the ASTROGRAPH



Volume 36 No. 4 February/March 2005

the ASTROGRAPH

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COVER PHOTOGRAPH

Object.....M17, the Swan nebula

Photographer.....Lee C. Coombs

Instrument.....10 inch F/5 Newtonian

Exposure\Film.....30 minutes/Kodak Ekta P200

Date.....1 July 2003

VOLUME 36 No. 4

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Color Astrophotography with Ekta P200 Slide Film
by
Lee C. Coombs

I have been using Ekta P200, short for Ektachrome Professional-Daylight (E-200), color slide film for color long exposure astrophotography with good results. I scan the raw slides into Photoshop using a Polaroid SprintScan 4000 scanner at 4000dpi. I make a copy of the raw scan for the processing. After setting the image size, I convert the scan to 16-bit mode for processing. Using the eyedropper tool (color sample tool), I select three points (black point, white point, and blank sky aim point). Using LEVELS, I set the black point (15-20) and white point (255) in the R, G, and B channels. Using CURVES, I adjust the brightness by raising a point at 128 in the RGB mode. Using CURVES, I correct color in the "blank sky aim point" in the R, G, or B channel if needed. The black point is reset in whatever channel(s) were adjusted. Using LEVELS in the RGB channel, the contrast is adjusted by moving the black point (to about 10-15). The white point is adjusted until the threshold colors begin to appear (~200 on average). Using CURVES in the RGB channel, tones are adjusted by selecting two points (~80 and ~180) and adjusting brightness and contrast using the S-shaped curve. Any remaining subtle color corrections are done with CURVES in the appropriate channel. The image is then converted to 8-bit mode and dust and scratches removed using the CLONE tool. Finally, the image is sharpened using the UNSHARP MASK. Obviously, not all the above steps are needed on every image and there is some additional tweaking required on certain images. However, about 90% of what I have processed respond well to the steps described above. For an average image, it takes me about 15 to 30 minutes to carry out the entire scanning and processing procedure. I'm still perfecting my techniques and I know I could squeeze out better images if willing to spend the time. A very helpful source of information for processing astronomical images in Photoshop is the book on CD by Jerry Lodriguss titled "Photoshop for Astrophotographers". I hope this gives the ASTROGRAPH's readers a good idea of how my images are processed. I would love to hear from other astrophotographers on how they do their processing, especially if what they do is significantly different from what I do. I know there are lots of different tricks that I am unaware of and would love to get some feedback and try out some different techniques. I have tried the technique described in the ASTROGRAPH Vol 35 No. 3 for combining long and short images of M42 using LAYERS with good results.



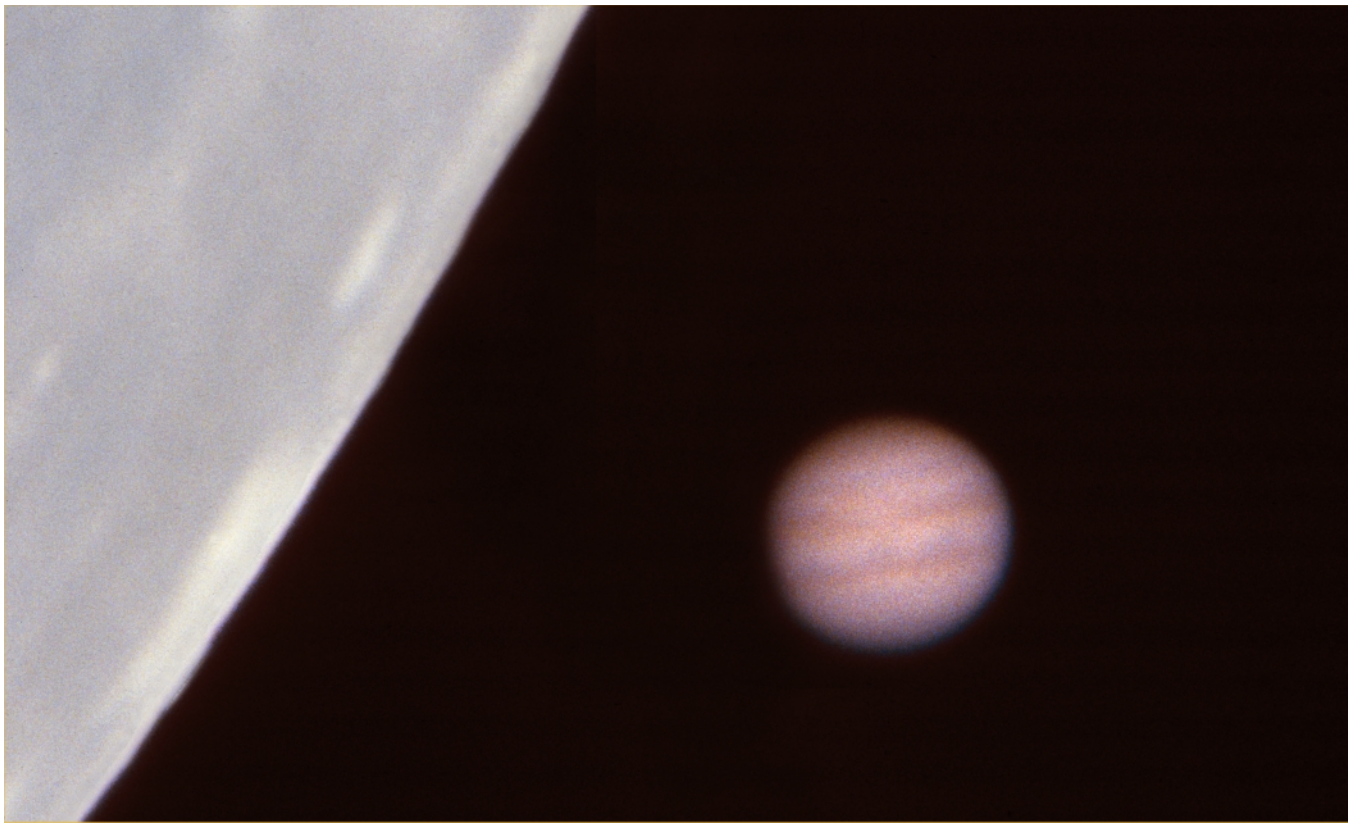
Above: Planetary nebula NGC 7293, the Helix Nebula, photographed by Lee C. Coombs on 14 September 2004 using a 10 inch F/5 Newtonian. Exposure was 41 minutes on Ektachrome Professional-Daylight (E-200) slide film.



Above: Galactic star cluster M46 and planetary nebula NGC 2438 photographed by Lee C. Coombs on 25 March 2003 using a 10 inch F/5 Newtonian. Exposure was 25 minutes on Ektachrome Professional-Daylight (E-200) slide film.



Above: Emission nebula NGC 2237, the Rosette Nebula, photographed by Lee C. Coombs on 17 January 2001 using a 10 inch F/5 Newtonian. Exposure was 35 minutes on Ektachrome Professional-Daylight (E-200) slide film.



Above: Jupiter occultation photographed by Lee C. Coombs on 2 April 1983 using a 10 inch F/5 Newtonian and eye-piece projection to yield F/90. Exposure was 1 second on Ektachrome Professional-Daylight (E-200) slide film.



Above: Emission nebula M8, the Lagoon Nebula, photographed by Lee C. Coombs on 3 July 2002 using a 10 inch F/5 Newtonian. Exposure was 30 minutes on Ektachrome Professional-Daylight (E-200) slide film.



Above: Emission nebula NGC 6888, the Crescent Nebula, photographed by Lee C. Coombs on 23 August 2000 using a 10 inch F/5 Newtonian. Exposure was 35 minutes on Ektachrome Professional-Daylight (E-200) slide film.



Above: Emission nebula NGC 2024, the Flame Nebula, and B33, the Horsehead Nebula, photographed by Lee C. Coombs on 10 January 2002 using a 10 inch F/5 Newtonian. Exposure was 30 minutes on Ektachrome Professional-Daylight (E-200) slide film.



Above: Emission and/or reflective nebula NGC 6992-5, the Veil Nebula, photographed by Lee C. Coombs on 22 August 2000 using a 10 inch F/5 Newtonian. Exposure was 35 minutes on Ektachrome Professional-Daylight (E-200) slide film.

Astrophotography for February and March

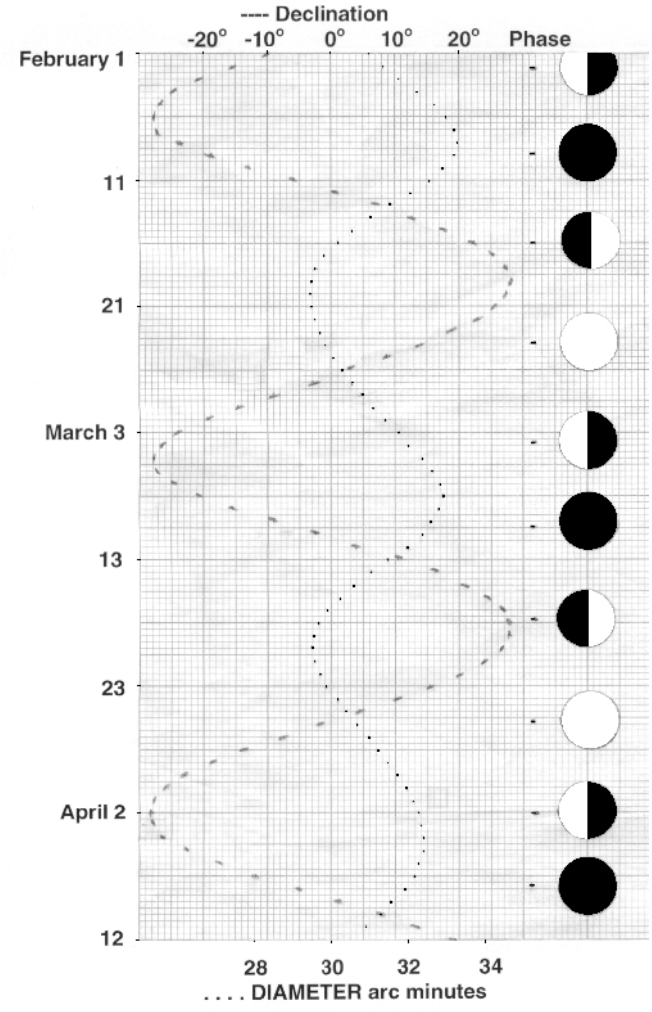
by

Ralph Proctor

Mercury begins February lost in the Sun's glare as it rapidly moves towards a 14 February superior conjunction with the Sun. Mercury emerges from the Sun's glare in late February as an evening object and reaches a greatest eastern elongation of 18 degrees on 12 March when it will be in poor photographic position with a declination of plus 5 degrees. During the remainder of March Mercury moves lower in the western sky and disappears into the Sun's glare at the end of March.

Venus begins February as a morning object low in the eastern sky and disappears into the Sun's glare in mid-February.

Lunar Declination and Diameter:



The Moon's first quarter phase will be located high on the ecliptic and in excellent photographic position during February (February 19) and March (March 18), with an apparent declination of up to +28 degrees.

Mars begins February as a morning object low in the eastern sky in the constellation Ophiuchus. During February and March Mars passes through the constellation Sagittarius and moves into the constellation Capricornus. During February and March Mars moves higher in the eastern sky, increases in brightness from magnitude +1.4 to +0.9, and increases in diameter from 4.57 to 5.83 arc seconds.

Jupiter begins February as a morning object in the eastern sky in the constellation Virgo. During February and March Jupiter moves higher in the eastern sky, increases in brightness from magnitude -2.2 to -2.5, and increases in diameter from 39.3 to 44.2 arc seconds.

Saturn begins February as an evening object high in the western sky in the constellation Gemini, having reached opposition with the Sun on 13 January. During February and March Saturn moves lower in the western sky, decreases in brightness from magnitude -.03 to +0.1, and decreases in diameter from 20.5 to 18.8 arc seconds.

Uranus begins February as an evening object low in the western sky in the constellation Aquarius, and by early February disappears into the Sun's glare on its way to a 25 February conjunction with the Sun. Uranus emerges from the Sun's glare in mid-March as a morning object low in the eastern sky. During February and March Uranus remains constant in brightness at magnitude +5.9, and increases in diameter from 3.36 to 3.37 arc seconds. Uranus is located at R.A. 22 hours 32.8 minutes declination -09 degrees 56 minutes on 15 February and at R.A. 22 hours 38.9 minutes declination -09 degrees 20 minutes on 15 March.

Neptune begins February lost in the Sun's glare as it moves towards a 3 February conjunction with the Sun. Neptune emerges from the Sun's glare in late February as a morning object low in the eastern sky.

During February and March Neptune remains in the constellation Capricornus, remains constant in brightness at magnitude +8.0, and increases in diameter from 2.20 to 2.23 arc seconds. Neptune is located at R.A. 21 hours 12.0 minutes declination -16 degrees 17 minutes on 15 February and at R.A. 21 hours 15.8 minutes declination -16 degrees 00 minutes on 15 March.

Pluto begins February as a morning object low in the eastern sky. During February and March Pluto moves higher in the eastern sky and remains constant in brightness at magnitude +13.9. Pluto is located at R.A. 17 hours 35.4 minutes declination -15 degrees 13 minutes on 15 February and at R.A. 17 hours 37.0 minutes declination -15 degrees 09 minutes on 15 March.

Events:

Jupiter will be occulted by the Moon on 27 February (15 hours Universal Time) for the southern part of Australia, and part of Antarctica; and on 26 March (16 hours Universal Time) for the southern Indian Ocean, the southwestern tip of Australia, and most of Antarctica.

Antares will be occulted by the Moon on 4 February (05 hours Universal Time) for southern Scandinavia, eastern Europe, the northern Arabian peninsula, and western Asia; on 3 March (11 hours Universal Time) for all but the northwestern part of North America, Central America, the Caribbean, and the northern tip of South America; and on 30 March (17 hours Universal Time) for northeastern China, southeastern Siberia, Korea, Japan, the northern Pacific Ocean, and the Hawaiian Islands.

The Sun will undergo an annular and total eclipse on 8 April for New Zealand, part of Antarctica, the southern United States, Central America, the Caribbean, and all but the eastern and southern part of South America. The eclipse begins and ends at 17 hours 51.2 minutes and 23 hours 20.4 minutes Universal Time respectively. Central eclipse at local apparent noon occurs at 20 hours 15.6 minutes Universal Time.

Minor Planet Position

		Date			
		14 February		15 March	
Planet	Magnitude	R.A.	Decl.	R.A.	Decl.
Ceres	08.8 - 07.7	15 hr 24.4 min	-09 deg 00 min	15 hr 39.0 min	-09 deg 17 min
Pallas	08.9 - 07.3	12 hr 44.1 min	-04 deg 02 min	12 hr 33.0 min	+06 deg 25 min
Juno	10.7 - 10.1	22 hr 09.0 min	-08 deg 30 min	23 hr 03.0 min	-04 deg 28 min
Vesta	07.6 - 08.4	00 hr 58.1 min	+00 deg 08 min	01 hr 42.6 min	+05 deg 19 min

Back issues of the ASTROGRAPH in its printed format are still available for $1.50 each ($2.00 for each color issue) plus postage. Currently the following issues are available:

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Volume No. 7 issue 5 and 6
Volume No. 8 issue 11, 3, 4, and 5
Volume No. 9 issue 1, 4, 5, and 6
Volume No. 10 issue 2, 3, 5, and 6
Volume No. 11 issue 1, 2, 3[1], 4, 5, and 6
Volume No. 12 issue 1, 2, 3, 4, 5, and 6
Volume No. 13 issue 1, 2, 3, 4, 5, and 6
Volume No. 14 issue 1, 2, 3, 4, 5, and 6
Volume No. 15 issue 1, 2, 3, 4, 5, and 6
Volume No. 16 issue 1, 2, 3, 4, 5, and 6
Volume No. 17 issue 1, 2, 3[2], 4, 5, and 6
Volume No. 18 issue 1, 4, 5, and 6
Volume No. 19 issue 1, 2, 3, 4, 5, and 6
Volume No. 20 issue 1, 2, 3[1], 4, 5, and 6
Volume No. 21 issue 1, 2, 3, 4, 5, and 6
Volume No. 22 issue 1, 2, 3, and 4
Volume No. 23 issue 4 and 5
Volume No. 24 issue 5 and 6
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Volume No. 28 issue 5 and 6
Volume No. 29 issue 1, 2, 3, 4, 5, and 6
Volume No. 30 issue 1, 2, 3, 4[1], 5, and 6
Volume No. 31 issue 1, 2, 3, 4, 5, and 6
Volume No. 32 issue 1, 2, 3, 4, 5, and 6
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Volume No. 35 issue 1 and 2

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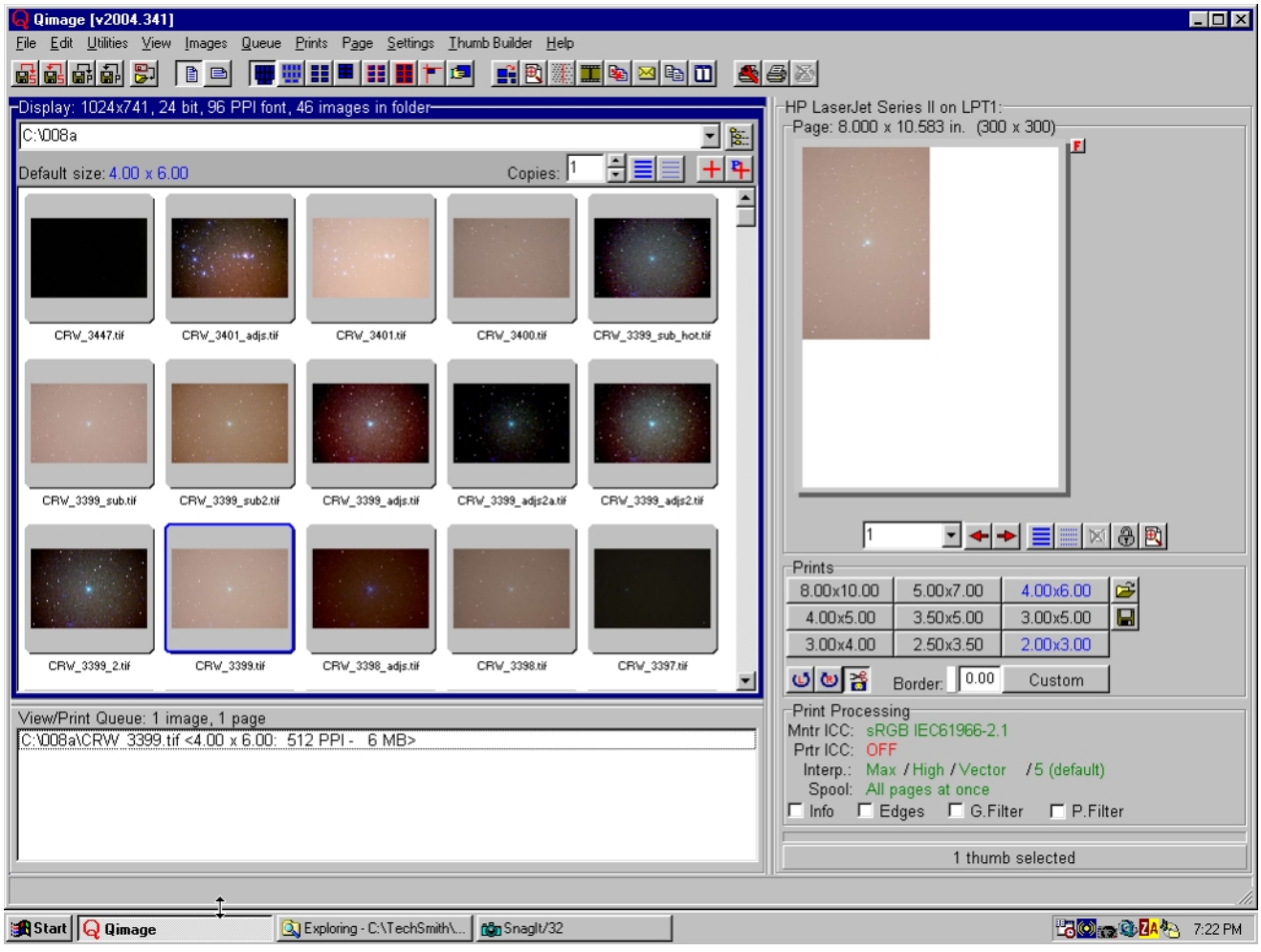
Dark Frame Subtraction

by

Robert C. Price

The image produced by even the best digital cameras contain numerous small blemishes that are fixed within the image. The best method to eliminate these blemishes from long exposure astronomical images is to take an identical exposure with the telescope or camera closed to all light and subtract that image from the astronomical exposure. This process is called dark frame subtraction. Dr. Gene Wells alerted the author to an image processing program call Q Image which contains an easy-to-use dark frame subtraction feature. Q Image characterizes itself as "multiple image printing and processing software". It claims that it has both color management and interpolation capabilities to produce the highest quality prints from today's quality ink-jet printers. Q Image can be downloaded from www.ddisoftware/qimage for $44.95 and purchased on CD for $59.95. There is a 30 day (reduced capability) evaluation feature for those wishing to evaluate the product. Q Image comes with lifetime upgrades. The author's evaluation and this article are limited to the dark frame subtraction feature. Figure 1 is the author's 4 minute exposure of Comet Machholz selected within Q Image. This 4 minute exposure of Comet Machholz was taken on 1 January 2005 using a Sigma 135mm F/2.5 telephoto lens and Canon 300D digital SLR (single lens reflex) camera at 400 ASA. The original RAW image format was converted to TIF for additional processing in Adobe Photoshop and Jasc Paint Shop Pro. Figure 2 is the same raw image of Comet Machholz processed on Adobe Photoshop to adjust the levels in the image to approximate the look (contrast and brightness) of a comet against a dark background. Color corrections to make the background a neutral dark gray or black color was then



Above: Figure 1 is the Q Image program and the author's 4 minute exposure of Comet Machholz selected within Q Image.



Above: Figure 2, the author's 4 minute exposure of Comet Machholz processed in Adobe Photoshop and Jasc Paint Shop Pro. Note the small bright "hot pixels" that appear at several locations and are missing from the image below.

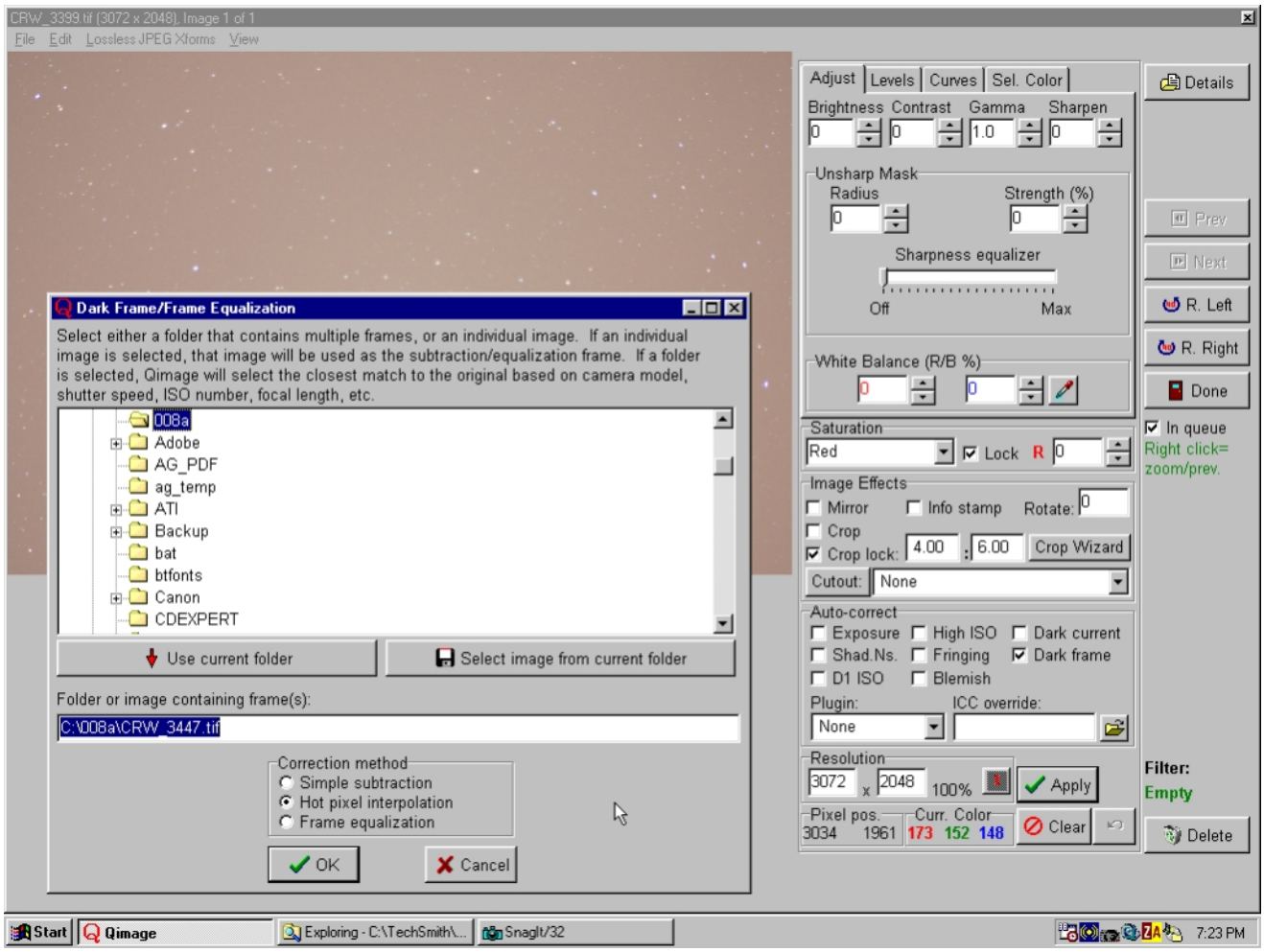


Above: Figure 3, the author's 4 minute exposure of Comet Machholz after dark frame subtraction (hot Pixel interpolation) and then processed in Adobe Photoshop and Jasc Paint Shop Pro in the same manner as the image in Figure 2. Note that there are still small artifacts where the brighter hot pixels were located.

accomplished in Jasc Paint Shop Pro. Figure 3 is the Q Image dark frame subtraction image using the hot pixel interpolation option. Addition processing of the Q Image processed image was accomplished in Adobe Photoshop and Jasc Paint Shop Pro in the identical method that was used with the non dark frame subtraction image seen in Figure 2. The dark frame feature in Q Image does for the most part eliminate the bright central hot pixel and adjacent pixels using the dark frame feature and hot pixel interpolation subfeature. However, closer examination of the hot pixel shows that the brighter hot pixels have a surrounding set of dark pixels that form an "O", five pixels on a side. This dark "O" shaped artifact is not eliminated when using the dark frame subtraction feature. Using the other sub options, simple subtraction and frame equalization the image did not result in better hot pixel elimination.



Above: Figure 5 top is a 4x enlargement of a hot pixel from the photograph in Figure 2. Bottom is an enlargement of the same area from the photograph in Figure 3. Note the difference in appearance of a faint star image at bottom.



Above: Figure 4, the Q Image program screen after the dark frame option is selected showing additional options with the hot pixel interpolation option selected. This screen also shows the dark frame image that was selected to use in subtracting hot pixels.



Above: Reflective and emission nebula IC 5146 and dark nebula B168 photographed by Lee C. Coombs on 14 August 2004 using a 10 inch F/5 Newtonian. Exposure was 35 minutes on Ektachrome Professional-Daylight (E-200) slide film.



Above: Emission nebula NGC 2174-5 photographed by Lee C. Coombs on 16 February 2004 using a 10 inch F/5 Newtonian. Exposure was 35 minutes on Ektachrome Professional-Daylight (E-200) slide film.