Mercury & Venus Section

Venus near inferior conjunction, 2007

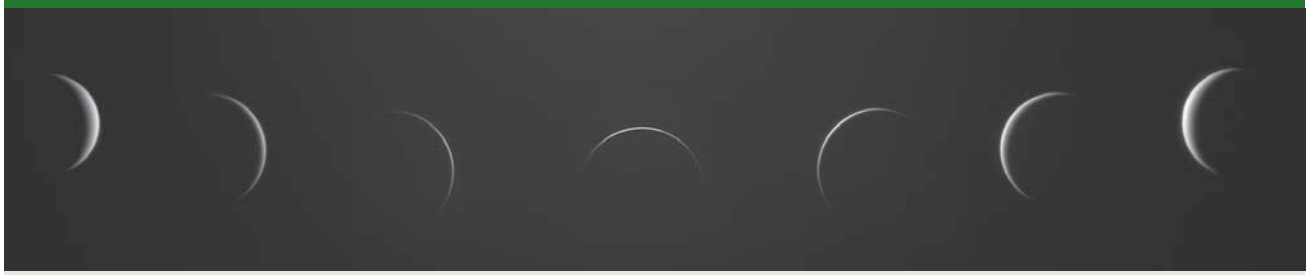

Figure 1. Venus at inferior conjunction, 2007 July 25 to September 8. A composite of 7 separate images, taken with a C9.25 at f/30 and a SKYnyx 2.0 CCD camera, *A.van Kranenburg*. North is up.

The Section received many observations of Venus during the E (evening) and W (morning) elongations of 2007. Colour filter work was discussed in the last Venus note (*Journal*, **117**(5), 229–230 (2007)), and here we report upon some of the data obtained near the inferior conjunction (IC) of 2007 August.

Cusp extensions

The Director has often followed Venus near IC in previous years, and had seen very long extensions of the cusps (or horns) to about 270°, but never the full circle. In 2007 I had better luck, a long run of fine days, and a 10cm Cooke refractor with accurate setting circles to hand. From July 28 onward I found slight extensions of both horns, and the crescent extended to about 225° on August 5, to 270° on Aug 9 and to 300° on Aug 11. In the last three observations the S. horn was by far the most extended one, an impression confirmed by Gianluigi Adamoli (Verona, Italy, 24cm SCT) on July 31 and Aug 12. On Aug 13 the Director repeatedly had the impression that the horns extended to a full circle, though the last quarter-circle was very faint. The best views were had with a very low power, ×40–120. The clarity of the sky greatly helped: the smallest amount of sunlit haze will blot out any extensions and moreover will make the field of view painfully bright in the vicinity of the Sun. Of course, one must always take care with finding the planet by offsetting from the Sun, a point often discussed in the *Journal*. Cusp extensions at the E elongation were also reported by David Fisher and Ian Hancock.

Venus reached IC on Aug 18, and Elias Chasiotis (Markopoulo, Greece, 28cm SCT) caught the planet on the same day, his image showing small cusp extensions. On Aug 23 Mario Frassati (Crescentino, Italy, 20cm SCT) also found small extensions. A collage by Arnaud van Kranenburg (Vlaardingen, Netherlands, 23cm SCT) beautifully shows the change in position angle of the direction of the crescent about IC: see Figure 1.

Nightside thermal emission

Just after IC, there was some successful imaging of the infrared thermal emission from the night side. Van Kranenburg used a filter passing IR wavelengths longer than 990nm to capture it on September 13, 14 and 16 (Figure 2), thereby joining the very select group of those who have achieved this feat. David Arditti's comments from Sept 25 (see below) are also pertinent. See the 2004 and 1999–2006 Section Reports (*Journal*, **117**(2), 65–76 (2006) and **118**(3), 131–144 (2008)) for a full discussion of the earlier work. Thermal emission is, however, a different phenomenon from the Ashen Light, which we must now discuss.

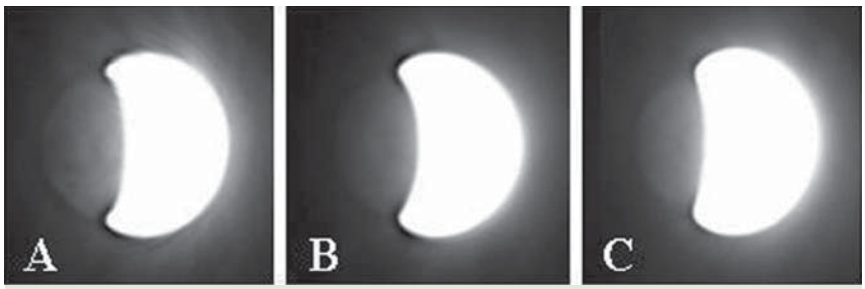

Figure 2. Overexposed infrared images of Venus showing thermal emission from the nightside, *A.van Kranenburg*. Equipment as in Figure 1, with Asahi 990nm long-pass filter. Each image was obtained between *ca*. 03:30m and 05:00, and was composed of 5–7 separate stacks of 150 images each. Each stack was recorded at a different camera angle to cancel out optical effects due to glare from the dayside. Some surface details are visible, but the observer warns that they may not be entirely real. South is up. **A.** 2007 Sept 13; **B.** 2007 Sept 14; **C.** 2007 Sept 16.

Ashen Light

The Ashen Light (AL), recently discussed by Patrick Moore and the writer (*Journal*, **117**(5), 265–272 (2007)) requires a nearly dark sky for its detection, and therefore a good eastern or western horizon. There were no definite reports of the AL at the E elongation, but because the planet was nearly 8° south of the Sun at IC, it could not be observed against a dark enough sky, at least not from the UK. By late September, Venus was well north of the Sun, and could be observed fairly high up against a dark pre-dawn sky.

In 2007 September and October, David Gray (42cm Dall–Kirkham Cass.) reported the AL on several occasions. On Sept 23 Gray observed at 05h 10m UT with the planet quite high, seeing very good and the sky fairly dark. Of the dark hemisphere he wrote: 'Nothing definite was noticed until the W22 filter was applied... Some patchiness was apparent... I combined the Baader Neodymium with the W22, and this made the features much more definite.' The patches moved with the planet when the latter was moved about the field of view, and as shown in Figure 3A, the patches were lighter areas against the faint general illumination of the dark side.

Arnaud van Kranenburg imaged the planet in visible, UV and near-IR wavebands at 05h 40m as the sky was brightening, and in poorer seeing. No sign of the AL was registered, but the observations need not contradict Gray's as the observer did not attempt to overexpose the crescent. A daylight UV image was also received from Gabriele & Jörg Ackermann (Zaberfeld-Michelbach, Germany, 18cm Mak-Cass). Detlev Niechoy (Göttingen, Germany, 20cm SCT) observed in daylight and reported nothing, but in fact on Sept 17 and 19 he had already recorded strong impressions of the AL against a dark

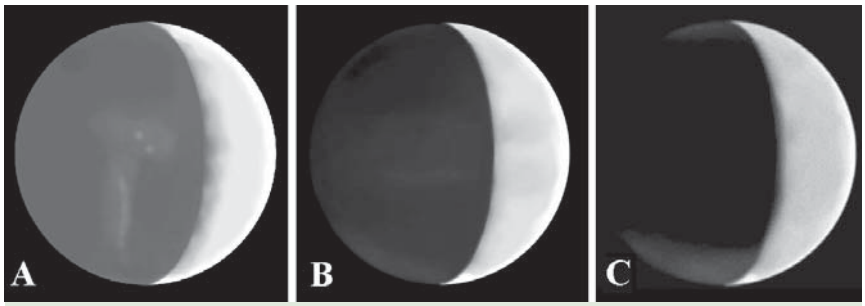

Figure 3. Drawings to show the Ashen Light as observed visually with a 415mm Dall–Kirkham Cass., ×365, W22 filter (with W23A in C), *D.Gray*. South is up.
A. 2007 Sept 23d 05h 10m; **B.** 2007 Sept 26d 05h 00m; **C.** 2007 Oct 7d 05h 20m.

sky. He secured another positive observation on Sept 24.

The Director issued an email alert on the very day of Gray's observation. There was a good response. David Arditti on Sept 25 observed visually (36cm Schmidt–Cass.) with a negative result, but adds: 'I then did another of my experiments in severely overexposing the planet in the IR. I have tried this at 807nm before, and got negative results on the night side, but this is the first time I have used so large an aperture as the C-14. I imaged at f/11. Subjecting this image to a substantial and careful levels stretch in Photoshop, it seems to me that the night side glow may just about be detected. This has been demonstrated before with 1000nm and 990nm filters, where the effect seems to be much more visible. It may be faintly present at 807nm as well, but it is not clear... I doubt the connection between the visual Ashen Light reports and the IR images of the night side. These images require extreme processing to produce, and the gap between the wavelength region they use, 800–1000nm, and the visible, is very large. All attempts to image the night side at wavelengths closer to the visual have failed, and, the thermal glow effect, if it exists at all, is seen to be excessively weak even at 807nm, which is still well beyond the visible.' On the same morning Chris Hooker (20cm Mak–Cass.) also took overexposed filter images (red, green and infrared) against a dark sky but in poor seeing, with negative results.

On Sept 26 to Gray (Figure 3B) under similar conditions the dark hemisphere was much fainter: nonetheless, lighter local structures were evident, at the limit of vision, in the form of two diffuse horizontal streaks. The effect was seen both with a single eyepiece and with a binocular viewer. Alan Heath observed visually about half an hour later and did not detect the AL, whilst the Ackermanns contributed a UV image taken at 06:55m UT, by which time the sky was too light. On Sept 30 to Gray (Figure 3C) the dark side was merely suspected for the most part, but diffuse light patches were seen near the cusps. A brief view on Oct 7 suggested two faint horizontal streaks, suspected both with and without an occulting bar. UV images by Ralf Vandebergh (Wittem, Netherlands, 25cm refl.) at 06:10 UT do not show anything on the darkside, and Niechoy saw nothing in daylight. Niechoy again recorded positive impressions of the AL upon dark skies on Oct 8, 10, 15, 17 and 20. On Oct 10, however, under very good conditions at 05:20–05:35 UT, Gray saw no trace of AL, marking the only slight disagreement within these runs of observations. On Oct 10, Niechoy had observed shortly before 04:00 UT.

As we have seen with the imaging data, most of the CCD/webcam images were taken in full daylight, when the diffuse scattering of sunlight by the foreground sky would swamp any trace of the feeble glow of the AL.

In conclusion, I would urge all of our image-makers to catch Venus upon a *dark* sky. Our visual observers too should observe the crescent as often as possible. The elongations of 2009 will offer a very good opportunity of adding to our knowledge of this elusive phenomenon. Until the Section has concrete negative evidence, the question of the Ashen Light will remain an open one.

Richard McKim, *Director*