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ON THE EPOCH OF THE KOLLAM ERA

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Abstract: It will be shown that the correct epoch of the Kollam Era is CE 25 July 824, Julian Calendar.

Keywords: Kollam era, Malayalam Calendar, *Sûryasiddhânta*

1 INTRODUCTION

The Malayam Calendar or Kollam Era, also known as Kollavarsham, is a solar and sidereal Hindu calendar used in the Malabar of Kerala and the Tirunelveli District of Tamil Nadu in India. The epoch of the calendar has been dated as CE 824 (Pothu Varsham) at Kollam with the first year of the calendar being year zero. Dr K.V. Sarma (1996) claims in a paper that the epoch of the Kollam Era is CE 25 August 824, Julian. Unfortunately this date is one month in error and there are also some more errors in the first paragraph of Sarma's paper. Below I will show that the correct date is CE 25 July 824, Julian.

2 PRELIMINARY INVESTIGATION

The epoch of the Kollam Era is the sidereal entry of the Sun in the zodiacal sign of Leo, at longitude 120° in CE 824. Using any modern astronomy program shows that the tropical longitude of the Sun on 25 August that year was about 156°. The difference between the tropical and sidereal longitudes was approximately zero at the time of the introduction of the original *Sûryasiddhânta* around CE 500 (Billard, 1971), and would then grow by about 1.4° per century because of precession. By the time CE 824, 3.24 centuries later, the difference amounts to about 4.5°. Thus, the sidereal longitude of the Sun on CE 25 August 824 was around 150°, a whole zodiacal sign away from Leo, and this date cannot be correct even by this crude investigation.

3 DETAILED COMPUTATION

I will now compute the time of the entrance of the sidereal Sun into Leo on CE 824. I will start with the result and verify that it is correct. The entrance, according to the *Sûryasiddhânta,* occurred on Julian Day 2022229.344 or CE 24 July 824 at 20:15 from midnight, Ujjain time.

The Kaliyuga Epoch is midnight CE 18 February –3101 (3102 BCE), Ujjain time. This corresponds to Julian Day 588456.5 in reference to Ujjain's longitude. According to the *Sûryasiddhânta*, the mean longitude of the Sun at the epoch is 0° and the Sun makes 4320000 revolutions in 1577917800 days, i.e. its daily motion is $432000 \cdot 360 / 1577917800 = 0.98560267…°$. The number of elapsed days since the epoch is $2022229.344 – 588456.5 = 1433763.844$. The mean solar longitude at the specific date is then $(1433763.844 \cdot 0.98560267)$ MOD $360 = 121.476°$. The longitude of the apogee (*mandocca*) of the Sun is 80° and the correction to the mean longitude, the equation, is $\arcsin(14/360 \cdot \sin(121.476° – 80°)) = 1.476°$. The true sidereal longitude of the Sun is then $121.476° – 1.476° = 120.000°$ (Leo).

As the entrance in Leo occurred late in the day, the first year of the Kollam Era would start at mean sunrise the next day, CE 25 July 824.
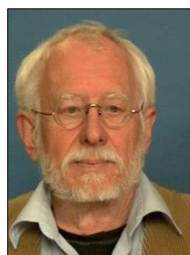
4 DISCUSSION AND CONCLUDING REMARKS

There are a few more errors in Sarma's paper. He claims that the difference between the Julian and Gregorian Calendars is ten days, which was true for the time of the introduction of the Gregorian calendar in CE 1582 by Pope Gregorius XIII. However, this difference is not constant, and for the year CE 824 it was only four days. Additionally, in order to go from the Julian to the Gregorian Calendar this difference should be added to the Julian date while Sarma subtracts it and gets the proleptic Gregorian date for the epoch as CE 15 August 824. The correct proleptic Gregorian date of the epoch is CE 29 July 824. I think that Sarma was misled by the fact that the current start of the Kollam New Year occurs around 15 August Gregorian.

5 REFERENCES

Billard, R., 1971. *L'astronomie Indienne: Investigation des Textes Sanskrit et des Données Numériques*. Paris, École Française d'Extrème-orient.

Sarma, K.V., 1996. Kollam era. *Indian Journal of History of Science*, 31, 93–99.

Dr Lars Gislén is a former lector in the Department of Theoretical Physics at the University of Lund, Sweden, and retired in 2003. In 1970 and 1971 he studied for a Ph.D. in the Faculté des Sciences, at Orsay, France. He has been doing research in elementary particle physics, complex systems and applications of physics in biology and with atmospheric physics. During the past twenty years he has developed several computer programs and Excel spreadsheets implementing calendars and medieval astronomical models from Europe, India and South-East Asia (see http://home.thep.lu.se/~larsg/).