

John Herschel's astronomical observations from Bangalore

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John Herschel (1837–1921), the son of well-known astronomer Sir J. F. W. Herschel and grandson of William Herschel, carried out independent observations and left behind important observational records. Here, some of his little-known contributions are summarized in the context of observations from Bangalore, India.

Born in South Africa¹, where his father Sir John Herschel was engaged in observations of the southern celestial hemisphere, the younger John grew up with telescopes and participated in observations. He was one of twelve children².

Herschel joined the Great Trigonometric Survey of India and his interest in the skies continued. He carried out independent observations and spent the period 1864–72 in the survey in different parts of South India³. His work is well-documented and has received appreciation from peers – ‘Lieutenant John Herschel, whose scientific acquirements and business habits prove him worthy of the honored name he bears, has continued his investigations, and matured the mechanical applications of formulae required for the reduction of all geodetical figures...’.

Continuing the tradition of astronomical observations, the younger John did extensive observations of southern nebulae, apart from the solar prominences. Some aspects of the forgotten observations are discussed here.

The observations

His first report of telescopic observations⁴ appears to be during November 1868. The site is Bangalore Base South End. The small 4" telescope at his disposal perhaps was his own. ‘...I...had a look at the Nebula round Eta Argus. Had I known I could see it so early I should have tried sooner. It is now on the meridian (and therefore at an altitude of 20 degrees) at sunrise’. Subsequent observations on 22 and 23 were carried out using the 5" refractor from the Royal Astronomical Society (RAS); his hand-drawn sketches appear in the *Memoirs* of the RAS⁵.

The sky condition is documented as ‘... the altitude at times was about 15 degrees, ...the air was clear enough to have stars of the third magnitude within a degree of horizon roughly speaking...’.

Obliging to the demands of the duties, he undertook the task of measuring the latitudes of most of the towns in South

India along the 78 degree meridian. He moved to other parts of India and was in charge of the ‘Bombay Party’ till November 1869, after which Lieut. Rogers took over the charge from him.

Herschel cautions about the appearance of ‘ghost’ images seen through the telescope. ‘... which when first remarked was mistaken for a companion ...so exact is the resemblance that it was only by accident that the true explanation presented itself. ...the red companion which was to the right (i.e. North) at first was also on the right (i.e. South) after reversal proving that the cause lay in the telescope and not in the sky...’.

The aligning of the heavy transit instrument was a real problem. He found his own solution to the problem, ‘...requiring special care is that of raising the telescope and sectors and inserting the transverse axis. A weight of 180 lb has to be raised and supported by two men at a particular height while the axis is being passed through an intricate passage. Muscular or nervous failure on the part of the supporters during the critical minute, flurry or awkwardness on the part of the person guiding the axis, a slip, or accident of that kind might easily produce consequences which ought to be almost impossible... . On returning to quarters I constructed a gin by means of which the telescope & c., can be raised out of its box to the right height, and passed into its place with ease and certainty – if necessary by one person...’.

Herschel was one of the first to observe the sudden brightening of Eta Carina (which was called Eta Argus in those days). He reports that it reached naked eye visibility and has recorded the appearance of the nebula surrounding it. The report in the *Monthly Notices of the Royal Astronomical Society* (where he is referred to as Leut. Herschel) is followed by the report of his father (who is cited usually as Sir John Herschel), who has identified all the stars and the subsequent development of the nebula. Observations of nebulae other than Eta Carina are not

available completely. Only the second list is available, suggesting that a first list also existed.

The other important observation of John Herschel is that of the 1868 total solar eclipse, from Jamakhandi about 600 km north of Bangalore, along with Campbell. Although the Madras Observatory reports it with a single sentence as ‘the beginning of the event was clouded out...’, John has meticulously recorded⁶ the spectrum and identified the spectral lines. He writes, ‘The totality commenced unseen... I went to the finder, removed the dark glass and waited... . Soon the cloud hurried over revealing the scintillating corona.... Instantly I marked a prominence near the needle-point, an object so conspicuous. It was a long finger-like projection. Three vivid lines, red, orange, blue and no trace of continuous spectrum...’.

One of his interesting observations concerns the migrations of locusts; their huge number disturbed his observations in 1870. ‘Dark shadows crossing the sun...’, he wrote. This phenomenon attracted worldwide attention and the unusual increase of pests in that year has been cited globally⁷.

After the death of Sir John Herschel in 1871, the younger John returned to England as is evident from the correspondence with Sir Talbot⁸. Ill health and the responsibility of compiling the mammoth work of his father, grandfather and (grand) aunt seem to have diverted his attention from regular observations. His interests continued in developing telescope accessories⁹.

Other than the name of his wife Mary Cornwallis, no information on his family is available in the records. There is a mention of the daughter of John Herschel¹⁰ as a faculty in the Mathematics Department, perhaps in Oxford. It is quite likely that this may be a daughter of John (grand-daughter of Sir J. F. W. Herschel).

The obituary note of John Herschel mentions that he spent 30 years in India. But the letter to Sir Talbot (mentioned

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above) indicates that he returned to England in 1874. His further observations of astronomical events are not documented. The same is the case with his business during this period and stay (either in India or in England).

Thus it may be concluded that John Herschel recorded astronomical observations of star nebulae and of the sun from Bangalore. His task began even before unpacking and installing the tools of the surveyors, which included a telescope, on 24 and 25 November 1869. He was, therefore, the first to initiate such professional observations from Bangalore, which now hosts prestigious institutions actively engaged in astronomy and astrophysics.

1. Buttman, G., *The Shadow of the Telescope – A Biography of John Herschel*, Butterworth Press, 1974.

2. Mitchell, M., Reminiscences of the Herschels – Caroline Herschel. (<http://www.astr.ua.edu/4000WS/4000WS.html>)
3. Obituary Reports, *Observatory*, 1921, **lxxxii**, 250.
4. Lieut. Herschel and Sir Herschel, J., *Mon. Not. R. Astron. Soc.*, 1868, **28**, 82.
5. Lieut. Herschel, *Mon. Not. R. Astron. Soc.*, 1868, **28**, 87.
6. Herschel, J., *Proc. R. Soc. London*, 1868–1869, **17**, 103–125 (description of instruments; spectrum of prominence).
7. Reports, *Mon. Not. R. Astron. Soc.*, 1870, **30**, 135; reads ‘An unusual phenomenon was noticed by Lieut. Herschel, Oct. 17 and 18, 1870, while observing the Sun at Bangalore, India’.
8. www.foxtalbot.arts.ac.uk/letters/name.asp?namestring=Hers.Jc&target=460#2
9. Herschel, J., *Mon. Not. R. Astron. Soc.*, 1874, **34**, 396.
10. From the notebook. *Observatory*, 1921, **xliv**, 200; reads a comment on hearing that

‘a professor is engaged to marry’ ... ‘The professor of Maths is a beautiful girl of 26 ...she is a daughter of John Herschel, the astronomer and philosopher... Lady Stanley remarked ...it is no use having professors so young and pretty...’.

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