ROUND-NUMBER RECKONING IN THAI FOR THE 5000 YEARS OF THE BUDDHA

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Abstract
In the Thai record two distinct forms of reckoning can be found: civil dates reckoned in secular mode according to the luni-solar year; and religious dates elapsed reckoned in religious mode and according to the 5000 years of the Buddha. A variety of anomalies and variations in convention can be detected in this latter form of reckoning, though its use of round-number reckoning may be accounted for satisfactorily.

There is a class of Thai inscription that not only presents the date being celebrated in luni-solar, secular, terms but also as so many years - month - days passed since the Buddha attained Enlightenment with so many years - month - days still to go, where the two sets of figures sum to 5000 years. It is easy to establish by inspection of these figures that the reckoning employs years of 12 months and months of 30 days (i.e. years of 360 days). When calculating, relative to a particular calendar date, the equivalent past and future time in the 5000 years of the Era of the Buddha it was the Thai practice always to employ years of 12 months and months of 30 days (i.e. years of 360 days).

Consider, for instance, the elaborate calculations of the Wat Phra Dhatu Chæ Hæng inscription, dating to AD 1846. Here the time remaining in the Era of the Buddha at the date of the inscription is given as:

> Future 2610 years, 7830 seasons, 30320 months, 60640 *uposatha*, 909600 days, 7276800 *yam*, 436608000 *nadi*. (Prasert 2534: 80-1)

Although there are some errors in the calculation, it is clear that the 360-day year is in operation.[1] On the other hand, for secular purposes Thai astronomers, expert in their craft, always adopted a year length with a realistic astronomical value of 365.25875 days and they have generated over

many centuries very precise and accurate horoscopes and other astronomically-based records deriving from this value.

One's reaction to the rounding of the year value to 360 days might be to suppose that in a religious context and by the authority of such works as *The Three Worlds*, a more harmonious number was felt to be appropriate. The circle as 360 degrees, the circle as a symbol of perfection—the year as 360 days in order to be in harmony with the cosmos.

However, a work produced in a very different context, Albiruni's account of India in the 11th century, offers a precedent for this 'whole number' mode of reckoning. Albiruni remarks:

> A month has 30 lunar days, for this number is canonical, as the number of 360 is canonical for the number of days of a year. (Sachau 1910: i. 350)

In a forest of other numbers in which, for instance, the 'month' of Brahman consists of 60 '*kalpas*' but extends in days to 14 digits (94,674,987,000,000 days) and the 'month' of *Kha* extends to 31 digits, we see in operation the curious Indian penchant for mathematically huge reckoning. No wonder the SouthEast Asian

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system reduced the Indian *yuga* of 4,320,000 years by a factor of 5400 and reckoned merely in cycles of 800 years.

Having defined the canonical year as consisting of 360 days, Albiruni then makes his framework of reference clear. He then says that 'the solar year has 365 [and] 827 /3200 civil days [in it]', which is to say that the Indian Solar year of 360 days was in fact 365.25843475 civil days long. Had Albiruni added only one more 32-thousandths of a day to his dividend and made it 828 parts, he would have given us 828 / 3200 parts of a day, which would yield 365.25875 days to a year—precisely the value that Southeast Asia adopted.

The key to reading the Indian 360-system as recorded by Albiruni is to see that *any* calendrical quantity can be declared to have 360 parts in it when regarded in its own right, but that each of these quantities also permits conversion to a base determined by a different mode of reckoning.

When the Thai adopted a 360-day year for the purposes of Buddha Era reckoning, they applied this 'round-number' thinking to a different purpose and in a different manner. For the Thai, the issue was to establish an efficient way of mapping the secular calendar against the religious one; i.e. to determine for any given secular calendrical date its equivalent in the 5000 years of the Buddha Era. To this end, the first point of procedure was to determine the starting point in the Buddhist year of 360 days. This proves from many examples to have been Vaisakha Full Moon, the date on which traditionally all the main events of the Buddha's life took place. An inscription from Burma or from Central Thailand would notate this as falling on the 15th day of the 6th month of the year, as is implicit in the inscription on the Kyaikthanlan Bell:

> Two thousand and seventy years six months and twenty-two days after the demise of the Lord of the three worlds, on Friday the 7th waxing of the month of Nadaw ['*mrikkasuiw*']. (RSASB 1939-40: 24)

The calculation runs as follows:

	month 6	day 15	= Vaisakha 15
plus	6 months	22 days	elapsed from then:
date =	month 1	day 7	

which equates with *Nadaw / Margasirsha* 7 waxing, as required. Here only the elapsed time from the demise of the Buddha is specified, but it was common to specify both halves of the equation, as did the author of the 1789 inscription of Wat Chae Haeng:

> CS 1151 . . *mikasiramasa purnami* . . . month 3, Full Moon . . . 2332y 8m 15d gone including today, and 2667y 3m 15d to go. (Prasert 2534: 91)

This gives a count:

past, to date:	2332	y	8	m	15 d
plus	2667		3		15
equals	5000		0		0

Here the total reaches the anticipated 5000 years, but one would have expected the fractional part of the reckoning, the period from *Vaisakha* Full Moon to *Margasirsha* Full Moon to have run as follows:[2]

	months	days
Vaisakha Full Moon		15 waning
Jyestha	1	
Ashadha	2	
Sravana	3	
Bhadrapada	4	
Asvina	5	
Karttika	6	
Margasirsha		15 waxing
total:	7	0

The interval to *Margasirsha* Full Moon is only 7 months even, not 8 months 15 days: a new point of departure has to be found. This point is easily determined by counting backwards through the year:

	months	days
Margasirsha Full Moon		15
Karttika New Moon	8	
Asvina	7	
Bhadrapada	6	
Sravana	5	
Ashadha	4	
Jyestha	3	
Vaisakha	2	
Caitra New Moon	1	

In order to tally, the reckoning has here to take its origin at the start of *Caitra*. One can see a ready explanation for this heterodox, secular reckoning. Experts who drew up long-term calendars wished to avoid the complication of

beginning a new page, a new 'year', with precisely the day of the astronomical New Year, since this could fluctuate between *Caitra* 6 waxing and *Vaisakha* 5 waxing. To stay clear of this complication, they therefore began a new page always with *Caitra* 1 waxing, though there might be up to another 34 days before the New Year proper began.[3] Clearly the author of the Nan inscription had just such a document in mind.

Some other Thai records also perform rather differently from what one would predict of them, even when their reckoning is plainly intended to originate in Vaisakha Full Moon. An inscription from Phitsanulok (FAD inscr. 98 of 1514 AD) records the date as 'month 1 [*Margasirsha*] waxing 7' and also as '2057, 7 months, 22 days'.

How is this reckoning constituted ? A table will again assist in our assessment:

	months:	**days:**
Vaisakha		15
Jyestha	1	
Ashadha	2	
Sravana	3	
Bhadrapada	4	
Asvina	5	
Karttika	6	
Margasirsha		7
total:	6	22

Since the count begins from Vaisakha Full Moon, there must be 15 days left in that month. And the day 7 waxing of the target month will then bring the day total to 22 days, as given. By non-inclusive counting, however, the month interval is only 6 months, not 7 months. But from many other similar instances one finds that the practice of some experts was to count inclusively, so that the interval *Vaisakha* to *Margasirsha*, when told off on the fingers, yields 7 months, not 6.

One other possibility suggests itself here, though it is one that creates a much greater difficulty than the one it might at first be thought to resolve. The year in question, CS 876, was in fact an *adhikamasa* year: one might therefore be tempted into supposing that the person doing the calculations over-conscientiously allowed the month of *Ashadha* to be counted twice as indeed it was in the secular / astronomical calendar. But if this had been the case, the author would have been doing no one a service. Inscriptions were intended to last in perpetuity (or at least until the 5000 years were completed) and those in subsequent generations would expect that no Buddha Era year would have 13 months in it. Although this secular year had 384 lunar days in it, it would in fact have been an utter solecism to allow an extra month to the religious year and would have brought its entire round-number reckoning to a halt. If any one Buddha Era year was allowed to have an extra month in it, then it would be necessary to establish which of all the other 4999 years also had extra months—the system would collapse in disarray.

An inscription from Wat Thaen Phra of 1814 reads:

> CS 1176 . . . Karttika month new moon, Friday . . . in Thai . . . month two new moon . . . 2357 years, 6 months, 15 days; and 2642 years, 5 months, 15 days. (Eade 1996:131)

past, to date:	2357	y	6	m	15	d
future:	2642		5		15	
total:	5000		0		0	

Here (in a year that was not *adhikamasa*) the month reckoning is again one in excess of what one would anticipate by non-inclusive reckoning:

	months	days
Vaisakha Full Moon		15
Jyestha	1	
Ashadha	2	
Sravana	3	
Bhadrapada	4	
Asvina	5	
Karttika New Moon		0
total:	5	15

The interval is of 5 months 15, not of 6 months 15.

Against this one may set an inscription dating to 1852 at Wat Pha Phrao. Here the reckoning is not in excess, but is in arrears. The text reads:

> CS 1214 . . . Phalguna month Full Moon . . . month 6 Full Moon, . . . 2396 years, 9 months 15 days. (Eade 1996: 142)

Here again the interval is clear if tabulated:

	months:	days:
Vaisakha Full Moon		15
Jyestha	1	
Ashadha	2	
Sravana	3	
Bhadrapada	4	
Asvina	5	
Kartikka	6	
Margasirsha	7	
Pausha	8	
Magha	9	
Phalguna Full Moon		15
total:	10	0

This date is corrupt in certain respects that need not concern us here, the immediate point is that if an inscription's date falls on a Full Moon and the desired interval also originates in a Full Moon, there cannot be fifteen days needing to be made up. The interval consists of a dark half (*Vaisakha*), a light half (here *Phalguna*), plus the intervening months whose secular day-total is immaterial.

Yet another Nan inscription, dating to 1906 (Wat Phra Dhatu Khao Noi), merits some attention. It is seriously at odds with itself in a number of respects, but its Buddha Era count (with due correction as to the future years) can be treated independently of the astronomical detail exhibited:

CS 1268 . . . mikasira month tithi 21 . . . waning 6 . . . 2449 years gone, seven months complete, 7 months, twenty-one days complete . . . 2560 [read: 2550] years to go, four months complete, 4 months, eight days complete, 8 days. (Prasert 2534: 95)

past:	2449	y	7	m	21	d
future	2550		4		8
total:	4999		11		29

If one lays out an entire year, one finds as follows:

	months:	days:
Vaisakha Full Moon		15
Jyestha	1	
Ashadha	2	
Sravana	3	
Bhadrapada	4	
Asvina	5	
Kartikka	6	
Margasirsha		

6 waning		21
sub-total	7	6
remaining in month		9
Pausha	1	
Magha	2	
Phalguna	3	
Caitra	4	
Vaisakha		15
sub total	4	24
total: [1 yr]	0m	0d

The fractional tally one would expect here is made up of the Vaisakha dark half at the start, the Margasirsha light half at the end, plus a further 6 waning days. To this sum six intervening months (measuring from *Jyestha* to *Karttika*) have to be added, giving 7 months and 6 days in all.[4]

One notes that the author's day-total supplies him with only 29 days, not 30 days.[5] And it is indeed the case that in secular terms the lunar month *Margasirsha* has only and always 29 days. But as a 'month' in religious reckoning it is required to have 30 days. To avoid confusion the author should not have counted forwards from his date in the secular calendar; he should have subtracted his elapsed total from 12 months 0 days, or better, from 11 months 30 days.

It will appear somewhat disconcerting that in a matter as important as the reckoning of a particular time in the 5000 years of the Buddha there are so many anomalies and inconsistencies. All the evidence suggests that although calendrical and astronomical reckoning lay in the hands of religious experts, secular / civil reckoning was considerably more familiar to them than religious reckoning. We note, moreover, that when the religious count fails to match the secular date, the former has a tendency to be in excess. The reason would seem to be that those making the calculation began by reckoning up the month interval before the day interval, and then favoured the use of inclusive counting. Consequently it was felt reasonable or natural that *Vaisakha* should be reckoned as '1 month . . .' , with *Jyestha* as '2 months', *Ashadha* as '3 months . . .' , etc. And if no subsequent adjustment was made when attention was turned to the days elapsed, the day-count would necessarily be 15 days too large.

It is worth noting, too, that the difference between the modes is reflected even in their notation. A secular date is routinely expressed as 'year x, month y, day z' (or rather as 'waxing / waning z nights'), where the implied origin of the count is not material to the reckoning. But a religious date reverses the ordering of the components and is expressed as 'x years, y months, z days', where the origin of both the month count and of the day count is vital to the accuracy of the reckoning.

The transference from civil reckoning to religious reckoning required more attention than sometimes it received.

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Notes

[1] 2610 years times 12 months equals 31320 months, not 30320; and 2160 years times 360 days equals 939600 days, not 909600. The errors appear to be at source, not to lie with the engraver or with the inscription's editors.

Note that 2610 years times the astronomical year of 365.25875 days would have generated a day-number in excess of 950000. It is therefore evident that the number on the inscription (however read) relates to a 360-day year, not to an astronomical year.

[2] Where possible I adopt lunar month names in preference to the more common lunar month numerals—not least as a way of avoiding confusion between the number of months that may have elapsed at a given date and the numbers assigned to the months that have elapsed, which can in any case take three different forms. Caitra is called month 5 in the South and either month 6 or month 7 in the North. Where it is necessary to use only numerals, I distinguish between 'month 6, day 15' (Vaisakha Full Moon by Southern reckoning) and '6 months 15 days' (an interval, here equating with Margasirsha New Moon).

[3] To compensate, some calendrists headed each new page with details of when Songkran would take place.

[4] The author's practice of reckoning in effect from Vaisakha New Moon is confirmed by the second date (face 2), where his date current of Vaisakha 8 waning leaves him with a fractional future count of 11 months and 7 days.

[5] It is likely that the intention here was to say that there had been 21 days elapsed up to the *start* of 'today' and that there were 8 days remaining after the *end* of 'today'. But of course in that case 'today' would have to be the 7th waning, not the 6th waning of the month: 21 days gone (counts to 6 waning)—today (counts as 7 waning)—8 days to go (counts from 8 waning to 15 waning).