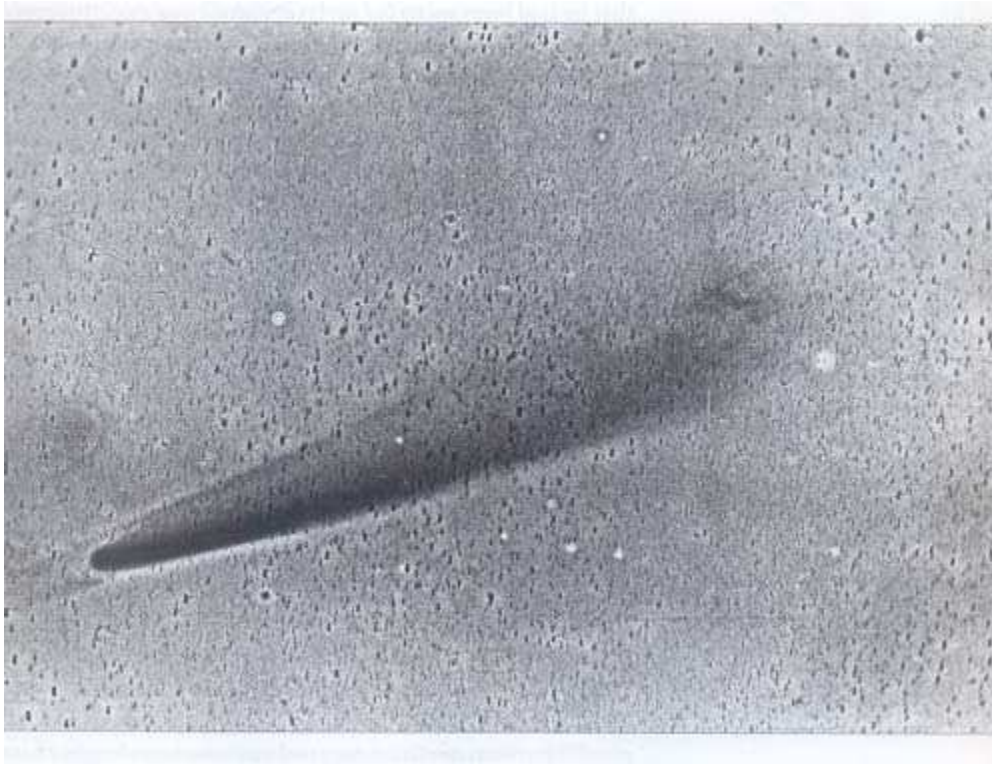


The Great September Comet of 1882 II (C\1882 R1) that Transited over the Sun - Pogson's Observations from Madras Observatory

The great comet of 1882 (designated as C\1882 R1) was one of the most brilliant Sun-grazing comets of the nineteenth century that launched a major astronomical project 'Carte du ciel' of photographing the sky (Gingerich 1992, Ashbroock 1961). The huge post-perihelion tail was concave towards south and shaped like the tusk of an elephant. 'Observing the comet with the naked eye at the seaside the whole tail took an hour to rise', exclaimed Nursing Row (1882) from Vizagapatam on October 7, 1882. The comet had many firsts to its credit: one of them being the display of anti-tail (or Sunward tail).



The comet was independently discovered by several observers in the southern hemisphere.



N. R. Pogson

Madras Observations:

The Madras observations were started by N. R. Pogson, then Director of Madras Observatory even before perihelion on 11th September 1882. Norman Robert Pogson was a well known observer, who established the magnitude scale that is used even today. He was a meticulous observer whose spectroscopic observations of the prominences at the 1868 total solar eclipse at Masulipatam contributed to the discovery of Helium. He had observed several comets earlier, a famous one being the rediscovery or recovery of the lost comet of Biela in 1872 (Pogson 1872).



Madras Observatory Building

Pogson used the 8-inch Troughton and Simms telescope for his observations. He started observing (may be independently) and measuring the position of the 'Upper or Eastern Nucleus' of the comet. Although no detailed account of the observations are available the above statement suggests that he observed more than one nucleus (the other nucleus being lower or western). He measured positions of the upper or eastern nucleus from September 11 onwards whenever the sky permitted him, using several comparison stars. These measurements (unpublished so far) are listed in the following table. On a few occasions he even gives the position of the end of the south tail (or long streak) and the centre of the end of the broad tail. (from which the length of the tail can be inferred). Sometimes he jots the length of the tail.

Nimbus Equatorial Observations, 1882 September 11.

Fraughton & Simms Equatorial Power 95

<i>Upper or Eastern Nucleus of Comet</i>				<i>Reduction</i>	
<i>t</i>	<i>h</i>	<i>z</i>	<i>π</i>	<i>z' 15'</i>	<i>z' 30'</i>
4 05 12	5 36 42	10 5 55	90 00 50	58 41	01
4 07 59	5 14 16	10 5 55	90 51 0	79 56	52020
4 09 44	5 14 15	10 5 59	90 51 01	80 00	009250
4 0 0	5 3 0	10 5 5	90 45 10	79 57	
				9.1220	7.4002
4) 205 51	55 3	206	5	9.1022	
4 02 12.95 -6.21	5 13 45.95 +16.05	10 5 52.5 +10.5	90 41 1 +1 0	90 57.5	
4 02 6.44 12 29 11.35 -4.75	5 14 2.6	10 5 9.0	90 42 4	99.26 79912 000.71	
				99.77	
19 20 29.9				0.0220 0.0145 2.0270	

Sample data sheet of September 11, 1882

Table 1. Measurement of positions of the upper nucleus of the comet 1882

Date	L.S.T h m s	L.M.T h m s	R.A h m s	N.P.D 0''
Sep				
11	4 52 6.44	17 28 29.9	10 06 9.0	90 42 04
16				
23	5 28 35.4	17 17 42.2	10 58 14.3	92 54 22
24	5 55 55.7	17 41 2.1	10 54 06.8	90 33 51
25	5 27 55.4	17 09 10.5	10 51 54.3	94 08 32
26	5 48 22.2	17 25 38.0	10 49 31.0	94 41 35
27	5 37 49.2	17 11 10.9	10 46 59.1	95 14 45.5
30	5 36 42.1	16 58 16.1	10 40 28.0	96 33 30

Oct				
4	5 43 5.9	16 48 55.3	10 33 21.05	98 44 04
8	6 29 25.7	17 19 23.9	10 28 43.6	100 28 43
16	6 06 1.75	16 24 36.5	10 17 51.4	104 00 6.5
17	6 51 31.3	10 1 29.8		
19	7 4 56			
24	6 54 39.5	(he did not fully reduce them)		

The observations cover up to November 1, 1882. On October 24, he comments that the comet was much fainter and its two nuclei often scarcely to be distinguished from the Coma and the dome stuck fast on opening it and the length of the comet's tail could not be measured. He clearly saw two nuclei.

The observations stopped after November 1. Pogson recorded that it was known that some comets split after perihelion.

Madras Equatorial Observations. 1872 October 24. Comet

Ring Micrometer on the Transposition of Images Equatorial. Power

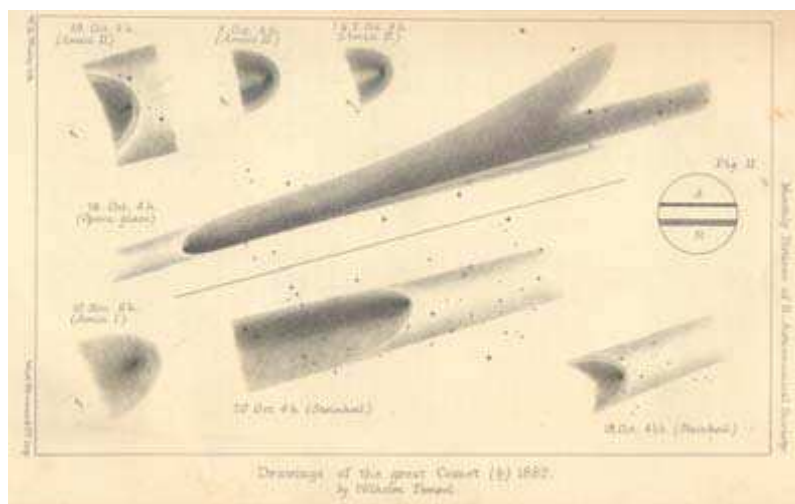
Object	Size	Entry	Inner Ring		Departure	Mark	Time	Circle	
			Entry	Departure				Outer	Inner

The comet was observed from the Madras Equatorial on Oct 24. It was seen at 6.54 AM. The comet was very faint and its two nuclei were scarcely to be distinguished from the Coma. The dome stuck fast on opening it and the length of the comet's tail could not be measured. He clearly saw two nuclei.

Star	1	21 43	16 48 55.3	10 33 21.05	98 44 04
Comet	24	6 54 39.5			

The Puzzle:

Pogson's records suggest that the Great Comet 1882 II had split even before perihelion. However David Gill of the Cape Observatory strongly asserts that it is not the case (Gill 1883). Writing in MNRAS Gill states, 'In reply to the question which you ask on behalf of the Society viz. whether before perihelion the Great Comet of 1882 showed a duplex or compound nucleus, the observations recorded by Mr. Finlay and Dr. Elkin on September 7 and 8 and printed in Monthly Notices prove clearly that no duplicity could be detected with our optical means on these dates. Dr. Elkin describes the nucleus as sharp, well defined disk 10" or 15" in diameter as strongly condensed in the centre. A short glimpse I obtained confirmed the view. ... weather was unfavourable till 17th, the day on which the disappearance of the comet on the sun's limb has been noted the nucleus was certainly single on that day'. Gill asserts that till September 28th the nucleus was single. However on September 30th the nucleus is seen to be split. It was remarked by Finlay there seems to be two balls of light in the head (of the comet). Drawings by Temple (1883) do show two bright nuclei on October 1 and 2.



Temple's drawings

Several observers had noticed multiple nuclei after 1st of October.

Regarding Pogson's observation: could the geographical separation between Madras and Cape Town offer a different line of sight to the comet displaying a different perspective? At a distance of 0.5 a.u a cometary object of 10 km can provide a disk of 8" that could in principle provide different facets to geographical locations separated by 6400 km. Could this be the probable cause? Pogson did not publish his observations. He also did not reduce some of these observations. The picture could have been clarified if drawings of the comet by him could be traced but none have been found.

Tailpiece:

Regarding the appearance of Comet 1882II Nursing Row (1883) mentions that 'Our Hindoo astronomers predicted the appearance of a comet in the southern hemisphere in their printed calendar for the present year. ... no other particulars except that it would possess a bright copper colour like the rising moon and a long tail. The name given to their predicted comet is Silpacam'.

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