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COVER PHOTOGRAPH

Object.....M51

Photographer.....Lee C. Coombs

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

Exposure/Film.....40 minutes/Kodak Ektachrome Professional 200

Date.....19 June 2004

VOLUME 38 No. 4

EDITOR.....Robert C. Price
CONTRIBUTING EDITOR.....Ralph Proctor
PROOFING CONTRIBUTOR.....Linda Miller
CONTRIBUTORS.....Lee C. Coombs

Features

Departments

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Product Evaluation: Canon 500mm lens

by

Robert C. Price

The Canon 500mm F/4.0 IS USM lens is a telephoto lens consisting of 17 elements in 13 groups. Its aperture is 125mm and its focal length is 500mm, giving it an F-value of 4.0. The Canon 500mm lens weighs 8.5 pounds and the optical tube is 15.2 inches long. The Canon 500mm lens comes in a hard shell carry case and the optical tube contains a lens cap. Figure 1 shows the Canon 500mm lens mounted to a Losmandy G-11 dovetail plate. The Canon 500mm lens comes with a ring mount with one 1/4-20 threaded hole and one 3/8-16 threaded hole for mounting the lens to a tripod or Wimberley mount dovetail plate. Figure 2 shows the Canon 500mm lens and its carrying case. The Canon 500mm lens contains integrated image stabilization and autofocus capabilities. Both functions can be turned off and should be turned off for long exposures when mounted on a telescope mount.

Initial tests on this lens were from the author's backyard 28 miles south of Washington D.C. This test consisted of mounting the lens to the author's Losmandy G-11 equatorial mount using a Losmandy dovetail plate. The camera used for this test was a Hutech modified Canon 350D. Several short 5 minute exposures were taken of the Orion Nebula to get a feel for how well this lens performed when used for long exposures at full aperture. Figure 3 shows part of an image taken using this lens. The image showed well formed star images from the center to the edge of the frame. Star images showed no hint of coma, astigmatism, spherical aberration, or chromatic aberration. It looked like this lens might be a winner.

The author took this lens to a dark sky site near Blue Knob, PA on 16 December. Light clouds prevented any serious photography the author had planned using his Tele Vue NP-101. The author decided to continue testing the Canon 500mm lens using 5 and 10 minute exposures on familiar objects such as the Orion Nebula, the Double Cluster, the Pleiades, the Horsehead Nebula and the Rosette Nebula. Every image showed some slight star trailing. The trailing was slight enough that it would not be visible on a full frame 8 by 10 image, but would be evident on

Above: Figure 1, Canon 500mm lens evaluation. Shown above is the Canon 500mm F/4.0 IS USM lens mounted to a Losmandy dovetail plate. A 1.4x extender is between the lens and camera.

images that were cropped from the full frame and enlarged to the equivalent of 16 by 20 or larger. These images also showed the effects of the high thin clouds. The high thin clouds caused bright stars to be surrounded by a faint halo of light. This halo can be seen in Figure 4. At the bottom of figure 4 is the 2.75 magnitude star SAO 132323 (44-lota Orionis) which is surrounded by a blue halo of light (caused by the high thin clouds) that blends with the lower part of the Orion Nebula. Note that this blue halo is absent from Figure 3, the image at the top of the page. Figure 4 is a portion of a 9 minute exposure of the Orion Nebula and is one of the images that showed this slight amount of star trailing. Figure 4 was cropped to show the same area shown in Figure 3. By comparison the same area from an image taken with the author's NP-101 is shown in Figure 5. Figure 5 is a 10 minute exposure taken from the author's backyard. What is suspicious about the star drift is that it is always in the same general direction, and that this direction is the same as right ascension drift. Additional tests were performed taking 10 minute images and rotating the lens 90 degrees between exposures. The direction of the star drift changed only slightly, about 15 degrees. If some component in the lens were causing the drift, a 90 degree change in the direction of the drift would have been expected. Some part of the lens mounting system could still be at fault, since the star trails do not seem to change direction when the lens is rotated 90 degrees. Until I can resolve why this lens seems to have a star trailing problem, I cannot recommend it for long exposure astrophotography. It is an excellent lens for wildlife photography. The author uses it for almost exclusively for wildlife photography, replacing his old Canon 300mm F/4 IS USM lens. Its sharpness can be seen in Figures 6 and 7. Even at prime focus and full aperture with a 1.4x extender it easily shows Saturn's rings. One additional note, while this lens can autofocus on bright stars and planets, the author has found that the Hutech knife-edge focuser is more reliable and can consistently focus better than the lens' autofocus. Focus is very susceptible to temperature changes. The author needed to refocus after 60 minutes even after the lens had cooled for 2 hours.

Above: Figure 2, Canon 500mm lens evaluation. Shown above is the Canon 500mm F/4.0 IS USM lens with its carry case and lens cap.

Above: Figure 3, Canon 500mm lens evaluation. Shown above is a cropped image centered on the Orion Nebula. This image showed well formed star images and was taken at F/4. Photographed by the author on 15 December 2006. Exposure was 5 minutes with a Hutech modified Canon 350D at 400ASA.

Above: Figure 4, Canon 500mm lens evaluation. Shown above is a cropped image centered on the Orion Nebula. This image showed trailed star images and was taken at F/4. Photographed by the author on 17 December 2006. Exposure was 9 minutes with a Hutech modified Canon 350D at 400ASA.

Above: Figure 5, Canon 500mm lens evaluation. Camparison image of the same area in the Orion Nebula taken using a Tele Vue NP-101. Photographed by the author on 26 October 2006. Exposure was 10 minutes with a Hutech modified Canon 350D at 400ASA.

Above: Figure 6, Canon 500mm lens evaluation. Shown above is a magnified image centered on Saturn. This image shows the resolving power of this lens with a 1.4x extender that resulted in a 700mm F/5.6 lens used at full aperture. Photographed by the author on 20 January 2007. Exposure was 1/25 second with a Hutech modified Canon 350D at 100ASA.

Above: Figure 7, Canon 500mm lens evaluation. Shown above is a magnified image centered on the Orion Nebula. This image shows the resolving power of this lens with 1.4x extender even when used at full aperture. Photographed by the author on 20 January 2007. Exposure was 21 seconds with a Hutech modified Canon 350D at 400ASA. The above image was cropped but no other corrections were done. It is essentially a raw image.

Above: Canon 500mm lens evaluation. Shown above is a full-frame image centered on the Double Cluster. Photographed by the author on 16 December 2006 with a Canon 500mm F/4 lens at F/4. Exposure was 4.5 minutes with a Hutech modified Canon 350D at 400ASA. High clouds caused the faint blue halos.

Above: Canon 500mm lens evaluation. Shown above is a full-frame image centered on the Pleiades. Photographed by the author on 16 December 2006 with a Canon 500mm F/4 lens at F/4. Exposure was 10.5 minutes with a Hutech modified Canon 350D at 400ASA.

Above: Canon 500mm lens evaluation. Shown above is a full-frame image centered on the Rosette Nebula. Photographed by the author on 17 December 2006 with a Canon 500mm F/4 lens at F/4. Exposure was 10 minutes with a Hutech modified Canon 350D at 400ASA.

Astrophotography for February and March

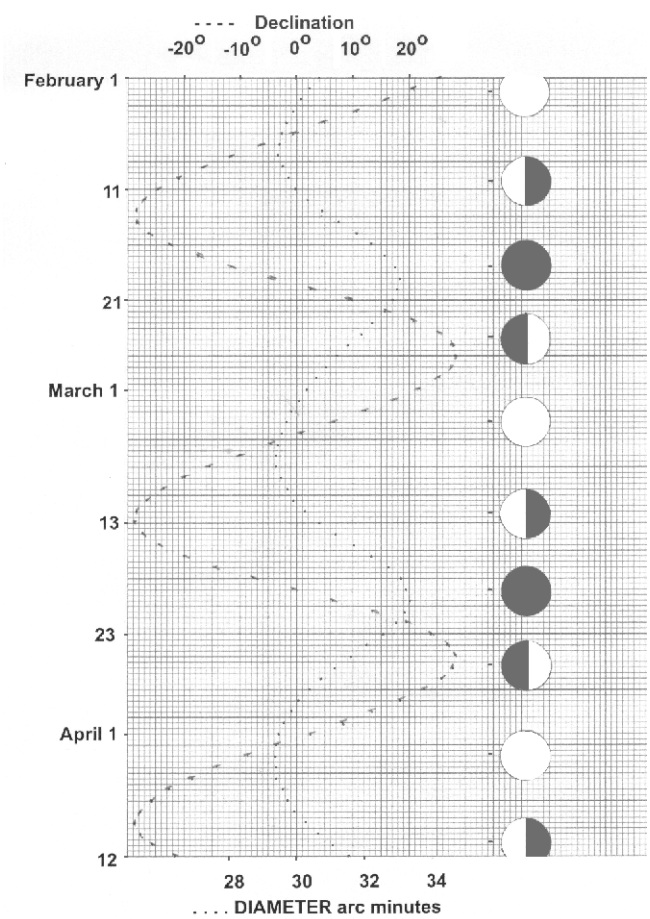
by

Ralph Proctor

Mercury begins February as an evening object low in the western sky. During February Mercury moves higher in the western sky and reaches a greatest eastern elongation of 18 degrees on 7 February when it will be in fair photographic position with a declination of plus 7 degrees. During the remainder of February Mercury moves lower in the western sky and disappears into the Sun's glare in mid February, reaching inferior conjunction on 23 February. Mercury emerges from the Sun's glare in early March as a morning object low in the eastern sky and reaches a greatest western elongation of 28 degrees on 22 March when it will be poorly positioned with a declination of minus 11 degrees.

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

Lunar Declination and Diameter:



The Moon's waxing quarter phase will be located high on the ecliptic and in excellent photographic position during February (February 26) and March (March 25), with an apparent declination of up to +29 degrees.

Mars begins February as a morning object low in the eastern sky in the constellation Sagittarius, but moves into the constellation Capricornus in late February. During February and March Mars moves higher in the eastern sky, increases in brightness from magnitude + 1.4 to + 1.1, and increases in diameter from 4.2 to 4.9 arc seconds.

Jupiter begins February as a morning object low in the eastern sky in the constellation Ophiuchus. During February and March Jupiter moves into the western sky, increases in brightness from magnitude -1.9 to -2.3, and increases in diameter from 33.9 to 40.4 arc seconds.

Saturn begins February as an evening object high in the eastern sky in the constellation Leo. Saturn reaches opposition with the Sun on 10 February and is in good photographic position. During February and March Saturn moves into the western sky, decreases in brightness from magnitude +0.0 to +0.2, and decreases in diameter from 20.2 to 19.4 arc seconds.

Uranus begins February as an evening object low in the western sky in the constellation Aquarius and by mid February disappears into the Sun's glare. Uranus reaches conjunction with the Sun on 5 March and emerges from the Sun's glare in late March as a morning object low in the eastern sky. During February and March Uranus remains constant in brightness at magnitude + 5.9, and decreases in diameter from 3.37 to 3.36 arc seconds. Uranus is located at R.A. 23 hours 00.8 minutes declination -07 degrees 07 minutes on 15 February and at R.A. 23 hours 06.7 minutes declination -06 degrees 30 minutes on 15 March.

Neptune begins February lost in the Sun's glare in the constellation Capricornus. Neptune reaches conjunction with the Sun on 8 February and emerges from the Sun's glare in early March as a morning object low in the eastern sky. During February and March Neptune remains constant in brightness at magnitude +8.0, and increases in diameter from 2.20 to 2.22 arc seconds. Neptune is located at R.A. 21 hours 28.9 minutes declination -15 degrees 07 minutes on 15 February and at R.A. 21

hours 32.9 minutes declination -14 degrees 48 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 increases in brightness from magnitude + 14.0 to + 13.9. Pluto is located at R.A. 17 hours 53.1 minutes declination -16 degrees 32 minutes on 15 February and at R.A. 17 hours 54.9 minutes declination -16 degrees 29 minutes on 15 March.

Events:

Saturn will be occulted by the Moon on 2 February (23 hours universal time) for central Asia, eastern Scandinavia, and the Arctic regions; and on 2 March (02 hours universal time) for western Russia and all but the southwestern portion of Europe.

Regulus will be occulted by the Moon on 3 February (14 hours universal time) for northwestern North America and northern Greenland; and on 2 March (21 hours universal time) for east central Asia and the Arctic regions.

Spica will be occulted by the Moon on 8 February (04 hours universal time) for the Drake Passage and the area south of South America.

Antares will be occulted by the Moon on 11 March (22 hours universal time) for the Southern Ocean and Antarctica; and on 11 March (06 hours universal time) for Antarctica and the southern portion of South America.

Mercury will be occulted by the Moon on 17 March (03 hours universal time) for the Southern Ocean south of New Zealand.

The Sun will undergo a partial eclipse on 19 March 2007 for most of Alaska, eastern and central Asia, all but the central part of Japan, and the western portion of Russia. The eclipse begins at 0 hours 38.3 minutes and ends at 4 hours 24.9 minutes universal time. The greatest eclipse occurs at 2 hours 31.9 minutes universal time.

The Moon will undergo a total eclipse on 3 and 4 March 2007 for the Arctic, all but the eastern portion of Asia, Europe, the British Isles, Africa; and the eastern portions of North, Central, and South America. The eclipse begins (Penumbra contact) at 20 hours 16.4 minutes and ends at 02 hours 25.4 minutes universal time. Umbra contact begins at 21 hours 30.0 minutes and ends at 01 hours 11.7 minutes. Mid-eclipse occurs at 23 hours 20.9 minutes universal time.

MINOR PLANETS

		position			
		14 February		15 March	
Planet	Magnitude	R.A.	Decl.	R.A.	Decl.
Ceres	09.3 - 09.0	23 hr 26.8 min	- 12 deg 25 min	00 hr 08.1 min	- 07 deg 40 min
Pallas	10.4 - 10.6	20 hr 56.6 min	+01 deg 55 min	21 hr 23.7 min	+03 deg 55 min
Juno	10.5 - 09.8	13 hr 51.8 min	- 05 deg 16 min	13 hr 44.9 min	- 02 deg 16 min
Vesta	07.6 - 06.7	16 hr 06.4 min	- 13 deg 41 min	16 hr 43.0 min	- 14 deg 22 min

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Volume No. 10 issue 2, 3, 5, and 6
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Volume No. 14 issue 1, 2, 3, 4, 5, and 6
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Volume No. 20 issue 1, 2, 3[1], 4, 5, and 6
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Volume No. 22 issue 1, 2, 3, and 4
Volume No. 23 issue 4 and 5
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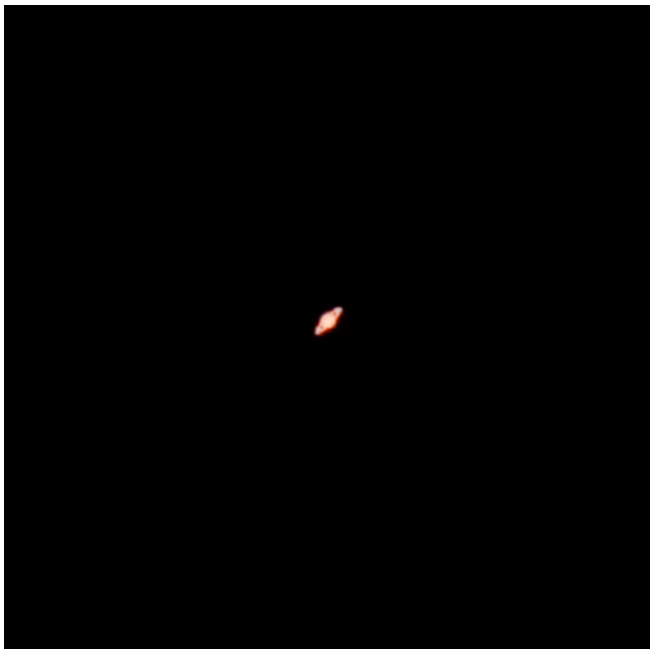
Tele Vue NP-101 Evaluation, part 2

by

Robert Price

The author evaluated the Tele Vue NP-101 in the October/November 2006 issue of the ASTROGRAPH. After of several more months of using the NP-101 the author can confirm his initial conclusion that the NP-101 is an excellent telescope for photographic use. Additional images on pages 60, 61, and 62 illustrate this point. The images of Saturn and the Trapezium in Orion on page 60 are extreme enlargements and are to the same scale. The image of the Beehive cluster on page 61 shows several 15th and 16th magnitude galaxies even with an exposure of 5 minutes.



Above: Tele Vue NP-101 lens evaluation. Shown above is an enlarged image of Saturn taken at prime focus. Photographed by the author on 23 January 2007. Exposure was 1/20 second with a Hutech modified Canon 350D at 100ASA.

Above: Tele Vue NP-101 lens evaluation. Shown above is an enlarged image of the Trapezium (Theta Orionis) taken at prime focus. Photographed by the author on 23 January 2007. Exposure was 25 seconds with a Hutech modified Canon 350D at 100ASA.

Above: Tele Vue NP-101 lens evaluation. Shown above is the eastern portion of the Andromeda Galaxy and NGC206, the blue colored star forming region near the center of the image. Photographed by the author on 22 November 2006. Exposure was 10 minutes with a Hutech modified Canon 350D at 400ASA.

Above: Tele Vue NP-101 lens evaluation. Shown above is the center region of the Beehive cluster showing several faint galaxies. Photographed by the author on 22 November 2006. Exposure was 5 minutes with a Hutech modified Canon 350D at 400ASA.

Above: Tele Vue NP-101 lens evaluation. Shown above is the center portion of an image of M1, the Crab Nebula. Photographed by the author on 17 January 2007 from a location near Blue Knob State Park, PA. Exposure was 20 minutes with a Hutech modified Canon 350D at 400ASA.

ASA Comparison Images

by

Robert Price

The author normally takes long exposures using a Canon 350D camera at 400ASA. Exposures taken from the author's backyard located 28 miles south of Washington, D.C. are limited by sky glow to about 5 minutes with the NP-101. In an attempt to see if a lower ASA setting would allow greater sky glow penetration, the author compared a 5 minute exposure at 400ASA with a 20 minute exposure at 100ASA. Although no greater sky fog penetration was noticeable, there was improvement in the noise of the image. The 100ASA image was considerably smoother as shown in Figures 1 and 2 below.

Above: Figure 1: ASA Comparison Images. Shown above is a 20 minute exposure of the Orion Nebula at 100ASA.

Above: Figure 2: ASA Comparison Images. Shown above is a 5 minute exposure of the Orion Nebula at 400ASA.

Above: M61 photographed by Lee C. Coombs on 21 May 2004 using a 10 inch F/5 Newtonian. Exposure was 35 minutes on Ektachrome 200 professional film.