

PROJECT REPORTS

STONE INSCRIPTIONS AS RECORDS OF CELESTIAL EVENTS*

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Stone inscriptions have been of great help in constructing the history of the land, tradition and culture and are considered as valuable as the literary records, coins and travelogues. The study is mainly based on *Epigraphia Karnataka* and *Kannada University Epigraphical Series* for South Indian inscriptions and other titles. The records of stone inscriptions date back to 3rd century BC. Stone inscriptions in general are engraved to mark special occasions to gift, donate or offer charity. Over 50% of the inscriptions cite charities made on the event of the eclipses. They were engraved to leave a permanent record of the gifts/donations and grants given by the kings, their feudatories, chiefs and village headmen. A good number of them record the heroic deeds of soldiers and commoners fighting with the enemies, wild animals during hunting. In some cases they mark the self-immolation of ascetics, widows and devotees. They are written in different languages. Dated inscriptions serve as important documents of celestial events. Here an attempt has been made to document the celestial events provided by these inscriptions and verify the actual dates. In this study, we have compiled the events from the stone inscriptions published in different volumes, restricted to the region of Karnataka State and adjoining parts of South India, putting the language, Kannada, as the selection parameter. It includes some Sanskrit inscriptions written in Kannada script also. The study was carried out under the following chapters.

- I. Introduction
- II. Inscriptions as Astronomical records

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- III. Methodology adopted for the search of Astronomical content
- IV. Solar eclipses
- V. Lunar eclipses
- VI. Concept of *Vyātipata*
- VII. Records of Planetary Configuration
- VIII. Concept of Solstice
- IX. Calendar System
- X. Conclusion

Many inscriptions reflect the cult of Sun worship in South India. The Sun worshippers considered self-immolation on the day of the eclipse as the most auspicious act for achieving salvation. Thus there are over 10,000 eclipses documenting the event of self-immolation, stating the date of eclipse. The third category of events documented cites the martyrdom of war heroes. The occasion for engraving such an inscription was chosen as the nearest event of eclipse. This category also includes people killed during a fight with a wild animal like tiger to save the fellow travelers. It also includes a small number of events of self immolation of a widow “*Sati*” upon the untimely death of her husband in a war or otherwise.

In this study all astronomical events like eclipses – solar and lunar, as well as the mention of solstices – winter and summer – used for verification with the modern method of extrapolated calculations. Fortunately, the most versatile soft-wares and tables available have been used for carrying the task. There are many stone inscriptions giving the position of planets apart from Sun and Moon. They also serve as important milestones. Some examples of planetary groupings in the sky also are available. Possible indications on comets also are seen in a couple of cases.

About 10000 inscriptions were studied out of which only 1100 were found useful for extracting meaningful information (Table 1 & Fig. 1). The difficulties arose because of differences in language style, incomplete descriptions, errors in details and damages to the stone. A few cases where details have been medaled also are identified, especially with copper plate inscriptions in possession of individuals (not displayed to the public).

The outcome of this work throws light on the depth of knowledge on astronomy. While it was very well known that they had the requisite mathematical knowledge, the exact mode of application still remains a mystery. Of the thousands of inscriptions available, those which can be used conclusively have been segregated. There are many examples of eclipses which are cited in the inscriptions in the eastern part of India but only in the

Table1. Volumes of stone / copper inscriptions used for the study with the total number of inscriptions in each and those with records of celestial events

Volume Name	Volume Short Name	Total Number of Inscription in the volume	Number of useful inscriptions
<i>Epigraphia Carnatica</i> Volume-1 - Kodagu District	EC-1	106	14
<i>Epigraphia Carnatica</i> Volume-2 - Hāsana District-I (Śravaṇabelagola)	EC-2	573	23
<i>Epigraphia Carnatica</i> Volume-3 - Mysūru District-I	EC-3	786	87
<i>Epigraphia Carnatica</i> Volume-4 - Mysūru District-II	EC-4	932	19*
<i>Epigraphia Carnatica</i> Volume-5 - Mysūru District-III	EC-5	667	28
<i>Epigraphia Carnatica</i> Volume-6 - Mandya District-I	EC-6	499	39
<i>Epigraphia Carnatica</i> Volume-7 - Mandya District-II	EC-7	566	42
<i>Epigraphia Carnatica</i> Volume-8 - Hāsana District-II	EC-8	585	49
<i>Epigraphia Carnatica</i> Volume-9 - Hāsana District-III	EC-9	645	65
<i>Epigraphia Carnatica</i> Volume-10 - Hāsana District-IV	EC-10	471	35
<i>Epigraphia Carnatica</i> Volume-11 - Chikkamagalūru District -I	EC-11	414	29*
<i>Epigraphia Carnatica</i> Volume-12 - Chikkamagalūru District -II	EC-12	467	24
<i>Epigraphia Carnatica</i> Volume 12 (Rice Volume) - Tumakūru District	EC-12 (Old)	686	66

Volume Name	Volume Short Name	Total Number of Inscription in the volume	Number of useful inscriptions
<i>Epigraphia Carnatica</i> Volume 13 - Śivamogga District	EC-13	418	29
Kannāḍa University Epigraphical Series - 1 - Ballāri District	EKU-1	635	199
Kannāḍa University Epigraphical Series - 2 - Koppāla District	EKU-2	388	60
Kannāḍa University Epigraphical Series - 3 - Hampi (Ballāri District)	EKU-3	420	25
Kannāḍa University Epigraphical Series - 4 - Kannāḍa Inscriptions of Tamil Nāḍu	EKU-4	145	14
Kannāḍa University Epigraphical Series - 5 -Part 1 - Kannāḍa Inscriptions of Āndhra Pradesh	EKU-5 - Part 1	362	91
Kannāḍa University Epigraphical Series - 5 -Part 2 - Kannāḍa Inscriptions of Āndhra Pradesh	EKU-5 - Part 2	262	97
Kannāḍa University Epigraphical Series - 6 - Kannāḍa Inscriptions of Mahārāshtra	EKU-6	177	79
Kannāḍa University Epigraphical Series - 7 - Rāyachūru District	EKU-7	418	80
Kannāḍa University Epigraphical Series - 8 - Bīdar District	EKU-8	195	34
Kannāḍa University Epigraphical Series - 10 - Bijāpura District	EKU-10	419	180
Total		11236	1408

west and vice versa. On verification it was found that in reality the eclipse was not visible in the relevant parts. Similarly, in case of lunar eclipse visible from the other side of the globe, the word *vyātipata* is used. Many instances of penumbral eclipses are recorded as *vyātipata*; this is quite understandable since they cannot be verified easily by observations. Citations of many planetary conjunctions have been found – this was difficult to resolve since the same word *vyātipata* is used here too. The positions of planets near the stars and near other planets are also identified.

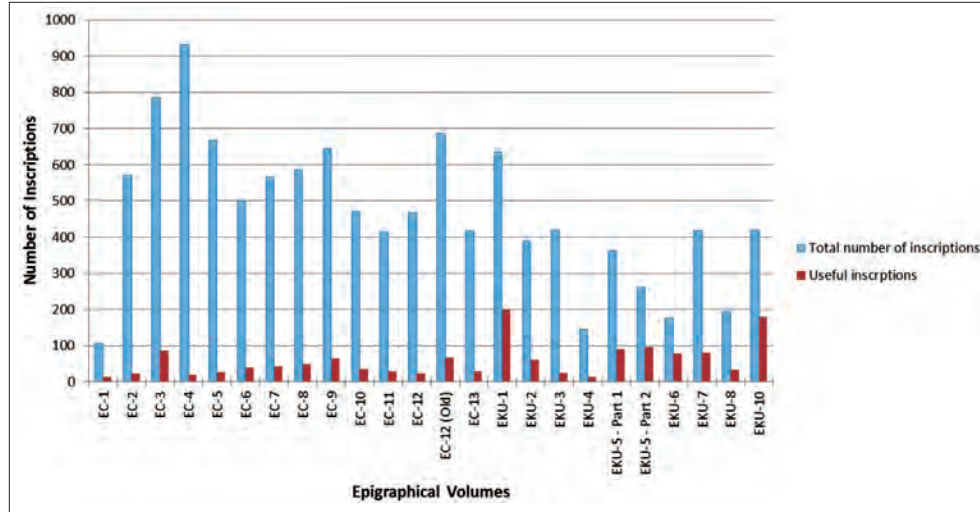


Fig. 2. Volumes of stone / copper inscriptions used for the study with the total number of inscriptions in each and those with records of celestial events

An extension of this study can precisely fix the shadow path of the moon during solar eclipses. This in turn will allow a comparison with modern extrapolations, which are based on a standard model of the variation of the precession correction. A second order variation should be observable by including more records from a broader geographical coverage.

Conclusion

Amongst all the special dates, the term *Vyātipata* appears to be special. This word is used in two different contexts. One of the five aspects of the ephemeris is called *yoga* similar to *tithi*. There are 27 of them and the 17th is called *Vyātipata*. This has no astronomical significance as is defined today, because it is a simple count of the remainder one gets by adding the longitudes of the sun and moon and dividing the sum by 13. When we look at the inscriptions they seem to refer to another definition – it is the instant at which the declination of the sun and the moon are equal in magnitude. The need for the observation of this lies in the challenge they faced – namely making a perfect luni - solar calendar which in turn predicted the eclipses. In modern technical terms, *Vyātipata* is an indicator of the maximum declination difference possible for the moon with reference to the sun.

This idea becomes very clear when we notice that the inscriptions show eclipses which were not observable from India. It is very clear that the dates were declared as eclipse dates based on only calculation. To arrive at that conclusion, a rigorous monitoring of the differences in the north – south coordinates of sun and moon need to be taken up on a regular basis. This study throws light on the observations that were used for precise calculation of the positions of the celestial bodies.

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