there is almost only white. To do this, move the left slider to the right and the right slider to the left beyond the maximum mountain.



To remove the slight noise from the mask, the 'Process' 'Convolution' is applied.



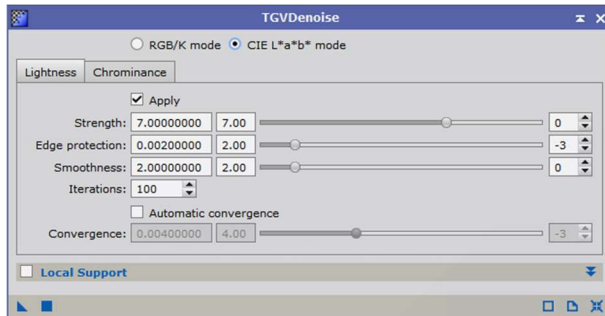
Now apply the mask to the image, start the 'Process' 'TGVDenoise' and change the mode at the top to Luminance and Color to process color and luminance noise.



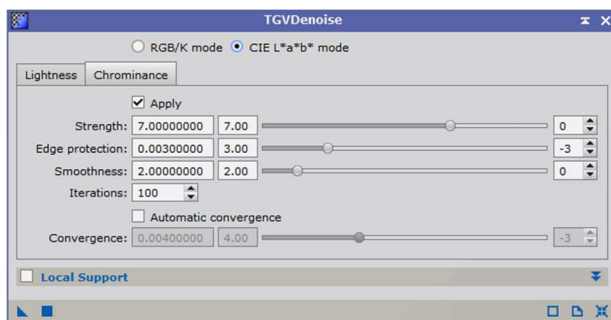
Using a preview, the values are now be adjusted so that the noise disappears but the image does not yet look too artificial.

With these values the result for this image looks satisfactory:

For Lightness:



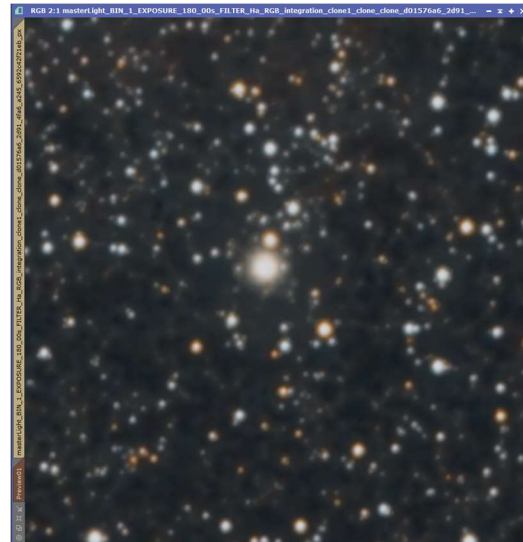
For Chrominance:



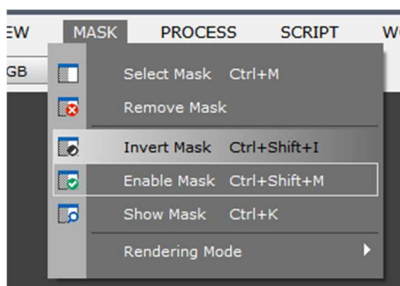
Before:



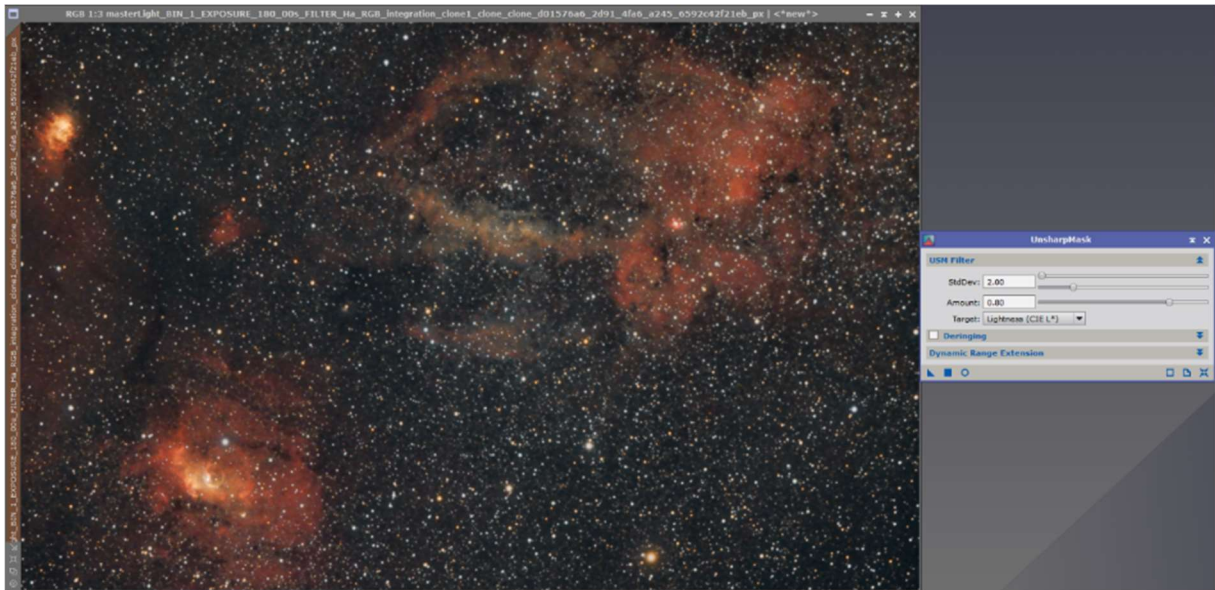
After:



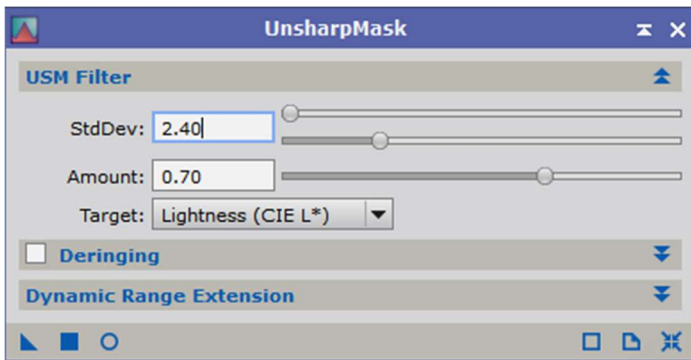
The last step is to sharpen the stars. To do this, invert the active mask:



Now open the 'Process' 'UnsharpMask':



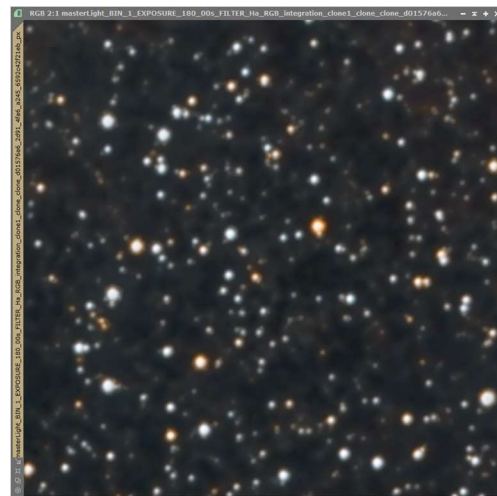
Subsequent setting values do not exaggerate the effect too much:



Before:



After:



The image can now be saved as a 16 bit TIF file.