

Madras Observatory : The beginning

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Received 1985 March 20; accepted 1985 April 15

Abstract. We present evidence to show that the Madras Observatory—to which Indian Institute of Astrophysics (IIA) traces its origin—was formed, and observations started, in the year 1786. We also discuss how the erroneous date of 1792 came to be generally accepted as the date of the formation of the observatory. We give chronology for the period 1786–1830.

Key words : Madras Observatory—Indian Institute of Astrophysics—history of astronomy

1. Introduction

It has generally been assumed that the Madras Observatory was set up in 1792. Thus, the administrative report¹ submitted on 1877 February 7 by N. R. Pogson, the Astronomer (as the Director was then called), to the Chief Secretary, of the Madras Government contains a brief history of the observatory which begins :

‘The Madras Observatory was instituted in the year 1792, Sir Charles Oakley Bart being then Governor of Fort St George, and Mr John Goldingham the first Astronomer. It originated from a small private Observatory, started in 1787, by Mr William Petrie, a scientific member of the Government, who upon his leaving India liberally presented his instruments to Government for use of the new Observatory’.

There is at the Indian Institute of Astrophysics (IIA)—which traces its origin back to the Madras Observatory—a manuscript volume² by John Goldingham containing a description of the observatory building, and his observations.

Very recently two manuscript volumes at IIA have come to light :

- (i) Manuscript Records 1794–1812 (referred to in the following as MSR)³;
- (ii) Manuscript Observations (MSO)⁴.

These manuscript volumes, which do not appear to have been examined before, contain copies of letters, office documents, and observations pertaining to the earliest years of the observatory. They permit a reasonable reconstruction of the history of the very early years of the observatory, clearing some misconceptions in the process. In this paper we discuss conclusions that can be drawn from the three manuscript volumes^{2–4}, taken together. Section 2 describes the formation of

observatory; section 3 the early instruments and observations; and section 4 the observatory buildings. Section 5 discusses how certain misconceptions regarding the setting up of the observatory could have arisen. Section 6 summarizes the results, and tabulates the history of the first 44 years of the Madras Observatory (1786–1830).

2. The formation

On 1804 September 4, William Petrie, an officer of the East India Company, submitted a long memorandum to Sir George Burlow, Governor of Madras, regarding the observatory. This memorandum provides glimpses of the observatory's history. Thus we read (MSR, p. 74)

'The Observatory was first established in 1786'.

Petrie's interest in the observatory becomes clear as we go on (MSR, p. 81) :

'I have thought it my duty to go into the foregoing detail to the Hon'ble Company who have so liberally patronized an Institution which I had the honor to begin...'

The main aim of the observatory, as Petrie explained in the memorandum (MSR, p. 76), was to provide navigational assistance to the company ships, and help determine the longitudes and latitudes of the company territories.

In a letter to the acting Astronomer written on 1810 February 15—twenty four years after the setting up of the observatory—Petrie recalled (MSR, p. 137)

'.....the following instruments were left by me when I delivered over the observatory to Mr Topping, the Company Astronomer, in 1789 for the use of the observatory when this establishment was kept up, viz. an astronomical clock by Shelton, a transit instrument by Stancliffe and 2 or 3 telescopes by Dollond'.

In his memorandum (MSR, p. 74), Petrie continued

'In 1790 the Astronomer's department was formed by the Court of Directors, and since that period it has continued to be a public office of record transmitting its annual operations to the Hon'ble Court and the Astronomer Royal'.

In 1794 the Astronomer, Topping, proposed to the Board of Revenue, Fort St George, the establishment of the post of Surveyor General, and the setting up of a school for training surveyors (MSR, p. 1). In a letter dated 1794 February 24, Topping suggested the appointment of a tutor to train the survey school students and wrote (MSR, p. 8).

'To this office (should be project meet with approbation) I take the liberty of recommending the Assistant Astronomer Mr Goldingham'.

Thus at least till 1794 Topping was the Astronomer. He was succeeded by John Goldingham who served as the astronomer till 1804 and then again for 1812–1830. For the period 1805–1811 when Goldingham was on leave to England, Capt. John Warren of 33rd Regiment on Foot was the acting Astronomer. Warren was appointed on Petrie's recommendation (MSR, p. 76). Warren would have liked to continue as a Director of Madras Observatory, but the Court of Directors of the East India Company turned him down. They wanted a Company officer to be the Astronomer, and asked for Warren's removal when Goldingham returned or even if he resigned (ref. 4a).

During his first phase of directorship, Goldingham was also the civil engineer. But when on 1811 March 30, East India Company permitted him, following his application, 'to return to Madras to resume charge of the observatory', he was expressly told in a letter dated 1811 March 30 by W. Ramsden, Secretary, East India House (MSR, p. 195) 'that you are not to interfere with the Engineer Department in any manner whatever'.

It is not clear when Goldingham took office. Topping was appointed Chief Surveyor of Bengal in 1794 (ref. 5, p. 7) but he did participate in observations in 1795 (section 3). But then it was not uncommon for Company officers to hold concurrent positions.

Interestingly, even in 1808, barely 21 years after the establishment of the observatory, and 18 years after taking it over, the East India Company was thinking of abolishing the observatory for reasons of economy. In his memorandum referred to above Petrie argued—apparently successfully—for the restoration of the observatory, but added (MSR, p. 82)

'Should unfortunately the immediate abolition of the Establishment be determined upon, I shall think it incumbent upon me to take under my immediate charge the useful and valuable instruments which I had the honor to present to my revered Employers'.

3. Instruments and observations

The original instruments of the observatory were the ones donated by William Petrie : (i) a clock by Shelton; (ii) 20 inch transit instrument by Stancliffe; (iii) a quadrant by Bird; (iv) three identical achromatic telescopes by Dollond, of $2\frac{3}{4}$ inches aperture and $3\frac{1}{2}$ ft focus.

The eight-day gridiron pendulum clock by John Shelton, London, remained at Madras till 1900 when it was shifted to the Kodaikanal Observatory (now IIA Kodaikanal) where it still is, and in use.

To the Petrie instruments were added various small telescopes, sextants, and chronometers which had been brought by the East India Company ships and officers, and were lying scattered at different places. It was not uncommon for the Company officers to give away to the observatory instruments they did not require any more, or to borrow from the observatory if need be. Thus a sextant was left at the observatory in 1808 by an anonymous caller; and a Dollond telescope—one of the Petrie's three—was returned to the observatory without a word (MSR, p. 154).

In or before 1792, the observatory acquired a 12 inch diameter circular instrument (altazimuth) by Troughton 'similar to that lately contrived by Mr Ramsden²' which was installed in the new building (section 4). Goldingham himself purchased a portable transit by Ramsden which he gifted to the observatory in 1804 when he left for England for seven years.

The Observatory had in addition to the Shelton clock two other clocks, by Haswall (also written as Hoswell), and by Monk. Also the observatory could borrow a zenith sector from Major Lambton's trigonometrical survey, when required (MSR, p. 78; ref. 6).

Also not only the Company ships but also country vessels could leave their chronometers at the observatory and get them checked free of charge (MSR, p. 80).

We learn about the earliest observations from the two papers⁶ Goldingham published in *Philosophical Transactions of the Royal Society* 1822, pp. 408–430; 431–436, entitled

‘Of the geographical situation of the three Presidencies, Calcutta, Madras, and Bombay, in the East Indies’.

‘Of the difference of longitudes found by chronometer, and by correspondent eclipses of the satellites of Jupiter; with some supplementary information relative to Madras, Bombay, and Canton; as also the latitude and longitude of Point de Gaulle and the Friar’s Hood’.

(Records of observations which went into these papers are contained in MSO).

The earliest observations used in these papers were made in the period 1787–1792. Longitudes were calculated by observing eclipses of Jupiter’s satellites at Madras (1787–1792), Calcutta (1787), Coringa (1790), Tranquebar (1789–1790), Masulipatnam (1790), and Bombay (1791).

The Calcutta, Coringa, and Tranquebar observations (1787–1790) were made by Topping, whereas the Bombay observations were made by Goldingham in 1791 on his way from England to Madras. Understandably the older observations are by Topping. The Madras observations (1787–1792) were made by either two or three observers using identical Dollond telescopes⁶. Goldingham does not name the Madras observers, but apparently pre-1791 observations cannot be by him.

Longitudes were also estimated by lunar observations, about 800 of which were made between 1787 and 1792. The observers were William Petrie, Topping, and Goldingham⁶. Thus Petrie who founded the observatory was also an observer.

Although the two Goldingham papers⁶ refer to observations made at the observatory as early as 1787, these are not the oldest observations on record.

The oldest observations on record pertain to 1786, the year of the foundation of the observatory, and are recorded in the Manuscript Observations (MSO, p. 164). On 1786 December 5 the longitude and latitude of Masulipatnam Fort Flagstaff were estimated. The longitude was measured by timing the immersion of the second satellite of Jupiter; the value obtained being $81 : 2$. The latitude measured ‘by means of 6 sets was $16^{\circ} : 10 : 16''$, Reduced to the Flagstaff $16 : 7 : 56$.’

The longitude of Masulipatnam was again measured in 1794 and 1795 by observing the correspondent eclipses of the satellites of Jupiter at Madras and Masulipatnam, Goldingham and Topping being the respective observers⁸. Thus Topping was observing as late as 1795 (section 2).

4. Buildings

The observatory buildings are described in an inventory of the observatory property, dated 1812 April 1, made at the time of John Goldingham’s resuming charge (MSR, p. 194) :

‘The Observatory buildings, the observatory, the residence of the astronomer (detached), and offices.’

The 1811 description of the buildings (MSR, p. 181) mentions

- (i) The Observatory buildings which contains [sic] the books and instruments and to whose meridian everything is reduced.
- (ii) An upstairs dwelling house.

We find the description of observatory buildings in a volume⁷ published in 1887 entitled 'Results of Observations of the Fixed Stars made with the Meridian Circle at the Government Observatory Madras in the years 1862, 1863, and 1864 under the direction of Norman Robert Pogson' :

'These [buildings] consist of two blocks; one comprising the old Observatory; the other the residence of the Astronomer..... The original Observatory, built in 1792, consisted of a single room.....'

'The house, originally provided for the Astronomer's use only, is a still older and substantial building than the observatory proper..... Library occupies two rooms on the ground floor... .. A granite step of the north-east door of the Library is bench mark of the Great Trigonometric Survey of India.....'

Explicit reference to longitudes being reckoned from the Astronomer's house is available in the records^{4b} of observations (preserved at Royal Greenwich observatory) made in 1787 by Major Huddart, an officer of the East India Company :

By 3 immersions and remersions of 1st and 2nd satellites being corresponding ones, observed at Calcutta and at *Mr. Petrie's house* at Madras the difference of the meridians is $32^{\circ}.12''.6$ of time. Madras being W. Diff. of meridians of *Mr. Petrie's house* at Madras and Greenwich is $5^{\text{h}}.53'20'' - 32^{\circ}12''.6 = 5^{\text{h}}.21'.7''.4$ or in degrees $80^{\circ}.16'.51''$.

That the reference meridian is associated with the older building and not the 1792 building proves that the observatory is older than the new building.

Reference to older observations is also made in Goldingham's preface dated 1794 February 18 to his 1793-94 observations (ref. 2)

'The two last pages [now missing] contain a statement of the results of a great number of lunar observations; corresponding eclipses of the satellites of Jupiter &c &c made either in the former observatory (Mr Petrie's) or at other established stations'.

We read in the 1878 book 'A Memoir on Indian Surveys' by C. R. Markham (ref. 5, p. 64)

'The fixed position or point of departure of the Trigonometrical Survey of India is the Madras Observatory.... Observations had been taken since 1787; but the building was erected in 1792'.

We have however seen that observations made as early as 1786 are on record.

5. Missing manuscripts and misconceptions

The construction of the new building was supervised by the assistant Astronomer John Goldingham, who wrote in his own handwriting a description of the construction and the building. The Astronomer, Michael Topping, also prepared a manuscript volume describing the observatory and the instruments.

The 1812 inventory of the Observatory property referred to above mentions among others the following manuscripts (MSR, p. 180) :

- (i) Topping's astronomical observations and description of the observatory;
- (ii) Observations by Topping from 1789 included in the book of observations of 1798;
- (iii) Marble covered books of observations from 1788 and surveying journal by Topping (4 books);
- (iv) Description of various instruments by Topping;
- (v) Book of levels of Topping;
- (vi) Mr Topping's observations on the seacoast;
- (vii) Topping's log book in 1785, 89, 90, 93;

- (viii) Book of views of Topping;
- (ix) Goldingham's field books of the coast north of Madras;
- (x) Log book 1790;
- (xi) Description of the observatory by Goldingham;
- (xii) Observatory correspondence from 1794-1811;
- (xiii) Astronomical observations.

Of all these only the last three volumes have survived so that the only contemporary account extant has been the one Goldingham wrote about the 1792 building. The first ten and the last few pages of this volume have been missing—since when cannot be ascertained.

Apparently dependence on this account, and on the plaque in the observatory building which recorded year 1792, has led to the belief that he was the first astronomer, and 1792 the year of the start of the observatory.

The description of the observatory shows an interesting evolution with time. As we move away from the actual event, inaccuracies creep in.

In his preface to 'Result of astronomical observations made at the honorable the East India Company's Observatory at Madras' volume 1, Madras, 1832, Thomas Glanville Taylor, Goldingham's successor, cautiously wrote (ref. 8, p. ii)

'The Observatory as it at present stands was built in the year 1792'.

This implies a pre-1792 history.

The obituary of Goldingham (d. 1849) published in the *Monthly Notices of Royal Astronomical Society* (ref. 9) says

'Johan Goldingham is known to science by his long occupation of the post of Astronomer at Madras'

This does not say that Goldingham was the first Astronomer. The 1878 volume 'A Memoir on the Indian Surveys' by Clements R. Markham (ref. 5) contradicts itself. It says on p. 64 :

'Mr Goldingham, who seems to have succeeded Michael Topping, was the Madras astronomer.....'

But on p. 328, we find

'Mr John Goldingham was the first astronomer'.

We have already quoted Pogson as saying in his 1877 administrative report that the observatory was instituted in 1792, and Goldingham was the first Astronomer. In the same report Pogson talks about 'Mr Goldingham's long tenure of the office extending over a period of 38 years 1792-1830'. This is certainly incorrect. We have seen that in 1794 Goldingham was the assistant Astronomer, and was on leave for the period 1805-1811 when John Warren officiated.

Pogson's successor C. Michie Smith calling 1892 the centenary of the founding of the Madras Observatory wrote in his report dated 1892 May 23 (ref. 1)

'The East India Company having resolved to establish an observatory at Madras....., Sir Charles Oakley... anticipating the order from the India House, carried out the design under his own authority, so that when the actual orders arrived in 1792 the observatory was already built'.

Michie Smith goes on to write

'....., but it does not appear how he [Michael Topping] came to be the architect of this building'

Apparently by 1892 memory of Michael Topping who was the Astronomer from 1789 till at least 1794 had been obliterated, and the first six years of the observatory 1786–1791 washed out.

6. Conclusions

We have shown that the Madras Observatory was functional in the year 1786. It was taken over by the East India Company in 1789, with Michael Topping as the Company Astronomer. Thus 1792 is neither the year of the establishment of the observatory, nor the year of its being taken over by the Company. The significance of the year 1792 is merely that the observatory building was completed in that year. Table 1 summarizes the chronology of the early years.

Table 1. Madras Observatory 1786–1830

1786	:	Observatory set up by William Petrie, and observations started.
1789	:	Observatory taken over by East India Company, and Michael Topping appointed Astronomer.
1792	:	Observatory building constructed.
?	:	John Goldingham succeeded Michael Topping.
1805–11	:	Capt. John Warren officiated as acting Astronomer.
1812–30	:	Goldingham again the Astronomer.

Acknowledgements

I wish to thank Dr J. C. Bhattacharyya who suggested that I take up the study of the history of the Indian Institute of Astrophysics, and provided all help. Mr K. S. Balasubramaniam was of immense help. Messrs Aleem, Chokalingam Irulappan, Krishnamurthy, and Elangovn gave valuable assistance. I thank Mrs M. I. Morris for giving me a copy of a letter from her personal collection, and permission to use it. I thank Miss J. Dudley, Librarian and Archivist, Royal Greenwich Observatory for scanning the archives for me.

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