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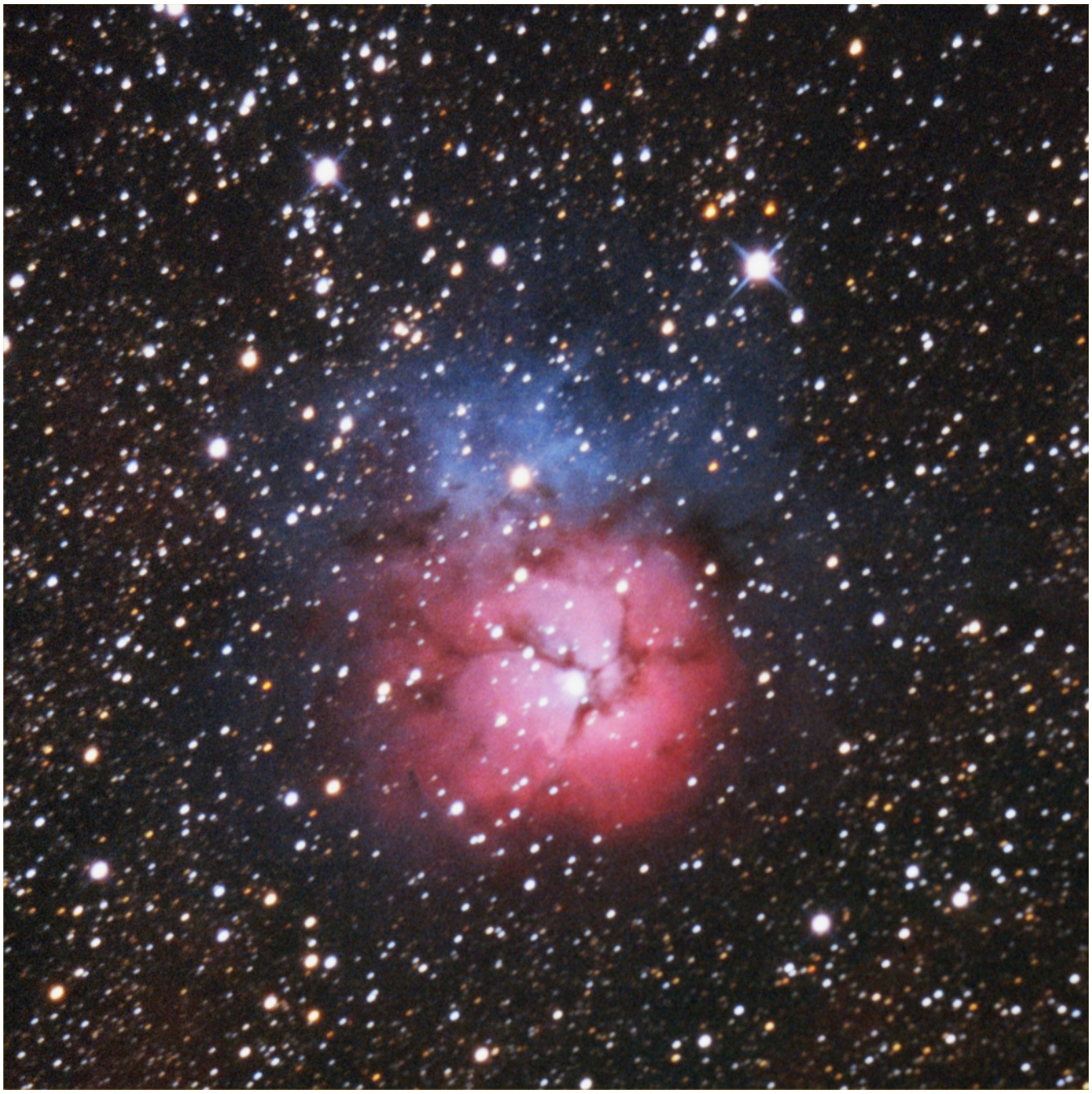

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the ASTROGRAPH

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COVER PHOTOGRAPH

Object.....The Trifid Nebula, M20

Photographer.....Lee C. Coombs

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

Exposure\Film.....35 minutes/Kodak Ektachrome P200

Date.....3 July 2003

VOLUME 37 No. 1

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Film Evaluation:
Konica Centuria Super 1600

by

Robert C. Price

This film evaluation is a continuation of the evaluation reported in April/May 2004 issue. Konica Centuria Super 1600, a 1600 ASA film, was evaluated using the Orion Nebula (M42) and a gray card/color chart as the test objects. Exposures on Kodak PPF 400 film, taken the same night and at almost the same time, were used for comparison. The Konica film evaluation consisted of exposures of 1, 2, and 4 minutes using M42 and daylight exposures of a gray card/color chart. Exposures of the gray card/color chart consisted of short exposures in daylight while the Sun (no clouds) was high in the sky. The exposure in daylight for the 1600 ASA film was 1/1000 second at F/16 with a ND2x filter. Both films were developed in standard C41 development chemistry and were developed by a Sam's Club store photographic lab. The Kodak PPF 400 film comparison images consisted of exposures of 2, 4, 8, and 16 minutes using M42 and daylight exposures of a gray card/color chart. The exposure in daylight for the 400 ASA film was 1/500 second. For this evaluation/comparison all images of M42 were obtained using an 8 inch F/5 Newtonian on an Orion Atlas mount. This mount is the same mount that was evaluated in the August/September 2004 issue after being sent back to Orion because of excessive guiding errors. After its return the author noted that the guiding error had been reduced. Note that the images on both Konica Centuria Super 1600 and Kodak PPF 400 film have better guiding than those published in the August/September 2004 issue. Guiding was done with an 80mm F/11.4 refractor at 182x. The refractor was attached to the same mounting rings that hold the Newtonian.

Qualitative Results

I still have not been able to quantitatively determine this film's reciprocity characteristic or color shift



Above: Figure 1, film test. M42, the Orion Nebula, photographed by Robert C. Price on 8 May 2005 using an 8 inch F/5 Newtonian. Exposure was 1 minute on Konica Centuria Super 1600.



Above: Figure 2, film test. M42, the Orion Nebula, photographed by Robert C. Price on 8 May 2005 using an 8 inch F/5 Newtonian. Exposure was 2 minutes on Konica Centuria Super 1600.



Above: Figure 3, film test. M42, the Orion Nebula, photographed by Robert C. Price on 8 May 2005 using an 8 inch F/5 Newtonian. Exposure was 4 minutes on Konica Centuria Super 1600.

during long exposures. Because of clouds and the low position of the full Moon during the Spring and Summer I was not been able to obtain a long exposure full Moon illuminated gray card image. My examination of the exposures of M42 showed that the negative of the two minute exposure on Konica Centuria Super 1600 had slightly more nebulosity than the 1 minute exposure, and the 4 minute exposure had more nebulosity than the 2 minute exposure. However, the increase in density did not seem to double as the exposure was doubled. The 1 minute exposure of M42 taken with Konica Centuria Super 1600 started to reveal nebulosity that extended to a semi-circle. The 4 minute exposure on Konica Centuria Super 1600 started to reveal nebulosity that extended to a full circle. I do not have a very dark sky and this 4 minute exposure started to pick up a significant amount of sky background. A close examination of the Konica Centuria image of the center of M42 revealed that this center area had not saturated in the 4 minute exposure even though by comparison the 16 minute exposure on PPF 400 had started to saturate and lose the red-magenta coloration of the nebula in the central area. The 1 minute exposure taken on Konica Centuria Super 1600 showed the magenta nebulosity of M42 starting to fill in the upper (northern) semi-circle of the nebula. A close examination of the negative of the 1 minute exposure showed that the center of M42 was not saturated but was very dense. The color in the center area is visible but would require exposure compensation to bring out the color if the image was exposed for the fainter outer nebulosity. The 1 minute exposure on Konica 1600 compares to the 4 minute exposure on Kodak PPF 400; the 2 minute exposure on Konica 1600 compares to the 8 minute exposure on Kodak PPF 400; and the 4 minute exposure on Konica 1600 compares to the 16 minute exposure on Kodak PPF 400. Konica Centuria is definitely a 1600 ASA film when compared to Kodak PPF 400. The Konica film appears to have slightly better red response and better red color saturation. As might be expected the grain on the Konica 1600 is definitely what you would expect for such a high ASA film.



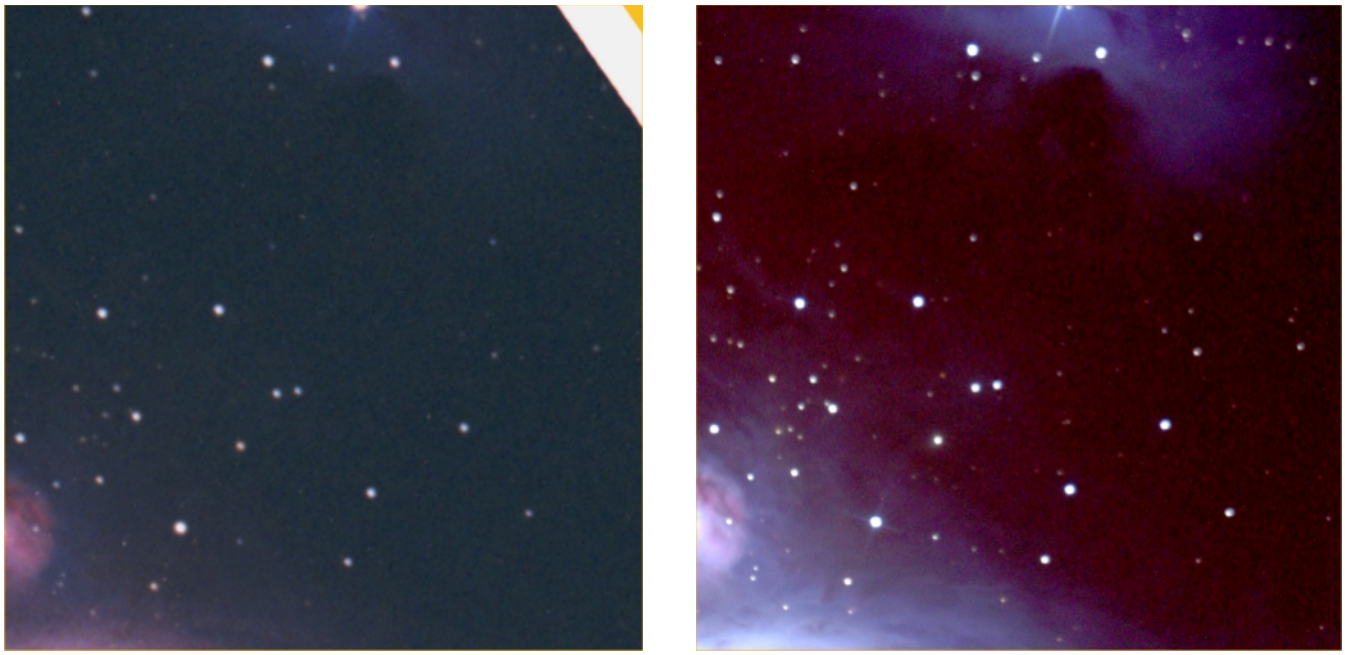
Above: Figure 4, film test. M42, the Orion Nebula, photographed by Robert C. Price on 8 May 2005 using an 8 inch F/5 Newtonian. Exposure was 16 minutes on Kodak PPF 400 film.

Film verses Digital

by

Robert C. Price

During the night of the film evaluation described on page 3, the author used a Canon 300D SLR to take images of the Orion Nebula using the same telescope. Exposures of 2, 4, and 8 minutes were taken the same night and at almost the same time as the film images. The eight minute exposure at 400 ASA was the maximum exposure attempted. This exposure seemed to be at the limit of what can be achieved because of the amount of sky fog at my location. It has been well documented that the infrared blocking filter in digital SLRs greatly reduces digital camera sensitivity to H alpha light. This lack of red sensitivity can be seen in the examples below, as well as the greater sensitivity the digital SLRs have to the blue end of the visible spectrum.



Above: Figure 1, film and digital camera comparison. Shown above are portions of an image of M42 photographed by the author on 8 May 2005 using an 8 inch F/5 Newtonian. Top left exposure was 16 minutes on Kodak PPF 400 film. Top right exposure was 8 minutes using a Canon 300D at 400ASA.



Above: Figure 2, film and digital camera comparison. Shown above are portions of an imageof M42 photographed by the author on 8 May 2005 using an 8 inch F/5 Newtonian. Top left exposure was 16 minutes on Kodak PPF 400 film. Top right exposure was 8 minutes using a Canon 300D at 400ASA. Note the difference in red and blue sensitivity.



Above: Figure 3, full frame image of M42 photographed by the author on 8 May 2005 using an 8 inch F/5 Newtonian. Exposure was 8 minutes using a Canon D300 at 400ASA. Levels were adjusted but colors were not corrected.



Above: Diffuse nebula M1, the Crab Nebula, photographed by Lee C. Coombs on 19 November 2000 using a 10 inch F/5 Newtonian. Exposure was 40 minutes on Kodak Ektachrome P200 slide film.



Above: Planetary Nebula M27, the Dumbbell Nebula, photographed by Lee C. Coombs on 29 June 2000 using a 10 inch F/5 Newtonian. Exposure was 30 minutes on Kodak Ektachrome P200 slide film.

Astrophotography for August and September

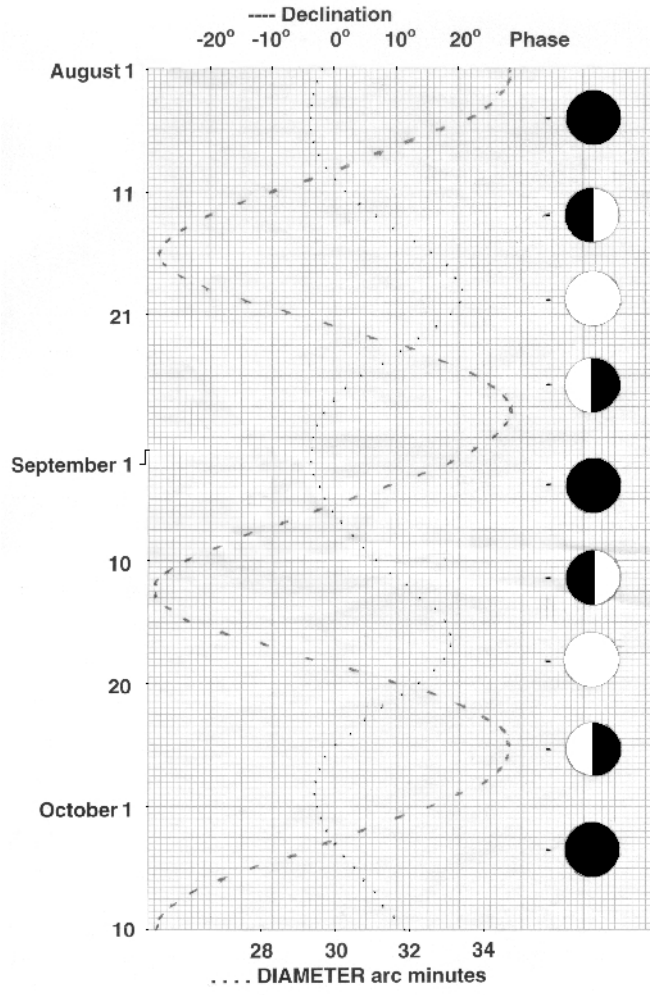
by

Ralph Proctor

Mercury begins August lost in the Sun's glare, but emerges from the Sun's glare in mid-August as a morning object low in the eastern sky. Mercury reaches a greatest western elongation of 18 degrees on 23 August when it will be in poor photographic position with a declination of plus 6 degrees. During September Mercury moves lower in the eastern sky and disappears into the Sun's glare at the end of the second week in September.

Venus begins August as an evening object low in the western sky. During August and September Venus climbs slightly higher in the western sky.

Lunar Declination and Diameter:



The Moon's waning crescent and quarter phases will be located high on the ecliptic and in excellent photographic position during August (August 2 and 29) and September (September 25), with an apparent declination of up to +28 degrees.

Mars begins August as a morning object high in the eastern sky in the constellation Pisces, but almost immediately moves into the constellation Aries. Mars moves from the constellation Aries into the constellation Taurus in late September. During August and September Mars moves higher in the eastern sky, increases in brightness from magnitude -0.4 to -1.7, and increases in diameter from 11.2 to 17.3 arc seconds

Jupiter begins August as an evening object low in the western sky in the constellation Virgo. During August and September Jupiter moves lower in the western sky, decreases in brightness from magnitude -1.8 to -1.7, and decreases in diameter from 35.0 to 30.8 arc seconds.

Saturn begins August lost in the Sun's glare, having reached conjunction with the Sun on 23 July. Saturn emerges from the Sun's glare in mid-August as a morning object low in the eastern sky in the constellation Cancer. During August and September Saturn moves higher in the eastern sky, decreases in brightness from magnitude +0.2 to +0.4 , and increases in diameter from 16.5 to 17.3 arc seconds.

Uranus begins August as a morning object high in the eastern sky in the constellation Aquarius. Uranus reaches opposition with the Sun on 1 September. During August and September Uranus remains constant in brightness at magnitude +5.7, and increases in diameter from 3.67 to 3.68 arc seconds. Uranus is located at R.A. 22 hours 45.3 minutes declination -8 degrees 46 minutes on 15 August and at R.A. 22 hours 40.8 minutes declination -9 degrees 14 minutes on 15 September.

Neptune begins August as a morning object high in the eastern sky in the constellation Capricornus. Neptune reaches opposition with the Sun on 8 August. During August and September Neptune remains constant in brightness at magnitude +7.8, and decreases in diameter from 2.35 to 2.34 arc seconds. Neptune is located at R.A. 21 hours 14.1 minutes declination -16 degrees 10 minutes on 15 August and at R.A. 21 hours 11.1 minutes declina-

tion -16 degrees 24 minutes on 15 September.

Pluto begins August as an evening object in the western sky, having reached opposition with the Sun on 15 June. During August and September Pluto remains constant in brightness at magnitude +13.9. Pluto is located at R.A. 17 hours 26.5 minutes declination -15 degrees 09 minutes on 15 August and at R.A. 17 hours 26.2 minutes declination -15 degrees 19 minutes on 15 September.

Events:

Venus will be occulted by the Moon on 8 August (04 hours Universal Time) for Alaska and northwestern Canada; and on 7 September (09 hours Universal Time) for the southern part of Africa and part of Antarctica.

Jupiter will be occulted by the Moon on 10 August (08 hours Universal Time) for the Southern Indian Ocean and parts of Antarctica; and on 13 September (18 hours Universal Time) for all but the northern portion of South America, and part of Antarctica.

Antares will be occulted by the Moon on 14 August (13 hours Universal Time) for the Arabian peninsula, southwestern Asia, India, southeastern Asia, and northern tip of Australia; and on 10 September (20 hours Universal Time) for the southwest tip of the United States, Central America, the Caribbean, the northern half of South America, and western central Africa.

The Sun will undergo an annular eclipse on 3 October for eastern Greenland, Iceland, all Europe except the British Isles, all but the southern tip of Africa, western Asia, and India. The eclipse begins and ends at 7 hours 35.5 minutes and 13 hours 27.8 minutes Universal Time respectively. Central eclipse at local apparent noon occurs at 10 hours 10.7 minutes Universal Time.

The Moon will undergo a partial eclipse on 17 October for parts of Antarctica, Australasia, central and eastern Asia, all but the eastern portion of North America, and Central America. The Moon enters and leaves the penumbra at 09 hours 51.4 minutes and 14 hours 15.1 minutes Universal Time respectively. The Moon enters and leaves the umbra at 11 hours 34.0 minutes and 12 hours 32.5 minutes Universal Time respectively. Mid-eclipse occurs at 12 hours 03.3 minutes Universal Time.

MINOR PLANETS

		position			
		15 August		15September	
Planet	Magnitude	R.A.	Decl.	R.A.	Decl.
Ceres	07.4 - 08.5	14 hr 44.2 min	-09 deg 20 min	14 hr 44.7 min	-11 deg 47 min
Pallas	08.8 - 09.6	12 hr 24.4 min	+19 deg 58 min	12 hr 53.9 min	+17 deg 12 min
Juno	10.0 - 09.5	02 hr 02.1 min	+08 deg 42 min	03 hr 02.5 min	+11 deg 04 min
Vesta	08.3 - 08.5	04 hr 14.5 min	+17 deg 40 min	05 hr 12.0 min	+19 deg 33 min

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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
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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
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The Constellation Aquarius

by
Robert C. Price

The constellation Aquarius crosses the meridian just after midnight in mid-August. Aquarius is a medium size constellation located just north of the constellations Sculptor and Piscis Austrainus. From east to west Aquarius is 3 hours 20 minutes in extent, from right ascension 20 hours 35 minutes to 23 hours 55 minutes. In declination it varies from 24 degrees south declination to 2 degrees north declination. On the north it borders Pegasus, on the east Cetus and Pisces, and on the west Capricornus. The constellation contains a number of galaxies, globular star clusters M2 and M72, and several planetary nebulae. Some objects of photographic interest are listed in the table on page 15.

Zeta Aquarii is a close double star whose 4th magnitude components are separated by 1.7 arc seconds. It is located at a distance of 75 light years and both stars are F2 class subgiants.

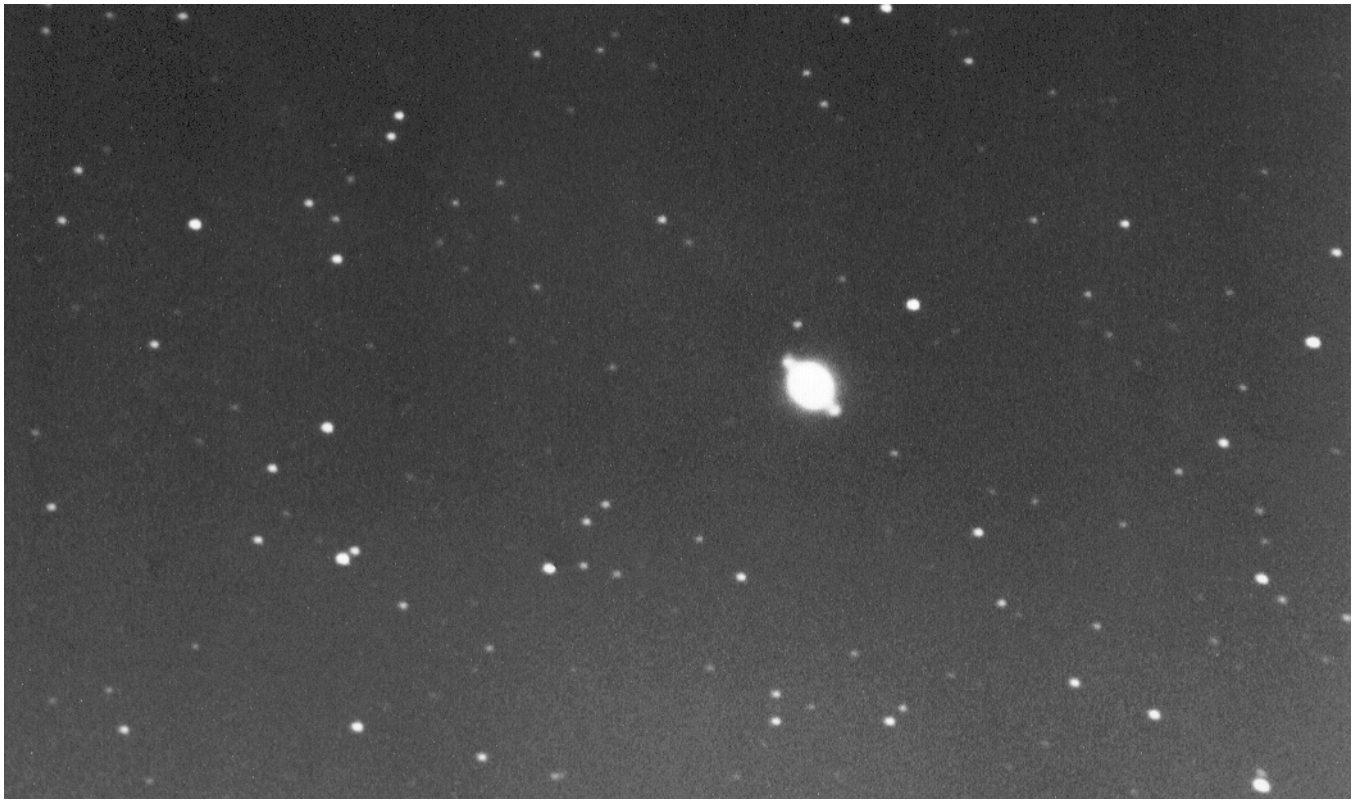
R Aquarii is a peculiar red pulsating class M7e giant star. It sometimes reaches 6th magnitude with an average period of 386 days. It is surrounded by nebulosity that resembles that of a planetary nebula. R Aquarii is part of a binary system and the second component probably is variable and has a symbiotic relationship with R Aquarii that explains the variable nature of the pair. Estimated distance to this binary system is 800 light years.

M2 is a bright globular star cluster consisting of over 100,000 stars. Estimated distance to this cluster is 50,000 light years, making it some 150 light years in diameter.

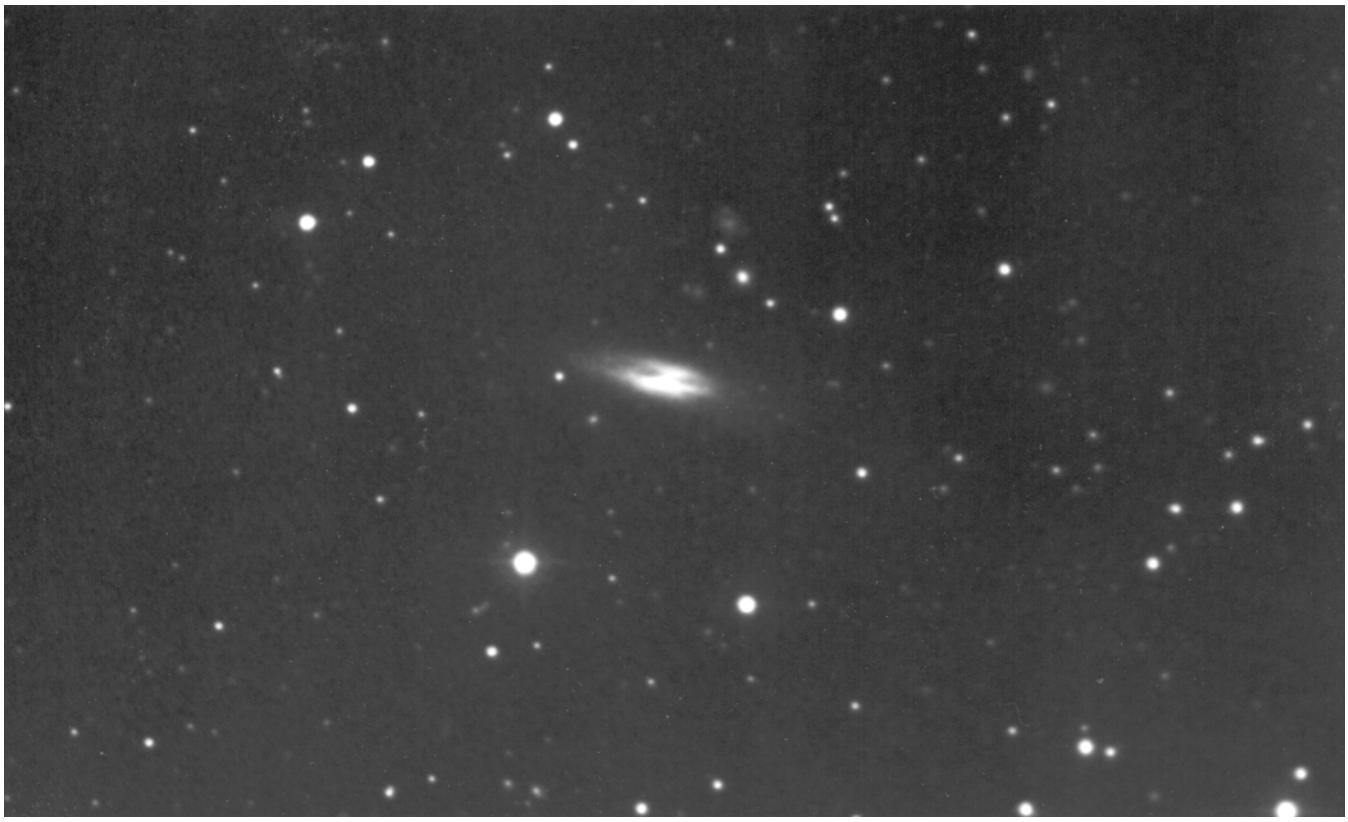
M72 is one of the dimmer globular star cluster. It consists of thousands of faint stars, 15th magnitude and fainter. Estimated distance to this cluster is 65,000 light years.

NGC 7009, the Saturn Nebula, is a bright ring shaped planetary nebula that consists of an inner ring 25 by 17 arc seconds surrounded by a larger shell 30 by 26 arc seconds. Estimated distance is 3900 light years which equates to a diameter of .5 light years.

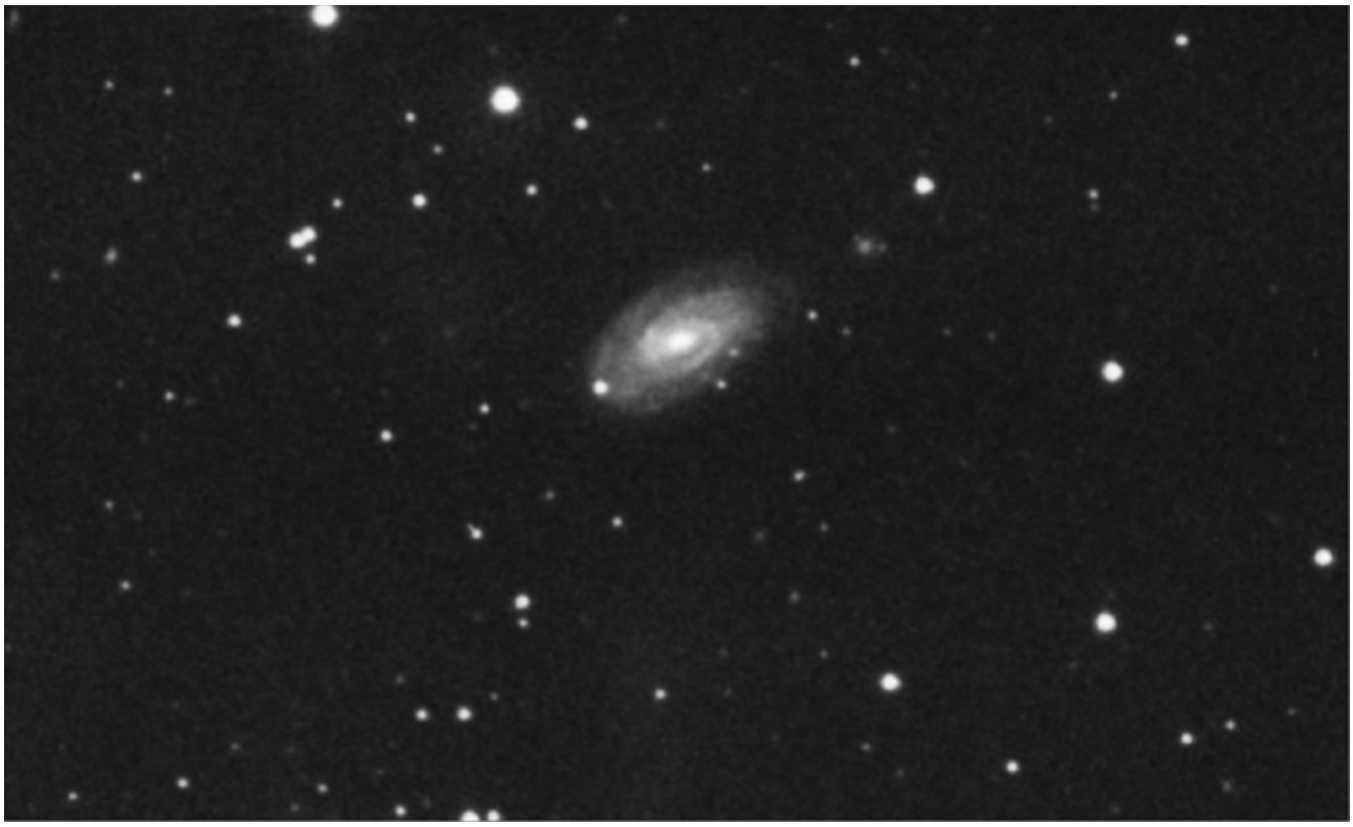
NGC 7293, the Helix Nebula, is the largest and closest planetary nebula with a diameter of 16 arc minutes. Estimated distance to this large and faint planetary is 500 light years which equates to a diameter of 1.7 light years.



Above: Planetary nebula NGC 7009, the Saturn Nebula, photographed by David Healy on 16 September 1985 using a 14 inch SCT at F/7. Exposure was 30 minutes on hypersensitized Kodak 2415 film.



Above: Spiral galaxy NGC 7183, photographed by Martin Germano on 29 August 1998 using a 14.5 inch F/5 Newtonian with coma corrector and ST-4 autoguider. Exposure was 95 minutes on hypersensitized Kodak 2415 film developed 7 minutes in D-19 at 68°F.



Above: Spiral galaxy NGC 7171, photographed by Martin Germano from Mt. Pinos CA on 17 August 1999 using a 14.5 inch F/5 Newtonian stopped to F/6 and ST-4 autoguider. Exposure was 75 minutes on hypersensitized Kodak 2415 film.



Above: Planetary nebula NGC 7293, the Helix Nebula, photographed by Chuck Vaughn using a 12.5 inch F/9 Ritchey-Chretien. Exposure was 120 minutes on hypersensitized Kodak 2415 film.

Objects for Astrophotography in Aquarius

	Mag.	Size.	R.A.	Declination	Description
NGC 6981	8.6	3' dia	20 hr 50.8 min	-12 deg 44 min	Globular star cluster, M72.
NGC 7009	8	25" dia	21 hr 01.4 min	-11 deg 34 min	Planetary nebula with 8th mag. central star.
NGC 7089	6	7' dia	21 hr 30.9 min	-01 deg 04 min	Globular star cluster, M2.
NGC 7171	12.8	2.5 x 1.5'	21 hr 58.3 min	-13 deg 31 min	Sb spiral galaxy.
NGC 7183	11.9	3.8' x 1.1'	21 hr 02.2 min	-18 deg 56 min	Sa spiral galaxy
NGC 7184	12.0	5.0’ x 1.0'	21 hr 59.9 min	-21 deg 04 min	Sb spiral galaxy with Saturn-like outer ring.
NGC 7218	12.7	1.8’ x 0.7'	22 hr 07.5 min	-16 deg 54 min	Sc spiral galaxy.
NGC 7252	13.0	0.8' x 0.7'	22 hr 18.0 min	-24 deg 56 min	Ep elliptical galaxy.
NGC 7293		12’ dia	22 hr 27.0 min	-21 deg 06 min	Planetary nebula with 13th mag. central star, the Helix Nebula.
NGC 7300	13.2	1.9’ x 0.8’	22 hr 28.3 min	-14 deg 17 min	Sb spiral galaxy.
NGC 7302	13.1	0.9’ x 0.6'	22 hr 29.7 min	-14 deg 23 min	E3 elliptical galaxy.
NGC 7309	13.2	1.3’ x 1.0'	22 hr 31.6 min	-10 deg 37 min	Sc spiral galaxy with 3 arms.
NGC 7371	12.9	1.0’ dia	22 hr 43.4 min	-11 deg 16 min	Sb spiral galaxy with faint outer ring.
NGC 7377	12.5	1.1' x 1.0'	22 hr 45.1 min	-22 deg 35 min	E1 elliptical galaxy.
NGC 7392	12.6	1.5’ x 0.9'	22 hr 49.2 min	-20 deg 53 min	Sb spiral galaxy.
NGC 7492	12.3	3’ dia	23 hr 05.7 min	-15 deg 54 min	Globular star cluster.
NGC 7585	12.8	1.0’ x 0.7'	23 hr 15.4 min	-04 deg 56 min	Sp spiral galaxy.
NGC 7600	13.1	1.1’ x 0.4'	23 hr 16.3 min	-07 deg 52 min	E6 elliptical galaxy.
NGC 7606	11.9	6.0’ x 1.6'	23 hr 16.5 min	-08 deg 46 min	Sb spiral galaxy.
NGC 7721	12.4	2.6’ x 1.0'	23 hr 36.2 min	-06 deg 48 min	Sc spiral galaxy.
NGC 7723	12.1	3.0' x 2.0'	23 hr 36.4 min	-13 deg 14 min	SBb spiral galaxy.
NGC 7727	12.0	2.7' dia	23 hr 37.3 min	-12 deg 34 min	Sa spiral galaxy with faint outer arms.



Above: Diffuse nebula NGC 7635, the Bubble Nebula, and galactic cluster M52 photographed by Lee C. Coombs on 22 August 2000 using a 10 inch F/5 Newtonian. Exposure was 40 minutes on Kodak Ektachrome P200 slide film.