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COVER PHOTOGRAPH

Object.....M8, M20, NGC6559, and IC1274

Photographer.....Robert C. Price

Instrument.....Canon 300mm F/4 Lens

Exposure/Camera.....three 20 minutes/Hutech modified Canon 40D

Date.....31 August 2008

Location.....south of Blue Knob State Park, PA

VOLUME 40 No. 2
EDITOR.....Robert C. Price
CONTRIBUTING EDITOR.....Ralph Proctor
PROOFING CONTRIBUTOR.....Linda Miller
CONTRIBUTORS.....Lee C. Coombs

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Product Evaluation: Deep Sky Stacker

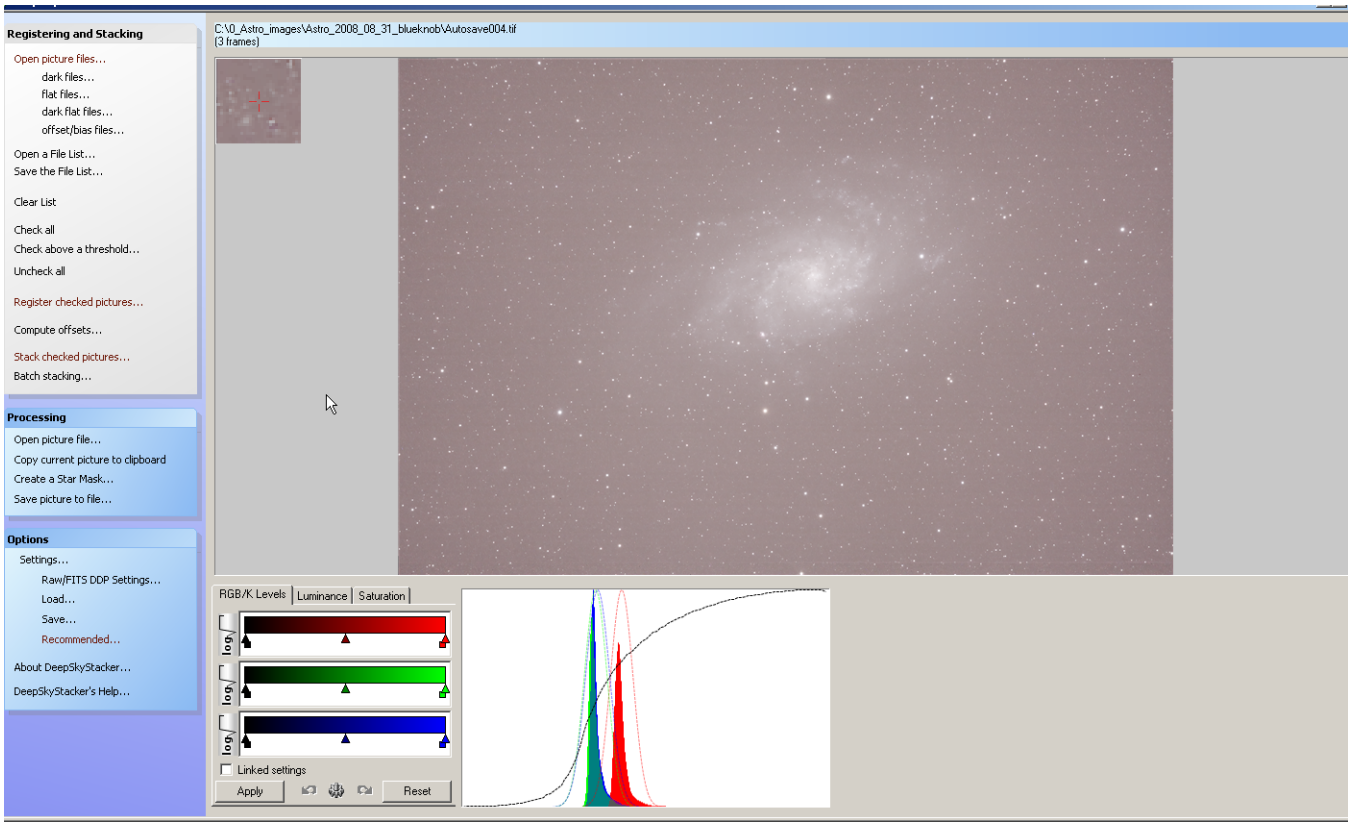
by

Robert C. Price

The product being evaluated is a free software product called Deep Sky Stacker. This product can be downloaded from the web site www.deepskystacker.com. As its name implies, Deep Sky Stacker will align and stack image files, including RAW image files, dark frames, bias frames, and flat files.

The author's evaluation of Deep Sky Stacker began with three images of M33 taken using a 5 inch refractor and Canon 40D camera at 100ASA. The Canon 40D is a 10 megapixel DSLR camera. Each of the three images were converted to 16 bit TIFF files using the Canon-supplied utility for opening Canon RAW image files. Each 16 bit TIFF file was further processed in Noise Ninja without the default sharpening. All three files were opened in Deep Sky Stacker, aligned, and stacked using the default settings. The resultant image, Figure 1 seemed flat and lacked color. The next step was to produce a darker image and neutral background by adjusting the red, green, and red channels. These adjustments are shown in Figure 2. The image still lacked color so the color saturation was increased by 15 percent. The resulting image is shown in Figure 3 and is the image that was saved and then opened in Adobe Photoshop Elements 3 for additional processing.

Figure 4 is the image from Deep Sky Stacker opened in Adobe Photoshop Elements 3. The color of the image of M33 that Deep Sky Stacker produced seemed to match some color images of M33 the author had seen on the web. The spiral arms were light blue and became a lighter blue as they neared the center of the galaxy. The spiral arms became a neutral white color near the center of the galaxy. There are magenta colored areas of nebulosity throughout the spiral arm structure where hydrogen alpha emission nebula appear. The other color of M33 the author has seen on the web shows the center third of M33 as a light yellow color. The outer arms are close to a light blue, but as the arms go inward they become a mixture of light blue, light yellow, and magenta.

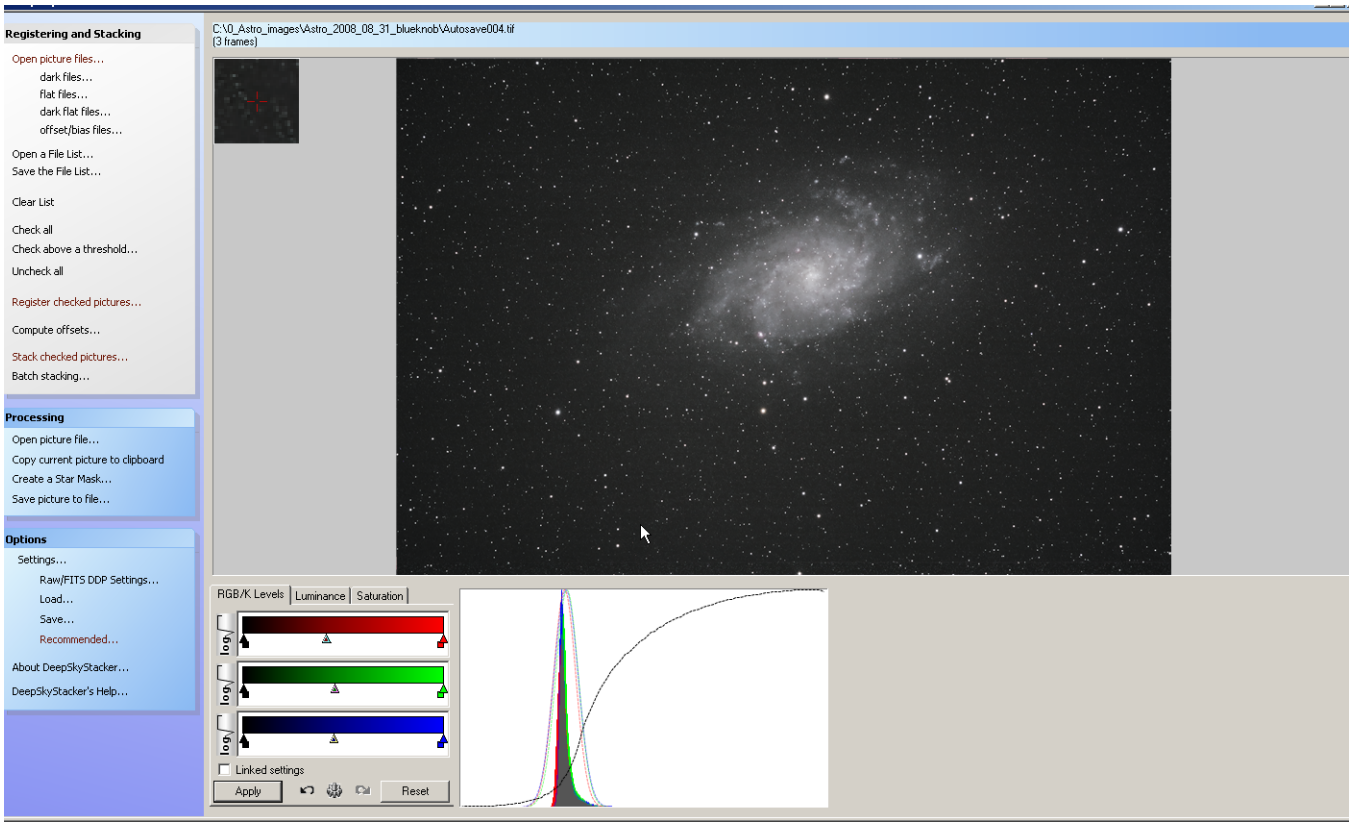


Above, Figure 1: Screen appearance after opening 3 images of M33 in Deep Sky Stacker and after the process of aligning and stacking the three images.

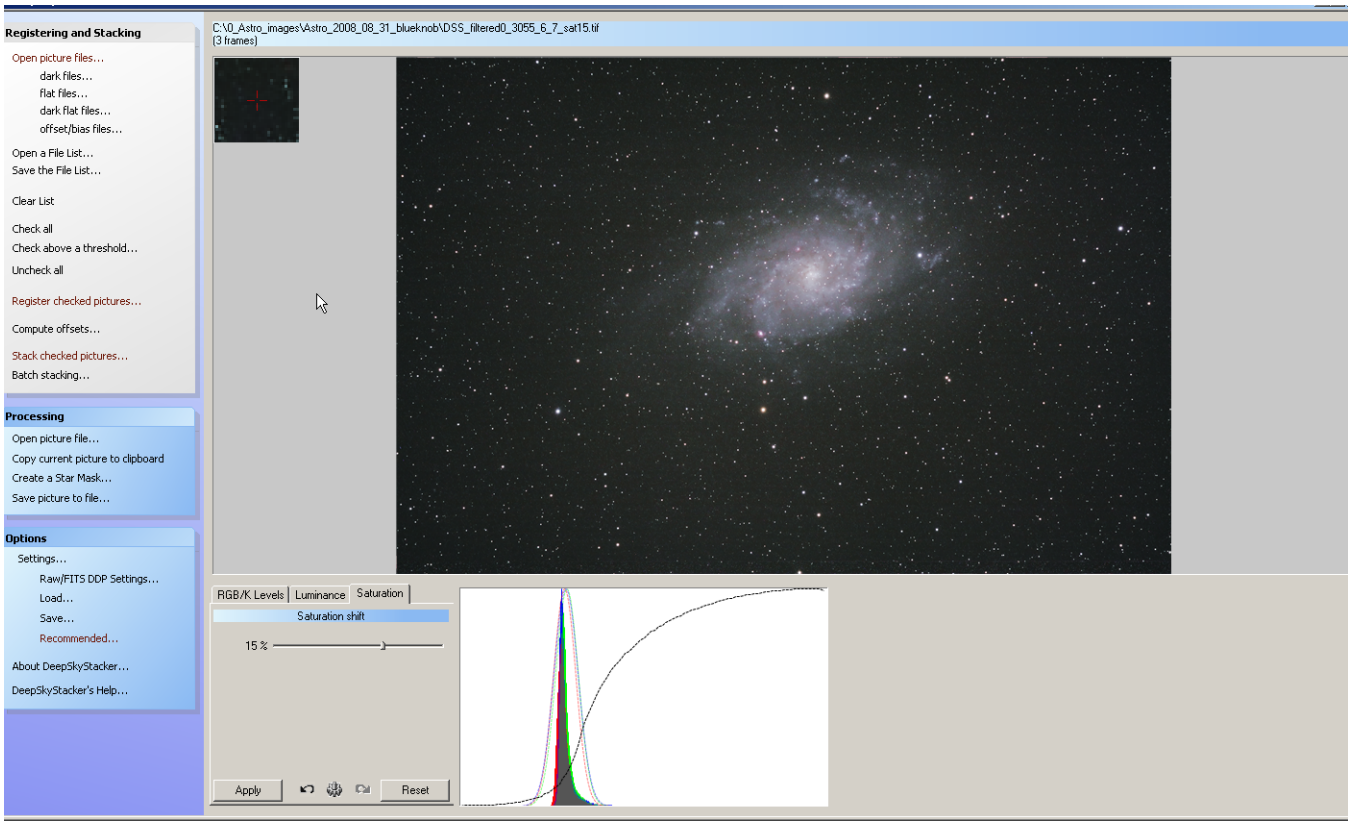
Once the image of M33 was opened in Adobe Photoshop Elements 3 the levels were adjusted as shown in Figure 5. This adjustment darkened the background and increased the contrast in the image. Figure 6 shows an enlarged version of a portion of the image from Figure 5. The enlargement shows some of the fine noise produced by the Canon 40D camera. This noise is especially prevalent with temperatures over 50 degrees Fahrenheit and is even more intense when ASA of 400 or higher are used. Figure 7 shows the same area shown in Figure 6 after the noise filter "despeckle" was used. This type of fine noise would have been even more objectionable if the Noise Ninja default setting that slightly sharpens the original TIFF image files was used. Instead of the Noise Ninja default setting a non default setting that allows no sharpening of the image was used, resulting in less noise to reduce in this last stage of image processing.

The time required for Deep Sky Stacker to align and stack the three TIFF image files seemed to take forever. It took the author an average of 17 minutes to align, stack, adjust the red, green, and blue channel levels, and increase the color saturation. Just the alignment and stacking process took 15.5 minutes. By comparison CCDStack took an average of 3 minutes to perform the same functions and save the file for further processing in Adobe Photoshop.

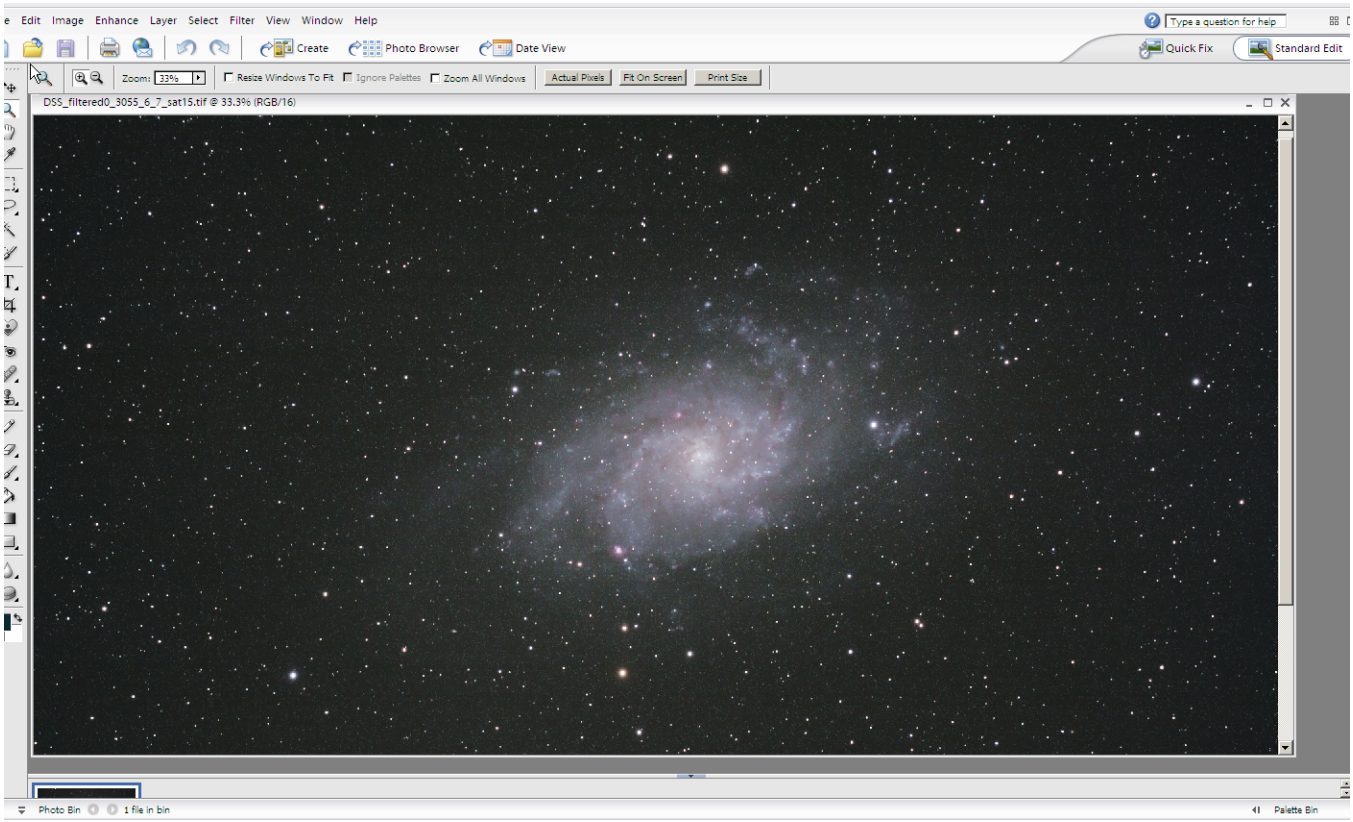
Deep Sky Stacker can open, align, and stack RAW Canon image files in about 4 minutes. The author used Deep Sky Stacker to align and stack the three RAW image files of M33. Figure 9 shows the Deep Sky Stacker screen after the three RAW files of M33 have been aligned and stacked. After the red, blue, and green channels were adjusted, the resultant image seemed to have even less color than the resultant image that used the TIFF files that were converted from these same RAW files. After increasing the saturation of the stacked image of the three RAW files the image was saved and opened in Adobe Photoshop Elements 3. After nearly identical level adjustments in Adobe Photoshop Elements 3 the image was opened in Noise Ninja and the default noise reduction was applied. The resulting image is shown in Figure 10. Note the totally different color of the image. The center third of the image of M33 is yellow.



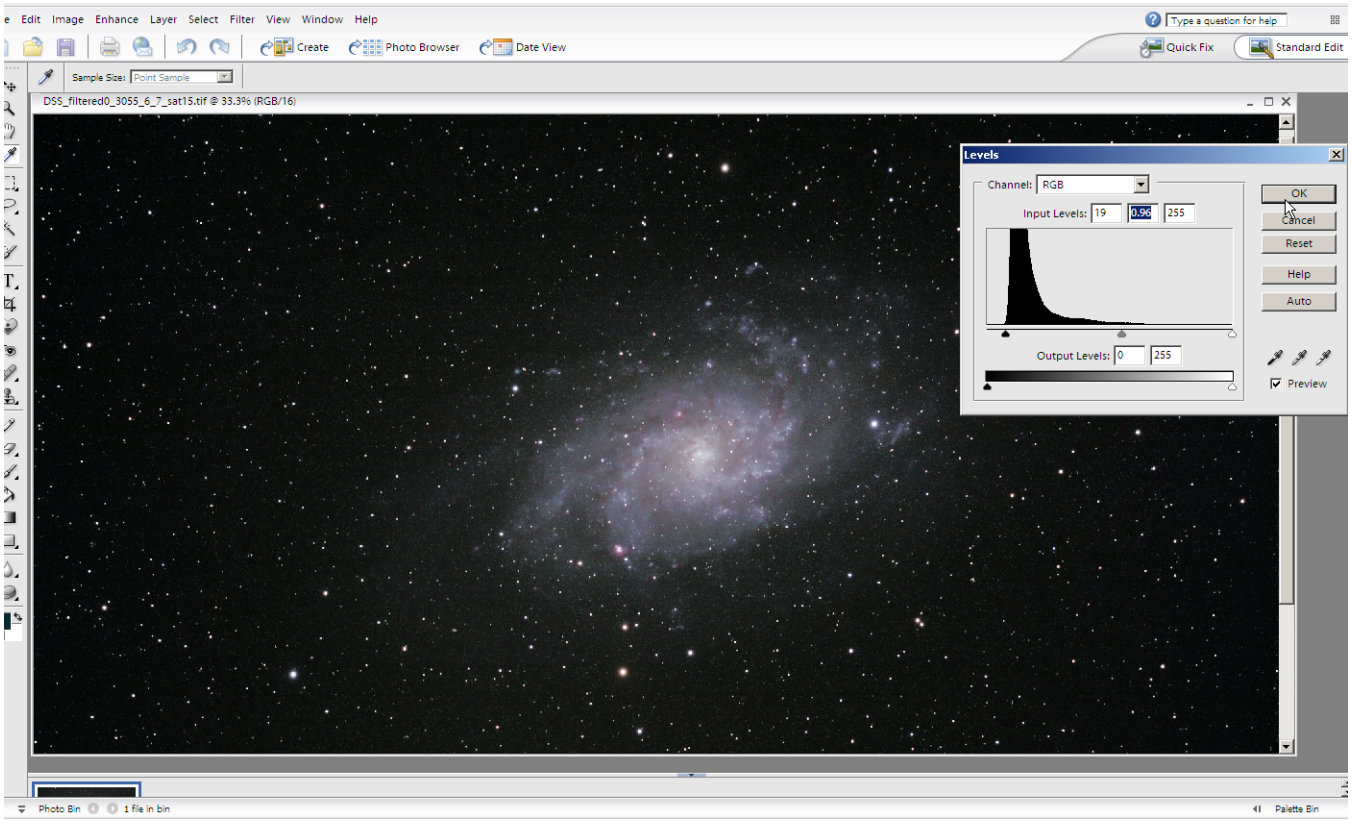
Above, Figure 2: Screen appearance of Deep Sky Stacker after aligning the three color channels to produce a neutral background.



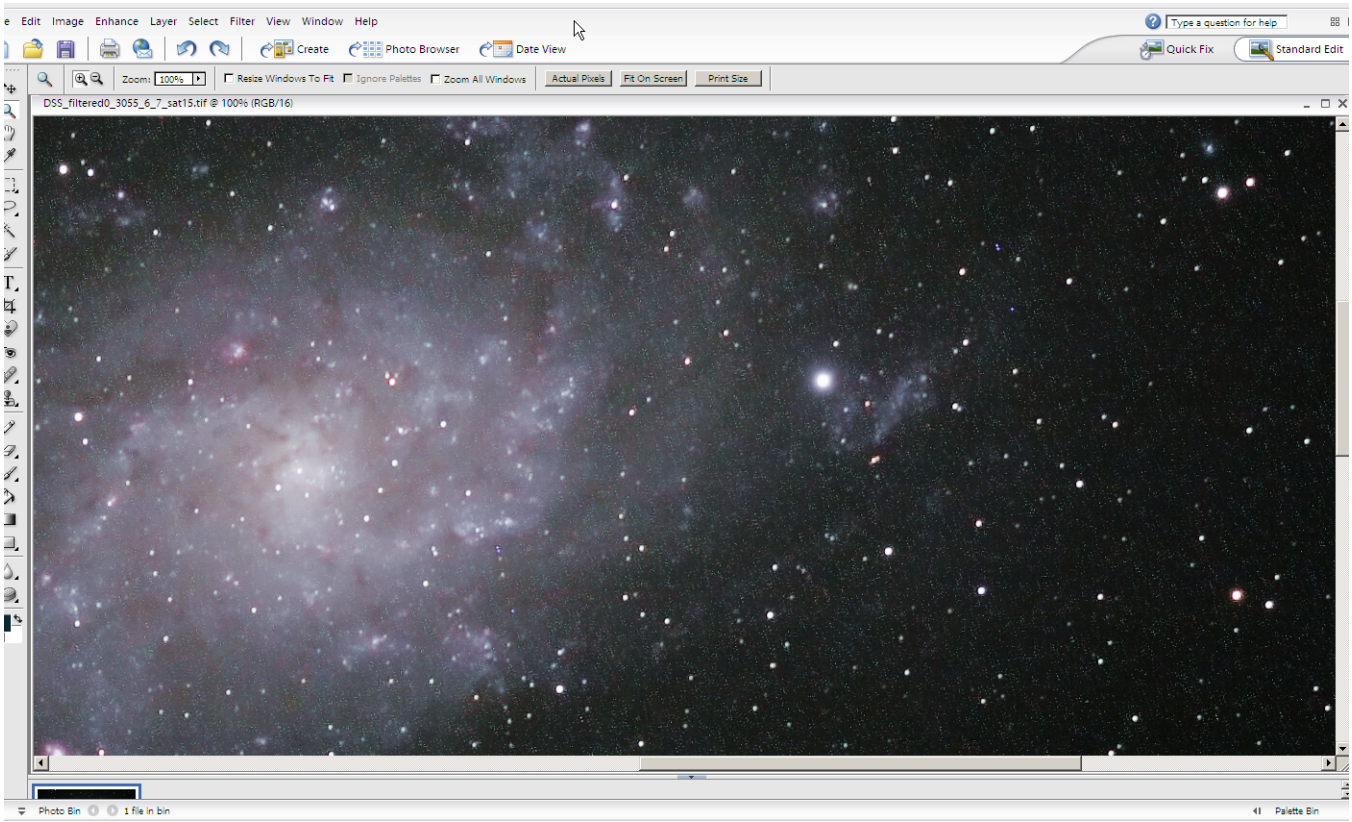
Above, Figure 3: Screen appearance of Deep Sky Stacker after increasing the color saturation by 15 percent to add more color to the image.



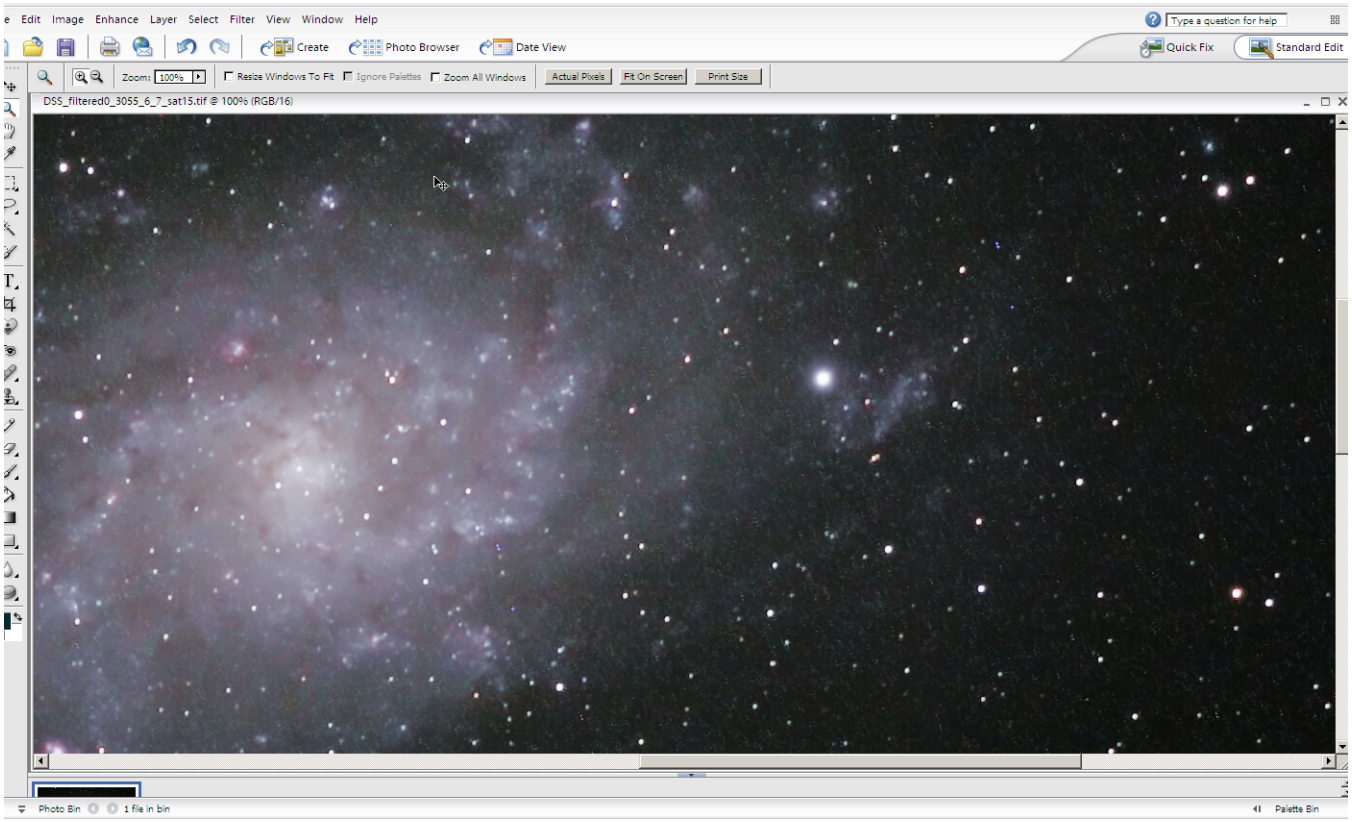
Above, Figure 4: Screen appearance of Adobe Photoshop Elements 3 after importing the image in Figure 3 from Deep Sky Stacker.



Above, Figure 5: Screen appearance of Adobe Photoshop Elements 3 after level adjustments were made to the image (Figure 3) imported from Deep Sky Stacker.



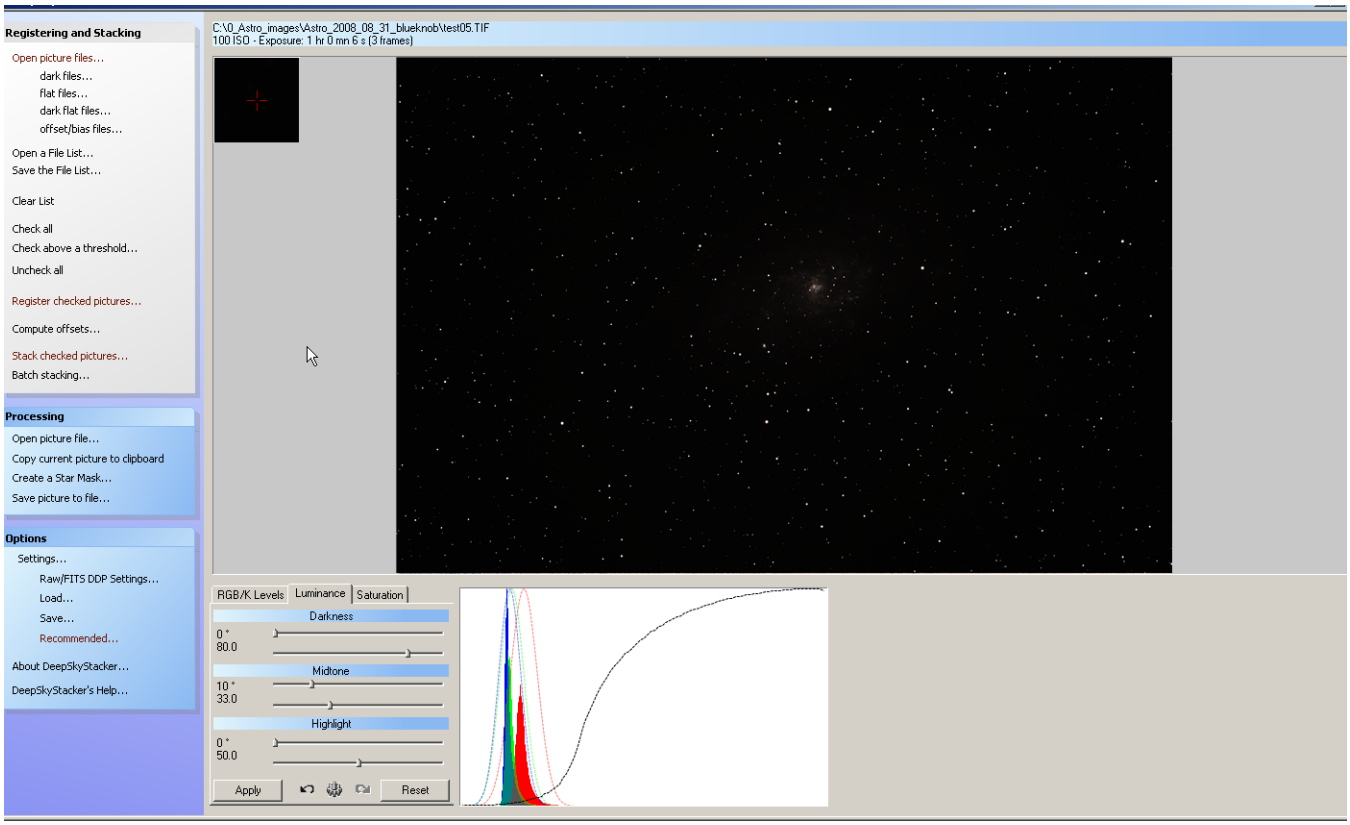
Above, Figure 6: Screen appearance of Adobe Photoshop Elements 3 after magnifying the image shown in Figure 5. Fine noise is apparent in the image.



Above, Figure 7: Screen appearance of Adobe Photoshop Elements 3 after the noise filter "despeckle" was applied to the image shown in Figure 6.



Above, Figure 8: Final image of M33 from Adobe Photoshop Elements 3 after being cropped.



Above, Figure 9: Screen appearance after opening three RAW images of M33 in Deep Sky Stacker and after the process of aligning and stacking the three images.



Above, Figure 10: Final image from three RAW images of M33 utilizing Deep Sky Stacker for alignment, stacking, and background correction. Abobe Photoshop Elements 3 was used for level adjustment.



Above: M64 photographed by Lee C. Coombs on 19 May 2003 using a 10 inch F/5 Newtonian. Exposure was 35 minutes on Kodak Ektachrome Professional 200.

Astrophotography for October and November

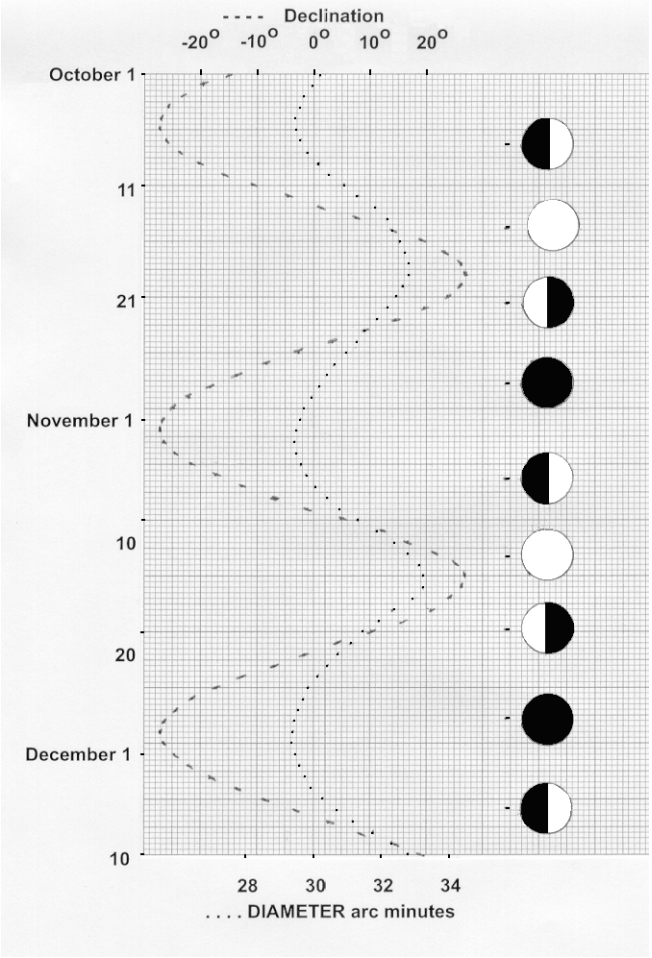
by

Ralph Proctor

Mercury begins October lost in the Sun's glare, reaching inferior conjunction with the Sun on 6 October. Mercury emerges from the Sun's glare in early October as a morning object low in the eastern sky. Mercury mover higher in the eastern sky and reaches a greatest western elongation of 18 degrees on 22 October when it will be in poor photographic position with a declination of minus 3 degrees. During the remainder of October Mercury moves lower in the eastern sky and by the end of October disappears into the Sun's glare.

Venus begins October as an evening object low in the western sky. During October and November Venus moves higher in the western sky.

Lunar Declination and Diameter:



The Moon's waning gibbous and last quarter phases will be located high on the ecliptic and in excellent photographic position during October (October 19) and November (November 15), with an apparent declination of up to +28 degrees.

Mars begins October as an evening object low in the western sky in the constellation Virgo. Mars moves into the constellation Libra in mid-October and becomes lost in the Sun's glare. During October and November Mars increases in brightness from magnitude +1.6 to +1.4, and increases in diameter from 3.77 to 3.78 arc seconds.

Jupiter begins October as an evening object high in the western sky in the constellation Sagittarius. During October and November Jupiter moves lower in the western sky, decreases in brightness from magnitude -2.3 to -2.0, and decreases in diameter from 39.8 to 34.0 arc seconds.

Saturn begins October as a morning object low in the eastern sky in the constellation Leo. During October and November Saturn moves higher in the eastern sky, decreases in brightness from magnitude +1.0 to +1.1, and increases in diameter from 16.2 to17.5 arc seconds.

Uranus begins October as an evening object high in the western sky in the constellation Aquarius, reaching opposition with the Sun on 13 September. During October and November Uranus moves lower in the western sky, decreases in brightness from magnitude +5.7 to + 5.8, and decreases in diameter from 3.68 to 3.54 arc seconds. Uranus is located at R.A. 23 hours 22.6 minutes declination -04 degrees 53 minutes on 15 October and at R.A. 23 hours 20.1 minutes declination -05 degrees 09 minutes on 15 November.

Neptune begins October as an evening object high in the western sky in the constellation Capricornus, reaching opposition with the Sun on 15 August. During October and November Uranus moves lower in the western sky, remains constant in brightness at magnitude + 7.9, and decreases in diameter from 2.33 to 2.25 arc seconds. Neptune is located at R.A. 21 hours 36.2 minutes declination -14

degrees 39 minutes on 15 October and at R.A. 21 hours 36.0 minutes declination -14 degrees 40 minutes on 15 November.

Pluto begins October as an evening object in the western sky in the constellation Sagittarius. During October and November Pluto moves lower in the western sky and decreases in brightness from magnitude +14.0 to +14.1. Pluto is located at R.A. 17 hours 54.6 minutes declination -17 degrees 30 minutes on 15 October and at R.A. 17 hours 57.9 minutes declination -17 degrees 38 minutes on 15 November.

Events:

Antares will be occulted by the Moon on 4 October (11 hours universal time) for the southern portion of Africa, Madagascar, and western Australasia; and on 31 October (18 hours universal time) for central South America, and the western tip of Africa.
Neptune will be occulted by the Moon on 10 October (10 hours universal time) for eastern Asia, the Philippines, Japan, and western Alaska; and on 6 November (19 hours universal time) for the northeastern tip of Canada, all but the southeastern portion of the United Kingdom, and western Scandinavia.

The Sun will undergo an annular eclipse on 26 January 2009 for the southern Indian Ocean and Indonesia. The eclipse begins at 4 hours 56.6 minutes and ends at 11 hours 00.7 minutes universal time. Central eclipse at local apparent noon occurs at 7 hours 46.4 minutes. The shadow of the annular eclipse begins southwest of the southern tip of Africa, travels northeast across the southern Indian Ocean and Indonesia, and ends in the Pacific Ocean.
The Moon will undergo a penumbral eclipse on 9 February 2009 for Russia, eastern Europe, Antarctica, all Australasia, the Arctic, all Asia, the eastern portion of India, and the western Pacific Ocean including the Hawaiian Islands. The eclipse begins (Penumbra contact) at 12 hours 36.8 minutes and ends at 16 hours 39.6 minutes universal time. Mid-eclipse occurs at 14 hours 38.2 minutes universal time.

MINOR PLANETS

		position			
		15 October		15 November	
Planet	Magnitude	R.A.	Decl.	R.A.	Decl.
Ceres	08.7 - 08.3	09 hr 50.2 min	+19 deg 51 min	10 hr 34.5 min	+17 deg 54 min
Pallas	09.4 - 08.0	05 hr 28.0 min	- 20 deg 36 min	05 hr 25.6 min	- 29 deg 23 min
0Juno	10.6 - 11.1	17 hr 38.5 min	- 12 deg 26 min	18 hr 17.9 min	- 13 deg 53 min
Vesta	07.8 - 07.0	02 hr 47.1 min	+04 deg 42 min	02 hr 17.4 min	+02 deg 58 min

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Volume No. 13 issue 1, 2, 3, 4, 5, and 6
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Volume No. 32 issue 1, 2, 3, 4, 5, and 6
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Digital Processing: Using Multiple Processes

by

Robert Price

It is a relatively simple matter to process a well exposed long exposure astronomical image with little to no noise. However, not all images contain such "well behaved" characteristics. Images from such cameras as the Canon 40D contain a large amount of noise when the outside temperature is above 50 degrees Fahrenheit. Figure 1 is a portion of an unprocessed image of M65/M66 and is a good example of a very noisy image. The first step in getting the most out of such a noisy image is having a good dark frame taken at about the same time and under the same conditions. Several programs will subtract a dark frame from an image file, but the result is not always perfect. Figure 2 shows the image in Figure 1 after dark frame subtraction in Deep Sky Stacker. There is still a lot of noise in the subtracted image. In order to reduce this noise the author used Noise Ninja for noise reduction. Because some of the noise had a color component the strength value for "luminance" and "colors" in the color-specific part of the Noise Ninja noise filter were each increased to a value of 10. Figure 3 shows the image in Figure 2 after processing in Noise Ninja. The background in Figure 3 looks almost neutral, but not perfect. The author used the "set background" feature of CCD Stack to obtain a better neutral background. Figure 4 shows the image in Figure 3 after background normalization in CCD Stack. Figure 4 still has some left over noise from Noise Ninja. The default sharpening feature of Noise Ninja tends to leave a noise in the processed image that looks like speckles. Most of this noise looks like single pixel noise and sometimes it looks like two or three pixels in a line. When it looks like single pixels the author has found the "despeckle" noise filter in Adobe Photoshop programs to be effective. When the noise contains pixels in a line the "dust and scratches" noise filter works better. Figure 5 shows the image in Figure 4 after level processing and additional noise processing in Adobe Photoshop Elements 3. Figure 6 shows the final image in a wider format showing the Leo Triplett, M 65, M66, and NGC 3628.



Above, Figure 1: Original cropped image of M65 and M66 taken with a Hutech modified Canon 40D camera and Tele Vue NP-101 4 inch refractor. Exposure was 20 minutes at 400ASA on 1 June 2008.



Above, Figure 2: Appearance of the image shown in Figure 1 after dark frame subtraction in Deep Sky Stacker. RGB channels were adjusted for a neutral background and saturation was increased by 15 percent.



Above, Figure 3: Appearance of the image shown in Figure 2 after noise reduction in Noise Ninja.



Above, Figure 4: Appearance of the image shown in Figure 3 after background adjustment in CCDStack



Above, Figure 5: Appearance of the image shown in Figure 4 after level adjustment and additional noise reduction in Adobe Photoshop Elements 3.



Above, Figure 6: Wider view of Figure 5 showing the Leo Triplett, M65, M66, and NGC 3628.



Above: M16 photographed by Lee C. Coombs on 23 July 2002 using a 10 inch F/5 Newtonian. Exposure was 30 minutes on Kodak Ektachrome Professional 200.