Chinthamani Ragoonathachary and Secularisation of Time During the Late Nineteenth Century Madras Presidency

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Chintamani Ragoonathachary, a 'native' astronomer took the initiative to modify and publish a new Panchang (almanac) and thereby produced a change in the calanderical system followed in the Tamil region. Inspired by the modern astronomy, this effort towards modernization of Panchang is an effort towards secularization of time. To engender reform he utilized popularization of astronomy. It is argued that this project of modernization by Chinthamani Ragoonathachari is not a colonial project but a project of 'native' elites to secularizing time in Tamil with the aim of meeting the needs of modern industrial society.

Introduction

Social life takes place in time and space. Calendar is often the device to specify time, more or less precisely, as the civil or religious purpose demands, generally in years, months, dates, week days, or other divisions of time (e.g., Tithi in Hindu religious almanac). That is, calendar is at the basis of our temporal accounting. Different cultures, regions and religions have been using different calendar systems from very ancient times. For civil purposes, Julian calendar of the Christian era with or without the Gregorian corrections has been adopted throughout most parts of the world. Nevertheless, 'calendar' is also a cultural conception, a way of cultural appreciation of the temporal. The seven day week may have its origin in Mesopotamia; nevertheless it is sacred for Jews and Christians for the observation of Sabbath. In this sense, 'calendar-time' is simply not an exercise in moment of numbers alone, but encapsulates temporal ordering and social structure/organisation. This paper examines the almanac reform that took place in the middle nineteenth century Tamil region.

Calendar Reforms

Calendar reforms, stemming from technical as well as ideological considerations, have occurred periodically. Technical considerations have to do with adjustments necessary in the lunar and solar calendar which various societies have had to make, but reforms in the organization of days and months have responded to socio-cultural and political considerations. The British colonial government introduced Gregorian calendar in India during the late nineteenth century as part of the colonial project of standardizing all measurements, such as land, weight, etc. The Madras government issued a proclamation on March 26, 1878 that time keeping would be based upon the standard Christian calendar in all official records and deemed it necessary that all the Panchangs published in its jurisdiction provide concordant date, month and year in Gregorian calendar system along with any preferred traditional system[1]. At the outset, this action may look like the usual overreach of Colonial Government with the aim to 'discipline' the colonial subjects, however careful examination of the context would show that the action of the government was actually the culmination of the efforts by 'native' interlocutors, in this particular case, Chintamani Ragoonathachary.

Chintamani Ragoonathachary

Chinthamani Ragoonathachary was a 'native' astronomer who joined the Madras observatory as a menial labourer and rose to occupy the high position of first assistant in the Madras Observatory. Hailing from a family of almanac (*panjang*) makers, he was a keen and erudite observer.

[1] Proceeding No 521 of March, 26, 1878, Fr St George.

Chintamani Ragoonathachary was an assistant to Norman Pogson, the British Government Astronomer and head of the Madras Observatory from 1861-1891. Then the focus of the observatory was the study of variable stars and asteroids. Ragoonathachary's discovery of the variability of light output from R Reticuli is considered the first observational discovery in modern astronomy by an Indian observer. His contribution to the discovery of the minor planet 'Asia' is amply acknowledged by Pogson in his communication to the Monthly Notices. He also participated in observations of solar eclipses visible from India, the most important of which was the eclipse of August 18, 1868. Spectroscopic observations of this eclipse, done at Guntur, in Andhra Pradesh, gave the first indications of the existence of the element Helium, so called because it was first detected in the Sun.

He was a member of the 1871 total solar eclipse expedition as well as Transit of Venus observation in 1874. Ragoonathachary communicated the results of some of his eclipse observations of 1871 (submitted through Pogson), to the Monthly Notices of the Royal Astronomical Society. He seems to have also been active in the preparations for the observation of the 1874 transit of Venus. Keen to popularize science and in particular astronomy, he communicated basic principles of astronomy in regional languages such as *Tamil, Malayalam, Kanada, Hindustani* and *Telugu*. He also gave popular lectures and wrote in dailies popularizing astronomy in Tamil.

'Native' Timekeeping (*Panchang*)

The Sanskrit word "*Panchang*" is made of two parts: *pancha* and *anga*. *Pancha* means five and *anga* means a limb or part. Thus the *panchanga* is a document made of five parts[2]. These five parts are the *tithi* (lunar day), the *vara* (day of the week), the *nakshatra* (lunar mansion- asterisms), the *yoga* (luni-solar day) and the *karaṉa* (half lunar day). The system of *Panchang* Calendar is uniquely Indian and influenced possibly by the Greek system.

The *Panchangs* are prepared not based on careful observations but based upon 'formulas' handed down by ancient founding astronomers/ astrologers (Like Aryabhata, Bhaskara, Varahamihira, etc). As suggested by the founder of the Siddhantha school (Say Aryabhata or Brahmagupta), certain corrections are made to the results obtained by applying the formula (called Bija) to get the 'true' position. There are two classes of almanacs in use; one called Siddhantha *Panchang* and the other Drigganitta *Panchang*. Another type, more prevalent in Southern India, Vakya *Panchang*, is a type of Siddantha *Panchang* based upon Siddhantha of Aryabhata with certain corrections (Bija) as the basis. Most of the Tamil region followed *Vakya Panchang*. Vakya means group of words, and as mnemonics, letters of the word representing numbers.

The earth apart from having the well known motions of rotation and revolution exhibits another motion called the precessional motion. Further the motions of the moon and other celestial objects often exhibit perturbations and hence are not perfectly uniform. The period calculated in earlier times were not so accurate and slowly the errors accumulated resulting in discrepancy between the observed positions of stellar objects and positions calculated according to 'Vakya'. Therefore most *Panchangs* are way off from the observed values of the stellar positions, even though they often do use some sort of Bija corrections.

Drigganita Panchang

Drigganita Panchang is primarily based on modern astronomy and gives the position of sun, moon and planets as they would be observed in the sky, as the name *Drigganita* implies. *Drig* derived from *Drishti* literally means 'observation'. It was clear during the middle of the nineteenth century, with the precision obtained by the modern astronomy, that the traditional calendars were way off the mark. Not only that the position of naksatras – stars are not where they are, in traditional *Panchang*, but often due to the accumulation of errors, it predicts eclipses when there will be none. Even when eclipse is predicted the first contact time varies by about 3 nadis. To illustrate, Ragoonathachari notes with sarcasm that certain Siddhantis in Ganjam (a Taluk in Andra Pradesh) and Thanjavour (in Tamil nadu) had predicted that a solar eclipse would occur on Avani 6 in 1871, yet there was no eclipse anywhere on the said date. Likewise, the rising of the moon was wide off the mark in most of the traditional *Panchang*, which were evident to all those who wanted to check the veracity of the computations.

[2] The ecliptic is divided into 30 equal parts each consisting of 12° angular distance. The time spent by the moon in each of these parts is called one *Thithi*. As the moon goes around the sky in a cycle of 27 days and 7¾ hours, each day it would appear to be near a specific star-nakshatram. Thus the ecliptic is divided into 27 *nakshatras* – lunar mansions or asterisms, reflecting moon's cycle against the fixed stars. The fractional part -7¾ hours every cycle is cumulated and is compensated by an intercalary 28th *nakshatra* once in a while – like leap year in Gregorian calendar. *Thithi* is divided equally into two parts and each part is called karana. From the first point in the ecliptic according to Hindu calendar, that is *Mesha* or Aries (*Meshâdi*) the angular distance of Sun and moon are computed. They are added together and normalized to a value ranging between 0° to 360°, by subtracting 360 from the total, if the sum is greater than 360. The sum is divided into 27 parts and each part is called a specific *Yoga*. *Vara* is the seven day week, similar to the week of Mesopotamian or Sumerian origin.

As the traditional *Panchang* was seen to be quite inaccurate, Chatre and Khetkar in Bombay, Venkatakrishna Raya and Ragoonathachari in Madras proposed Drigganitha *Panchang* to replace the traditional outmoded *Panchang* computations based on the *Vakya Panchang*[3]. Ragoonathachary was disturbed at the apparent deviation of the traditional almanac with the actual events. The phenomenon computed by the traditional almanac and the actual occurrence of events differed in reality. In view of this, he and his friends attempted to devise a new almanac – *Drigganitha Panchang* – or 'almanac that agrees with the observation'. He had to face the criticism of the *Jyothishis* – astrologers, who argued against such improvements and criticized him for his scientific zeal.

Being based upon modern astronomy, *Drig* system of *Panchang* was more accurate and accorded with observation to a great extent. Further, Ragoonathachary's *Drigganitha Panchang* not only provided the traditional five calendarical elements – like Thithi, Vara, etc., but also provided concordance with 'English months and dates' (standardised calendar). Therefore this *Panchang* was of more practical utility; 'native' officials working in government establishments or those dealing with government found it handy.

Rupture in the Flow of Time

The new *Panchang* caused a major stir in the society. According to the traditional belief, rites were to be performed at the time they were enjoined to be performed. The new *Panchang*, following modern astronomy was not averse to making corrections in the rhythm of flow of time. When the *Drigganitha Panchang* was used, there was a certain problem in computing *Tithis*. *Dharmasastras*, or religions canon, looks forward to Tithi having a mean duration of 59 nadis with not more than 6 *nadi* variation. Siddhantic astronomers gave a strict meaning to *Tithi*. According to them, when the longitude of the moon gains exactly 12 degrees or its multiple on that of the Sun, a tithi is completed. Therefore there are 30 *tithis* in a (lunar) month. As the motion of the moon is not uniform the duration of the tithi will naturally vary. This was known to the ancient Siddhantic astronomer. *Vakya Panchang* that uses only the first inequality of the motion of moon arrives at *Tithi* with not more than 6 nadi variation, to conform to this injunction.

However that was not the case with *Drigganita Panchang*, which applied many inequalities to find the true position of the moon. Hence the actual *tithi* could vary from the mean by about 10 nadis, whereas the Dharmasastras permit only 6 nadis. Drigganitha *Panchang*, with its adherence to accordance with observation had to make tithi conform to the actual position of moon in the sky. This caused a dilemma.

'What is time?' Orthodox astrologers following the Siddhanthis argued that passage of time is unrelated to actual movement of celestial objects, and that reference to movement of celestial objects is only for ease of calculation. 'Appointed time' was central to the argument of the Siddhantis. Therefore, performance of rituals according to Sastras, they argued, demanded no accuracy of accordance between the *Panchang* and actual position of celestial objects. It was contented that accuracy and accordance with actual observation may be needed for Astronomy (*Jyothir Vigyan*) but not for computation of *thithi*, *nakshatra* and other aspects for the purpose of performing rituals. Krishna Josiyar (astrologer) of Nanguneri, who had a great following, argued for the retention of the *Vakya Panchang* tradition on the above ground. Krishna Josiyar contested that one may use the modern technique for observational astronomy, but for ritual use, one should resort to the traditional computation of the position of stars, for 'appointed time' is crucial. Time flows on its own accord independent of events. If *Drigganitha Panchang* is followed, siddhantis argued that we may be misled from the 'appointed time' by the *Dharmasastras*, even though we may be accurate in predicting the celestial event.

Kuppuswami Sastry, a famous Sanskrit scholar argued "people who have faith in *sastras* believe that the sages who gave the *dharmasastras* alone could see the subtle connection between the rites and the times at which they are enjoined to be performed and we must follow what they have envisaged". Even while most siddhanthis accepted that the *Drigganitha panchang* was more in accordance with actual astronomical event (like say, rising time of moon, new moon or eclipse), doubts were raised as to whether the cycle of time being followed could be ruptured.

In these arguments one can see a parallel in the debates of modernising calendar during the 1920s in Europe. Sabbatarians objected very strongly to calendar reform on the ground that it would result in interruption of the continuity of week days that posited to have existed since the time of 'creation'. The interruption would disrupt celebrating Sabbath at exact interval of seven days. The objection of the Siddhantis was of a similar nature.

[3] Irinjaatappilly Madhavan Namboodiri (1340 - 1425) and his student Vatasseri Parameswaran Namboodiri (1360 - 1455) are credited to have established the *Drigganitham* school in Kerala mathematicians. As a result of systematic observations and research on movements of celestial bodies, they estimated the error factor and established a new method called *Drig* to calculate the actual position of the celestial objects. Nevertheless, this was not part of the *Vakya Panchan*g tradition.

Ragoonathachary and his supporters countered this argument ingeniously. In fact his claim to promote *Drig Panchang* was couched in a language of how we would be committing grave ritual error by following siddhanthi's *Vakya panchang*. They argued that *Dharmasastras* enjoin us to perform rites at certain conjugation of celestial objects. Performing the *Amavasya tharpan* (rites performed for forefathers on every new moon day) is to actually take place at the time of new moon if the benefits of such rites are to be accrued. The offerings and sacraments that are to be performed during the eclipse are to be undertaken at the precise time of its occurrence. He argued that if according to *Dharmasastras* we are to conduct a particular ritual at a time of certain conjugation of planets, stars and other celestial objects, in following siddanthis one is certain to err. At the time appointed according to *Vakya Panchang* such conjugation would indeed not occur. Due to the precession of earth and other motions, the position of celestial objects would have changed from the tables prepared by the *Vakya Panchang*, even if *bija* – corrections- are applied. He went on to argue that as the *Dharmasastras* entail us to conduct rituals at an appointed time at which actually the celestial objects are in certain conjugation, and hence it is prudent to follow *Drig Panchang*.

Blunting the 'Tradition and Modern' Dichotomy

'Old is gold', argued the Siddhanthis and disparaged Ragoonathachari's attempt at *Drigganitham* as having no backing of the established scholarly works of Rishis or Sages. The effort at modernising *panchang* was viewed by the siddhanthis in terms of tradition verses modern, that too a modern method based upon European sciences. 'Modern science may be acceptable for the material needs and progress in this world, but traditional *sastras* are crucial for observing one's *Dharma*', Siddanthis contented. Further, in Ragoonathachari's popularisation of modern astronomy they found another fault. Concepts of Modern astronomy did not match with the Puranic myths about celestial objects or events. For example, the popular puranic myth about the eclipse considered it to be an event linked with two serpents – *Rahu* and *Kethu*. The serpents swallow the sun (or moon as the case may be) to take revenge. As the Brahmins perform sacrament and make offering, *Rahu* and *Kethu* are pacified and they release Sun (or moon). However modern astronomy explains eclipses as natural occurrences linked to Earth, Sun and Moon's orbital geometry. Many naive siddhanthis barraged Ragoonathachary on such counts and chided him for being hand in glove with Europeans and accused him and his supporters of committing sacrilege of Hindu tradition.

Ragoonathachari countered by citing Aryabhata and other ancient Indian astronomers. Many other ancient astronomers and Aryabhata in particular had speculated about the nature of eclipses and provided a wholly natural account for the occurrences of eclipses and other celestial events. Ragoonathachari argued that modern astronomical thoughts like nature of eclipses, or that Earth being a spherical sphere floating in space were not purely European thoughts. Rather, much before Europeans, these were known to ancient Indian Rishis like Aryabhata. He could silence the Siddhanthis's naïve arguments by copiously quoting from their own founding Siddhantis like Aryabhata, Bhramagupta and so on.

What is most interesting is the way Ragoonathchary constructed his narrative while making these counter claims. He observes that "Solar eclipses are caused due to moon … (and) ….occurs only during the new moon day and not on any other time.... But, lay people wonder 'how can that be possible, during new moon, when the moon itself has waned for it to cause shadows that cover sun." They say 'what is said in the Puranas is true. The correct explanation is that the two demons, *Rahu* and *Kethu*, swallow the moon and the eclipse occurs'. This opinion is nothing else but erroneous." While scholarly personalities like Aryabhata well versed in mathematical methods, could understand the nature of the eclipses and other celestial events, Ragoonathachary argued that ignorant 'lay public' took the puranic myth as literal truth. He hastened to add that Puranic myths were made by great Rishis and hence were not false statements, but only that we should not take them literally. He recounted his discussion with the Seer of Abhilom Matt on the nature of puranic myths. The seer had maintained that the puranic myths are allegorical in nature and they subtly point to deeper truths and hence should not be taken too literally. Thus Ragoonathachary consciously constructed the dichotomous categories of 'wise men' and 'lay public'. It is the 'lay public' who literally make meaning out of Puranic Myths and spread ludicrous stories like Rahu and Kethu being serpents in the celestial region and so on. On the other hand 'wise men' like Aryabhat and in the modern times, astronomers, understand the true nature of the eclipses and other celestial phenomena.

Ragoonathachari did not cast himself as modern nor present his *Drigganitah Panchang* as a break from tradition. Rather he used the rhetoric of 'for the current times...' to explain his *Drig Panchang*. Observing that even in tradition it was customary to make *bija* correction to account for errors accumulated at a given point of time, his *Drigganitha Panchang* was merely an extension of such tradition of removing errors. By making the panchang to accord with the actual position of stars, moon and other celestial objects, he was doing no more than what scholars had done

in the past imploring *bija* corrections to original *vakya* formulas. Noting that traditional scholars had always interpreted the cannon texts to match their times, so must be the case with his *Panchang*.

He further notes that unlike other *sastras*, *jothisastra* could be practically observed and tested. Arguing that 'accuracy' is crucial and observation only could testify a *Panchang*. Ragoonathachary observes that the traditional *pramana* (evidence) includes 'inference'. This epistemic method is sanctioned by *sastras*. In using inference as a *pramana* (evidence) we are actually resorting to certain indirect observation to accord and attest what we are not able to directly examine. Therefore, Ragoonathachari argued that *Dristi* is a primary *pramana* (evidence) and hence the *Drig* system is superior. In this narrative of justifying *Drig* system, Ragoonathchari did not reject tradition, but found support within tradition.

Thus, in the rhetoric of Ragoonathchari, the colonial opposition of tradition/modern is dissolved. In place of tradition/modernity, a new binary of men of wisdom and lay public is manufactured, and thus in this new rhetorical demarcation between identity and difference, new power relations are assembled. In this framework modernity is called to transform old into new, lay public into men of wisdom, that is modernity is not the handmaiden of colonialism, but a mid-wife of 'modernising India'. Modernity henceforth will not be a colonial project, but 'national'; men-of-wisdom of this nation will now work to 'modernise' the 'lay public'. The elite's past tradition is taken to be unproblematic, whatever that could be 'naturalised' is recovered, and the rest is historicized or rationalised as not to be taken literally. 'Modern' will not be Western or break with the past in the reinscribed articulation, but temporally new continuation of the past and also a domesticated one.

Constituency of 'Public'

Though 'lay public' are demarcated and separated out from 'wise men', it is interesting to observe that the whole debate between *Drig* supporters and Siddhanthis was rhetorically addressed to the 'public'. By nineteenth century, it was no longer the case that the debates are settled by 'scholars' (pandits), but should be rational to 'pubic'. Although both sides did bring in testimonies from various 'pandits' (scholars) to attest their views, the testimonies themselves were not the object of evidence, but the arguments provided by the scholars were. Further, the debate spilled from scholarly forums into public sphere with newspaper, pamphlets and publications used as forums for debate.

During the 1880s, *Native public opinion*, a daily published from Madras was abuzz with letters from its readers on the debate. Traditional *Panchang* computers, native personalities of public standing and many others recorded their view on the subject. Some argued that Ragoonathachary's *Drigganitha Panchang* is good only for predicting eclipses precisely, but is yet to be proved suitable for calculating *tithi*, *nakshatra* and so on. Few others stated that Ragoonathacharya's *Drig* is complete in all respects, others stated that *Drig* system has no authority of established works of *Rishis* and hence this modern method could not be accepted. A section argued that while *Drig* is useful for actual observation of eclipses and so on, they doubted its utility with respect to religious rites and rituals or for computing astrological predictions. One of the clinching facts that turned the tide was the computation by Ragoonathachary of the 1868 total solar eclipse. While the prediction of the August 18, 1868 eclipse by Ragoonathachari was with an error of about 12 seconds, the error factor of even the best of Siddhantis was about 24 minutes.

Debates also ensued in the publications brought out by the protagonists. Ragoonathachari's almanacs carried detailed critique of the objections raised by various people. Siddhantis like Krishna Josiyar published pamphlets in which they presented their side of the arguments. *Panchang* makers aligned with either Ragoonathchari's *Drig* system or the traditional Siddanthi position. Traditional scholars like Venkatesvara Rayar who initially looked at *Drig* system with scorn, found the traditional siddhanti system inaccurate and at times totally erroneous in predicting events like eclipses. Therefore he switched sides and became a votary of the *Drig* system.

The fulminations by Siddhantis and *Drig* supporters in the public sphere culminated in acceptance of *Drig* system by both the Sankara Matt of Kanchipuram (then at Kumbakonam) and also the Vaishnavite matt of Sriperumpadur Ahobilam Matt. Sankara Matt and Ahobilam amongst themselves commanded respect over most of the Tamil elites. Ragoonathachary himself being a Vaishnavite could interject with the seer of the Sriperumpadur matt. The seer was convinced and accorded his support to Ragoonathachari's almanac. Ragoonathachari's friends, Venkatesvara Dikshitar and Sundaresa Sroutigal interacted with Sankara Matt. Venkatewsvara Dikshitar and Sundaresa Sroutigal had earlier experimented with Ragoonathachari's *Drig Panchang* and had found it to be accurate in the prediction of sun rise, moon rise and so on.

To discuss and arrive at an acceptable system of *Panchang* a meeting was called at Sankara matt at Kumbakonam. Astronomical and astrological scholars like Venkatesvara Dikshitar, Sundaresa Sroutigal and Krishna Josiyar engaged in a debate on the subject. Prominent public personalities

like Diwan Bahadur RV Srinivasa Iyer C.I.E., Inspector General of Registration, Rao Bahadur Appa Sastrigal and Appa Dikshidar, were appointed by the Matt to be arbitrators. Pointing out the substantial magnitude of errors in eclipse, moon rising time and so on found in the *Panchang* published by him, Krishna Josiyar was challenged in the sadas. Unable to meet the challenge, he left the sadas without providing any explanation for the discrepancies. Subsequently the sadas arrived at the conclusion that the *Drig* system needs to be followed and a new almanac to be prepared on those lines. Accordingly the *Acharya* (head pontiff), the head of the matt, issued a *srimugam* (message of blessing) in 1877 affirming that the Venketesvara Dikshitar and Sunderesa Sroutigal's decision is correct. From then on a *Drig* almanac began to be published under the auspices of Kanchi Sankaracharya Matt in the name of 'Sri Kanchi Math almanac'.

Thus, two dominant sects of Tamil society adopted the new almanac based upon *Drig*, which was 'scientific and precise'. Nevertheless with a view to assuage the feelings of the traditionalists, Ragoonathachary and *Drig* system adopted a compromise. Instead of putting back the commencement of the year by three days to accommodate the 3 degree and odd accumulation of anomaly, in their almanac they fixed the first point to coincide with the traditional *Panchang*.

Secular Panchang

Typically the traditional *Panchang* contains very many elements other than the intended five elements. Festival dates, temple carnival dates, important events like new moon day are highlighted. Many of these specific dates and times are important for undertaking specific rites and rituals. 'Appointed time' for performance of specific rituals are also listed. Often, predictive astrology is inserted and aspects like omens, good and bad days, auspicious days/time and so on are presented.

Ragoonathachary's *Drigganitha Panchang* differed from the traditional *Panchang* in not only the method of computation (*Drig*) but even in the contents embodied in the *Panchang*. While it retained number of useful and practical aspects like enumerating the festival dates, temple carnival dates and so on, it included copious details on various astronomical events. New moon, full moon and various astronomical events like occultation were listed in the *Panchang*. Details of Solar eclipse, Transit of Venus were discussed in detail.

Further, in the style of British almanacs, the Drigganitha *Panchang* also listed the government holidays and dates connected with the State ceremonies like queen's birthday and so on. Also abstract of railway timetable was provided. Even while retaining the traditional time /day divisions like *tithi*, *nakshtram*, *nadi* and so on, the *Drigganitha Panchang* provided equivalent concordance in terms of 'standard' 24 hours clock and 'English dates and months'. With the introduction of modern clocks and establishment of clock towers in various provincial towns, slowly the 'clock time' had come to hegemonise the social life. Though the traditional time divisions like *nadi* and so on were still in vogue, especially for conduct of rituals and rites, the practical time was cognised as 'clock time'. Thus *Drigganitha Panchang* was advantageous for the then emerging middle class, who were using the panchang and at the same time involved in the activities connecting with the colonial govenrment.

Hence, the *Drigganitha Panchang* gave the position of the bodies in true Indian style by taking *Mesha* as the starting point instead of vernal equinox. Like most traditional *Panchang* the *drigganita Panchang* also used solar sidereal year. However as the Drigganitha *Panchang* is based upon modern astronomy it takes the sidereal year to be 365-15-23 whereas the Siddhantas have been using sidereal years longer by about 8.5 vindai, resulting in the first point of Mesha itself having a progressive motion with reference to correct point, of one degree in about 420 years. This has accumulated to about 3 degrees today.

By winning over religious sects, engaging in public debates, organizing public events, publishing popular books accessible to the lay reader, Ragoonathachary was able to make a dent in the public opinion and could garner acceptance for the need to changeover. In fact it is noteworthy that the colonial government issued its order on the calendar standardisation only in 1878, well after the major religious sects accepted the *Drig* system.

Changing 'Times'

It is well established that the forces of modernity tend to create a rational secular world. Nowhere are the forces of modernity and materialism more strongly felt than in questions of measurements. Modern science, and in parts modern society, depends upon the possibility of correct calculations. The accurate measurement of length and mass, of voltage and current, of heat and pressure according to convenient and standardized scales is vital to science including applied science. The standard measures are vital to master and exercise control over the material world. In a capitalist society such measurements are also vital to the computation of inputs and outputs, profit and loss, capital, interest and rent. Measurement and ways of computing of Time is not left alone. In a colonial society the necessity to stan-

dardize measures are much more compelling; myriads of 'native' customs and practices of measurement makes colonial control difficult.

We experience time both as physical passage and as a social procession. For keeping count of the physical passage it is enough we tag it with an event (event time). For daily chores often we resort to 'event-time' (before breakfast, let's meet at lunch time, etc.); however for cultural-religious or for many modern day civil activities we need 'time-time' derived from appropriate 'clocks and calendars' (particular *tithi*, office time and so on). One of the hallmarks of modernity and industrial society is use of event-time progressively weakened and replaced by 'clock time' even in ordinary mundane daily activities (e.g., 'bake for 3.5 mts in a microwave oven').

'Time' is a vessel for both the sacred and the profane, social conventions and equivalents. Time, like space is a fundamental factor of the human condition. At the personal level, temporality is not extrinsic but rather constitutive of our being-in-the-world, and temporality is equally a parameter of social organization and social interaction. Time is not merely a 'physical' entity devoid of the social; 'time' results in everyday sequencing of activities which *reproduce* social organization. It also influences the pace and content of activities (holidays; time to go to school, etc.); and thus transformation of 'time' *produces* or seeks to produce new forms of organization and interaction.

Often one is not cognisant of 'time' as a fundamental structure relating the human being and the human group to the environment unless there is a rupture in temporality. Such ruptures often result in radical shift in the quantitative and qualitative temporalization of social activities.

Customary gifts, obligations and rights of each community constituted the social and economic relation in an ideal feudal set-up. Periodicity for such gifts, obligations or payment was not monthly or weekly wages, but linked to certain religious-cultural events (like Pongal in Tamil region) or socio-cultural occasions (such as marriage). However, with the emergence of modern industrial society under the colonial tutelage 'time' became an instrument of measure of labour. From then on it became necessary to calculate the cost, and therefore the length of any given activity. Working time, that of labourers, clerks and in general most of the working population, became gradually contractual, as fair exchange is not possible without calculating and measuring. In the new social order compensation is not for the 'work done' but for the 'time worked'.

Organization of modern society rests upon 'clock time'; school time, weekly holidays, office time, lunch hour and so on. Thus, the calendar reform was not only a colonial project of mastery over the 'native cosmos' through the instrument of standardization, but also a necessary condition for the 'native society', in particular aspiring native elites to adjust to the then emerging modern capitalist society.

The shift from the 'sacred' to 'secular' time that the *Drig Panchang* signifies is a rupture in the 'ordinary' time. While the 'ordinary' time, with its everyday sequencing of activities just reproduces existing social organization again and again, 'extraordinary time' produces or seeks to produce new forms of organization and interaction. The secularization of time, embodied in the *Drigganita Panchang* engendered an 'extraordinary time' during the nineteenth century Tamil Society. The *Drig Panchang* accommodated the needs of industrial society -'clock time' (railway time, working time in modern offices and so on) and created a new way of looking at material compensation from the employer – transition from customary gifts & rights to payment of wages according to 'time worked'.

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