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THE JAIPUR OBSERVATORY OF SAWAI JAI SINGH II (1688 CE TO 1743 CE)

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Abstract: India has a long tradition of observational science. Sawai Jai Singh II played an important role in the glorious journey of Indian astronomy. In this paper, I am going to discuss the Sawai Jaisingh II and his Jaipur observatory in India.

Keywords: Jaipur Observatory, Associates of Sawai Jai Singh II, Renowned Foreign Visitors of Jaipur Observatory, Astronomical instruments of Jaipur observatory, Restoration.

Introduction:

Sawai Jai Singh II played an important role in the glorious journey of Indian astronomy. He was the only person of the whole world who built five astronomical observatories in India through his personal efforts.

The five astronomical observatories of Sawai Jai Singh II are –

1. Delhi observatory (1724 CE)
2. Jaipur observatory (1728 CE)
3. Ujjain observatory (1734 CE)
4. Varanasi observatory (1737 CE)
5. Mathura observatory (1738 CE)

The above observatories have various types of astronomical instruments. These instruments are played an important role in the astronomical observations of Indian astronomy.

Astronomy is an observational science. The positions and movements of heavenly bodies have to be observed and recorded very accurately before a theory to explain. The astronomical observations are not very accurate

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without instruments. Therefore, instruments and observatories are one of the most important tools of astronomical studies.

The word 'observatory' derived from the 'Jantra-Mantra' in Sanskrit Language. 'Jantar' means instrument and 'Mantar' means mysterious calculation. Therefore, observatory (Jantar-Mantar) means the strange calculations with the help of instruments. The Jantar-Mantar or observatory is known as Jantra – Śhala or vedha shala or Jantralaya or yantra Mahal etc. ..[1]

Sawai Jai Singh II was born on 3rd November 1688 CE at Amber in Rajasthan, India. His father Raja Bişnu Singh or Bişānsingh was the rular of Amber. His grandfather was Mirza Jai Singh and they belong to kaccawa or kushwaha dynasty. The 'Sawai' was a title of honour given by Mughal emperor Aurangazeb to Jai Singh II. The 'Sawai' literally means a quarter over one in strength and intelligence. In other words it means one and a quarter of an average man in the worth.

The Mughal emperor Aurangazeb was impressed by the wit and chivalry of Maharaja Jai Singh II. Unexpectedly died on 1699 CE. At the age of 11 Jai Singh II was crowned as the Raja of Ambor on 25th January 1700 CE. [2]

The legendary person Sawai Jai Singh II died on 21st September, 1734 CE at Jaipur. A glorious period of Indian astronomy was ends to his death. According to his work he became an immortal person in Indian and world also. He was one of the most important pathfinder of Indian astronomical observatories or Indian astronomy. [3]

Jaipur Observatory was the most important and largest observatory of Sawai Jai Sing II. After Delhi Observatory, he built Jaiupur Observatory in 1728 CE.

- **The Parameters of Jaipur Observatory:**

Here I mention a few geographical paramenters of Jaipur Observatory at a glance.

- **Altitude:** 431 meters (1414 feet) above M.S.L.
- **Latitude:** $26^{0}55^{/}27^{//}$ North.

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- **Longitude:** 75^0 $49^/$ $8.8^{//}$ East of Greenwich.
- **Height above sea level:** 436 Meters.
- **Local Time:** + 26 minutes, 43 seconds (Indian Standard Time).
- **Universal Time:** - 5 hours, 3 minutes, 17 seconds. [4]

A brief history of the construction of Jaipur observatory:

Sawai Jai Singh II was the founded of the Jaipur city. He shifted his capital from Amber to Jaipur city around 1727 CE. Before removing his capital from Amber to new city Jaipur, Sawai Jai Singh II built many astronomical instruments, their blue prints and some wooden, metal models of astronomical instruments also. Perhaps he started the construction of the Jaipur Observatory before 18th November of 1727 CE and the Observatory was complited in 1728 CE.

Jaipur observatory was the biggest observatory of Sawai Jai Singh II. Therefore, the finishing touch of this observatory was continued for a few years till in 1738 CE. [5] Various astronomical instruments of Jaipur observatory were built or contructed at different times. The Giant Samrāṭ Yantra, Ṣaṣṭhaṁśa Yantra were designed and started in 1732 CE which were completed around 1735 CE. It is to be noted that the Rajasthan State Archives mentioned this fact was recorded means Jaipur State expended a bulky amount of money on astronomical instruments or some "Large instrument". Perhaps the "Large instruments" were the Great Samrāṭ instrument and Ṣaṣṭhaṁśa instruments which were built in 1735 CE.

After two years, construction of the major instruments were completed of this observatory. Therefore, Jaipur observatory was complete its construction in 1738 CE or the Jaipur observatory was continued its construction till 1738 CE. [6]

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The associates of Sawai Jai Singh II:

The Jaipur observatory was the 2nd astronomical observatory of Sawai Jai Singh II, but it was his largest astronomical observatory. Here he did a lot of experiments on instruments and observational works. For the purpose of his astronomical works he created a group and included many famous persons who were well known to astronomy and related works. Various renowned persons were associates of Sawai Jai Singh II in the construction of Jaipur observatory.

Some notable persons who were the court scholars and astronomers of Sawai Jai Singh II were closely associated with Jaipur observatory. Viz. Pandit Vidyādhar, Pandit Jagannāth Samrāṭ, Pandit Kewal Rāma Sharma, Pandit Ratnakar Pundarik etc. Pandit Vidyādhar was the chief architect of Jaipur observatory. [7]. The construction work of Jaipur observatory was top form between 1734 to 1735 CE. There were perday twenty three astronomers and a large number of skilled persons jointly worked in this construction. This work was performed in the department of building and construction under the surveillance of Pandit Vidyādhara.

Further, we may say that a few numbers of Islamic and foreign knowledgeable persons in astronomy were associated to Sawai Jai Singh II. [8]

Renowned Foreign Visitors of Jaipur Observatory:

Many travellers visited Jaipur observatory. Some of renowned foreign visitors Viz. The European astro -scholar Padre Manuel Figueiredo, the Fidalgo and the Padre Xavier De Silva etc. were appeared to visited this observatory.

The Portuguese Jesuit Missionaries arrived to visit Sawai Jai Singh II and his observatory in 1729 CE.

The Don Pedro De Silva from Portugal and the German scholars Andre Strobel were come to visit Jaipur observatory.

French Jesuit and astronomer pere claude Boudier with an associate from Chandranagar or Chandannagar, West Bengal came to Jaipur and visit Jaipur

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observatory. Some astro-scholars from Islamic countries also came to visit Jaipur Observatory. [9]

The famous foreign visitor Tieffenthaler visited Jaipur observatory at the reign of Sawai Madho Singh II in 1751 CE. It is to be noted that some of these foreign visitors were also the associates of Sawai Jai Singh II. [10]

The astronomical instruments of Jaipur observatory at a glance:

We have already come across that the Jaipur observatory was constructed by Sawai Jai Singh II. The Jaipur is the capital of the kingdom of Sawai Jai Singh II. Therefore, he spent a lot of time here and did various experiments on astronomical instruments. There were various astronomical instruments in the Jaipur observatory, which are as follows:

1. Brihat Samrat Yantra (The Large Equatorial Sundial Instrument),
2. Laghu Samrat Yantra (The Small Equatorial Sundial Instrument),
3. Dhruva Darshaka Yantra (The Pole Star Instrument),
4. Dhoop Ghari Yantra (The Horizontal Sundial Instrument),
5. Narivalaya Yantra (The Hemispherical Sundial Instrument),
6. Krantivritta Yantra (The Ecliptic Instrument),
7. Yantraraja (The Astrolabe),
8. Unnatansha Yantra (The Altitude Instrument),
9. Dakshinottaro Bhitti Yantra (The Meridinal Wall Instrument),
10. Shashthansha Yantra (The Sextant Instrument)
11. Rashivalaya or Rashi Yantra (The Zodiac Instrument),
12. Jaya /Jai Prakasha Yantra (The Armillary Sphere Instrument),
13. Kapala / Kapali Yantra (The Hemispherical Bowl Instrument),
14. Chakra Yantra (The Circular Instrument),
15. Rama Yantra (The Altitude / Azimuth Instrument),
16. Digansha Yantra (The Azimuth Instrument). [11]

The various astronomical instrument and their models which are some complete and incomplete are the significant part of Jaipur observatory.

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Jaipur observatory has measonry and metal both astronomical instruments. Some of portable instruments are storage at the site of this observatory, viz astrolabe.

The masonry instruments of Jaipur observatory as follows:

i. Laghu Samrāṭ Yantra (The Small Equatorial Sundial Instrument),
ii. Bṛhat Samrāt Yantra (The Large Equatorial Sundial Instrument),
iii. Krāntivṛtta Yantra (The Ecliptic Instrument),
iv. Digaṁśa Yantra (The Azimuth Instrument),
v. Rāma Yantra (The Altitude/Azimuth Instrument),
vi. Kapāla Yantra (The Hemispherical Bowl Instrument),
vii. Jaya Prakāśa (The Armillary Sphere Instrument),
viii. Nāḍīvalaya (The Hemispherical Sundial),
ix. Dakṣinottara Bhitti (The Meridinal wall Instrument),
x. Ṣaṣṭhāṁśa (The Sextant Instrument),
xi. Rāśivalaya (The zodiac Instrument),
xii. Dhruvadarśaka Paṭṭika (The Pole Star Instrument).

The metal instruments of Jaipur observatory as follows:

i. Cakra Yantra (The Circular Instrument),
ii. Yantrarāja (The Astrolabe),
iii. Incomplete Yantra rāja,
iv. Unnatāṁśa Yantra (The Altitude Instrument),
v. Krāntivṛtta (The Ecliptic Instrument),
vi. Samrāṭ (The Equatorial Sundial).

The two models of Samrāṭ Yantra made in metal and they are preserved now. The Yantrarāja instrument was made in brass and still it is very good condition. The Yantrarāja instrument was made in brass and still it is very good condition. The other incomplete Yantrarāja instrument was made in iron. [12]

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Uptill now a brief description of the astronomical instruments which were introduced by Sawai Jai Singh II is given. More details are discussed in the chapter no. 2.3.

Restoration

Sawai Madho Singh II played an important role in the restoration of Jaipur observatory. He was the compatible son of Sawai Jai Singh II, who took some fundamental decision to restoration the instruments and observatory of Jaipur.

The decision of Sawai Madho Singh II about the restoration of Jaipur observatory became productive. Now, Jaipur observatory is preserved under the Archaeology Department of Government of Rajasthan and they played a significant.

Among the observatory of Sawai Jai Sing II, the Jaipur observatory is the finest in all respects. [13]

Conclusion: The importance of Jaipur Observatory at a glance:

1. The jaipur observatory is popularly known as the Jantar-Mantar of Jaipur.
2. It is marked as the world's largest, finest preserved and most precise stone observatory.
3. The large Sundial instrument or Bṛhat Samrāṭ Yantra is situated in this observatory and still it is worked fruitfully.
4. The Jaipur observatory is a model observatory and now it is a National monument of India.
5. Various astronomical instruments of this observatory are still works.
6. The incredible Jaipur observatory still works as a territory of practical demonstrations and examinations for the student of astronomy and astrology currious persons.
7. It is famous for tourist place etc.

The Jaipur observatory is played an remarkable role in the Jouney of Indian astronomy

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