The lunar eclipse of 2003 May 8/9

The eclipse photographed from Suffolk by Martin Mobberley with a 125mm ETX SCT and Nikon Coolpix digital camera, 4 sec. exposure. From left to right: May 9, 01:00 UT; 01:21 UT; 01:32 UT. *M. P. Mobberley.*

SN 2003ie in NGC 4051

Ron Arbour discovered his 10th supernova, 2003ie in NGC 4051, on 2003 September 19. This image was recorded by Martin Mobberley on 2003 Sept. 23, 19:49–19:51 UT. C14 SCT @ f/7.7, SBIG ST9XE CCD, 120 sec exposure. *M. P. Mobberley.*

Occultation by Saturn of the star SAO 78867 on 2003 November 15

An occultation of the star SAO 78867 (magnitude 8.6) by Saturn took place on Saturday morning, 2003 November 15 at approximately 05h 30m UT. The above series of images by Jim Phillips MD of Charleston, South Carolina, using a TouCam-Pro on a 9-inch (228mm) f/15 AstroPhysics apochromatic refractor, was forwarded by Tom Dobbins, who remarks that it is notable that the star can be seen shining through the inner regions of Ring B. *J. Phillips.*

Variable Star Section

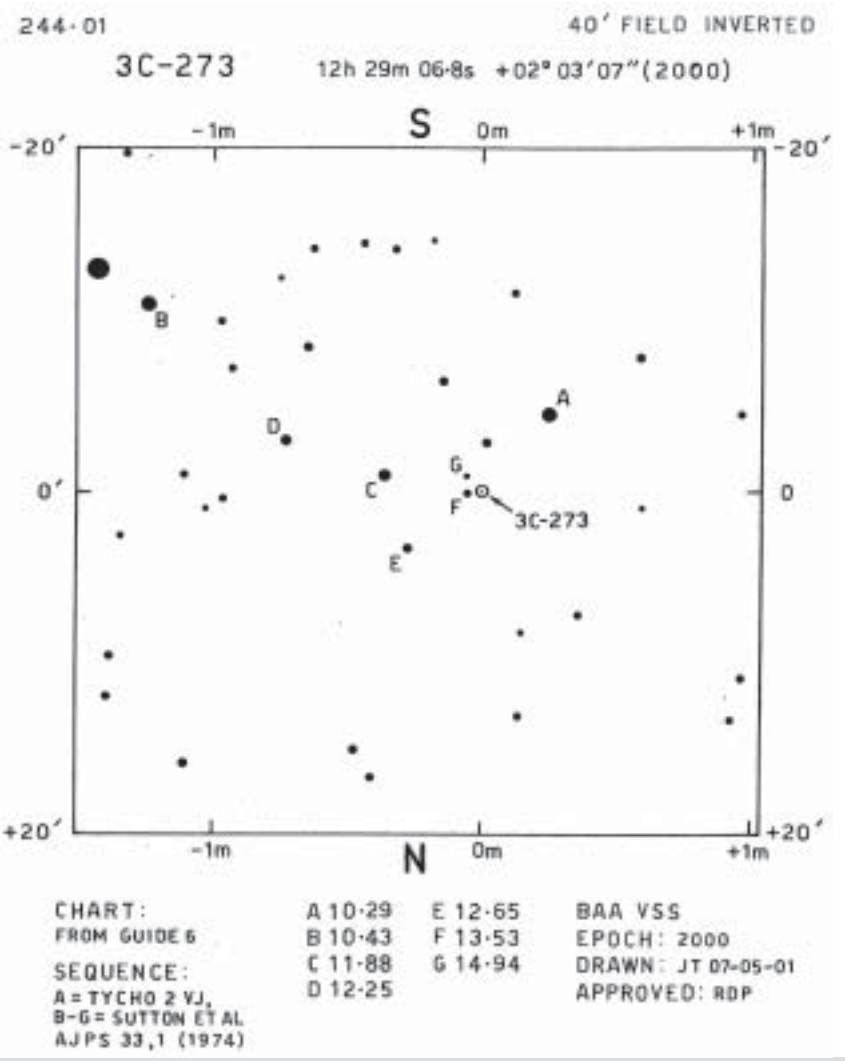
3C 273 enters a bright state

John Toone with his telescopes in 1988.

3C 273 was identified as a quasar (quasi-stellar object) when its radio emission was occulted by the Moon in 1962. The following year an analysis of its spectrum revealed its substantial redshift and hence the extra-galactic nature of quasars. Within 15 years 3C 273 had been discussed to some extent in over 200 academic papers and today it is widely recognized in astronomical literature as the most famous of all the quasars. Apart from brief periods in 1936, 1937 and 1988 when it was outshone by 3C 279, it is also the brightest quasar in the sky, normally by a margin of several magnitudes. Since the discovery of its true nature, 3C 273 has been known to be optically variable and studies of photographic plates dating back to 1887 have indicated irregular variations between roughly magnitudes 12.4 and 13.1.

Back in 1981 I set out to establish whether the optical variations in 3C 273 could be detected and usefully monitored by visual means. The standard observing methods of the VSS were rigorously applied to this task and I made where possible fractional estimates that bracketed the quasar between a brighter and fainter comparison star. Full estimates were carefully recorded and later reduced to the Penston V sequence shown on the current VSS chart 244.01. The instruments used were a 20cm Schmidt–Cassegrain (288 observations) and 41cm Newtonian (29 observations) and the target frequency of observations was every 10 days. The 41cm Newtonian was only used during the few years (mainly 1987–1989) that I was in Manchester where increasing light pollution made comparison F difficult to see with the 20cm SCT. Where possible observations at low altitude and in twilight and moonlight were avoided, because I was conscious that 3C 273 is blue in colour (B–V of +0.2) and the comparison stars are yellow (B–V range of +0.6 to +1.0). 3C 273 is positioned close to the ecliptic in Virgo and observations are impossible from the UK during the months of July to October due to solar interference. Each month the Moon also passes close by and interrupts observing opportunities.

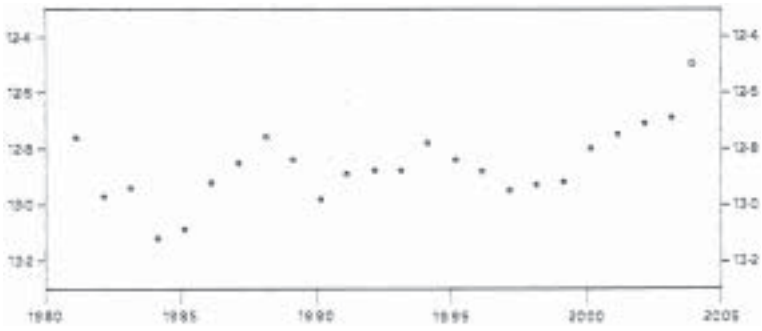
Once observations were underway it soon became clear that real variations were being detected but they were slight (never more



Visual observing chart 244.01 for the quasar 3C 273. *BAAVSS*.

Observations of 3C 273 between 1980 and 2004

Apparition	*Mean magnitude*	*No.of obsvns.*
1980/1981	12.76	7
1981/1982	12.97	21
1982/1983	12.94	14
1983/1984	13.12	6
1984/1985	13.09	13
1985/1986	12.92	15
1986/1987	12.85	13
1987/1988	12.76	14
1988/1989	12.84	16
1989/1990	12.98	13
1990/1991	12.89	17
1991/1992	12.88	11
1992/1993	12.88	16
1993/1994	12.78	18
1994/1995	12.84	13
1995/1996	12.88	13
1996/1997	12.95	15
1997/1998	12.93	14
1998/1999	12.92	15
1999/2000	12.80	14
2000/2001	12.75	15
2001/2002	12.71	13
2002/2003	12.69	9
2003/2004	12.5	2



Lightcurve of 3C 273 based on 317 observations in yearly means, 1980–2004. *J. Toone.*

than 0.2 magnitude during any single apparition) and very slow. Since no significant short term variation was seen I thought that the best way to present and analyse the observations was in yearly means, bearing in mind that the apparition lasts from early November to late June from the UK. The results are given in the table and are also depicted in graphical form. Throughout the 1980s and 1990s 3C 273 behaved in semi regular fashion with a hint of a 6–7 year period. It was recorded as bright (magnitude 12.8) in 1981, 1988 and 1994 and faint (magnitude 13.0) in 1984, 1990 and 1997. For three years in 1991–1993 it was effectively constant with the mean magnitude not varying more than 0.01.

Since the minimum of 1997 there has been a distinct change in behaviour with a slow but steady brightening trend, and 3C 273 had reached magnitude 12.7 by 2002. The 2003/2004 apparition has begun with it even more luminous at around magnitude 12.5, and brighter than comparison E for the first time since my observations commenced.

It would seem therefore that the current apparition that lasts until 2004 June is an excellent opportunity for both professional and amateur astronomers to observe 3C 273 in a bright state. For professional astronomers the current array of multi-wavelength measuring devices aboard satellites was not available the last time 3C 273 was this optically bright, which was before 1980 (first half of the space age). For amateur astronomers 3C 273 is approaching the brightness level of SS Cyg and RU Peg in quiescence and can be picked up in quite small telescopes. In fact an interesting challenge would be to find out what is the smallest telescope with which anyone has seen a quasar.

Important note

Visual observers should take care when making magnitude estimates of 3C 273 because of the close proximity of comparison F. The telescopic power employed should be sufficient to clearly show F, otherwise the observer could be estimating the combined magnitude of the quasar and F. The resultant false brightening effect could amount to as much as 0.36 magnitude if 3C 273 is a magnitude brighter than F at mag 12.5.

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