

# Limb projections on Saturn

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We present two unusual observations of Saturn recorded during the early years of the twentieth century.

While JS was carrying out research into the life of Thomas Hinsley Astbury (1858–1922; Figure 1), an unusual observation came to light that Astbury made of Saturn during the lunar occultation on 1900 September 3, which might be of interest to readers, especially planetary observers.<sup>1</sup>

The eagle-eyed Astbury, best known for his variable star discoveries, was observing from his home in Wallingford, Oxon, using his 3¼ inch (8.3cm) Wray refractor ×80. Conditions were as good as they could be considering that the planet was in Sagittarius, thus at a low elevation, and at the time of the observation he noted ‘definition was perfect’. As he peered at the planet as the occultation proceeded, he could see the Cassini division and the shadow of the planet on the rings quite clearly and steadily, but he was not prepared for what he saw next. In his own words, from his report



**Figure 1.** Thomas Hinsley Astbury (1858–1922). Courtesy Tracey Wernham Clark & Emma Anderson

published in the *BAA Journal*:<sup>2</sup>

‘The first indication of anything unusual was a very small, but distinct, prominence just round the bend of the W. ansae towards the S. edge of the ring, sharply defined and of the same brilliance itself. A steady look convinced me of its reality, and I watched as it quickly decreased and vanished, just as the moon’s dark limb was seen encroaching upon the outer ring, having lasted almost four or five seconds. It was situated some distance from the point of first contact, and its altitude was rather less than the distance across the outer ring at the point where it appeared.’

He went on to note that ‘It is, of course, very easy to dismiss the question as an optical illusion; but I have never witnessed anything of the kind before, though I have observed Saturn some scores of times with the same instrument.’

Four years later, and still perplexed by his observation, he wrote a further letter to the *Journal*.<sup>3</sup> ‘I have just been reading’, he wrote, ‘that in 1876 Prof Newcomb watched the occultation of Saturn’ for possible effects indicative of a thin lunar atmosphere. Could it thus be, Astbury wondered, that differential refraction by this atmosphere as Saturn approached the limb of the Moon, the

## ► The Amateur’s Moon: continued from previous page

22 *ibid.*, pp. 9–10

23 *ibid.*, pp. 24–26

24 *ibid.*, p. 22

25 W. Goodacre, *The Moon, with a description of its surface formations*, Bournemouth, 1931

26 W. Goodacre, ‘Fauth’s New Moon Charts’, *J. Brit. Astron. Assoc.*, **43**(5), 212 (1933)

27 The intriguing story of Barker’s Circle has been recounted recently by Richard McKim in his paper ‘Barker’s Circle: a 1930s BAA lunar observing group’, *J. Brit. Astron. Assoc.*, **123**(1), 20–32 (2013). I am very grateful to Dr McKim, for his researches have resulted in the Barker’s Circle papers being deposited in the Lunar Section archive, and I have drawn on them for following paragraphs of this address.

28 W. Goodacre, Letter to L. F. Ball, 1937 Oct 11. BAA Lunar Section archive

29 Circular from Barker to members of his Circle (undated, but late 1937). Held with L. F. Ball’s correspondence in the BAA Lunar Section archive.

30 *ibid.* Emley himself had conducted such forms of lunar observation, including albedo measurements of spots in Schickard and attempts to identify far-side ray craters on the basis of rays on the Moon’s limb.

31 See, for example, R. Barker, Letter to L. F. Ball, 1946 July 6, and H. P. Wilkins, Letter to L. F. Ball, 1946 Aug 9, both in the Lunar Section archive.

32 ‘Obituary: Hugh Percival Wilkins’, *J. Brit. Astron. Assoc.*, **70**(5), 238 (1960). See also P. A. Moore, Letter to L. F. Ball, 1949 Dec 7 (in the Lunar Section archive) and ‘The British Astronomical Association: the Second Fifty Years’, *Mem. Brit. Astron. Assoc.*, vol. **42**, part 2 (1990),

pp. 59–60.

33 Comments taken from a circular written by Barker to members of his Circle, dated 1934 April 14. A copy of the circular is preserved in the Lunar Section archive in one of E. F. Emley’s notebooks.

34 See Bill Leatherbarrow, ‘A Honeycombed Moon: O’Neill’s Bridge and other lunar arches and tunnels’, *J. Brit. Astron. Assoc.*, **122**(1), 42–48 (2012) and ‘Hugh Percival Wilkins, 1896–1960: an appreciation’, *J. Brit. Astron. Assoc.*, **120**(1), 39–42 (2010).

35 See, for example, W. K. Hartmann, ‘Discovery of multi-ring basins. Gestalt perception in planetary science’ in *Multi-ring basins: Formation and evolution; Proc. of the Lunar & Planetary Science Conference, Houston, TX, Nov 10–12, 1980*, ed. R. B. Merrill & P. H. Schultz, Pergamon Press, 1981, pp. 79–90.

36 Whitaker also authored a standard work on lunar nomenclature, *Mapping and Naming the Moon: A History of Lunar Cartography and Nomenclature*, Cambridge University Press, 1999. In 1982 he was awarded the Goodacre Medal of the BAA.

37 ‘Comment from the Director’, *The Moon*, vol. 5, no. 2 (1956 December), p. 26

38 G. Fielder, ‘The Future of the Lunar Section’, *The Moon*, vol. 7, no. 1 (1958 October), p. 3

39 See, for example, his monograph *Lunar Geology*, Lutterworth Press, 1965

40 F. H. Thornton, Letter to L. F. Ball, 1959 Nov 19, held in the Lunar Section archive.

41 An example would be Keith Abineri’s work on the measurement of the floor of the crater Schickard, using high-resolution *Orbiter* imagery.



**Figure 2.** Mentore Maggini (1890–1941). Courtesy the Library of INAF-Osservatorio Astronomico di Palermo, Italy

phenomenon sought by Newcomb, was the explanation for what he had seen in 1900? ‘At the point where the ‘flattened’ portion of the ring met the undistorted part,’ Astbury argued, ‘the different curvatures would produce an angle or protuberance, and it was doubtless the upper, *i.e.*, southern, of these which I saw and described as a prominence. Being altogether unprepared, and not having considered the form which distortion might be expected to assume, I did not look for the northern ‘prominence’; but this would probably have been much

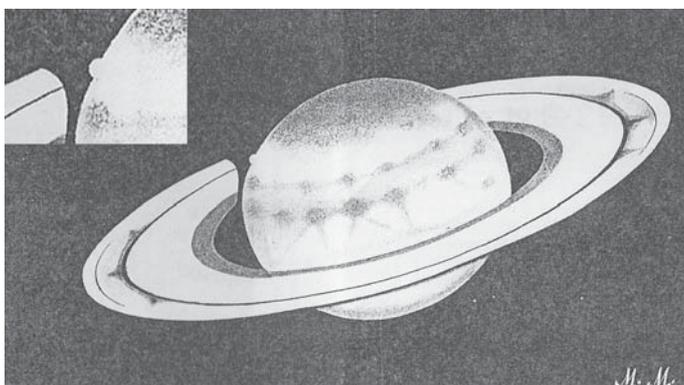
less conspicuous, owing to the obliquity with which the ring system was occulted by the moon’s limb.’

Of course we now know the Moon’s atmosphere is so tenuous that it could not cause such effects. So the question remains: what did Astbury observe? Was it a real effect, or simply an illusion? A. F. O’D. Alexander’s classic work *The Planet Saturn – A History of Observation, Theory and Discovery* makes no reference to the observation, but does refer to a phenomenon of similar characteristics reported by the twenty year old Italian astronomer Mentore Maggini (1890–1941; Figure 2).<sup>4</sup>

Maggini, then an assistant at the Osservatorio Ximeniano, Florence, a small observatory established in 1756 by the Jesuit Leonardo Ximenes (1716–1786), announced his observation in the *Astronomisches Nachrichten* of 1910 October 11<sup>5</sup> and published a full account in *Bulletin de la Société Astronomique de France* the following March.<sup>6</sup>

Observing Saturn on 1910 September 29 with a Calver reflector of 35cm aperture ×350 he noticed at the extremity of the south equatorial belt, a large bright area, and close by, highlighted by the planet’s shadow on the rings, a conspicuous luminous spot projecting from the west limb of the planet (Figure 3). No Saturnian satellite was in the vicinity at the time of the observation. The observation has never been fully explained.

‘Irradiating spots, diagonal wisps and straight streaks’, commented Alexander, ‘are more familiar features on Jupiter than on Saturn; the bright projection may have been a contrast effect



**Figure 3.** Maggini’s drawing of Saturn on 1910 September 29. The inset shows an expanded view of the region around the spot projecting from the west limb of the planet.

caused by the contiguity of the bright spot and the dark shadow.’<sup>7</sup>

A plausible if predictable supposition amply supported by the observational record of Venus and Mars. The eye is easily misled, and inference too readily subject to imagination. Even so other explanations cannot be excluded. The recent observations of impacts on Jupiter<sup>8</sup> have taught us to be more circumspect. Imperfect as the historical record is, in hindsight its anomalies occasionally prove surprisingly relevant and provide useful insights towards a better understanding of past effort, and present results. Importantly they remind us that (a) our predecessors were less fortunate in their equipment than ourselves and (b) that resolution is an evolutionary process dependent on technological progress, and on observers’ individual visual experience, the visual experience of their milieu, and expectations formed by previous visual models.

## Acknowledgments

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## References

- 1 A detailed biography of T. H. Astbury will appear in a future edition of this *Journal*: Shears J., *J. Brit. Astron. Assoc.*, accepted for publication (2012)
- 2 Astbury T. H., *J. Brit. Astron. Assoc.*, **11**, 35–36 (1900)
- 3 Astbury T. H., *J. Brit. Astron. Assoc.*, **15**, 40 (1904). The source of Astbury’s continued interest is to be found in D. P. Todd, *Astron. Nachr.* **90** (No. 2146), 159–160 (1877). Simon Newcomb (1835–1909) was primarily a theoretical astronomer. Not widely known is the fact he published *His Wisdom The Defender* (1900), a narrative that comes under the heading of futuristic fiction, in which he promulgates the use of aircraft to end war.
- 4 Alexander A. F. O’D., *The Planet Saturn: A History of Observation, Theory and Discovery*, (London: Faber and Faber 1962), 323–324
- 5 Maggini M., *Astron. Nachr.*, **186**, 79 (1910)
- 6 Maggini M., *BSAF*, March (1911)
- 7 Alexander, *op.cit.* [4], 324
- 8 Some 15 years after the bombardment of Jupiter by comet Shoemaker–Levy 9, which caused visible impact scars, a new impact scar appeared on 2009 July 19, discovered by Anthony Wesley from New South Wales, Australia. See: Rogers J., *J. Brit. Astron. Assoc.*, **119**, 235 (2009).

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