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On the Wrong Dates in the Colophons of Tamil Nadu Manuscripts: Data, Observations, Interpretative Hypotheses

Marco Franceschini

For some years now, Giovani Ciotti and I have been working on a research project on scribal colophons and loan notes recorded in palm-leaf manuscripts from Tamil Nadu, the main objective of which is to shed new light on the production and circulation of manuscripts in that region.[1] In the course of the project, we created a large database that now contains almost a thousand paratexts, about half of which contain a date: this paper is concerned precisely with dates, or rather, 'wrong' dates, and aims to examine the incorrect calendrical values that make them such – how many there are, what they are, why they are there. What will be said from here on is based on the data collected in our database and the considerations inspired (and, not infrequently, imposed) by the research for which that data was collected; the use of "we" and "our" in this paper refers to the co-authorship of that research and the database it produced. This article can be divided into three parts, the first one preparatory to the following two. The first section will specify the methodological tools needed to select the data that will be presented in the subsequent sections: first, a definition of the criteria – correctness and incorrectness of dates, degrees of convertibility – on the basis of which it will be possible to divide dates into categories and to select the wrong dates that are the object of this study; secondly, the methods for identifying the calendrical data that are at the origin of the inaccuracy of those dates will be established. The wrong calendrical values constitute the subject of the second section of the paper: the analysis of the quantitative data, presented in tabular form, will provide the opportunity to propose some considerations regarding the possible reasons for the presence, consistency and distribution of errors in the dates. In the third section,

1 See Buriola Meneghin, Ciotti & Franceschini forthcoming, Ciotti 2022, Ciotti & Franceschini forthcoming, Ciotti & Franceschini 2016, Franceschini 2022.

reflections will be presented on the structure of the dates, but also on the sources and the ways in which the dates and their calendrical elements were known in Tamil Nadu between the early 17th and early 20th centuries.

1. Definitions and Methods

1.1. Correct dates, wrong dates: definitions

The first section of this paper is eminently definitional, classificatory and methodological in nature. Its purpose is to provide the theoretical coordinates to determine: 1) which dates contain errors; 2) how and in which cases it is possible to identify the calendrical element that is the cause of a date's incorrectness.

The first question that arises is that of defining correctness and inaccuracy, in order to draw a dividing line separating dates the calendrical data of which have been correctly recorded by the scribe from those that, on the other hand, contain errors. In our research on colophons (and, consequently, also in this paper), a date is considered correct, i.e. free of errors, if *at least one day* (or part of a day) can be found *in a calendar* in which all the calendrical values therein recorded occur simultaneously; on the other hand, a date is considered incorrect, i.e. containing one or more errors, if it is not possible to find a day (or part of a day) in a calendar in which all the calendrical values therein recorded are simultaneously current. Thus, according to this definition, the calendar is the touchstone against which the correctness of dates is tested. Yes, but which calendar?

1.2. Calendars: the Gregorian calendar

The most obvious option is to use the *pañcāṅga*s, the traditional Indian annual calendars, which we can assume were the reference tool for the scribes themselves in determining the values in the dates (see below). But the use of *pañcāṅga*s as a reference calendar is problematic for two reasons: firstly, because only a few of the annual *pañcāṅga*s from the period under consideration here have come down to us; secondly, because, even when extant, these *pañcāṅga*s are available only in manuscript form, with the consequent difficulties of consultation and the presence of gaps due to deterioration of the palm leaves. In addition, and more generally, one must bear in mind that the dates collected in our database are based on five different Indian systems of counting years (Jovian cycle, Kollam era, Śālivāhana-Śaka era, Kali era, Christian era), each of which fixes the point of origin of its numbering at a different time;[2] the Jovian cycle system, indeed, lacks

2 The Kollam era is made to begin in 825 CE, the Kali era in 3102 BCE, the Śālivāhana-Śaka (or Śaka) era in 78 CE. The years of the Kollam era are solar and current (i.e. the

a 'zero year', as it counts years on the basis of recurring cycles of sixty years each.[3] Such a plurality of different and heterogeneous calculation systems makes it convenient to convert all dates into a single calendar, in order to transform them into mutually congruent and commensurable quantities, which we can then place on a single timeline and compare with each other, irrespective of the system originally used for computing years. From this perspective, the use of *pañcāṅga*s as a reference calendar seems inconvenient, since in Tamil Nadu these traditional calendars use the non-linear (i.e recurring) Jovian cycle year as their primary system of counting years (see below, § 2.3.1). Instead, it was decided to convert all dates to the Gregorian calendar, and this for two reasons: firstly, the Gregorian calendar is the calendar officially adopted by most nations today (including the Indian Republic); secondly, it is the only one of the five calendars used for manuscript dates that is still commonly used today. For the conversion of manuscript dates to the Gregorian calendar, the Ephemeris of Swamikannu Pillai (Pillai 1915 and Pillai 1922) were used.

1.3. Correctness and actual correctness

Let us return to the distinction between correct dates and incorrect dates. By supplementing the definitions given at the beginning of this section with what we added later, concerning calendars, we can now define a correct date as a date whose calendrical data occur simultaneously on *at least one day* of the Gregorian calendar; conversely, a date is incorrect if the calendrical data it contains do not occur simultaneously on any day of the Gregorian calendar. Nearly all dates are wrong because some of their values conflict with each other (e.g. "30 June 2024, Saturday", whereas 30 June 2024 was a Sunday); although very rare, there are also dates that are wrong because they contain invalid values (e.g. "31 June 2024"; see § 2.1 below).

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first year of the series is counted as 1); the years of the Kali and Śālivāhana-Śaka eras, which elsewhere in India are luni-solar and expired (i.e. the counting of years begins with year zero), are solar in Tamil Nadu and, not infrequently, current (Pillai 1922 I.1: 53–54).

3 The so-called 'Jovian cycle' in use in Tamil Nadu has no connection with the movement of the planet Jupiter: it is, instead, a recurring series of sixty solar years, each marked by a name; at the end of the last year, the series resumes from the beginning. The only connection with Jupiter is represented by the names assigned to the years, which are the same names that were used in northern India to designate the years of a cycle of sixty 'true' Jovian years, the duration of which corresponded to the time taken by Jupiter to cross a sign of the zodiac (i.e. an arc of 30 degrees or 1/12 of a Jupiter revolution) (Pillai 1922 I.1: 50–51).

Before going any further, it is necessary to clarify that dates in Tamil Nadu manuscripts may contain a highly variable number of calendrical values, ranging from one to 15 and more. In this article, however, only the 'main' calendrical elements will be considered, those that allow us to determine the correspondence of the date with a day in the Gregorian calendar, and thus its correctness or incorrectness: year (Jovian, Kollam, Śālivāhana-Śaka, Kali, Christian: *saṃvatsara*, *varṣa*, *abda*), month (solar and lunar: *māsa*, *mācam*), day of the month (henceforth, simply "day": *dina*, *tēti*, *tikati*), day of the week (*vāra*, *vāsara*, *kiḻamai*), fortnight (*pakṣa*), *tithi* (1/30th of the lunation),[4] *nakṣatra* (constellation).[5] On the other hand, minor calendrical elements (such as *yoga*, *karaṇa*, *lagna*, *velā*, *muhūrta*, etc.) will not be taken into account since, being current only for a short portion of the day, their correctness or incorrectness cannot be established.[6]

1.4. Degrees of convertibility

Of the 952 colophons collected in our database, 540 contain a date; of these dates, 481 (89%) are correct, 59 (11%) contain errors. All correct dates can be divided

4 The duration of a *tithi* corresponds to 1/30th of the lunation, so in a lunar month there are 30 *tithi*s. The Indian tradition does not number the *tithi*s continuously from 1 to 30 but divides the lunation into two fortnights (*pakṣa*s): since the lunar month is started on the first day of the new moon, we will have 15 *tithi*s in the 'bright fortnight' (*śuklapakṣa*) followed by 15 *tithi*s in the 'dark fortnight' (*kṛṣṇapakṣa*). Therefore, the placement of a *tithi* within a complete lunation is only known to us through the combination of two values: that of the *tithi* and that of the *pakṣa* in which the *tithi* is placed. The expression 'lunar day', used in various publications to refer to the *tithi*, is ambiguous, as in other contexts it is used to denote the entire lunation (i.e. the entire synodic lunar month): for this reason, the term *tithi* will be used in this article.

5 Originally, the value of the *nakṣatra*s was determined by the transit of the moon across 28 divisions of the ecliptic (the 'lunar zodiac'), each identified by the presence of a group of stars (*nakṣatra*, precisely). Already in ancient times, however, the *nakṣatra* became a purely formal value, equal in duration to that of the moon's transit across 1/27th of the ecliptic. As the original link between the value of the *nakṣatra*s and the constellations has thus disappeared, the Sanskrit word *nakṣatra*, which also has a strong astrological connotation, has been preferred in this study to the English 'constellation'.

6 As an example, a colophon whose date contains all the main calendrical elements reads as follows: *1021 [symbol for "Kollam year"] viśvāvasusaṃvatsaraṃ poṭṭāci [symbol for "month"] 19 [symbol for "day"] veḷḷikkeḻamai śuklapakṣattu dvitiyai – svātīnakṣatraṃ – yinta śubhadinattil vedāntācaryyar īṭupāṭu eḻuti mukintatu – || periyanampi veṅkaṭācāriyar svahastalikihitaṃ – muḻuvatum*, "In the Kollam year 1021, Jovian year Viśvāvasu, month of Poṭṭāci, day 19, Friday, 2nd [*tithi*] of the bright fortnight, under the constellation of Svātī, on this auspicious day, the *Īṭupāṭu* of Vedāntācaryyar was fully copied. The *periyanampi* Veṅkaṭācāriyar copied with his own hand. It is complete" (EO0003c).

into three groups on the basis of their 'degree of convertibility'; this tripartition will be useful for the detection and study of errors in dates. The dates in the first group, which we shall call 'single-match dates', correspond to a single day of the Gregorian calendar; the dates in the second group ('multiple-match dates') correspond to two or more non-cyclically recurring days of the Gregorian calendar; the dates in the third group ('cyclical dates') may correspond to a theoretically infinite number of days that recur at regular intervals.

Single-match dates account for about half of all the dates in our repertoire (266 out of 540): more than a quarter of these dates (74 out of 266, 28%) consist only of the Kollam year, solar month and day, but the remaining ones include a larger and more varied number of calendrical elements.

The multiple-match dates, of which there are only 23 (out of 540, 4%), can have a very varied structure: for example, dates made up of the Kollam year, month and day of the week belong to this category (as they correspond to four or five days of the Gregorian calendar) or dates including only the Kollam year and the month, but not the day (and can therefore correspond to any day of that month in that year).

Finally, the cyclical dates (192 out of 540, about one third of the total) are for the vast majority made up of the Jovian cycle year (which, let us remember, occurs every sixty years), the month (solar or lunar) and the day or, much more rarely, the *tithi*.

1.5. Chronological limitation

It should be noted here that the conversion of dates in the Gregorian calendar takes place in different ways for dates that contain a year expressed according to a linear counting system (Kollam, Śālivāhana-Śaka, Kali, Christian eras) and for those in which only the Jovian cycle year is specified.

The years of the Kollam, Śālivāhana-Śaka and Kali eras have an unambiguous numerical correspondence with two consecutive years of the Gregorian calendar, of which they cover the last and first months respectively; obviously, the years of the Christian era coincide with those of the Gregorian calendar. Therefore, we can place dates that record (at least) one of these years within a specific twelve-month interval of the Gregorian calendar by means of the year value alone, and then further specify the conversion with the help of the other calendrical information contained in the date. In contrast, a Jovian cycle year corresponds to several intervals of twelve months of the Gregorian calendar, recurring every sixty years; therefore, the conversion of dates in which only the Jovian cycle year is recorded proceeds by trial and error, seeking for each occurrence of the Jovian cycle year a day of the Gregorian calendar on which all other calendrical data specified in the date is current. In our study, we considered it appropriate to delimit the time span of these searches, based on the chronological distribution of the 266 single-match dates collected in our database (i.e. correct dates that correspond to a single day of the Gregorian calendar). Since all these dates fall between the early 17th century and the early 20th century CE, we assumed that this is the time span during which most of the Tamil Nadu palm-leaf manuscripts that have come down to us were written. Expanding, out of caution, this time span by about half a century in either direction, we have decided to consider plausible only those dates that, converted to the Gregorian calendar, fall between the mid-16th century and the mid-20th century. In our research, therefore, the conversion of dates based solely on a Jovian cycle year is restricted to this chronological interval, and the possibility that such dates correspond to a day before the mid-16th century or after the mid-20th century is excluded by the conversion procedure adopted. Therefore, in light of the above, an inaccurate date must be (re)defined as a date whose calendrical data do not occur simultaneously on any day of the Gregorian calendar *within the chronological interval 1550–1950* CE.[7]

2. Errors

2.1. Which dates can be wrong?

In this section of the paper, we will present and discuss the data concerning errors in dates, which were obtained using the procedure just described. In general terms, the data can be summarised as follows: of the 952 colophons currently collected in our database, 540 contain a date; of these 540 dates, 59 contain an error. But which dates may contain errors?

As a rule, the error in a date consists of the irreconcilability of one (or more) calendrical values with the other values recorded in the date: therefore, only dates that contain at least two calendrical values can contain errors. In our database, there are only three dates that record only one calendrical value (and which, therefore, cannot be wrong).[8] It should be emphasised that dates that contain two or three calendrical elements have a very low probability of being incorrect, because the elements they contain are very unlikely to conflict with each other. In our database, dates that contain two or three calendrical elements always consist of year (Jovian or Kollam), solar month and day (or only two of these elements):[9]

7 Dates prior to the introduction of the Gregorian calendar in 1582 are calculated according to the so-called 'proleptic Gregorian calendar'.

8 The single calendrical value recorded in the three dates (IFP RE15532β, IFP RE15554β, IFP RE37119α) is always the Jovian cycle year.

9 The only exception is a date (MORI P3332α) that contains only the Jovian cycle year and the Kollam year: since the two years actually co-occurred over an interval of several months, the date is correct (and belongs to the 'multiple-match date' type).

such a date can only be inaccurate if it contains an invalid value, e.g. if the day number exceeds that of the last permissible day for the month with which it is associated. In fact, this error is found in only one date,[10] although there are 206 dates consisting of two or three calendrical elements, more than a third of the total.[11] More precisely, dates containing two calendrical elements are only 20, whereas dates containing three calendrical values represent by far the largest group in our database; they mostly consist of year (Jovian or Kollam), month (solar or lunar), and day (see below, § 3).

All in all, therefore, almost all errors (58 out of 59) are found in dates composed of four or more calendrical elements: in these dates, at least one further element has been added to the 'nuclear triad' consisting of year, month, day, which is very often represented by elements of the *pañcāṅga*s: day of the week, fortnight and *tithi*, *nakṣatra* (see below, § 2.3.3). These additional elements serve as control data: their presence makes it possible to ascertain the correctness of the date by verifying that all (four or more) values recorded in the date occur simultaneously on a day of the Gregorian calendar. Hence, we shall henceforth call 'verifiable dates' those dates in which at least one control value appears.

We can now (definitively) update the general data provided above: the database contains 952 colophons, 540 colophons contain a date; 285 dates are unverifiable (because they contain only one, two or three calendrical elements) and, of these, only one is wrong (because one of its values is invalid, see footnote 10); the remaining 255 dates are verifiable and, of these, 197 are correct while 58 contain at least one wrong value.

Table 1 (see p. 260) contains the data, extrapolated from our database, on the errors attributable to individual calendrical elements. Before analysing them in detail, it is necessary to clarify to what extent and by what process errors in dates are ascribed to one calendrical element rather than another.

2.2. What is the error?

It has been said that we consider a date that does not correspond to any day in the Gregorian calendar to be incorrect; but, in contrast to the simplicity of this definition, it is not at all easy to know what the wrong value is in an incorrect date. Indeed, since we do not know the day to which the wrong date should correspond,

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10 The date (VM 2.25a) records "year Kollam 1050, month of Kārttikai, day 31", but the month of Kārttikai can only count 29 or 30 days.

11 To this number must be added that of the relatively numerous dates, which contain only one or two calendrical values, but which can be expanded by incorporating the information provided by the scribe in another, larger date recorded in the same or another colophon of the same manuscript.

	Certainely wrong	%	Possibly wrong	%	Occurrences (out of 255 verifiable dates)	Occurrences (out of all 540 dates)
Śālivāhana-Śaka year	5	35.7	1	7.1	14	16
Kali year	3	27.3	1	9.1	11	11
Christian year	0	–	1	8.3	12	12
Kollam year	8	7.4	2	1.9	108	193
Jovian cycle year	0	–	4	1.9	206	350
Solar month	0	–	1	0.4	235	497
Lunar month	1	5.3	2	10.5	19	37
Day	8	3.5	10	4.4	226	475
Day of the week	11	5.4	10	4.9	203	211
Fortnight (*pakṣa*)	1	1.4	0	–	74	83
Tithi	4	2.9	6	4.3	138	148
Nakṣatra	11	7.1	4	2.6	156	160

Table 1: Number of errors and occurrences in the dates of each calendrical element. Percentage values are calculated in relation to occurrences in verifiable dates.

how do we know what the wrong value is on that date? The answer is that, in most cases, we do not know for sure. In fact, we attribute the error to a given calendrical value by means of a procedure based on the (arbitrary, but common sense) assumption that it is less likely to get the value of a long duration element wrong than that of a shorter element, since we have a more certain and precise knowledge of the former; in particular, that it is less likely to get the current year wrong than the current month, and the current month wrong than the calendrical elements of shorter duration (day, day of the week, *tithi*, *nakṣatra*), the latter all being placed on the same level.[12] Let us give a few examples to clarify how the error in a wrong date is searched for and detected.

It was said earlier (see footnote 10) that the date "year Kollam 1050, month of Kārttikai, day 31" is wrong because the month of Kārttikai can only have 29 or 30 days, never 31: to which calendrical element do we attribute the error? We must certainly absolve the year, because Kārttikai never has 31 days, regardless of the current year; but the error can similarly be imputed to the month (assuming Kārttikai was recorded in error instead of a month that can have 31 days) or to the day (assuming the scribe wrote "31" instead of a lower number). On the basis of the principle stated above, according to which the wrong value is more likely to

12 The duration of a *tithi* and a *nakṣatra* differs by a few minutes from that of a solar day: a *tithi* is slightly shorter, a *nakṣatra* slightly longer (Pillai 1922 I.1: 3, 8).

be that of the shorter element, we attribute the error to the day. Note that for the error of this date, we are unable to advance an amendatory hypothesis, as we have no arguments for preferring one particular correction to another: the number "31" could equally well have been misspelled instead of "30" or "3" or "1", to give a few examples.

Much more frequently, however, the identification of the wrong value in a date allows us to make amendatory hypotheses that enable us to reconstruct the date the scribe intended to record. Take for example the date "year Kollam 1027, month Paṅkuṉi, day 15, Friday, *nakṣatra* Rohiṇī",[13] which does not correspond to any day in the Gregorian calendar. Following the principle stated above, we assume that year and month are correct and look for the error in one of the shorter calendrical elements: day (15), day of the week (Friday), *nakṣatra* (Rohiṇī). The procedure involves changing, in turn, the value of one of the calendrical elements while keeping the others unchanged, in the search for a combination that makes the date correspond to a day in the Gregorian calendar: changing the value of the day of the week and that of the *nakṣatra* does not allow us to arrive at a solution; but if we correct the value of the day from "15" to "14", all the values in the date correspond in agreement to 26 March 1852 CE. We assume, therefore, that the wrong value was that of the day and propose to amend it from "15" to "14".

Let us now take as an example the date "Jovian cycle year Vikrama, month of Kārttikai, day 24, Friday, 13th *tithi*, *nakṣatra* Cuvāti".[14] The search procedure is the same as in the previous example, but whereas in the previous date the year was expressed in the Kollam era, which has a fixed correspondence in the Gregorian calendar (Kollam year 1027 = 1851/1852 CE), on this date the year is given according to the Jovian cycle system: therefore, the search procedure will have to be repeated for every occurrence of the Jovian cycle year Vikrama in the chronological interval 1550–1950 CE (Jovian cycle year Vikrama = 1580/1581, 1640/1641, 1700/1701, 1760/1761, 1820/1821, 1880/1881). At the end of these attempts we arrive at the observation that by correcting the value "Cuvāti" of the *nakṣatra* to "Vicākam" the date corresponds exactly to 5 December 1760 CE.

Finally, there are dates that, by correcting different values, can be made to correspond to different days of the Gregorian calendar[15] and other dates that, on

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13 *1027 [symbol for "Jovian cycle year"] paṅkuṉi [symbol for "month"] 15 [symbol for "day"] veḷḷikkeḻamai rohiṇīnakṣatrattil* (EO 0127α).

14 *vikiṟamavaruṣa kāṟttikai [symbol for "month"] 24 cukiṟavāramun tiṟiyoteciyum cotinaṭcattiramuṅ* (BnF Indien 199).

15 For example, the date "Jovian cycle year Prajāpati, Tai month, day 26, bright fortnight, 12th *tithi*, Monday" (*prajotpatti [symbol for "Jovian cycle year"] tai [symbol for "month"] 26 [symbol for "day"] pūrvapakṣattu dvādeśiyum somavāsara[[…]]ttu ṉāḷ*, VM 4.2b) can

the other hand, require the correction of two or more calendrical values in order to correspond to a day of the Gregorian calendar.[16]

2.3. Data analysis

The data in Table 1 were collected using the procedures just exemplified. The first column of the table shows the number of dates on which each calendrical element was recorded with a value that was certainly wrong, the third column shows the number of dates on which each calendrical element could be wrong (but the blame for the date inaccuracy can likewise be attributed to other calendrical elements). The second and fourth columns show the percentage incidence of errors (certain and possible) on the total occurrences of each calendrical element in the verifiable dates; the latter figure is given in the fifth column. Finally, the sixth column records the total number of dates (verifiable and non-verifiable) in which each calendrical element appears. The order in which the calendrical elements appear in the table follows the order in which they are normally recorded in the dates.

In the following paragraphs, a brief analysis of the data in the table will be proposed, starting with the years.

2.3.1. The years

The year is the calendrical element that appears most frequently in the dates in our database: only two dates (out of 540!) record no year at all,[17] while almost one date in three (152 out of 540, 28%) contains two or more years, referring to different eras. The great discrepancy between the numbers of errors (especially

correspond to two different (and contiguous) days by correcting two different values: it corresponds to 23 January 1632 CE, correcting the day from "26" to "25", alternatively to 24 January 1632 CE, correcting the day of the week from "Monday" to "Tuesday".

16 For example, in the date "Kali year 5006, Jovian cycle year Krodhin, month of Dhanus, day 8, full moon day, Tuesday, *nakṣatra* Kṛttikā" (*ṣaḍuttarapañcasahasravatsaraparimita-kalau krodhināmasaṃvatsare dhanurmmāse (')ṣṭamadine śuklapaurṇamāsyāṃ bhaumavāsare kṛttikānakṣatrayukte śubhadine*, IFP RE04137), it is necessary to correct the Kali year (from "5006" to "5005"), the day of the week (from "Tuesday" to "Thursday") and the *nakṣatra* (from "Kṛttikā" to "Mṛgaśīrṣa") to obtain the correspondence with the day 22 December 1904 CE, suggested by the other elements in the date (Jovian cycle year, month, day, *tithi*).

17 The two dates are IFP RE20167 and IFP RE33814β. In 59 dates, the year was not recorded because its value must be inferred from another date previously recorded in the same colophon or in another colophon in the same manuscript.

in percentage values) committed by the scribes in recording the years of the different eras stands out. In particular, the performance of the Jovian cycle year is surprising, as its value is never certainly wrong, even though it was recorded on 206 verifiable dates (and 350 in total). Indeed, there is no doubt that the Jovian cycle year was the system of computation of years most familiar to the scribes of Tamil Nadu in the 17th–20th centuries. The scribes' predilection for the Jovian cycle year is not only inferable from the very high number of its occurrences in dates (far greater than that of the years of the other eras) and the precision with which it was recorded, no doubt resulting from the scribes' great familiarity with it: the Jovian cycle year is also the year to which *pañcāṅga* manuscripts were named in the centuries examined here[18] and is explicitly referred to as the "Tamil year" by one scribe.[19]

Although clearly Keralite in origin (Sarma 1996: 93; Pillai 1922 I.1: 54), the Kollam era was also widely used in Tamil Nadu,[20] as shown by the presence of the Kollam year in over a third of the dates in our database (193 out of 540). The value of the Kollam year, however, is wrong in a relatively high number of the verifiable dates (7.4%). Yet, it should be noted that (a unique case among the calendrical elements examined in this study) all the errors concerning the Kollam year (8 out of 108 verifiable dates) are of the same nature: the value recorded in the date is one unit higher than the correct one. The systematic nature of these errors suggests that they may all have the same origin, perhaps an inaccuracy in the value of the Kollam years recorded in the *pañcāṅga*s of the time.[21]

At the opposite extreme to the near-absolute accuracy with which the Jovian cycle year was recorded in dates, and the commendable accuracy of the Kollam

18 For example, in one of these *pañcāṅga*s (IFP RE41617), the title, recorded (as is customary) in the left margin of the recto of the first folio, reads: *hariḥ om śubham astu svabhānu [symbol for "Jovian cycle year"] vākyapañcāṃgam*, "Hariḥ om. May there be prosperity. The *vākyapañcāṃgam* of [the Jovian cycle year] Svabhānu." On the meaning of *vākyapañcāṅga*, see below, § 3.3.

19 *ittamiḻ cupakiṟutu [symbol for "Jovian cycle year"]*, "in this Tamil Cupakiṟutu [Jovian cycle year]" (TAM 201).

20 According to Pillai (1922 I.1: 54) the Kollam era was "used in Malabar, Cochin, and Travancore"; according to Sarma (1996: 93), it was "prevalent in Malabar", but also in use in "the adjoining districts of Tirunelveli and Madurai in Tamilnadu and part of Sri Lanka"; similarly, Filliozat (1953: 737–738) writes: "Usage limité à Côte de Malabar et de Mangalore au cap Comorin (pays malayālam), ainsi qu'au district tamoul de Tinnevelly." All in all, it appears that the Kollam era was in use in the region of today's Kerala State and in the southern districts of Tamil Nadu.

21 A confusion between "expired years" and "current years" cannot be invoked to explain these errors, because the Kollam years are current years, and their correct value is therefore one unit higher than if they were expired years.

years, we find the very high percentage of wrong values for the Śālivāhana-Śaka and Kali years, 35.7% and 27.3% respectively. Besides the high number of errors, other clues suggest that Tamil Nadu scribes of the period under examination were unfamiliar with these two eras: the infrequency with which they are recorded in the dates (16 and 11 occurrences respectively, in 540 dates); the fact that the Śālivāhana-Śaka and Kali years never appear alone in the dates, but are instead always accompanied by the much more usual Jovian cycle year (sometimes also by the Kollam year); the absence of a distinctive symbol to mark the Śālivāhana-Śaka and Kali years, which are labelled by the scribes using indiscriminately the symbols otherwise reserved for the Jovian and Kollam years;[22] finally, the fact that, in three cases, the scribe, when writing the date, omitted to write the value of the Śālivāhana-Śaka or Kali year (which he evidently did not know) and left a blank space so that it could be added later. In one case, the value of the omitted (Śālivāhana-Śaka) year was actually added (but its value is wrong!);[23] in two cases, the year number was never added, and a blank space remains in the date.[24]

Quite different is the case with the Christian year, which recurs in the dates with a frequency comparable to that of the Śālivāhana-Śaka and Kali years (12 vs. 16 and 11 respectively), but which, unlike the latter, is never certainly wrong. It is important to emphasise that the Christian year is the only one among the calendrical elements examined in the present study that was not mentioned in the *pañcāṅga*s coeval to the dates collected in our database; this is, at least, what emerges from an initial survey of some *pañcāṅga* manuscripts dating back to the 19th century that have come down to us. So from what source was the value of the Christian year known to the scribes who added it to dates otherwise composed of traditional calendrical elements, presumably copied from a *pañcāṅga*? It seems reasonable to assume that such precise

22 In dates, calendrical values are usually identified by a marker, which may be represented by a word (*vāra*, "day of the week", *pakṣa*, "fortnight", *nakṣatra*, "constellation", etc.), but which, in the case of year, month and day, is much more often represented by a symbol (Franceschini 2022). There are distinct symbols specifically used to mark the Jovian and Kollam years, but there are no special symbols for the Śālivāhana-Śaka and Kali (and Christian) years, which are instead marked with the symbols of the Jovian and Kollam years, without distinction.

23 IFP RE20078β. That the year was written later than the rest of the date is clearly indicated by the fact that, contrary to the latter, it was not inked. Moreover, the space that was initially left blank to accommodate the year value is considerably larger than the space that was actually used to write it.

24 In one case, the space should have accommodated the Kali year (BnF Indien 2β), in the other the tens and units of the Śālivāhana-Śaka year, of which only the thousands and hundreds remain, "16[xx]" (IFP RE20103δ).

knowledge of the Christian year, which resulted in its accurate recording in the dates, came to the scribes from frequenting circles of Europeans in Tamil Nadu[25] or from their adherence to Christianity. In at least two dates, written by the same (anonymous) scribe, the choice to record the Christian year has obvious religious motivations: since in these two dates the Christian years are preceded by the expression *tēvacakāṟtam*, "the year of the epoch of God"[26] and the colophons containing them conclude with invocations to the Holy Family and Mary,[27] we can obviously assume that the scribe who composed them was of the Christian faith and, for this reason, well informed about the current year in the Gregorian calendar. It is possible that a similar motivation led the scribe called Laṣcumaṇaṉ to compose the only date in our database in which the year recorded is neither Jovian nor Kollam, but the Christian year, precisely.[28]

2.3.2. Month and day

Scrolling down the table, the values for months and days are shown after those of the years. The solar month is the single calendrical element that occurs most frequently in dates; despite this, the recording of its value is always free from certain errors. By contrast, the lunar month appears very rarely in the dates, probably as a consequence of the eminently solar nature of the Tamil calendar; moreover, in two of its occurrences, it is combined with the solar day and is, therefore, used as a simple substitute for the solar month. The importance of the lunar month for the purposes of the present study is marginal.

Like the solar month, the day also recurs with a very high frequency and the number of errors concerning it is low in percentage terms (but see below, § 3.2). The very high frequency of citation in the dates of the Jovian (and Kollam) year, the month (especially the solar month) and the day, the general correctness of

25 In one date, the Gregorian year is identified twice as "the English year": *iṅkilīcu [symbol for "Jovian cycle year"] 1835*, "the English [year] 1835", and *iṅkilīcu [symbol for "Jovian cycle year"] 1830*, "the [English] year 1830" (CNM D1063).

26 *tēvacakāṟtam 1847 i* and *tēvacakāṟtam 1849 i* (MS-OR BOX Y item 3α and MS-OR BOX Y item 3β respectively), "the year of the epoch of God 1847 (and 1849) of the English era", taking *i* as the abbreviation for the word *iṅkilīcu*, "English [era]", in this context standing for "Gregorian [calendar]".

27 *cēcumaricūcai yeṉṉai yiraṭciyum*, "May Jesus, Mary, and Joseph protect me" (MS-OR BOX Y item 3α) and *mariyacakāyam untāka*, "May there be the support of Mary" (MS-OR BOX Y item 3β).

28 The manuscript (BnF Indien 333) transmits a well-known Hindu religious text in the Tamil language, the *Kācikāṇṭam*.

their values, their contiguity and their placement in the central part of the table (and, thus, of the dates), will provide the cue for some considerations that will be elaborated in the last section of this study (§§ 3.1 and 3.2).

2.3.3. The 'members' of the pañcāṅga*: day of the week,* pakṣa *and* tithi*,* nakṣatra

The last rows of Table 1 (see above, p. 260) contain data on the day of the week, fortnight and *tithi*, *nakṣatra*. These are three[29] of the five main calendrical elements presented in traditional Indian calendars, the *pañcāṅga*s, "five member [calendars]", precisely.[30]

Among the elements of the *pañcāṅga*, the day of the week is the one most frequently recorded in the dates: the number of its mentions is lower only than that of the elements of the 'nuclear triad', i.e. solar year (Jovian or Kollam), solar month, day. Such a high frequency of mentions in the dates of the day of the week is perhaps a consequence of the fact that it is (unique among the elements of the *pañcāṅga*s) a solar calendrical element, in tune with the Tamil calendar. In contrast to the high number of mentions, however, the value of the day of the week is found to be inaccurate in a relatively large number of the verifiable dates (5.4%). This may come as a surprise, given that in Europe, knowledge of the days of the week is traditionally widespread, since, for centuries, their alternation has marked the individual and social lives of people, dictating times for resting from work, personal hygiene, participation in religious services, and certain ritual observances (the Easter liturgy, Friday restrictions, etc.). On the contrary, there seems to be no reason to believe that, until recently, there was widespread knowledge of the days of the week in India: the days of the week are not distinguishable from one another, they coincide exactly with the days of the solar month and, from a social point of view, their alternation did not exert any particular influence on people's lives; in India, the importance of the days of the week was purely astrological, in combination with the other elements of the *pañcāṅga*.[31]

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29 The combination of the fortnight (*pakṣa*) and *tithi* values yields a single calendrical value, that of the *tithi* proper (see footnote 4 above).

30 The remaining two main elements of the *pañcāṅga*s, *yoga* and *karaṇa*, were not taken into account in this study as their correctness or incorrectness cannot be established (see above, § 1.3).

31 On the other hand, it cannot be excluded that, in the centuries under examination, the growing European presence had spread a certain familiarity with the day of the week in Tamil Nadu even among non-Christians.

The *nakṣatra*s also have a high percentage of errors in verifiable dates (7.1%, the highest if one excludes years). The *nakṣatra*s are particularly arcane calendrical elements: their duration is calculated by mechanically dividing the duration of a lunar month into 27 parts, and the time of their onset during the day is always variable, so the value of the current *nakṣatra* can only be known by consulting a *pañcāṅga*.

Although the method of calculating (*pakṣa*s and) *tithi*s is as complex as that of *nakṣatra*s, their value is wrong in a very low percentage of verifiable dates (1.4% and 2.9% respectively). The reason for this probably lies in the fact that, unlike the *nakṣatra*, the current *tithi* is not only knowable through the *pañcāṅga*: in fact, the *tithi*s are the only calendrical elements represented in Table 1 whose value is observable and assessable with the naked eye. Apart from the obvious recognisability of the last *tithi* of the bright fortnight and the last *tithi* of the dark fortnight, which coincide with the full moon and the new moon respectively, it is likely that the ability to recognise even intermediate *tithi*s by simple direct observation of the moon was widespread. On the role that *pakṣa*s and *tithi*s might have played in the consultation of the *pañcāṅga*s, see below, § 3.2.

With regard to the counting of errors, it should be noted that, in this study, the so-called 'following-day *tithi*s' and 'following-day *nakṣatra*s' are not considered errors.[32]

3. Final Considerations

In this last section, further reflections on the data collected in Table 1 will be offered, all prompted, more or less directly, by the following question: between the early 17th century and the early 20th century, from which source did the scribes in Tamil Nadu draw the information they then recorded in dates? The answer to this question seems obvious: the scribes' source was the *pañcāṅga*s, the Indian annual

32 It has already been mentioned that the duration of *tithi*s and *nakṣatra*s is not very dissimilar to that of a solar day (see above, footnote 12), but unlike the latter (which in India traditionally begins at sunrise), *tithi*s and *nakṣatra*s begin at different times of the day. By convention, the *tithi* and *nakṣatra* associated with a particular day are the ones current at sunrise, but it is possible that a few minutes after the day begins, the current *tithi* (or *nakṣatra*) ends and the next one begins: because of this, the time at which a scribe finishes copying a manuscript may fall when the *tithi* (or the *nakṣatra*) that is astronomically current is actually the one following the *tithi* that, by convention, governs that entire day, since it was current at sunrise. In the present study, the recording of these *tithi*s and *nakṣatra*s (which are called "following-day *tithi*" and "following-day *nakṣatra*") instead of those conventionally associated with the current day are not considered errors.

calendars that are still used today to know the astrologically auspicious moments (and to avoid the inauspicious ones) for the performance of various activities, not only religious ones.

Indeed, there is no reason to doubt that the *pañcāṅga*s were the instrument for determining the values inserted by the scribes in the more complex and articulated dates, those containing calendrical elements that would not have been knowable by any other means, e.g. *yoga* and *karaṇa* or even the starting time of *tithi*s and *nakṣatra*s. On the other hand, with regard to the dates with the simplest structure we have different clues that seem to conflict with each other: some seem to indicate that the scribes also resorted to *pañcāṅga*s for recording these dates, while others suggest that the scribes could have composed them from memory, without consulting any sources.

3.1. The nucleus of the dates and the 'standard date'

Let us begin with the dates with the simplest structure. It seems evident that in the manuscripts produced in Tamil Nadu in the centuries under examination, the triad of calendrical elements composed of year (Jovian and, secondarily, Kollam), month (solar, much more rarely lunar) and day represented both the fundamental part of the date (represented in almost all the dates in our database), and its 'standard' form. Concerning the first point, it has already been mentioned that the elements of the 'triad', considered individually, are by far those that recur most frequently in dates (see above, § 2.3.2, and Table 1, sixth column).[33] With regard to the second point, on the other hand, the assumption that the standard form of the date consisted of the triad year, month, day is based on the observation that, when categorised according to the data they contain, the dates most frequently represented in our database are precisely those consisting of Jovian cycle year, month, day (103), Kollam year, month, day (83) and Kollam year, Jovian cycle year, month, day (63). Overall, dates containing only these calendrical elements constitute almost half of the total (249 out of 540).[34]

33 In short: only three dates (out of 540) do not record either the Jovian or the Kollam year, while solar month and day are by far the most represented calendrical elements in the dates (497 and 475 times out of 540, respectively).

34 Two further clues that seem to corroborate these hypotheses come to us from the sequence (reproduced in the table) in which calendrical elements are usually recorded in dates: in this sequence, Kollam year, Jovian cycle year, month and day are contiguous and occupy the central positions, suggesting their status as the fundamental nucleus of dates, a nucleus to which any further information can be *optionally* premised or postponed, but never intruded upon.

3.2. *Pañcāṅga*s and other date knowledge methods

Concerning the supposed 'standard dates', the number of errors concerning the calendrical elements that constitute them deserves some reflection: while there are no certain errors concerning the Jovian cycle year[35] and the solar month (recorded in 206 and 235 verifiable dates respectively), the day is wrong eight times (out of 226 verifiable records).[36] This fact seems to suggest that the scribes wrote the dates from memory, without relying on the *pañcāṅga*s: under such conditions, it is reasonable to imagine that they remembered the values of the longer calendrical elements (year and month) correctly, but could get the value of the day wrong. On the other hand, this assumption is based on the supposition that consulting a *pañcāṅga* would have prevented the recording of incorrect values concerning the day: but we know with certainty that consulting the *pañcāṅga*s did not bar the possibility that the date contained errors. In this respect, a particularly significant datum is the one relating to the 38 dates that record all the main calendrical elements: at least one year, solar or lunar month, day, day of the week, fortnight, *tithi*, *nakṣatra*. These dates were undoubtedly composed by consulting a *pañcāṅga*, since it is the only source from which some of this information can be borrowed: nevertheless, as many as four of them contain errors, demonstrating that the data recorded in the *pañcāṅga*s may have been inaccurate or that those consulting them may have lacked the necessary expertise for their correct interpretation. If, then, contrary to previous assumptions, we assume that scribes consulted the *pañcāṅga*s to compose all dates, even the simplest ones, then all the errors found in our database must necessarily be attributed to inaccuracies in the *pañcāṅga*s or to the inexperience of those who used them.[37]

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35 The Kollam year is not considered here, since, as explained above (§ 2.3.1), all the errors concerning it probably have the same origin, perhaps to be found in a defect in the *pañcāṅga*s of the time.

36 One could ascribe this to the procedure followed to detect errors in dates (described above, § 2.2), which involves first looking for the inaccuracy in the calendrical elements of shorter duration (which in standard dates is the day) and only later in the longer ones (in standard dates, the Jovian cycle year and the solar month). But note that the same procedure led us to impute the error of several dates to elements of equal duration to the Jovian cycle year and the solar month, such as the years of the Śālivāhana-Śaka and Kali eras and the lunar month (see above, Table 1).

37 It should be noted that admitting that the scribes *always made* use of the *pañcāṅga* provides further data to support the hypothesis that the triad year, month, day represented the standard form of the date. In fact, this would mean that, in almost half of the dates, the scribe, despite having at his disposal the wealth of information offered by the *pañcāṅga*, would only have included in the colophon the data essential to him (those constituting the standard form of the date), neglecting all the others.

In this respect, to the best of our present knowledge, we cannot know whether the scribes possessed manuscripts of the *pañcāṅga*s and were able to consult them themselves or whether they used the services of professional astrologers. Let us suppose that the scribes consulted the *pañcāṅga*s themselves and resorted to them in order to know the values of all dates, even the simplest ones, consisting only of the triad year, month, day. If they did so, it was because they were unsure of the value of certain calendrical elements, probably that of the day. But if they did not know the value of the day, how could they identify the current day in the *pañcāṅga*? What other element of the *pañcāṅga* allowed a scribe to 'find the right line' in the calendar, i.e. to locate the current day? Although this is a difficult hypothesis to test, we can perhaps assume that this element was the *tithi*. As already mentioned above (§ 2.3.3), the *tithi* is the only calendrical element among those recorded in the dates whose value can be known by direct observation (of the moon – clouds permitting, of course) and the ability to measure the value of the *tithi* in this way was probably widespread.[38] One might wonder why, in spite of its (hypothetical) decisive role in finding the current day in the *pañcāṅga*s, the *tithi* was recorded in just over a quarter of the dates (148 out of 540). It is possible that the role of the *tithi* in India in the centuries under consideration was similar to that of the day of the week in today's society: we use the day of the week to find the current day in the calendar, but we only rarely mention it when dating a document, for the reason that, by custom, it is not included in our 'standard date'.

3.3. Conclusions

This study started with the survey of the dates and, in particular, the analysis of the errors they contain, and ended with the formulation of hypotheses concerning the knowledge of time and the use of *pañcāṅga*s in Tamil Nadu in the period between the early 17th and early 20th century. Based on the data currently available to us, we can be certain that the *pañcāṅga*s were the source for the compilation of the more complex dates recorded in the colophons; by contrast, it is possible that the simpler dates, particularly those consisting of the Jovian cycle year, solar month and day, were written by scribes from memory; furthermore, we assumed

38 Richmond (1956: 144–145) was convinced of this: "In recent times people have taken to living indoors and using artificial light at night, but those of an earlier time were very much influenced by the light of the night, the moon, and well acquainted with its phases recurring at regular intervals." The same hypothesis was also supported by KETAKARA 1923: 27: "By practice one is enabled to state the number of the current *tithi* by a mere glance at the Moon's orb."

that the value of the (*pakṣa*s and the) *tithi*s could be widely known through direct observation of the moon and was used to find the current day in the *pañcāṅga*s.

It is to be hoped that future research will shed new light on these aspects, proceeding in two directions: on the one hand, the collection and study of the dates recorded in the colophons should be continued, as they represent the fundamental and indispensable data on which any advancement of our knowledge on these topics is based; on the other hand, the study of the *pañcāṅga*s coeval to the dates under examination should be inaugurated, which, fortunately, have come down to us in a fair number in manuscript form. The study of these texts is made difficult by their cryptic form, a consequence of the extensive use of abbreviations and technicalities, but it would allow us to shed light on several still obscure aspects. A first aspect that could be clarified is the congruity between the data recorded in the *pañcāṅga*s of past centuries and those reported in the ephemerides contemporary to us. Such congruity cannot be taken for granted, at least for the values of the shortest elements (and, a fortiori, for instantaneous ones, such as the start time of *tithi*s and *nakṣatra*s): in fact, the *pañcāṅga*s in use in Tamil Nadu in the centuries under examination (and, therefore, also those that have come down to us in manuscript form) are *vākyapañcāṅga*, i.e. *pañcāṅga*s in which the astronomical-astrological data are calculated according to relatively simple, but not entirely accurate, traditional methods. Only from the end of the period considered in this study did other *pañcāṅga*s begin to be produced (called *dṛkpañcāṅga*s or *tirukaṇitapañcāṅka*s) that incorporated the observations of modern astronomy and used much more complex, as well as more accurate methods of calculation – which are, in fact, the same methods that are used to calculate the values given in contemporary ephemerides. All in all, the study of the *pañcāṅga* manuscripts may reveal a possible cause of the errors we have found in the dates, since the inaccuracy of the values recorded by the scribes may have originated from the inaccuracy of the data recorded in the (*vākya-*)*pañcāṅga*s that were available to them. Moreover, the study of the *pañcāṅga*s coeval to the dates collected in the database could provide answers to some of the questions mentioned in the present study, such as the origin and cause of the systematic errors concerning the Kollam year. Finally, the study of the colophons possibly recorded in the *pañcāṅga* manuscripts could shed light on their circulation and, in particular, who owned them, helping to clarify whether the scribes consulted the *pañcāṅga*s personally (and directly) or whether they used the intermediation of professional astrologers.

Abbreviations

BnF	Bibliothèque nationale de France (Paris)
CNM	National Museum of Denmark (Copenhagen)
EO	École française d’Extrême-Orient (Puducherry)

MORI	Oriental Research Institute (Mysore)
MS-OR	Cambridge University Library
RE	Institut Français de Pondichéry (Puducherry)
TAM	Tiruvāvaṭuturai Ātiṉa Nūlakam
VM	van Manen collection, University Library (Leiden)

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