Observing projects with asteroid–comet connections

A joint meeting of the BAA Comet Section and Asteroids & Remote Planets Section, Milton Keynes, 2012 October 6

The speakers outside the OU. *Left to right:* Sam Duddy, Gareth Williams, Luca Buzzi, Stephen Lowry, Graham Relf, Roger Dymock, Richard Miles, Simon Green, Eamonn Ansboro, Jonathan Shanklin, Nick James. *Photo by David Briggs.*

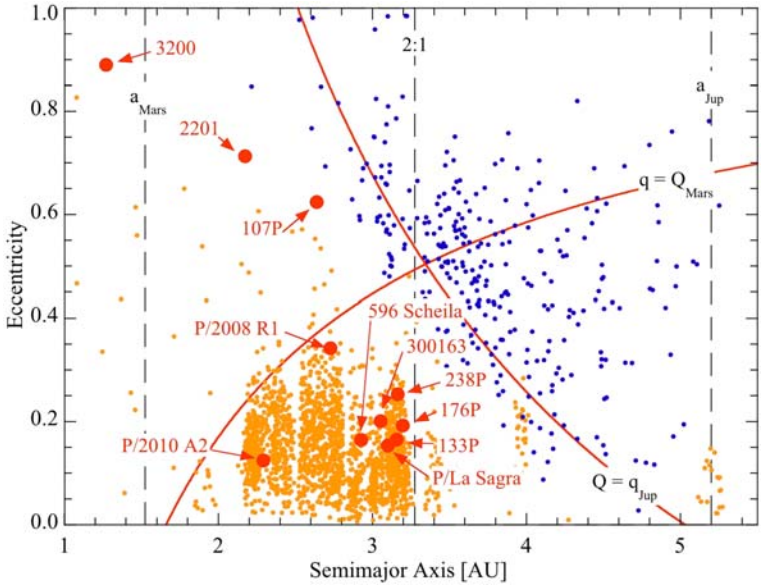
An audience of nearly 70 assembled on October 6 in the Berrill Lecture Theatre at the Open University in Milton Keynes for a discussion meeting covering observation of comets and asteroids. ARPS Director Richard Miles did the hard work of organising the venue and speakers, adopting the format of a day of many short talks, which worked very well. This report gives a brief summary of the talks and discussion, and a longer version appears in the Comet Section newsletter *The Comet's Tale*.

Richard Miles began proceedings with a talk on 'Icy asteroids and rocky comets: an introduction'. Brian Marsden had noted in 1969 that 28P/Neujmin and 49P/Arend–Rigaux might be transitional objects. At that time it was thought that comet orbits were unstable whilst asteroid orbits were stable, but subsequent research has changed the picture. Jonathan Shanklin, Director of the Comet Section, followed with an introduction to 'Comets, quasi-comets and the Comet Section'. An important part of Section work is making long term observations of returning objects to show how they evolved. For this reason 2P/Encke will be the focus for an observing campaign in 2013.

Simon Green, Senior Lecturer in Planetary and Space Sciences at the OU, spoke about 'Sample return from asteroids and comets'. Asteroids and comets retain information about the early solar system; comets from the outer part, asteroids from the inner part, and they also contain material that pre-dates the solar system. Stephen Lowry, Lecturer in Astronomy and Astrophysics at the University of Kent, covered 'YORP and other perturbation effects affecting asteroids and comets'. Solar radiation can change the rotation of an asymmetric body by reflection, and also by absorption and re-emission of thermal radiation.

Sam Duddy, Post-Doctoral Research Associate at the University of Kent, took this theme a little further with 'Characterisation of unbound asteroid pairs'. Asteroids larger than a few hundred metres don't rotate faster than 2–5 hours. This implies that there is a limit on the bulk density which is much smaller than that of meteorites, which in turn implies voids or fissures.

Speaking on 'Methods common to observing comets and asteroids', Nick James then explained some of the techniques that he uses.



The distribution of mass-losing asteroids, including their relation to normal asteroids (orange dots) and classical comets (blue dots). *David Jewitt*, http://www2.ess.ucla.edu/~jewitt/mbc.html

The final speaker of the morning session was Graham Relf, from the BAA Computing Section, who described 'New observing aids for asteroids and comets on the Computing Section website'. [Read Graham's talk on the next page of this *Journal*.)

During the lunch break there was an opportunity to view several poster displays that had been brought along. The afternoon session began with Roger Dymock describing 'Project Alcock: Encouraging comet observations, imaging and discovery'. The idea of the project was to get people out looking at comets, where there is a whole range of possibilities. Luca Buzzi had specially come from Italy for the meeting and told us about 'Finding comets amongst the asteroid population: Project T3'. He is co-ordinator of the T3 Project, which was launched in 2006. The T3 Project team has now shown that 10 objects, first thought to be asteroidal in nature, are in fact comets.

By coincidence Gareth Williams, Associate Director of the Minor Planet Center (Boston, Massachusetts), was in Milton Keynes for his PhD viva. He described the subject of his PhD, 'Improving the absolute magnitudes: Correcting the astrophotometry'. This included creating a new UBVRI catalogue to 20th magnitude, and from this a correction for each astrometric catalogue. Eamonn Ansbro concluded the first afternoon session, with a talk on 'Detecting trans-Neptunian objects by occultation methods'.

After tea, Richard Miles gave two short presentations, first on the theme of 'Frosty asteroids and Project Themis'. Asteroids brighten above the standard 'log r' rate at low phase angle, to give an opposition brightness surge, which depends on the nature of the surface regolith. He followed up with 'Target Asteroids for Spacecraft: Observing opportunities for amateurs'. Finally Graham Relf, who has a background in image processing, showed some examples of his work including an image of 2009 P1 (Garradd).

The meeting was a great success, linking professional and amateur astronomers, and providing much time for mutual discussion. There will be many opportunities for amateurs to contribute in future to professional research on these small solar-system bodies. Looking forward, we hope to organise a similar pro-am meeting for European amateurs to contribute to the *Rosetta* ESA mission to 67P/Churyumov–Gerasimenko.

Jonathan Shanklin