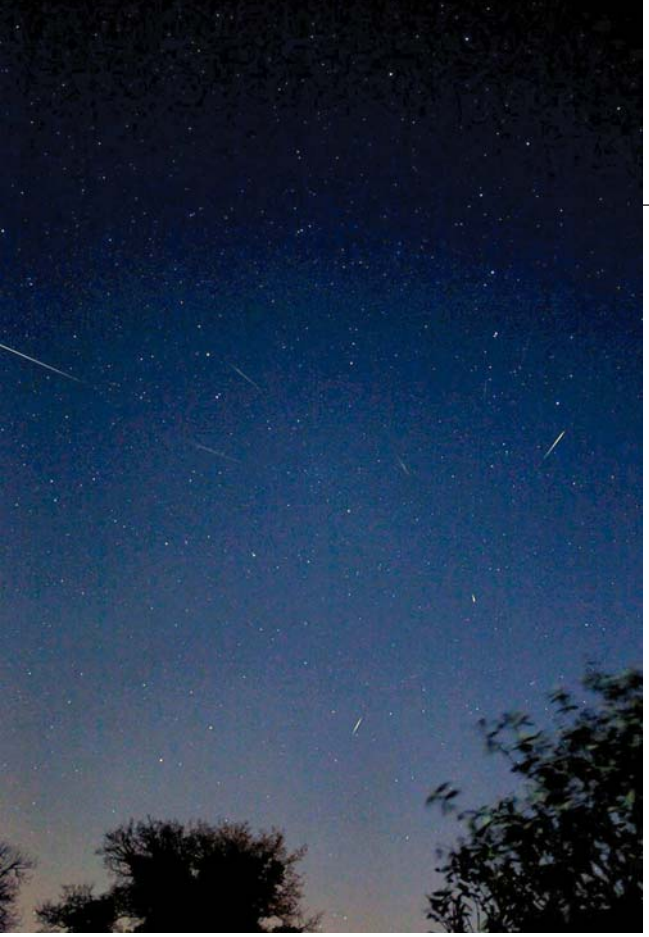
Quadrantids put on a good show in 2012 January

Observers who ventured out in early January to monitor the activity of the Quadrantid meteors, one of the three most active regular annual showers, were rewarded with a good display this year. A fine set of visual, photographic and video observations has been submitted to the BAA Meteor Section, enabling the rise to the peak to be well recorded for the first time in many years. This was in spite of the fact that observations on the maximum night were hampered by a waxing gibbous Moon, which only set at about 03:30 hrs. Fortunately the peak of the Quadrantids this year occurred at about 06h UT, so the final rise to maximum could be observed without interference from moonlight for several hours before dawn.

Active from January 1–6, the Quadrantids have been poorly observed in most recent years thanks to a combination of a very narrow period of high activity, poor January weather, and moonlight interference in at least one year out of three. Unfortunately, activity is close to peak levels for only about six hours: at other times, only a 'trickle' of a few meteors per hour might be detected. The Quadrantid radiant (RA 15h 28m, Dec +50°) actually lies in northern Boötes (in a region occupied by the now defunct constellation of Quadrans Muralis), and from the latitude

Left: **Composite image of Quadrantid trails captured in darker skies after the Moon had set on 2012 Jan 4 between 03:36 and 06:18 UT. The stars of the Plough are centre frame.** ***© Richard Fleet.***



Composite image of Quadrantid meteor trails on 2012 Jan 4 between 00:38 and 02:56 UT. The sky is bright due to moonlight. The stars of the Plough are upper right in the frame. © *Richard Fleet.*

of the British Isles it is circumpolar. Although the radiant is rather low in the northern sky during the evening hours, it is rising higher by midnight and climbs to a very favourable elevation as dawn approaches. Observations in the early morning hours of January 4 were, therefore, the most productive – particularly after moonset.

Tom Lloyd–Evans, observing from St Andrews in Fife, saw a total of 41 Quadrantids between 03:42 and 06:10, of which 27 Quadrantids (and 4 sporadics) were seen between 05:00 and 06:10. Richard Fleet, observing from Wilcot near Pewsey in Wiltshire, reported that the skies cleared after midnight on January 3/4 following a cloudy evening and he contributed four watches between 00:45 and 06:10, recording a total of 69 Quadrantids, of which 27 were seen in the final 35 minutes of the observing period. Richard remarked that he had been pleasantly surprised by the Quadrantids since he had never had much success with them before.

David Swain, observing from Preston near Cirencester in Gloucestershire, noted 13 Quadrantids in the final hour of his observing session which ended at 06:15. Hazel McGee, watching from Clandon near Guildford in Surrey, remarked how surprisingly warm it was for the time of year early on January 4, recording 14 Quadrantids in her watch that ended at 06:50 as dawn twilight interfered. From Goring near Worthing in Sussex, Graham Boots contributed three watches, noting 7 Quadrantids between 06:10 and 06:40 as the sky brightened on January 4. Other observers who contributed visual meteor data included Geoffrey Johnstone and Dr John Owen.

Visual observations analysed by the Director show that the Quadrantid ZHR (the corrected hourly meteor rate) rose steadily from 35 m/h at 00h on January 4, to 45 m/h by 02h, 55 m/h by 04:00, 65 m/h by 05:30, and peaked at about 75 m/h by 06:30. This peak rate is somewhat lower than the level of 100–120 m/h that was noted when the shower was last well-covered by BAA observers, demonstrating that the Quadrantid rate at maximum does vary from year to year.

Much of the high activity close to the peak comprises moderately bright to faint meteors. As a result of particle-sorting, brighter Quadrantids (produced by larger meteoroids) become more numerous following the maximum (after daylight interfered from the UK in 2012). Quadrantids are, like the Geminids, relatively slow meteors, with an atmospheric entry velocity of 42 km/sec. The brighter shower members are sometimes strongly coloured (often blue or green).

Richard Fleet also carried out digital imaging with a Canon 5D at 6400 ISO and a 28mm f/3.5 lens. Between 00:25 to 03:10 on Jan 4 (*i.e.* before moonset), he made 6-second exposures, recording 15 meteors in a total of 1500 frames, an average capture rate of one meteor per 11 minutes exposure. From 03:15 until 06:30 (*i.e.* after moonset) he increased the exposure time to 15 secs per frame, recording 20 meteors in a total of 700 frames, a capture rate of one meteor per 9.75 minutes exposure. These results may be usefully compared with Richard's data for the Geminids in 2011 December. Then he managed to capture 17 meteors in 110 minutes before moonrise, an average capture rate of one meteor per 6.5 minutes exposure, and 12 meteors in just 50 minutes after moonrise, an average capture rate of one meteor per 4.2 minutes exposure.

Peter Lawrence from Selsey in Sussex remarked that meteor trains had managed to evade his many efforts to record them photographically over the years – until the Quadrantid shower this year when he succeeded in capturing two trains from bright events on the morning of January 4.

Peter Meadows reported that he carried out automatic imaging of the Quadrantid shower from Great Baddow near Chelmsford in Essex using an Imaging Source monochrome DMK AU03 camera with Opticstar 2.8 to 12.0mm f/1.4 lens. Each image was of 10s duration. The camera was pointed towards the north with Polaris in the lower middle of each image. Imaging took place between 22:30 UT and 07:00 UT on January 3/4. Observing conditions were generally good except for cloud between 00h and 01 UT. Only 6 meteors were recorded (5 Quadrantids and one sporadic) and none were particularly bright.

Nick James, observing from northern Chelmsford, fared rather better with his video system employing a Watec 902H2 Ultimate camera with 3.8 mm f/0.8 lens. On maximum night, between 01:17 and 07:07 UT, his system recorded a total of 35 bright meteors of which 29 were Quadrantids. The brightest event was at 07:02:13 UT on the morning of Jan 4. By the next clear night, Jan 5/6, Quadrantid rates had dropped substantially; Nick's system recorded only 3 Quadrantids and 5 sporadics during the entire night.

As always the Director is most grateful to all the observers who took the time and trouble to contribute to the Section's observations of the Quadrantid meteors in 2012 January.

John W. Mason, *Director*

Nick James' video image of a bright Quadrantid passing close to Regulus at 23:36:54 UT on 2012 Jan 3.

The brightest Quadrantid recorded by Nick James' video imaging system occurred at 07:02:13 as dawn twilight brightened the sky on 2012 Jan 4.

The first 5 frames from a sequence of 20 frames showing the decay of a persistent train produced by a bright Quadrantid early on 2012 Jan 4. Images by Pete Lawrence from Selsey in West Sussex.