

Built by Sawai Jai Singh of Jaipur, Jantar Mantars have accurately predicted the position of stars for almost three centuries besides serving as giant masonry clocks that follow the movements of the sun and the moon, writes **Mukesh Khosla**

# Ladder to stars

**O**RACLES and astrologers have often said that human beings have cosmic origins and their destiny is inextricably linked to stars. Even in the modern world many believe that planets influence a person's fate. The science of the zodiac is based on this premise.

Natural disasters like earthquakes; floods, volcanic eruptions, droughts and even epidemics have often been blamed on stars. With such an umbilical linkage to the heavenly bodies, both scientists and seers began developing instruments to determine the exact position of stars in a bid to determine how they would influence mankind.

Experts from ancient Babylonia, Egypt and Greece began devising gadgets to measure the stars. The early zodiac calendar was developed around the four elements of earth, water, air and fire. It had 12 signs, each sign being ruled by a planet. Indians, too, developed a fascination for astronomy and there are ample references to stars and planets in the Indian mythology.

But the man who gave a scientific base to these beliefs was Sawai Jai Singh-II, Maharaja of Jaipur, who built five grand observatories called Jantar Mantar (a corrupted version of *Yantra Mantra* — *Yantra* for instrument and *Mantra* for formula), at Delhi, Jaipur, Varanasi, Ujjain and Mathura. All five observatories were built between 1724 and 1730 A.D. The observatories, in the words of historian V. Balaswaroop are, "monuments that irradiate a dark period of Indian history."

## Genius mathematician

Jai Singh was a genius mathematician and a keen scholar of astronomy. He had the Turkish astronomer Ulugh Beg's *Zij Ulugh Begi*, Greek astronomer Ptolemy's *Almagest* and several other works translated into Sanskrit and studied them thoroughly. But he found faults in many of these treatises and started propounding his own theories based on his vast studies.

Jai Singh was given the title of Sawai by the Mughal emperor Aurangzeb. Because when it came to matters of science and architecture he was definitely one and a quarter (*Sawai* in Hindi) times superior to the

rest of the world. Based on experience, Jai Singh, after whom Jaipur is named, decided to build an observatory that would predict the position of stars as well as tell about time. He used very few metallic instruments and instead relied on masonry work for his 'ladders to the stars'. These huge geometric structures were erected in the shape of astronomical instruments and were used to accurately measure the position of stars and their altitude for calculating eclipses and other celestial events. However, for nighttime sightings Jai Singh used metallic instruments, the main one being a sighting tube attached to a circular ring that could be rotated in different directions.

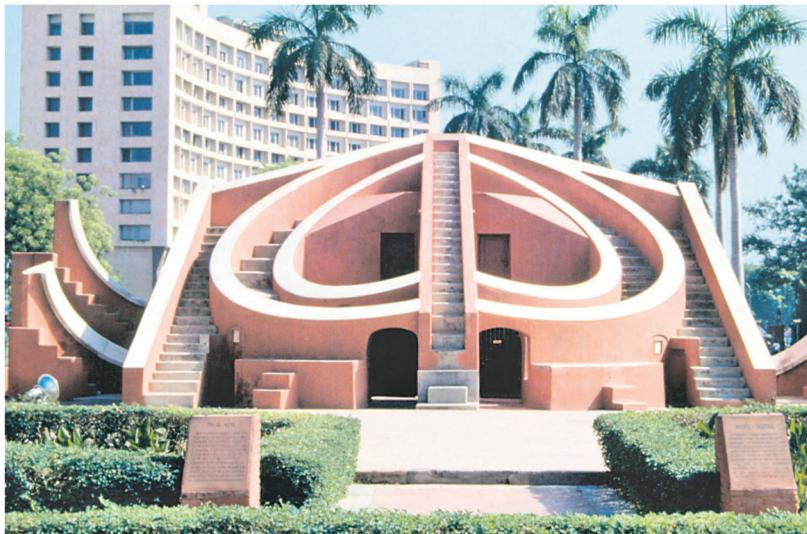
Dr Barry Perlus, Professor of Art, Cornell University, after seeing the Jantar Mantar at Jaipur wrote, "I was struck by how modern it seemed. It's a representation of the real mechanics of the universe architecturally."

## Heritage value

The first Jantar Mantar came up in Delhi in 1724. For seven years the Maharaja kept a close eye on the observatory to ensure that its readings were accurate. Almost 285 years later, it still works with the same precision as it did when it was first built. It is one of the most recognised sites of Delhi. Its heritage value is underscored by the fact that it was the official logo of the 1982 Asian Games.

It is dominated by a huge masonry sundial called the *Samrat Yantra*, which reflects the local time accurate to half a second. There is the *Jai Prakash*, designed personally by Jai Singh, that determines the position of the sun and other heavenly bodies. There are two pillars in the observatory that establish the shortest and longest days of the year.

The construction of Jaipur Jantar Mantar, which is the largest stone observatory in the world, started in



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1727 and took six years. Like the one at Delhi, this one, too, has a 73-foot-tall sundial *Jai Prakash* to monitor the movement of celestial objects. Then there is the *Ram Yantra*, a cylindrical building with an open top and a pillar in its centre. The other instruments include the *Samrat Yantra*, a 90-foot equinoctial dial, the *Digamsha Yantra*, a pillar surrounded by two circular walls, and the *Narivalaya Yantra*, which is a cylindrical dial.

## Accuracy & precision

Situated next to the City Palace, the Jantar Mantar is one of the most popular tourist sites in Jaipur. Built in an area of five acres, its imposing instruments

have stood the test of time and still fascinate scientists and astronomers around the world for their accuracy.

Though lesser known, the Jantar Mantar in Ujjain, Madhya Pradesh, also called *Vedh Shala*, is the most significant as it is only 3 km from the Tropic of Cancer. It is much smaller than Delhi and Jaipur observatories and has just four basic instruments — *Samrat Yantra*, *Nadi Walaya*, which measure time, *Dignasha Yantra* that determines the position of planets and stars and the *Bhitti Yantra*, a meridian instrument.

The Jantar Mantar at Varanasi also has time measuring and angle-measuring devices like the *Krantiwritta Yantra*,

*Digamsha Yantra*, *Samrat Yantra*, *Prakash Yantra* and *Ram Yantra*. However, it is not a popular site among tourists, who come to this holy city. That's because the place has been reduced to ruins and it is virtually impossible to go through thousands of vendors who have encroached upon the surroundings of the observatory near the Dashashvamedh Ghat.

Though the Varanasi Jantar Mantar is a familiar tale of neglect of an important heritage site, but the fifth observatory built in Mathura has completely disappeared. Thankfully, the observatories at Jaipur and Delhi still stand strong encapsulating the spirit with which they were built. —NF

## TELEVISION

### The deadly joint

**M**ARIJUANA has over 200 names, including hashish, hash, pot, herb, weed, grass etc. *Inside Marijuana* on Sunday at 8 pm on the National Geographic Channel showcases the deadly effect of this psychoactive drug that can completely alter thinking patterns. Scientists studying this widely used, illicit substance, consider it among the most complex in the plant kingdom with 400 active chemicals and compounds. Its reach can be gauged from the fact that in California alone, the marijuana trade outpaces the entire wine industry, placing it among the largest cash crops in the USA.

### An affair to remember

**A**FTER *Rebecca* this one is Daphne du Maurier's most famous romantic novel. *Frenchman's Creek* on Saturday at 8 pm on the History & Entertainment Channel is a treat for those who like history intertwined with literature. Set in the 17th century, it stars Tara Fitzgerald as the beautiful, wealthy and bored housewife Lady Dona St. Columb, who impulsively got married and has regretted it since. She decides to leave her shallow husband and London's corrupt sophistication to seek solitude in the family home in Cornwall with her two children. Here she discovers that French brigands are marauding the local community and her home is being used as a hideout by a pirate (Anthony Delon) with whom she starts falling hopelessly in love. The movie explores the complex mind of a woman. —NF



Based on a novel by Daphne du Maurier, *Frenchman's Creek* is about an illicit romance

Sansar Chandra takes a look at the new Samvatsara-2066 that starts on March 27

**T**HE new *Samvatsara-2066* will start this week. Although the new *Vikrama* year will start at 9.35 p.m. on Thursday (March 26), but according to our astrological code, the first bright lunar day (*Chaitra Shukla Pratipada*) has to operate at sunrise to be designated as Samvatsara day. So Friday, March 27, corresponding with Chaitra 14th will be the new Samvatsara Day. The first *Navratra* will be on the same day, while the Baisakhi — the first day of the solar year (*Mesha-Sankranti*) will fall on Monday, April 13.

The role of *varshapati* or the king of the year will determine whether the incoming year is good or bad as he is the custodian of all powers.

## Inactive Venus

Surprisingly, Venus, the top most authority of the current year, is inactive and of no consequence also.

King, the first dignitary of the year, is a victim of malady and makes the year under review full of chaos and anarchy. Like last year this year again the dismal planetary picture predicts continuation of this economic morass. Recession will remain. Jobs will shrink further, with unemployment, a major challenge for the government.

The new Samvatsara will start when *Revati* — one of the *gandamoola* constellations — will be calling the shots, a clear sign that the current year is a tumultuous one. Chaos may increase. The rulers may not be able to check anti-social elements and problems facing India. Peace, law and order, justice and even the security and stability of rulers could be challenged.

## Fractured mandate

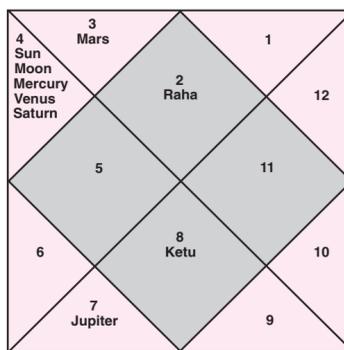
With a dismal starry position and the Lok Sabha polls next month, it does not bode well for India. The incoming poll may throw up a shaky government. So we should be ready for a fractured mandate again paving way for a coalition. The new Samvatsara with its total period of sway commencing from March 26, 2009 (9.35 p.m.) ranging up to March 16, 2010 (2-30 a.m.) and spread over to 354 days, 00 hours and 5 minutes is called *Shubha Krit*. It denotes a tension-ridden year. The rulers will remain absorbed in self-glorification and grinding their own axe while terrorists and insidious elements will rule. A greater defence is needed or our security forces could be caught napping.

## Women empowerment

Surprisingly, this time both the top positions, kingship and premiership, have been bagged by the fair sex with Venus as a King and the moon as P.M. So the new year will be a woman-dominated year. There will be some increase in their influence and authority. Their strength in Lok Sabha, Rajya Sabha, state legislature, municipal corporations, administrative services, judiciary where

## FREE INDIA'S CHART

Friday-Saturday  
August 15, 1947  
12 a:m (midnight)



they are in a minority will increase.

Since Venus, the king, is exalted in two horoscopes and moon, the P.M. is exalted in one and dignified in the other, both of them mean business. So women will not be as vulnerable as today. Crime against them will come down. Crimes such as wife beating, female foeticide and dowry crimes will be dealt with sternly. Some astrologers have predicted a marked balance in the sex ratio during the current year.

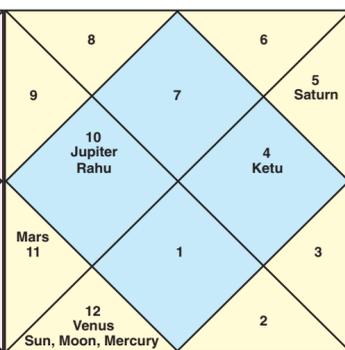
## Rule of anarchy

The next most important dignitary in the cabinet is the sun as he has annexed three portfolios but being in the house of enemies, it bodes no good for the nation. The law and order deteriorate. Riots, abduction, genocide, mayhem and cross-border terrorism will keep the general public traumatised. Rest of the portfolios, with two having gone to Jupiter and one each to the remaining three, stand quite evenly divided and do not pose any threat to the smooth functioning of the Cabinet.

The solar chart with its operational period commencing on Tuesday, April 14 at 00.48 hours is no better than the Samvatsara chart. It is also the victim of *gandamoola* afflictions. The difference between the two is that the former is *Revati*-born while the latter belongs to the *jyeshtha* constellations. The first quarter of *jyeshtha* is derogatory for the well-being of elderly people. They will face problems socially, economically and health-wise during this year. Their family, too, could neglect them and create problems. The solar chart predicts

## SAMVATSARA CHART

Thursday  
March 26, 2009  
9:35 p:m



problems, especially in joint families. The old will be at the receiving end. Legal battles cannot be ruled out. In some cases, the elderly will be compelled to live in orphanages or old age homes.

## Fiscal health

The third horoscope entitled *Aardra* entry chart is another important astrological fountainhead to investigate and assess the impact of natural resources on humans. The areas of trade, commerce, agriculture, industry, etc also come under the purview of this chart. This chart, during the course of this year will be assuming its sway on Monday, June 22 at 3.50 a.m.

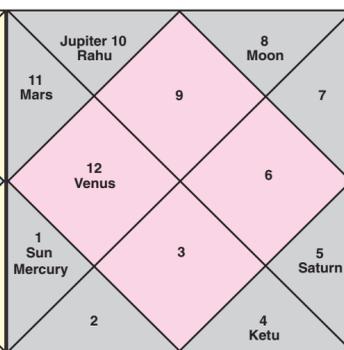
It seems inauspicious that the birthday of our third horoscope will be taking place on *Krishna Chaturdashi*-the 14th day of the dark half of *Aashara*, which stands obliterated. It is a highly ominous development. It is said, "Anyone who is blessed with the birth of a child on this day is bound to lose his entire wealth even if he happens to be Lord Indra, the king of gods."

Another maledictory influence that has trounced the *Aardra* entry chart sharply is *Dvijanna yoga*. If the same ascendant that operates at the time of one's birth is repeated in one's annual chart, it is called *Dvijanna yoga*. It indicates a revolutionary change in life, as if being born again. This evil influence, whether on an individual or a country, is another name for deterioration, downturn and slump.

With such bad starry position, India's economy shows no promise. Despite the agriculture sector not being so deficient, the inflationary trends

## SOLAR CHART

Tuesday  
April 14, 2009  
00:48 a:m



will continue to harm the common man. With the recession in the employment sector, there will be unrest among employees as they lose jobs or face sharp salary cuts. Population will grow rapidly and there will be acute paucity of accommodation. Even a small house will be a luxury.

## National security

The fourth horoscope is free India's horoscope. While the first three horoscopes deal with the annual reading of the country, the fourth one presents the full picture of her past, present and future.

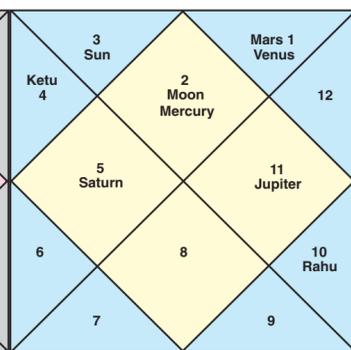
Free India's horoscope reveals that India has been a victim of *kaal sarpa yoga*. It is still under threat as the country is under the sway of sun in the main role and *Rahu* as second in command. *Rahu* is responsible for *kaal sarpa yoga*. Since Sun and *Rahu* are at the daggers drawn and shall be ruling over us up to 8.8.2009, we can expect insurgency and vandalism to spread. The fortunes of the ruling class will remain under a cloud up to the period the Sun-*Rahu* duo rule the roost. Stability and security will remain under threat.

## Good rains

Rohini's preference of sea as her abode is a fortunate sign and proves the rain gods will oblige throughout the year. *Samvatsara's* occupation of gardener's house is another lucky sign that we will receive abundant rainfall. *Samvartaka* cloud, known as an originator of tempests, cyclones and hailstorms, will spread its fury, especially on the lives of fishermen. *Drona* cloud and *karkata* ser-

## AARDRA ENTRY CHART

Monday  
June 22, 2009  
3:50 a:m



pent are also pro-rain and are not likely to disappoint us. *Subudhna* serpent, though anti-rain, will hit Rajasthan only. The mountainous regions of Northern India will receive abundant rain and rivers will flow with a vengeance.

*Samvatsara's* choice of frog as a mode of transport spells trouble. Despite expansion of roads, railways and air link ensuring greater mobility, the journey may be hazardous and risk-prone. People will be in haste to move. The greed of hoarders will also rise. The poor will have to pay heavily for their basic needs. The authorities may fail to protect the common man from falling an easy prey to the greed of anti-social elements.

## Sensitive Sensex

There would be no major upsurge in the growth-oriented sectors, as all of them will remain affected by divergent policies projected by different political affiliations. Despite a bold approach in the budgetary estimates, the implementation may falter because of divergent ideologies of coalition partners. More and more people will try their luck in the stock market. There will be glut of investment. Foreign investors will be responsible for inflating and deflating the markets. Those who exercise restraint will reap handsome rewards, while the hard-liner speculators will lose. The Sensex will and can rise or fall at will, surprising the investors. With political uncertainty there cannot be any stability or positive upturn in this sector. The government's indifference towards small investors by imposing unnecessary taxes is also not a good gesture.