Mercury & Venus Section

The transit of Mercury, 2003 May 7

The Mercury transit of May 7 will be the first to be visible from Great Britain since 1973 November 10. An earlier letter to the *Journal*[1] gives the precise times and the track across the Sun, but throughout the UK the transit will commence around 05.11 UT and end at about 10.33 UT. Mercury transits happen in May and November in conjunction with the nodes of the planet's orbit (see also the paper by R. L. Stratford in the current *Journal*). There are twice as many November transits, when Mercury is close to perihelion. The less frequent May events find the planet at aphelion. In May therefore, Mercury will appear slightly larger against the Sun than it can do during a November transit.

Venus transits are plainly visible without a telescope, provided suitable precautions are taken, but Mercury's are not so.[2] Mercury's apparent diameter in May will not exceed 13 arcseconds, or about the size of a small sunspot. Modest telescopes, however, can be used to good effect, as Alan Heath did in 1973. Alan employed a 5cm refractor to project a 10cm solar image and he recorded Mercury's 10 arcsecond image at several points in the transit.

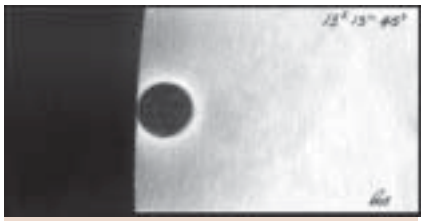
If you plan to observe by 'projection' (do not use a catadioptric [Schmidt–Cassegrain] telescope for this) focus the Sun's image onto a piece of white or light grey card with a ×50 eyepiece.[3] A telescope drive is not necessary. At the start and the end phases of a transit both Mercury and Venus display the 'black drop' effect. This causes errors in timing the instants of contact with the solar limb. Odd appearances have been reported in the past, such as white, grey or bluish haloes surrounding Mercury as well as luminous patches or spots on its disk or near the limb.[4] These may well be instrumental in origin, but such phenomena should be noted. Low power CCD images were obtained by amateurs at the last transit in 1999. Under good conditions, one wonders if high power CCD or video imaging would reveal any such effects? If so, they would be of great interest.

Direct observation can be made only through a solar filter that is mounted **securely** in front of the telescope's objective. Never use any eyepiece mounted filter on its own and do not be tempted to fasten pieces of flexible plastic solar filter material (mylar) over the end of a telescope with string, or rubber bands. Note also that certain types of glass solar filter are only for photography, not visual work. Anyone with access to a solar H-alpha setup may like to note that at the 1973 transit Harold Hill (spectrohelioscope) observed Mercury when it was actually off the edge of the solar disk.[5] Also, first or last contact is impossible to time in white light, but Hα equipment and a video setup may well allow this to be done.

Many of us will be at work on the morning of Wednesday May 7, but for those who are able to observe, there is the chance of catching some part of the event even if there is cloud about, because Solar transits take a long time.

Warning – never look at the Sun, with or without a telescope. If you look at the Sun you will damage your eyes. The safest way to observe the transit is to project the Sun's image through a refracting or reflecting (NOT Schmidt–Cassegrain) telescope onto a piece of card. Stand with your back to the Sun and use the shadow of the telescope tube on the card to home in on the projected image. Never 'sight' along the tube to the Sun. Keep finders capped at all times.

Peter Macdonald, *Transit Coordinator*



Mercury leaves the Sun, 1973 November 10. Drawing by Richard Baum, 11.5cm refractor ×30. The view obtained by a careful observer using simple equipment to project the Sun. The effect on the image of turbulence in our atmosphere is accurately depicted. Note the impression of a bright halo surrounding the planet.

References and notes:

1 *J. Brit. Astron. Assoc.*, **112**(5), 244 (2002)
2 Sandner W., *The Planet Mercury*, Faber and Faber, 1963, p.77
3 Note that an astronomical telescope usually reverses a projected image laterally.
4 Antoniadi E. M. (tr. Moore), *The Planet Mercury*, Keith Reid Ltd, 1974, p.20–23
5 *J. Brit. Astron. Assoc.*, 110(5), 234–235 (2000)