Letters

Gamma Virginis this spring and summer

From Mr Christopher Taylor

As γ Virginis returns to the evening sky, may I remind observers that this splendid system is still playing out the climax of its 169-year orbit, to which I drew attention in these pages a year ago.[1] Indeed, Gamma has fully lived up to the expectations expressed in that earlier letter, one consequence of which is that its present behaviour is at least as interesting and important an observational target as that at apparent periastron last Spring – dramatic though that was – with the added incentive that the pair is now far easier to split. When seen in the 12½ inch at Hanwell on the morning of February 11, Gamma had opened out again from its minimum of 0.3 arcsec or rather less in late April/early May (a date within two or three weeks of the 2004 prediction given in ref. 1) to a full 0.5 arcsec, and had revolved approximately 60º since the last measure here on June 8. In other words, as the components have separated and become much easier to resolve, so their orbital revolution has actually accelerated – exactly the same violation of Kepler's law of areas as occurred in 1836.

Any true 2-body system should obey Kepler's law, even as applied to the relative motion in oblique projection on the sky which is directly measured at the telescope. This means that there should be a rise and fall of the angular velocity which is exactly symmetrical, locally, about a peak at the instant of apparent periastron. As in 1836, Virginis has shown a flagrant disregard for this rule over the last twelvemonth: it was already spectacularly obvious by April 18 last year that the system was swinging in to periastron much too slowly, as measures at that date showed it to have fallen fully 20º of position angle behind the best computed orbit (Soderhjelm 1999), which had been in very close agreement with observations only a year or so earlier; now, just as in 1836, this laggardly approach to apparent periastron has been succeeded by a great spurt during the subsequent reopening.

Despite solar conjunction preventing any observations of a vital post-periastron arc, the before-and-after asymmetry of motion is very conspicuous, the 60º revolution quoted above implying an average angular velocity of about 90º/year over that 8 month period (and a peak, therefore, well in excess of that mean value), compared with an average of only about 60º/year, at most, over the much shorter period 2004.99–2005.30 immediately preceding the appulse itself. Clearly, the current outward motion is not even approximately the expected mirror-image of the inward motion of a year or so before, and peak angular velocity must have fallen some months after closest approach.

Here we have a signal coming loud and clear from observational data of one of the best known, and allegedly best understood, of all binaries. Orbit computers from John Herschel to the present have steadfastly ignored this anomaly, whose cause remains unknown. The case is not made any easier by the conspicuous absence of any obvious residuals over the remaining 98% of the orbit, other than this short arc around periastron. So, now that γ Virginis is once again becoming a more accessible target for 'common telescopes', I urge all suitably equipped observers to keep close watch on this intriguing phenomenon. It should be perfectly possible to compile a sufficient set of good observations for the period 2005–2007 to put the existence of this strange perturbation entirely beyond further debate and so, for instance, to persuade some obliging infrared astronomer to institute a direct search for a possible sub-luminous third body in the system. In particular, any p.a. measurements for the period April 2005 to summer 2006 would be extremely useful, whether obtained visually or from properly calibrated digital images: please send anything you have to me at the address below. This is a rare opportunity for some very interesting amateur work.

A full observational record of last Spring's periastron passage and much else on 'the story of γ Virginis' can be found on the Hanwell Observatory website **www.hanwellobservatory.org.uk**. I would like to thank those who have already contributed CCD images and measurements to that compilation.

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1 Taylor J. C., *J. Brit. Astron. Assoc.*, **115**(2), 107 (2005)

Bright lunar features

From Mr John Vetterlein

I was interested to read Richard McKim's letter in the February *Journal* concerning a bright feature in the crater Werner. Like Richard I am not a lunar specialist but it so happened that just recently (2006 Feb 02, 17h 27m UT) I was struck when observing the Moon by two very bright features which almost sparkled to the eye when observed with a 100mm refractor at ×45. I photographed the full disk with a 175mm Meade Maksutov and found much the same appearance when viewed on the LCD screen at certain magnifications (Figure 1). The extreme effect only lasted a little over one hour.

The two features are to be found on the rim of Mare Crisium. One would appear to be the crater Proclus (east) the other is in the region of Cliomedes G (north).

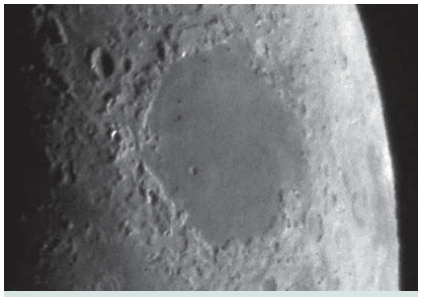

Figure 1. Mare Crisium showing Proclus and Cleomedes as bright regions. 175mm Maksutov ×68. 1/120 sec., ISO 200. A section from a full disk photograph. 2006 February 02, 17:40 UT.

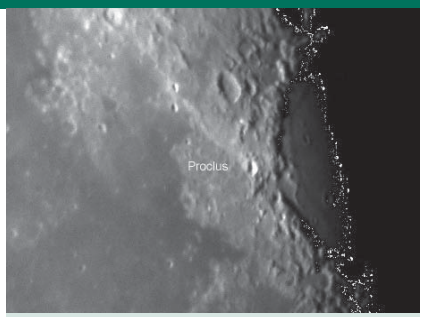

Figure 2. Proclus on the rim of Mare Crisium. 175mm Maksutov ×120. 1/350 sec., ISO 100. 2006 February 15, 22:37 UT.

The phase of the Moon at the time was 23.1%, while Richard's observation was made with the Moon at 83.5%. All such effects are light-incidence dependent, so that for comparison one would have to make a detailed analysis of the local circumstances, not easy when dealing with the inclined walls of craters such as Proclus.

Then, by good fortune, a clear night on 2006 February 15/16 gave another angle on the same feature (Figure 2), though on this occasion at 93.5% phase it appeared less bright by contrast with other features with the Moon.

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The Hay Steavenson telescope

From Dr R. A. H. Paterson

In 2005 the Hay Steavenson telescope is 110 years old. Its maker, George Calver, signed its 32cm primary mirror and dated it 1895. Will Hay, who restored and owned this telescope, was of course the well-known comedian and BAA member who discovered the famous white spot on Saturn in 1933. Dr W. H. Steavenson, who with Will Hay 'rescued' and restored this instrument, was a distinguished astronomer, past President of both the BAA and RAS and honoured in our Association by the Steavenson medal.

The history of this instrument is given in a paper previously published in the *Journal*.[1] In 1981 the telescope was moved to its present site in Thame, where it is primarily used for visual photometry of variable stars for the Variable Star Section. It was because of this work that Calver's original secondary mirror has been replaced by a flat large enough to yield an evenly illuminated unvignetted field of view of ½ degree. Calver's flat produces a central obstruction of 19% of the aperture, but only a small unvignetted field as it does not 'catch' peripheral rays much off the optical axis. Because the apparent angular distance between a variable star and its comparison stars can be, say, 20 minutes of arc it is important that the telescope's focal plane is evenly illuminated over that range. The new mirror gives a central obstruction of just under 25%.

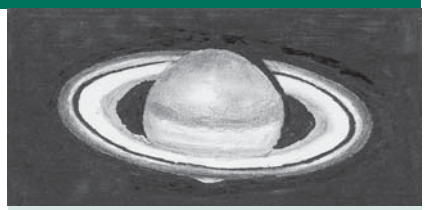
For practical purposes any central obstruction under 20% does not degrade the Airy disc sufficiently to compromise performance on imaging the Moon and planets (the main use for which Calver designed the telescope?), so the excellent on-axis performance of Calver's mirror set has been compromised in favour of better off-axis photometric performance (coma notwithstanding). Nevertheless, the performance on extended images is very good (the plate glass primary, refigured by John Mathers, is superb) especially when using a binocular viewer. There is little doubt that two eyes are better than one for observing the Moon and planets and that sharing a telescope's light between both eyes greatly enhances one's ability to see fine detail. In fact the views are breathtaking.

Apart from the modifications previously described I have sought to maintain the telescope as it was when it came into my hands. However, the original rack and pinion focuser has been replaced with a 2 inch drawtube by Henry Irving. This allows for the use of equipment requiring that size. I have not installed a modern drive system (e.g. an AWR GOTO) because the one by Will Hay or Dr R. M. Fry, the previous observer, still works well.

At its previous modestly dark site west of Oxford the limiting visual magnitude with the telescope was between 15 and 15.5. In a truly dark site one could expect to see significantly fainter with it. The present site is on the south edge of Thame overlooking open country to the south. When first set up the limiting visual magnitude it yielded was fainter than 15, but light pollution has subsequently grown and the limit now is 14.5 to around 15.

It is good to observe with this venerable telescope under a starry sky. It has a 'presence' that befits amateur astronomy and it is a fine link to the admirable past members of our Association. It is still sheltered in the roll-off roof observatory built by the previous observer some 70 years ago. The telescope is massive enough to allow one to use it in a gale of wind without much trouble, apart from awful seeing – though this little affects variable star estimates.

It is of interest that this Calver telescope is almost identical with P. B. Molesworth's which is illustrated in the 1997 October *Journal*,[2] and more versatile than Walter Goodacre's 1910 model which was built for a single latitude. That Calver has also now been 'rescued' and restored. It is set up in a new observatory (to be named the Walter Goodacre Memorial Observatory) in Norfolk where the skies are truly dark.



Saturn on 2005 March 03 drawn using the Thame instrument. 21:30 UT, 32cm spec. ×360, seeing IV Ant. *R. Paterson.*

So the Hay Steavenson telescope is still going strong at 110 years of age and is as effective as ever. It only remains to ensure a long and productive future for it. Its links to distinguished past members of our Association necessitate this. Perhaps it too will in due course be established in its own memorial, possibly public, observatory for amateur use in perpetuity.

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1 *J. Brit. Astron. Assoc.*, **85**(5), 412 (1975)
2 *J. Brit. Astron. Assoc.*, **107**(5), 240 (1997)

Robert Burns and the aurora

From Mr John Farquharson

Further to Ron Livesey's letter[1] regarding Robert Burns and the aurora, another mention of this phenomenon is found in his ballad 'As I stood by yon roofless tower' (1794). The 'roofless tower' refers to Lincluden Abbey on the banks of the River Nith, north of Dumfries.

The cauld blae North was streaming forth
Her lights, wi hissing, eerie din:
Athort the lift they start and shift,
Like Fortune's favours, tint as win.

[cauld: cold; blae: blue; Athort: athwart, across; lift: sky, horizon; tint as win: lost as gained.][2]

The Burns canon contains many astronomical references and it is apparent that he had a considerable knowledge of the subject.

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1 Livesey R. J., *J. Brit. Astron. Assoc.*, **115**(5), 295 (2005)
2 Mackay James A. (ed.), *Robert Burns, the complete poetical works*, Alloway Publishing, Ayrshire, 1993

Pluto finder chart in the 2006 *Handbook*

From Mr Nick James

Terry Moseley has pointed out that the limiting magnitude of the chart on page 77 of the 2006 *Handbook* is around 13.3 rather than the 15.5 stated. This is because the source catalogue used has a significantly brighter than normal cutoff limit in this part of the sky.

Observers should note that Pluto will therefore be fainter than the limiting magnitude of the chart, and that an unambiguous identification will only be possible by confirming motion from night to night.

Apologies, and I will make sure that I use a better catalogue next year.

Nick James

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