POLARIS

Royal Astronomical Society of Canada
London Centre Newsletter
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Using Star Removal and Masks to Enhance Your Images

By Rick Saunders

There are many times during processing images of nebulae or galaxies that one needs to attempt to stretch the histogram of the target without blowing out the stars in the image. The new Photoshop CC (2015 and 2017) versions give a simple way of doing this. To illustrate this I'll use an image I took of Messier 16 with the EOS T1i and the 10" newtonian. Below is the original processed image. As you can see the shape of the nebula stands out nicely and the there's a hint of the 'wispy' nebula outside the main part that is visible.

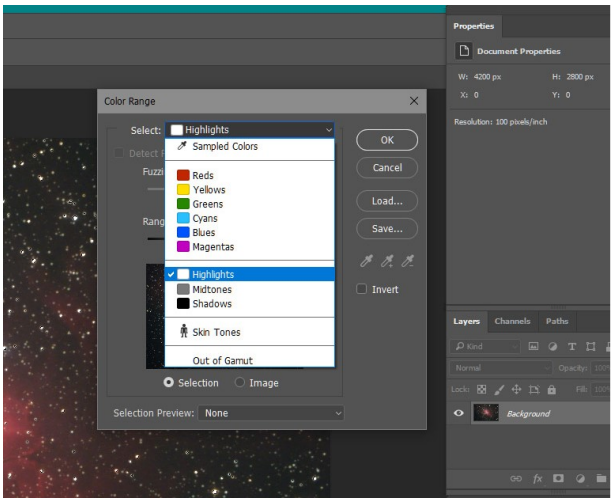
To further process this allowing the thin parts to show through would cause the stars in the image, especially those in the central cluster to become very much over-exposed, or 'blown out'.

So let's start trying to remove the stars so that the nebula can be stretched.

To start with, we want to select just the stars in the image. To do this we'll use the 'Select → Color Range' menu item. When the function windo appears there is a drop-down box at the top labeled 'Select'. Click this and check the 'Highlight' entry. Then put the 'Fuzziness' slider about 50 percent and adjust the 'Range' slider until you get most of the stars and the least amount of the nebula.

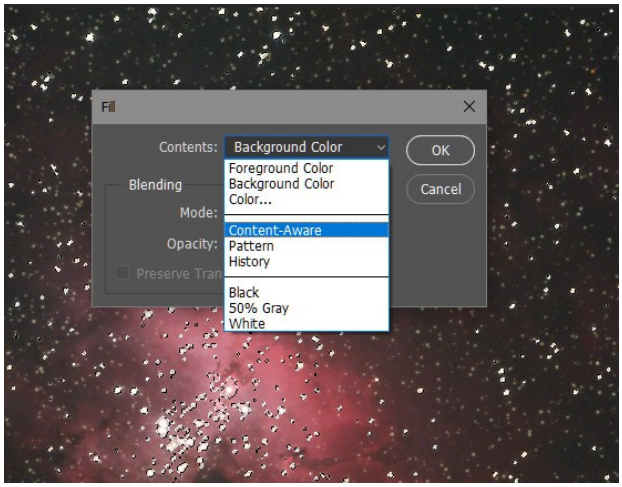
Once the stars have been selected then you can feather the selection a bit using the menu item 'Select → Modify → Expand'. I set it to about 3 or 4 pixels for the T1i. Now we can just hit the delete button to remove them. The 'Fill' function window SHOULD pop up (some times it doesn't so if you just end up deleting then Ctrl-Z and then use Shift-F5 to fill).

The Fill that we want to use is not a solid colour or gradient, but the item called 'Content-Aware'. Select



this from the 'Contents:' drop down box at the top of the window. I'm not exactly sure how the function works, but it does try to put some kind of background fill into where the stars used to be. It's not perfect, but it does work.

Once the stars have been removed there will probably be the remnants (rings) of some of the brighter stars left. Use the 'Elliptical Marquee Tool' or the 'Lasso Tool' to surround these and just hit the Delete key (or the

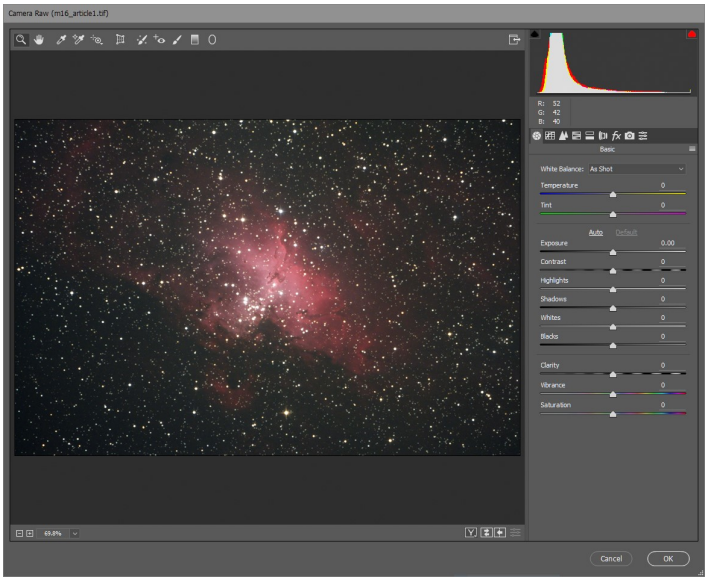


Shift-F5) if the Fill window doesn't appear then Enter. That should get you to a decent starting point. When you're at this That should get you to a decent starting point. When your at this stage you can either leave the

target as is or you can play with the 'Noise → Dust and Scratches' menu item to try to clean up the image. You'll loose resolution doing this, but you'll end up with smoother nebula colours.

Also, you can clean up the non-nebula parts using a standard Clone Tool or just deleting and smoothing the background.

When you're done it's time to start the process of stretching the histogram in order to bring out the nebula in the starless image. I like to use linear and non-linear stretching here just as I did when first processing the image and when that is done I switch to the Adobe Raw Filter.



The Adobe Raw Filter is an amazing tool which works much like the processing in Adobe Lightroom. Most of the functions that I use are on the first panel. I'll adust Temp and Tint and then play with the contrast etc.

The most important of the sliders (to me) are the three at the bottom. The Clarity, Vibrance, and Saturation sliders. These do wondrous things to the image to bring out the colours and texture.

When that is done I'll click on the *fx* icon to bring up that tab and use the Dehaze to set the final image.

The image below is M16 with all the stars removed. As I mentioned, you lose some resolution with this but as we're going to be adding it back INTO the original image, it should be all right. Note, the stars are gone and a LOT of nebulosity has been able to be dragged out of the background.

This can be used as 'astro art' if you wish but I think that putting the stars back in makes a much nicer image, so we'll go back to our original.

Stuffing all that nebulosity into the original image can be done in two ways. The first is to create a new layer ON TOP of the starless nebulosity then pasting in the original and changing the opacity to let the nebulosity show through. This works, but dims the stars to the point that they lose saturation (not good). The

second method is to use a mask (another article or the tutorials on youtube). This creates a situation where the nebulosity image is turned into a layer mask, inverted and then placed over the original. Where the mask is white the image above shines through and where it's black the image below is 'masked'. The underlying image, the masking image and the mask can then all be tweaked to give you a useful final.

December Meeting

The guest speaker for December will be Arthur Oslach speaking on video astronomy.

Moon Phases

December 7, 2016

December 14, 2016

December 21, 2016

December 29, 2016

Sky Events for Late December and Early January

December 18 Regulus 1.0° N of Moon
December 21 Winter Solstice
December 22 Jupiter 2° S of Moon
January 1 Mars 0.02° S of Neptune
January 2 Venus 1.9° S of Moon
January 9 Aldebaran 0.4° S of Moon
January 11 Double shadow transit on Jupiter
January 12 Venus greatest elongation E (47) Venus 0.4° N of Neptune
January 15 Regulus 0.8° n of Moon

Mercury well placed in evening twilight until Dec 23rd
Venus continues to shine brightly in the western sky after sunset
Mars sets early evening
Jupiter rises in the east well after midnight in Virgo
Saturn too close to the Sun to be visible
Uranus well placed in the evening sky in Pisces
Neptune in western evening sky in Aquarius, setting in the late evening

R.A.S.C. London Centre Library
Books of the Month, December 2016
By Robert Duff

As always, these "Books of the Month" are available for loan to members, to be returned at the following monthly meeting. The books for December 2016 are as follows:

In Search of Time: Journeys Along a Curious Dimension, by Dan Falk. c2008
The Science of Shakespeare: A New Look at the Playwright's Universe, by Dan Falk. C2014
Sky & Telescope [compact disc]: January—December, 2015 (1 DVD-ROM disc) – c2016.

For a complete listing of our library collection please go to the Main Menu on the left side of the RASC London Centre Web site main page and click on Club Library: **http://www.rasclondon.ca/library-and-rentals**
If there is a particular book or video you wish to borrow, please feel free to contact me by telephone at (519) 439-7504 or by e-mail at rduff@sympatico.ca

Donations to RASC London Centre Library

We wish to thank Norman McCall for donating a *Zhumell 2" Variable Polarizing Filter #3* to the RASC London Centre for use at Western University's Cronyn Observatory. Norm made the donation of the *Zhumell 2-inch Variable Polarizing Filter #3* at the RASC London Centre's Observers Group Meeting held at Dave Clark's home on Saturday, November 19th, 2016.
Bob Duff brought the *Zhumell 2-inch Variable Polarizing Filter #3* donated by Norman McCall to RASC London Centre to the Cronyn Observatory Public Night, Saturday, November 26th, 2016, where it was placed in a drawer in the dome storage room.

Cronyn Observatory Exploring the Stars & Public Nights November — December 2016
By Robert Duff
Cronyn Observatory Public Night Monday, Nov. 14th, 2016

Partly cloudy skies with hazy clouds greeted some 500 visitors to Western University's Cronyn Observatory Public Night, Monday, November 14th, 2016. The Public Night was scheduled for 7:00—9:00 p.m. However, graduate student Dilini Subasinghe opened the door early, after directing the big 25.4cm refractor in the dome towards Mars at 6:30 p.m. She welcomed a line-up of visitors, there to see the unusually large full Moon—or "supermoon"—with the closest lunar perigee (356,509 km) since 1948.

There were 55 people counted by Dilini at 6:50 p.m. and over 100 when RASC London member Bob Duff arrived at 7:10 p.m. The line of visitors extended from up the stairs into the dome to all the way back along the walkway to the observatory, nearly to the sundial beside the traffic circle. There were an estimated 500 visitors by the end of the evening.

RASC London Centre was represented by Everett Clark, Paul Kerans, Charlene Kerans, Dale Armstrong, Mark Tovey and Bob Duff. Graduate student Kendra Kellogg was telescope operator in the dome and showed a few visitors Mars through the 25.4cm refractor, using the 28mm Meade Super Wide Angle eyepiece (157X). Kendra moved the 25.4cm refractor to the bright star Vega at 7:00 p.m. when Mars was obscured by clouds.

On the roof patio outside the dome Paul Kerans set up his 9.25-inch (23.5cm) Celestron Schmidt-Cassegrain (Vixen equatorial mount) and showed visitors the Moon, the Owl Cluster (NGC457) and the planet Uranus (21mm Ethos eyepiece, 112X).
Bob Duff began by showing visitors the Moon through the London Centre's 25.4cm Dobsonian (17mm Nagler eyepiece, 66X) but soon took over the observatory's 8-inch (20.3cm) Meade Schmidt-Cassegrain set up by Dale Armstrong and Everett Clark. Charlene Kerans took over the 25.4cm Dobsonian (17mm Nagler eyepiece, 66X) from Bob and spent most of the evening showing visitors the Moon. Dale set up his 80mm Vernonscope refractor on the front lawn of the observatory to show the Moon to the visitors who were lined up on the walkway. A 32mm Konig eyepiece yielded 16X and provided a

4 degree field of view, nicely setting off the Moon and clouds in Dale's 80mm Vernonscope.

The Moon was very bright in the 20.3cm Schmidt-Cassegrain, through the 26mm Plossl eyepiece (77X), and Bob swapped in the 20mm Plossl (100X), then the 12.5mm Ortho (160X) and finally the 20mm Plossl eyepiece (100X) again to reduce glare and make a more comfortable view for the visitors.

Mark Tovey welcomed 28 visitors to the historic *"Period Room,"* which featured the "*Sotellunium"* mechanical eclipse demonstration model and Dr. H. R. Kingston's brass refractor telescope. Mark was dressed in 1940s period costume.

The evening began with the Cronyn Observatory door opening early at 6:30 p.m. and ended with the last visitors departing around 10:30 p.m. It was an unexpected and enjoyable evening of lunar observing, thanks to the unusually large full Moon—or "supermoon."

Exploring the Stars, Louise Arbour French Immersion Public School, Grade 6, November 17th, 2016

Clear skies greeted 47 visitors (including 26 children and 21 adults) from Louise Arbour French Immersion Public School, Grade 6 class, for Exploring the Stars at Western University's Cronyn Observatory, Thursday, November 17th, 2016, 6:00 p.m. Graduate student Robin Arnason presented the digital slide presentation *"Black Holes"* and fielded questions. Robin followed this with the activity *"Galaxy Sorting."*

RASC London Centre was represented by Everett Clark, Paul Kerans and Bob Duff. When everybody arrived upstairs in the dome, Bob gave a brief talk about the Cronyn Observatory and some of the technical aspects of the big 25.4cm refractor. Bob also explained the 2 clocks on the east wall of the dome and the difference between Standard and Sidereal Time.

The visitors were then divided into 2 groups to view through the big 25.4cm refractor and the 2 amateur telescopes set up on the roof patio outside the dome. Robin and Everett showed the visitors Mars through the 25.4cm refractor, using the 28mm Meade Super Wide Angle eyepiece (157X). Bob showed them the Andromeda Galaxy (M31), the Owl Cluster (NGC457) and the yellow and blue double star Albireo through the London Centre's 25.4cm Dobsonian, using the 17mm Nagler eyepiece (66X).

Paul showed them the Andromeda Galaxy (M31), Uranus, Neptune and the Ring Nebula (M57) through his 9.25-inch (23.5cm) Celestron Schmidt-Cassegrain (Vixen equatorial mount), using his 28mm eyepiece (84X). Towards the end of the evening Robin, Bob and Paul tried to locate M57 with the big 25.4cm refractor in the dome, but the city brightened sky made it difficult to see the faint stars in the constellation Lyra. Bob finally directed the 25.4cm refractor towards the *"Double-Double"* star system Epsilon Lyrae, swapping in the 18mm Radian eyepiece (244X), which nicely resolved the 2 binary stars. It was a pleasing view for the few remaining visitors. The observatory was closed when the last visitors left around 8:00 p.m., after an excellent evening of astronomy.

Exploring the Stars, Lester B. Pearson School for the Arts, Grade 6, November 23rd, 2016

Cloudy skies with occasional wet snow precipitation greeted 92 visitors (56 children and 36 adults) from Lester B. Pearson School for the Arts, Grade 6 class, for Exploring the Stars at Western University's Cronyn Observatory, Wednesday, November 23rd, 2016, 7:00 p.m. The visitors filled the lecture room with many standing as graduate student Robin Arnason presented the digital slide presentation *"Our Solar System"* and fielded questions. Robin followed this with the activity *"Kitchen Comet,"* making a comet from dry ice and other materials on a table set up at the front of the lecture room.

RASC London Centre was represented by Bob Duff and Paul Kerans. When everybody arrived upstairs in the dome, Bob gave a talk about the history of the Cronyn Observatory and some of the technical aspects of the big 25.4cm refractor. Bob also explained the Schmidt camera and Cassegrain reflector telescope piggy-backed in the 25.4cm refractor, as well as the 2 clocks on the east wall of the dome and the difference between Standard and Sidereal Time.

Since cloudy damp snowy weather ruled out opening the dome, Bob invited the visitors to view the television screen visible in the windows of the Western Sports & Recreation Center through the observatory's 8-inch (20.3cm) Meade Schmidt-Cassegrain telescope (20mm Plossl eyepiece, 100X) set up inside the dome so as to view out the door to the roof patio.

Paul Kerans returned the London Centre's 25.4cm Dobsonian (17mm Nagler eyepiece, 66X), which had also been set up in the dome, back to the storeroom since it was not being used. Paul showed visitors his chondrite (stony) and iron meteorites as well as his Moon meteorite sample in a small plastic display case. Paul had placed his lunar meteorite sample in a wooden block with a transparent *Lexan* polycarbonate sheet cover and he invited visitors to *"walk on the Moon."*

The children asked many good questions and everybody appreciated the excellent slide lecture on the solar system, the comet making activity with dry ice, examining meteorites and viewing through a telescope, despite the cloudy damp snowy weather. Paul distributed one *"Star Finder"* planisphere early in the evening. The visitors were gone by around 9:00 p.m.

Cronyn Observatory Public Night, Monday, December 12th, 2016

Cloudy skies with snow on the ground greeted 13 visitors to Western University's Cronyn Observatory Public Night, Monday, December 12th, 2016, 7:00 p.m. Since there was no slide presentation, visitors simply went upstairs into the dome where they were greeted by graduate students Shannon Hicks and Robin Arnason.

Robin was telescope operator in the dome and supervised as visitors climbed the observing ladder to view the lights on the communications tower in south London through the big 25.4cm refractor (28mm Meade Super Wide Angle eyepiece, 157X). Shannon greeted and talked to visitors in the dome.

RASC London Centre was represented by Paul Kerans and Bob Duff. Paul set up the observatory's Orion AstroView 6 (15cm) Newtonian reflector (20mm Plossl eyepiece, 37.5X) inside the dome so as to view out the door to the roof patio. Paul invited visitors to view the lights on the communications tower in south London through the 15cm Newtonian reflector.

Bob talked to visitors and answered questions, explaining some of the history of the Cronyn Observatory and technical aspects of the big 25.4cm refractor in the dome. Bob also explained how the 15cm Newtonian reflector telescope worked and, in response to an inquiry, the 2 clocks on the east wall of the dome and the difference between Standard and Sidereal Time.

Paul showed the visitors his chondrite (stony) and iron meteorites as well as his Moon meteorite sample in a small plastic display case. Paul had placed his lunar meteorite sample display case in a wooden block with a transparent *Lexan* polycarbonate sheet cover and he invited visitors to *"walk on the Moon."*

Shannon distributed 2 *"Star Finder"* planispheres to 2 interested boys. The visitors were gone by around 8:30 p.m. after an enjoyable evening learning about astronomy and telescopes despite the cloudy weather.