Meetings

Ordinary Meeting, 2010 May 26

held at the Royal Astronomical Society, Burlington House, Piccadilly, London W1

David Boyd, *President*
Ron Johnson, Hazel Collett & Nick James, *Secretaries*

The President opened the 5th meeting of the 120th session, and asked the audience to approve the minutes of the last meeting. Eight membership candidates were approved and declared elected. Mr Nick James, Papers Secretary, announced that one paper had been accepted for the *Journal* by Council that day:

> *The orbital and superhump periods of the deeply eclipsing dwarf nova SDSS J150240.98+333423.9*, by Jeremy Shears *et al.*

The President announced that the next meeting would be the Exhibition Meeting at Greenwich on June 26. He then introduced this year's George Alcock Memorial Lecturer, Mr Guy Hurst, editor of *The Astronomer*.

Visual observing successes without a telescope

Mr Hurst first described George Alcock's early life. Alcock was born in Peterborough in 1912, and spent nearly all his long life in the vicinity of that city. At the age of eight he saw a partial eclipse of the Sun. However, the event that triggered his lifelong dedication to astronomy was his observation of a fireball in daytime on 1930 December 30. He consulted John Manning Prentice, then BAA Meteor Section Director, and subsequently attended his first BAA meeting in 1931 July.

Alcock commenced a long apprenticeship in meteor observing under Manning Prentice, but sadly just missed discovering Nova Herculis 1934 (first seen by Manning Prentice) as it appeared on a night when work the following day dictated he go to bed early, a disappointment he often mentioned in subsequent years. His focus remained on meteor work, which he pursued with great dedication, for example, clocking-up a total observing time during a Quadrantid meteor watch one January night in 1951 of 10 hours 48 minutes. Alcock did sometimes use a telescope, being a contributor to the Mars Section early in his observing career. However, it was his work with the naked eye and binoculars that made him famous.

Showing a fine drawing Alcock made of Comet Pons–Brooks in 1954, Mr Hurst commented that his remarkable observing abilities seemed to be threefold. Firstly, he had the ability to see more than others, both in terms of faintness of objects and subtleties of detail. Secondly, he had the draftsmanship and artistic ability to render very accurately what he had seen. Thirdly, of course, there was his famous and amazing ability to memorise star patterns. By day, he was a teacher of Latin, which involved, at that time, much memorisation of passages. Mr Hurst speculated that this cultivation of memory in the classroom may have spilled over into the way Alcock approached astronomy.

Those who knew Alcock knew that, to him, astronomy was only a sideline. His main interests lay in meteorology, natural history, and architecture. His drawing ability was mainly cultivated in drawing nature and buildings, such as Peterborough Cathedral. His interest in meteorology allowed him to predict when it would be clear at his location; he did not rely on available forecasts, but had his own system. This seemed to work, so that he was often observing in the early morning, when few others were awake, and most of his discoveries were made in the morning. In 1959 came the remarkable achievement of the discovery of three comets in one year: C/1959 Q1, C/1959 Q2, and C/1963 F1.

In 1964 James Muirden founded a magazine called *The Casual Astronomer*, later to become just *The Astronomer*. Its second issue contained an article by Alcock on errors in the *Atlas Coeli*. He was concerned that many of the stars missing from the atlas could be variable and could be reported incorrectly as novae. At the end of 1964 Alcock was voted by magazine readers, oddly, to be the year's 'most casual astronomer'. In 1965 he found another comet, C/1965h.

In 1967 came Alcock's first nova discovery, Nova Delphini. He described to Mr Hurst how he had recognised the new object: he was not aware which star was out of place, but his mind instantly noticed that the familiar pattern of the stars had become 'disturbed'. The discovery of Nova Vulpecula followed in 1968, another discovery made in the morning sky, in the distinctive asterism well-known by the appellation of 'The Coathanger'. His third nova discovery was of Nova Scuti in 1970.

In 1971 Alcock drew a section of Cepheus with the naked eye as a test of his sight; he recorded stars to seventh magnitude – and this was in a location, near Peterborough, already suffering from significant light pollution, particularly from the ground of Peterborough Football Club, about which he often complained. He was now concentrating on nova searching in or near the Milky Way, and had memorised large areas of the Milky Way to magnitude 7.5.

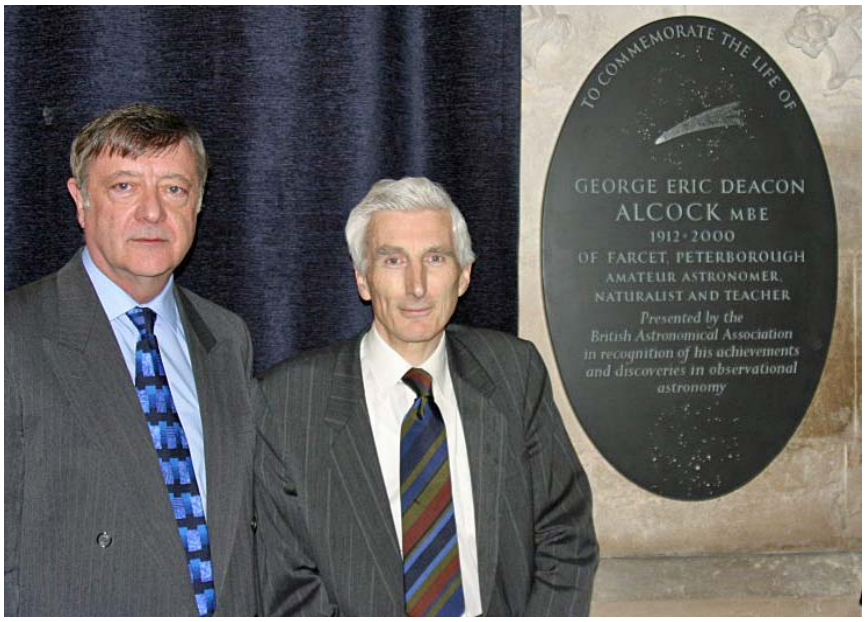
In 1983 Alcock found his fifth comet, also identified on photographs by Japanese amateur Araki, and in data from the IRAS infrared satellite, hence its designation as Comet IRAS–Araki–Alcock, an ordering of the names which, Mr Hurst recalled, rankled Alcock, as he had reported it first, though the other observations predated his. Phoning Mr Hurst on the morning of the discovery, he described it as a mag 9 comet overhead. Mr Hurst had gone out and not been able to find it for a while – until he saw a mag 6 comet about 1° across. Mr Hurst wondered how such a bright object had managed to reach the point of being overhead without being discovered earlier.

In 1991 Alcock discovered Nova Herculis from inside his house, observing one morning through double glazing – amusingly in contradiction to conventional wisdom on how to observe. It was mag 5, and, on receiving the report, Mr Hurst alerted Denis Buczynski, who obtained a confirmatory photograph in near-daylight.

Alcock gave few talks, but Mr Hurst fondly remembered an occasion when he had talked to the *TA* AGM in 1992. In 1996 a biography of Alcock by Kay Williams appeared, with the title *Under an English Heaven* – it is still in print. He was honoured in a civic ceremony conducted by the Mayor of Peterborough in 1998. On this occasion the Mayor lamented that the people of that city had had in their midst such a remarkable and famous person for so long without acknowledging him. He died in 2000 at the age of 88.

Alcock's record of five comet and five nova discoveries was a remarkable achievement in visual astronomy, unlikely to be repeated, Mr Hurst said, that must make him rank with the greatest observational astronomers of modern times. The planning for a plaque in his honour in Peterborough Cathedral was undertaken by David Tucker, then BAA Treasurer, who is an architect by profession. Despite the obstacles placed in the way of making this kind of change in such an ancient building, the project came to fruition, and the plaque was unveiled at a ceremony on 2005 April 19 by the Astronomer Royal, Sir Martin Rees.

Finally, Mr Hurst reviewed the observational opportunities still open to amateurs following in Alcock's footsteps and observ-



BAA President Tom Boles *(left)* and Astronomer Royal Sir Martin Rees with the plaque to George Alcock in Peterborough Cathedral, unveiled on 2005 April 19. *Photo by Nick James.*

ing visually with the naked eye or binoculars. These he listed as the study of meteors with the naked eye, searches for comets, and novae searches using binoculars, plus observation of the large number of inadequately-covered variable stars within binocular range. Mr Hurst hoped that the CCD age would not see an end to the tradition of visual discovery exemplified in the remarkable life of George Alcock.

After applause, the President introduced the next speaker, Prof Mike Bode of Liverpool John Moore's University.

The explosions of novae

Professor Bode first explained that he would be concentrating his treatment on classical novae, as opposed to dwarf or recurrent novae. Classical novae are characterised by a very rapid rise of about 9 magnitudes followed by an early decline, a transition period, and a final decline. There is a relationship between the maximum magnitude and the rate of decline.

All classical novae are thought to result from close binary systems with a period of only a few hours, that include a white dwarf star. DQ Herculis (Nova Herculis 1991), an Alcock discovery, was crucial to the work which established the theory. Matter is transferred to the white dwarf, which gathers an accretion disk, and the outburst is due to eventual thermonuclear runaway on the surface of the star. Infrared output is at a maximum, not at the peak of the optical outburst, but later, during the transition minimum. This is due to the heating of the gas in the accretion disk by the initial explosion, which produces radiation at all wavelengths from X-ray upwards.

About 8 classical novae are seen each year in our galaxy, but theory predicts about 12 should be seen. In some cases, years after the explosion, its remnants can be resolved optically by large telescopes. Measuring spectroscopically the rates of expansion of these remnants, plus the radial velocity of the ejecta, can yield a distance to the object.

Prof Bode spent some time talking about Nova Persei 1901, GK Persei, a well-studied fast 'neon' nova. This has a primary of 1 solar mass and a secondary of 0.3 solar masses. An early 34 hour photographic spectrum by Perrine of the nebulosity surrounding it showed a strong similarity to the spectrum of the nova taken a few days after outburst. This indicated that what was observed in the nebular spectrum was a light echo of the explosion. Modern multi-frequency imaging shows that the nebula is like a supernova remnant in miniature. It seems to be a cloud of ejecta from a previous phase of the evolution of the binary system, as it is believed that the 1901 explosion of this system was its first nova explosion.

Prof Bode then discussed recurrent novae. The typical inter-outburst period of these is 10–100 years. RS Ophiuchi is a good example of the type. It gave outbursts in 1898, 1907, 1933, 1945, 1958, 1967, 1985, and 2006. Such recurrent novae are believed to be due to systems in which a high mass white dwarf is orbited by a red giant secondary, with an orbital period of typically 100 days. In this type, thermonuclear runaway on the surface of the white dwarf causes an explosion that hits the wind from the red giant, and shock-heats it. There is a very fast decline from the outburst in the optical. Amongst the recurrent novae there are also three possible sub-types.

The 2006 outburst of RS Oph was studied at many wavelengths. An optical spectrum was taken by the French amateur Christian Buill, and the *Swift* GRB satellite was used to look at the X-ray emission. It was found that the X-rays were at first hard, then soft – consistent with the decelerating shock model. The outburst was also observed in radio wavelengths using the Very Long Baseline Array. Fourteen days after the outburst, a ring of radio emission was seen, of a diameter of the order of that of Saturn's orbit.

Novae may be discovered in various ways. The solar Mass Ejection Imager on board the US *Coriolis* satellite observed the outburst of V1280 Sco in 2007, and, in the same year, the outburst of V598 Pup was discovered in X-rays by the ESA XMM-Newton satellite. This nova had been missed on earlier sky patrol images at mag 4, which, Prof Bode commented, suggests that novae could still be found by naked-eye observers. Another example was KT Eri, which was seen on 2009 November 25 at mag 8. It was then found to be on sky patrol images on Nov 14 at mag 5.4. It was subsequently even found on Liverpool Telescope SkyCam T images.

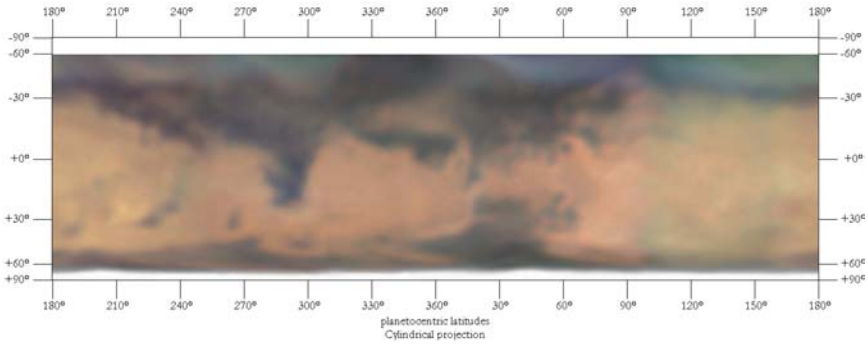
Some open questions on novae, Prof Bode concluded, remain. These include: Is there a continuum of outburst cycle timescales connecting classical novae to recurrent novae? What is the cause of the short-period oscillations observed? How are the jets formed? What is the link between recurrent novae and Type 1a supernovae? Though there are data 'goldmines' now available to researchers in terms of the various surveys taking place, the role of the amateur in studying novae, Prof Bode asserted, does not diminish.

Following applause and questions, the President introduced Dr Richard McKim, Director of the Mars Section.

The Mars opposition of 2010 January 29

Dr McKim said that at this opposition, the northern hemisphere of Mars had been presented. The diameter of the disk was 14 arcseconds, and the solar longitude was 44°, corresponding to the middle of the martian northern spring. Dr McKim showed drawings of the planet made by Richard Baum, Peter Grego and David Gray, and discussed how the greenish colour on Mars perceived by visual observers is a subjective effect, due to colour contrast.

Blue morning and evening clouds are seen most in the northern hemisphere, and had been nicely captured by Paul Abel, who drew the view through a blue filter. Most of the



Albedo map of Mars in 2010 by Martin Lewis, from images taken between Jan 17 & March 5. 222mm Dobsonian + tracking platform + DMK21AF04AS.

dark features of Mars are stable, but there are changes in some over the years, due to dust movement. Dr McKim compared the CCD map of Mars created in 2005 by Damian Peach (at a perihelic opposition) with one created this (aphelic) opposition by Martin Lewis. After accounting for the lower resolution due to the increased distance, changes are clear.

Every 15 or 17 years, oppositions of Mars are similar. This opposition was therefore similar to that of 1994–'95. Dr McKim showed a polar projection map from 1994–'95 showing an annular rift in the Northern Polar Cap. In 2009–'10 the polar rift was widely observed, as shown in images by David Arditti, Peter Garbett and Peter Edwards. Images from Damian Peach on Jan 29 showed a dust storm taking place on the northern polar cap – a rare event, as dust is more commonly seen in the southern hemisphere. A couple of observers also saw this visually, and it was confirmed in images taken using the 1m telescope at Pic du Midi.

Another dust storm was shown in Bill Flanagan's image of 2009 November 4–5. In February–May orographic clouds over the volcanoes were well seen. Sometimes the volcano tops were seen protruding through cloud that extended all round the planet in the form of an equatorial cloud band.

The President thanked Dr McKim and introduced Dr Richard Miles to present the Sky Notes.

Sky notes for June, July and August

Dr Miles said that he had recently visited Australia, and showed an attractive picture he had taken of the dome of the 150-inch (3.8m) Anglo-Australian Telescope, now renamed the Australian Astronomical Telescope following the withdrawal of UK funding. He then discussed the current visibility of the planets. Mercury has a good morning elongation, greatest on May 26. Venus is an evening object, and will have its greatest elongation on August 20. Mars is observable in the west, but is only 6 arcseconds in diameter. Jupiter is not yet observable in a dark sky from the UK, but Saturn is at quadrature, with the rings at a tilt of only 1°.7.

Dr Miles pointed to a grazing lunar occultation of 9 Geminorum occurring on August 7, with the track of the graze crossing Kent, and to an asteroidal occultation of the mag 2 star Delta Ophiuchi, occurring on July 8, the track crossing much of Europe, but not the UK. The Sun has been very quiet, but Dr Miles produced an interesting image taken by Thierry Legault showing the ISS in transit across it. Returning to the planets, Dr Miles showed an image of Venus taken close to the Moon on May 16, by Naimal Islam Opu. He also showed images of Jupiter by Anthony Wesley and Tomio Akutsu showing the planet with the South Equatorial Belt missing. On Saturn, he said, the South Equatorial Belt is darker and redder than the North. Stefan Buda had succeeded in imaging a transit of Titan, and a white spot in the South Tropical Zone had been imaged by Jim Phillips.

An outburst of GK Persei is in progress, as happens every 5–10 years, and a new WZ Sge-type dwarf nova has been discovered in Perseus. Epsilon Aurigae is in eclipse, and Robin Leadbeater has succeeded in measuring the intensity change of the potassium spectral line, while the occulting disk of material around the star has been observed in the radio by very long baseline interferometry.

The best evening comet is C/2009 K5 (McNaught), at mag 8 visible all night, but now fading. On the other hand, C/2009 R1 (McNaught), also mag 8, is brightening rapidly, and could reach mag 2–3 in June. Comet P/2010 H2 (Vales) was recently discovered by Jan Vales, and seemingly had an outburst similar to that of Comet Holmes. Dr Miles said he had imaged this comet with the Faulkes Telescope North, and detected a spiral structure in the coma.

He had also imaged an asteroidal object discovered by the Catalina Sky Survey. Designated 2010 KQ, it seems likely that this is in fact a man-made object in orbit around the Sun. Dr Miles speculated that it might be the spent Proton rocket fourth stage that launched the Luna 23 probe to the Moon, noting that its spectrum corresponds well with that of space-weathered titanium dioxide paint.

The President thanked Dr Miles and adjourned the meeting until the Exhibition Meeting at the Royal Naval College on 2010 June 26.

David Arditti