Letters

Modelling the transit of Venus

From Mr David Thomas

Members might be interested to know how we used our scale model of the Solar System described in BAA *Journal* Vol.113 No.5 (2003 October) to illustrate the transit.

Reasonably accurate orbits have been mown into the grass of the model for the inner planets. I have mown Venus and Earth as circular orbits and treated the orbits with lawn fertilizer and weed killer so that they stand out more from the surrounding grass.

Mercury is a pretty accurate ellipse and with a friend we showed how one could illustrate Kepler's 2nd Law to about 5% using markers set in the ground at '10 day' intervals. Mars presented quite a challenge since the setting out cord is about 100 metres long and we have to negotiate various obstacles such as trees. (The cord from the mower, round the Sun, onto a temporary marker as the second focus and back to the mower, has considerable elasticity and keeping the tension reasonably constant is quite a challenge). We spot checked the accuracy of these orbits using a program sent by Gordon Taylor. Many people who have visited the model have commented that the orbits give it a much more dynamic feel and a sense of how the planets move round the Sun. We believe that our model is the only one which shows any part of the orbits.

On June 8 we placed marker poles for the positions of both Venus and Earth at the start and end of the transit. The distances moved during transit were approximately 16cms and 14cms respectively. Each pair of poles was joined by a wire of about the right diameter, at angles relating to the planes of their orbits. One could then see how Venus crossed the model of the Sun when viewed from the Earth position during the event.

Because we only had a projected image from a pair of binoculars and a NexStar 8 with solar filter, I only advertised locally and anticipated some 20 or so viewers. One of the first of the 50 adults who later appeared was the chairperson of the Parent Teacher Association of the local primary school. Because of her intervention and the commendable flexibility of the school staff, all 250 pupils came across class by class and looked through the 'scope.

Not only did the school make use of the series of photos of the transit I took for an end of term display, but each class is now known not as a number but has been given a planet name.

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Jeremiah Horrocks

From Mr Michael Gainsford

I was very interested to read Mike Frost's article on Jeremiah Horrocks in the 2005 June *Journal*.

Horrocks was a childhood hero of mine. I was brought up in Penwortham, about 5 miles from Much Hoole, and went to school about two miles away. Of course in those days he was considered by everyone to be the 'astronomical vicar', and a local celebrity.

Carr House stood derelict for several years after the War, after which it opened as a doll museum, before being sold as a private residence. It is generally accepted that Horrocks observed by projection from a room above the porch. It follows from this that his telescope could not have been of the Galilean type, but one with a convex lens at the eye end. Such telescopes had not been around very long at the time, but as he is said to have purchased his telescope in 1638 (for two shillings and sixpence!) the new type was apparently commercially available by then.

Carr House today. *(Photo by Mike Frost).*

Mr Frost mentions a few of the memorials to Horrocks. There are others, including a tablet in Westminster Abbey, and also one (of 1826) at the church of St Michael's in the Hamlet, Toxteth, Liverpool. This is a fascinating church well worth a visit. It is one of the few churches built around a cast iron frame. Apparently this type of construction was devised so semi-prefabricated churches could be shipped out to the far flung British Empire. Of more 'astronomical' memorials, Horrocks has a crater on the Moon, adjacent to Hipparchus, and the public observatory at Moor Park, Preston, bears his name.

In my more modest researches into possible causes of Horrocks' sudden death I investigated records of visits of the plague to Lancashire in the 17th century. Major plagues hit Manchester in 1605 and 1646, and in 1631 Preston lost a third of its population to the plague. But the dates don't fit very well.

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Transit tales from history

From Mr Terence Moseley

A very minor correction regarding Mike Frost's article 'Some transit tales from history' in the superb and fascinating June issue of the *Journal*.

On page 135 Mr Frost states that Charles Mason observed the June 1769 transit of Venus from 'Cavan in central Ireland'. While there is indeed a town of Cavan in central Ireland, being the principal town of that county, Mason actually observed from the lesser-known townland of Cavan in Co Donegal. It lies near the larger town of Lifford, just across the border from Strabane. See his report 'On the Transit of Venus, and other Astronomical Observations made at Cavan near Strabane in the County of Donegal, Ireland' in *Phil. Trans. Royal Society*, **60**, 80, and **60**, 454–496.

A briefer account is given by Dr John Butler (Armagh Observatory) in 'Transits of Venus', *Proceedings of IAU Colloquium No 196*, 2004, edited by D. W. Kurtz & G. E. Bromage.

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The transit observed from Orkney

From Mr John Vetterlein

Following a fine evening on June 7, the forecast was poor for Orkney the following day. However despite swathes of high cloud, some of it seeded by aircraft condensation trails, the Sun did manage to break through from time to time in the initial stages of the transit. An image close to first contact was obtained and another about three minutes later at 05:24 UT.

The sky deteriorated rapidly for the next half hour or so but then brightened miraculously, allowing observations up to mid-transit at 08:21. I used 85mm (equatorial) and 100mm (altazimuth) refractors employing projection or Baader filters respectively. Photographs were taken using a Minolta Dimage F300 digital camera working at various speeds from 1/300 sec to 1/1000 sec.

A visit to the Rousay School at 08:30 to demonstrate the events to pupils and members of staff (using the projection method) followed. Filters were also used to observe the event without optical aid. The general consensus was that Venus appeared remarkably black and much larger than anticipated.

Returning to the observatory by 10:20, I had to observe visually using low powers and a smaller telescope with appropriate filters. Near the end the cloud was so dense as to make observation almost impossible. Despite this a poor image was secured at 10:52 as Venus prepared to depart. The time of last contact was taken using binoculars (plus filters). All in all things could have been worse. The afternoon then settled into the poet's apt description for these parts of gray, upon gray, upon gray....

A point I should like to emphasise from a technique point of view is the fact that many of the early photographs were taken with the Sun effectively obscured by cloud. The Sun was practically invisible on the projection screen and to the eye via filters yet by suitable processing quite tolerable images were obtained.

Compared to a comet such as Hyakutake, or a grand auroral display, the transit was more memorable than spectacular. However I am sure all those who had anticipated the event for decades, and who managed to see it for real, would not have been disappointed.

John Vetterlein

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Observing Venus near the Sun

From Mr Michael Hendrie

In your excellent coverage of the 2004 transit of Venus in the 2005 June *Journal* you included some notes of my observations of Venus on 2004 June 5 only 4.8° from the Sun's centre, but my notes on the safety aspects of making the observations were omitted. In case other observers, perhaps with portable equipment, should be encouraged to try similar observations I wish to record the special precautions I took before putting my eye anywhere near to the eyepiece. One cannot be too careful.

Firstly the observations were made with a 150mm Cooke refractor weighing upwards of 500kg, so it could not be displaced by a careless kick. It was accurately aligned on the pole using photographic methods. It has large accurate setting circles and a stepper motor drive with a solar rate. The sunshield was 700mm long (not 70mm as stated, my error). The Cooke has strong clamps, not clutches, to lock both axes.

Using the setting circles and sidereal time the telescope was set on the Sun and the image checked in a projection box. The telescope was then set to the position of Venus and a ×80 eyepiece substituted for the projection box. The projected image was checked for any exceptional brightness before looking through the eyepiece. Venus was kept in sight during the observations: I did not go away and come back later for another look.

I have observed Venus before near the Sun and on the day of inferior conjunction, but usually it is several degrees above or below the Sun which cannot drift into the field of view. A few days before the transit the difference in declination was of course very small. Observations were made only before transit/inferior conjunction when any interruption in the telescope drive would have caused the Sun to drift away from the field. Observations on days soon after the transit would have risked the Sun drifting into the field and were not attempted. One should never sweep for an object close to the Sun.

This is the closest to the Sun I have observed Mercury or Venus but is by no means a record. A transparent, deep blue sky is required as a milky sky scatters too much sunlight. In good conditions the curved outline of Venus is like a thin, white hair.

Michael Hendrie

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Giant sunspot groups

From Mr Peter Norman

I must make a correction to the Solar Section notes for 2005 January in the June *Journal*. Active Region 720, that crossed the Sun's CM on January 15/16, was certainly large, and unusual in the lateness of its appearance some 4.5 years after solar maximum, but to say it rivalled the giant groups of 1946, 1947 and 1989 is somewhat stretching the point. With a maximum area of some 2000 millionths it was big, but this cycle has seen at least five active regions larger than this, and the giant spot groups referred to in the report were two or three times as large – that of 1947 April reaching no less than 6132 millionths at maximum.

It is of interest to note that a large proportion of the largest groups this cycle have occurred after the maximum as recorded by sunspot number, and I believe this is the first cycle since area measurements were first made at RGO (in 1874) when no group as large as 2000 millionths occurred before maximum had been reached. However, up to nine have been recorded since (Sep 2000, Mar 2001, Aug 2002, Oct 2003 (two or three), Jul 2004, Aug 2004 and Jan 2005).

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Venus transit CD-ROM

The special CD-ROM containing all observations received of the Venus transit is still available from the BAA office. Order online at **www.britastro.org/sales** or telephone Jean Felles at 020 7734 4145.