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New Discoveries of Astronomical Science in Madras Presidency during Eighteenth and Nineteenth Centuries

Dr. Priya Kurian

Assistant Professor & Head, Department of History, Mar Thoma College for Women, Perumbavoor, India

Abstract:

The foundation of modern science in India was laid by the Europeans. They introduced the scientific knowledge of the west and brought contemporary science to India. This changed the situation in India and led to an intellectual awakening particularly from the nineteenth century. The British rule in particular marked the beginning of a scientific revival in India.

The Madras observatory participated in observations and discovery of new planets, minor planets and comets especially when such are invisible to European astronomers. Researches upon the variable stars, several new ones having been discovered, the usual attention to all casual phenomena, such as eclipses, transits, occultation's, etc. These were the eclipses that established the foundations of astrophysics and especially of solar physics. In these observations the Madras observatory's contributions were most significant.

Thus the observatory has rendered valuable services to the Growth of Astronomical Sciences. Its work in various discoveries was innumerable. It can also be said that the growth of this science was at peak of new discoveries in the eighteenth and nineteenth centuries.

1. Introduction

Astronomy is the oldest scientific discipline human kind has known which is the eye of the sciences. Ever since man learnt to walk upright, he has looked at the skies and wondered. His desire to understand the cosmic environment and put this understanding to practical use led to the development of astronomy.

Astronomy being the main branch of Indian scientific tradition, received wider attention from the western adventurers in the eighteenth and nineteenth centuries.ⁱ This science deals with planets and their satellites, including the earth and moon, with comets and meteors, with the sun, the stars and clusters of stars, with the interstellar gas and dust, with the system of the milky way and the other galaxies that lie beyond the milky way.ⁱⁱ

The most comprehensive of the sciences, astronomy is also regarded as the oldest of all and is rightly called the Queen of all Sciences.ⁱⁱⁱ

2. Under the East Indian Company

The foundation of modern science in India was laid by the Europeans. They introduced the scientific knowledge of the west and brought contemporary science to India. This changed the situation in India and led to an intellectual awakening particularly from the nineteenth century. The British rule in particular marked the beginning of a scientific revival in India.

The study of astronomy and allied sciences regained importance in India with the establishment and general expansion of the suzerainty of the East India Company. Thomas Deane Pearse (1741-89) of the Bengal artillery undertook a series of observations of latitudes and longitudes from 1774 to 1779 and again from 1781 to 1784 during his marches to and from Madras in the Mysore war.^{iv}

Nothing however was done until 1786, when Sir Archibald Campbell, Governor of Fort St. George (1786-89) ordered an astronomical survey. In September 1787 he informed the council that he had, in the previous November engaged Michael Topping, 'a person of very considerable mathematical and geographical knowledge, 'to fix the latitude and longitude of the principal coast stations north of Masulipatnam. The observation made by Topping during his overland journey to Calcutta were submitted, and the council resolved that he should prosecute his work southward to Cape Comorin, and after determining the exact coast line, ascertain the position of the principal places in the Carnatic. Topping began the Southern Survey in 1788, and secured the services of John Goldingham to make correspondent observations at Madras.^v

3. Reasons for the Development of Astronomical Sciences

The motive behind the British to develop astronomical sciences was their commercial interest and political ambition and also 'for promoting the knowledge of astronomy, geography and navigation in India and to know the latitude and longitude of India to expand their territories'.^{vi}

The main reason for showing an accurate interest in astronomy is that, the authorities of the company found it necessary to prepare accurate maps of the territory under their control and of the sub continent in general and to expand their territories. This required accurate determination of longitudes and latitudes of important places. The longitude of the Madras observatory had a most important role as a fundamental meridian from which observations for longitude in the Indian Survey were reckoned.

Another reason for the development of Astronomical Science is that the Madras observatory participated in observations and discovery of new planets and comets, especially when such are invisible to European astronomers.

4. First Observatory at Madras, 1792

Michael Topping persuaded the Court of Directors, the establishment of an (astronomical) observatory at Madras which would be of very great advantage to science. In 1791, Topping was deputed to build the observatory. Sir Charles Oakely being then Governor of Fort St. George, the observatory came into existence at Madras in 1792. It originated from a small private observatory started in 1787, by William Petrie, a scientific member of the Government of Fort St. George. He had built an observatory at his private expenses, probably the first modern astronomical observatory in the East.^{vii}

Petrie had in his possession two three – inch achromatic telescopes, two astronomical clocks with pendulums, and an excellent transit instrument. This equipment formed the nucleus of instrumentation of the first observatory established at Madras in 1792. As Topping was deputed to build the observatory, a garden house was purchased at Nungambakkam, Madras, while the instruments were removed to the Fort because of the war against Tipu Sultan of Mysore. A separate 20 feet x 40 feet single room was constructed in 1792 as the observatory.^{viii}

Land was observed for 5000 pagodas and the observatory was completed in 1792.^{ix} Topping functioned as the first astronomer of the observatory till 1794. Topping died at Masulipatnam on the seventh January 1796. He was succeeded as astronomer and marine surveyor by John Goldingham. John Goldingham found the longitude of Masulipatnam and corresponding eclipses of the satellites of Jupiter in 1797. He was the first Government astronomer. He also found out the Longitude of Madras between the years 1817 and 1826.^x

During Goldingham's medical leave (1805 – 11) John Warren held the astronomer's and other posts. In 1824, Warren computed his famous "Doctrine of Times" known in Sanskrit as Kala Sangalitan" it contains abundance of materials for constructing a calendar of the positions of the Sun and Moon or to be a key to the Hindu Solar and Lunar calendars. He was assisted by Sastry, the Hindu astronomer and other learned native astronomers. Colonel Warren's work treated clearly of the Tamil, Telugu, Mohammedan modes of computation and showed their relation to English time so that the dates relating to any secular matters such as accounts, deeds, inscriptions and other records executed under Tamil, Telugu, Mohammedan and English Governments could easily and precisely be ascertained. It also served as a guide for determining the periods of certain religious and civil observances according to the mode of reckoning time to indifferent countries.^{xi}

Thomas Glanville Taylor held the charge as astronomer from 1830 to 1848. He equipped the observatory with new and more powerful instruments and began the compilation of his star catalogue. In 1844, was published Taylor's catalogue of 11,015 stars founded on observation made at Madras during the years 1822 to 1843.^{xii}

From 1849 to 1858 the post of astronomer was held by Captain W.S Jacob. He made numerous measurements of double stars and of satellites of Saturn and Jupiter.

The Madras Observatory was in charge of Major J.F Tennant from 1859 to 1860. Succeeding him were N.R Pogson and Michie Smith. From 1861 until his death in 1891, Pogson explored new areas of observations. The Madras observatory could boast of discovering eight new variable and temporary stars. Asia, one of the minor planets was discovered on 17th April 1861. It is so named in consequence of its being the first discovery made in this quarter of the globe. The discovery was made between years 1862 to 1877. The eight variable and temporary stars are Virgins discovered in 1862; Scorpii; Ophiuchi and Sagittarii in 1863; Virginis in 1868; Capricorni in 1865; Reticuli in 1867 and Centauri in 1877.

With the equatorial, the planet Feria was discovered on 2nd February 1864 was detected in Cancer by N.R.Pogson, the then astronomer. Sappho was discovered on 3rd May 1864. It revolves round the Sun in three years, five months and twenty two days.^{xiii} The eighty-ninth minor planet, "Sylvia" is discovered in the constellation Scorpio on 16th May 1867. The period of revolution is six years and six months only.^{xiv} The planet Camella, situated between the orbits of Mars and Jupiter, was discovered on November 17, 1868 and was situated in the constellation Cetus. The period of revolution of this minor planet is six months and seven days.^{xv} Vera was discovered on 4th February 1885. The period of revolution of this minor planet was five years, four months and twenty four days.^{xvi}

On 2nd December, 1872 a bright telescopic comet was found at Madras. The faint nebula in Phoenix was discovered by Miss Pogson in October 1876.^{xvii} Pogson also determined the longitude between Pondicherry and Madras in 1869. The expedition to Masulipatnam in 1868 was a leading feature for observing the total eclipse of Sun and also an expedition from Madras to Avanishi in Coimbatore District for watching the total Solar eclipse which crossed the Presidency in 1871. The discovery in 1867 of the light variation of Reticuli by Raghunatha Chary is perhaps the first astronomical discovery by an Indian in recent history.^{xviii}

M.C Michie Smith was appointed by the Government of Madras as Government astronomer to succeed Pogson in 1881. During his time, Kodaikkanal in upper Palani Hills was chosen for the location of the proposed solar observatory. The foundation stone was laid by Lord Wenlock, Governor of Madras in October 1895.^{xix} But the construction work began only in 1898. The idea of establishing a branch of the Madras Observatory at the most suitable site on the Palani or Nilgiri Hills for certain classes of astronomical works, more especially photographic and spectroscopic observation of the Sun and Stars was conceived by Pogson.

For over a century the Madras Observatory continued to be the only astronomical observatory in India engaged in systematic determination of star position and brightness. The scheme for the reorganization of the Indian Observatories came into force from 1st April 1899. From that date, the Madras Observatory was transferred from the Government of Madras to the Government of India. The former astronomer became the Director of Kodaikkanal and Madras Observatories. From that date the astronomical work in the Madras Observatory came to an end, except for transit observations for time determination.^{xx}

5. Conclusion

The Madras Observatory participated in observations and discovery of new planets, minor planets and comets especially when such are invisible to European astronomers. Researchers upon the variable stars, several new ones having been discovered, the usual attention to all casual phenomena, such as eclipses, transits, occultation's etc. These were the eclipses that established the foundations of astrophysics and especially of solar physics. In these observations the Madras Observatory's contributions were most significant.

Britain co-operated with every new discoveries made by the company's astronomers. They sent new instruments from England in pursuit of Astronomical discoveries. Over 50,000 observations were made with the transit circle of Troughton and Simms of London. A new meridian circle came from London in the year 1858. The transit instrument and the meridian circle were utilized for cataloguing 3,000 stars that included standard stars, large proper motion stars, variable stars, and like. It is with the new 8-inch cooke equatorial that Pogson made his discoveries of asteroids and variable stars.

Thus the observatory has rendered valuable services to the Growth of Astronomical Sciences. Its work in various discoveries was innumerable. It can also be said that the growth of this science was at peak of new discoveries in the eighteenth and nineteenth centuries.

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