

THE CALENDARS OF SOUTHEAST ASIA 3: VIETNAM

Lê Thành Lân

50 Tran Xuan Soan, Hanoi, Vietnam.

Email: lethanhlan43@gmail.com

Abstract: This paper discusses the causes of misunderstanding about the nature of Vietnamese calendars; about the ancient Vietnamese calendar-finding process; about the results of studying three old calendars that were produced by different Vietnamese dynasties; and about the differences that existed between Vietnamese and Chinese calendars when they existed simultaneously; and finally some consequences of studying these ancient Vietnamese calendars.

Keywords: History of astronomy, calendars, Vietnam

1 INTRODUCTION

This paper deals with ancient Vietnamese calendars that date between AD 1544 and 1903, that is to say from the Giáp Thìn (甲辰) year, which is the 12th Nguyễn Hoa (元和) year of King Lê Trang Tông's (黎莊宗) reign in the Restored Lê Dynasty (黎中興), up to the Quý Mao (癸卯) year, which is the 15th Thành Thái (成泰) year of the Nguyễn (阮) Dynasty.¹

1.1 A Brief History of Research on Ancient Vietnamese Calendars

In 1884, after the conclusion of the Giáp Tuất (甲戌, Patenotre) Treaty, Vietnam was divided into three regions with different systems of Government: Tonkin (Bac Ky = Northern Vietnam), Annam (Trung Ky = Central Vietnam) and Cochinchina (Nam Ky = Southern Vietnam). In Tonkin (Northern Vietnam) and Cochinchina (Southern Vietnam), the needs of the administrations prompted the French to prepare comparative calendars in French and Quoc ngu (a native script) that matched the solar and the lunar-solar calendars.

The first of these French calendar-makers was Raymond Deloustal (1872–1933) from the French colonial service, who produced his *Annamite-French Calendar from 1802 to 1922*. This was published in 1908 (Deloustal, 1908) and was republished in 1915 and 1922. The cover of one of these calendars is shown in Figure 1. Cordier and Le Duc Hoat (1935) were next to produce a calendar, with their *Concordance of Lunar and Solar Calendars from 1802 à 2010* (Figure 2). All three authors based their works on the Chinese calendar as described in a book by Hoang (1910) titled *Concordance des Chronologies Neoméniques Chinoise et Européene*. Unfortunately, they did not contact the Observatory in Annam (Central Vietnam) and wrongly assumed that Vietnam used the Chinese calendar.² They were unaware that in Annam (Central Vietnam), the *Kham Thien Giam* (Observatory) of the Nguyễn Dynasty produced a lunar-solar calendar of its own to be used in Vietnam, and that the King distributed this

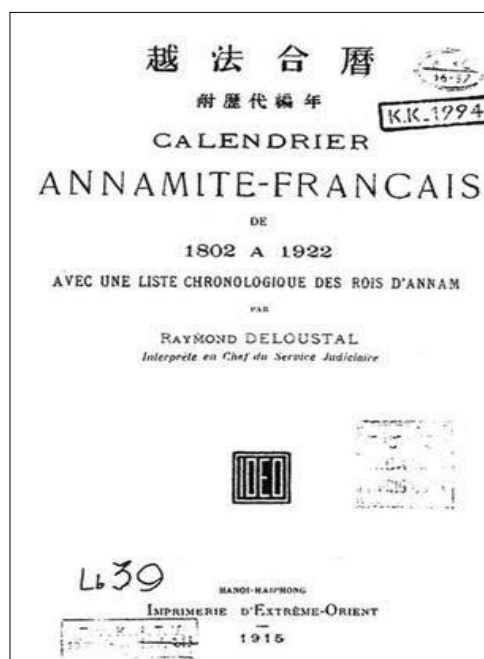


Figure 1: The cover of Deloustal's Calendar.

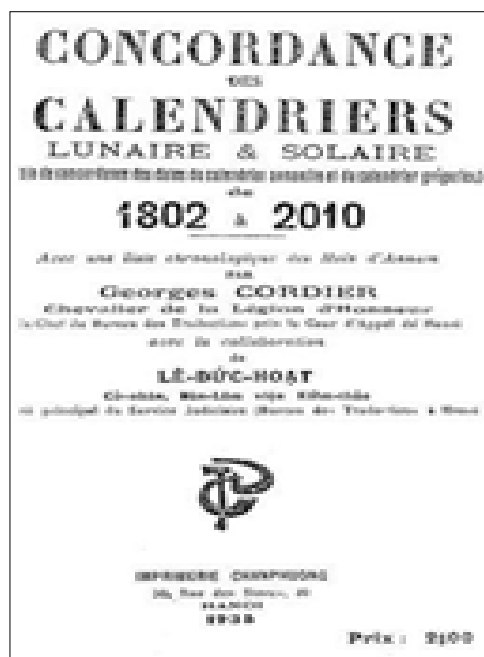


Figure 2: The cover of Cordier and Le Duc Hoat's Calendar.

Table 1: The intercalary moons in the Deloustal, Cordier and Le Duc Hoat, and Vietnamese calendars.

Year		Cordier and Deloustal's Calendar		Vietnamese Calendar	
Lunar Calendar	Solar Calendar	Name Moon	Order Moon	Name Moon	Order Moon
癸亥	1803	2	3rd	1	2nd
乙丑	1905	6	7th	8	9th
戊辰	1808	5	6th	6	7th
辛未	1811	3	4th	2	3rd

calendar every year. As the Chinese Han script was gradually replaced by the Quoc ngu, and the above-mentioned calendars became quite prevalent, this misconception was deeply embedded in the minds not only of foreigners but also of Vietnamese people. The calendar for the first eleven years of the Nguyễn Dynasty (1802–1812) by these authors was obviously based on the Chinese calendar (see Table 1 and Figures 3 and 4). However, during this eleven-year period there are four major differences between the Deloustal and the Cordier and Le Duc Hoat calendars and the Nguyễn Dynasty calendar (see Table 1 and Figures 3–5): differences in the intercalary Moon; the lunar leap year has 13 lunar months; the intercalary Moon is named after the previous Moon; and regarding the order, it will be increased by 1 (see Table 1).

In 1944, Hoàng Xuân Hãn examined a hand-written copy of the old *Bách trúng kinh Calendar* (百中經, *The Completely Accurate Calendar*). Coded A 2872, this was the Vietnamese calendar from 1624 to 1799. Hoàng Xuân Hãn declared that this Vietnamese Lê Dynasty calendar was

quite different from the Chinese Qing Dynasty (清) calendar. Unfortunately, this hand-written copy of the *Bách trúng kinh Calendar* then disappeared, but people did not pay attention to Hoàng Xuân Hãn's comments because they were busy with the war against the French.

Then in 1982, in his book *Lịch và lịch Việt Nam (Calendars and the Calendar)*, this same scholar (Hãn, 1982) examined the calendar of the Restored Lê Dynasty, covering the period 1644–1788, as well as a calendar of the early Nguyễn Dynasty, from 1802 to 1812. After accessing additional historical documents from the two countries he argued that there were substantial differences between the Vietnamese and the Chinese calendars during the Lý (李) and Trần (陳) Dynasties from 1080 to 1300. However, this was mere scientific speculation and not the result of research based on these early calendars, so his conclusion was not widely accepted.

Recently, as a result of our examination of three old calendars, we have been able to confirm the existence of an ancient Vietnamese calendar.

In 1967, Tùng et al.—who compiled the calendar for the Vietnamese Meteorological Service—read the book titled *Hoàng triều Minh Mệnh Khâm định vạn niên thư* (皇朝明命欽定萬年書, *Calendar of Thousands of Years Issued by King Minh Mệnh*), that includes the Vietnamese calendar from 1544 to 1861. However, they did not realize that this was specifically a Vietnamese calendar and therefore different from the Chinese calendar. Hence, they missed a chance to find an earlier ancient

1803			1804			1805			1806			1807			D. 1808			1809			1810			1811		
嘉隆 2 ^e ANNÉE 癸亥 二 de 亥 年 GIA-LONG			嘉隆 3 ^e ANNÉE 甲子 三 de 子 年 GIA-LONG			嘉隆 4 ^e ANNÉE 乙丑 四 de 丑 年 GIA-LONG			嘉隆 5 ^e ANNÉE 丙寅 五 de 寅 年 GIA-LONG			嘉隆 6 ^e ANNÉE 丁卯 六 de 卯 年 GIA-LONG			嘉隆 7 ^e ANNÉE 戊辰 七 de 辰 年 GIA-LONG			嘉隆 8 ^e ANNÉE 己巳 八 de 巳 年 GIA-LONG			嘉隆 9 ^e ANNÉE 庚午 九 de 午 年 GIA-LONG			嘉隆 10 ^e ANNÉE 辛未 十 de 未 年 GIA-LONG		
Mois annamite	Mois	Jours	Mois annamite	Mois	Jours	Mois annamite	Mois	Jours	Mois annamite	Mois	Jours	Mois annamite	Mois	Jours	Mois annamite	Mois	Jours	Mois annamite	Mois	Jours	Mois annamite	Mois	Jours	Mois annamite	Mois	Jours
1	Janv.	23	1	Fév.	11	1	Janv.	31	1	Fév.	18	1	Janv.	28	1	Fév.	14	1	Fév.	4	1	Janv.	25	1	Janv.	25
2	Fév.	22	2	Mars	12	2	Mars	1	2	Mars	20	2	Fév.	26	2	Mars	16	2	Mars	5	2	Fév.	23	2	Fév.	23
2*	Mars	23	3	Avril	10	3	Mars	31	3	Avril	19	3	Mars	27	3	Avril	15	3	Avril	4	3	Mars	24	3	Mars	24
3	Avril	21	4	Mai	9	4	Avril	29	4	Mai	18	4	Mai	8	4	Avril	26	4	Mai	3	3*	Avril	23	4	Mai	22
4	Mai	21	5	Juin	8	5	Mai	29	5	Juin	17	5	Juin	6	5	Mai	25	5	Juin	2	1	Mai	22	5	Juin	21
5	Juin	19	6	Juill.	7	6	Juin	27	6	Juill.	16	6	Juill.	5	6	Juill.	24	6	Juill.	2	5	Juin	21	6	Juill.	20
6	Juill.	19	7	Août	5	6*	Juill.	26	7	Août	14	7	Août	4	7	Août	22	7	Août	31	6	Juill.	20	7	Juill.	20
7	Août	17	8	Sept.	4	7	Août	24	8	Sept.	12	8	Sept.	2	8	Sept.	20	8	Sept.	30	7	Août	19	8	Sept.	18
8	Sept.	16	9	Oct.	4	8	Sept.	23	9	Oct.	22	9	Oct.	1	9	Oct.	9	9	Oct.	29	8	Sept.	18	9	Oct.	17
9	Oct.	16	10	Nov.	2	9	Oct.	22	10	Nov.	10	10	Nov.	20	10	Nov.	18	10	Nov.	27	9	Oct.	17	10	Nov.	16
10	Nov.	14	11	Déc.	2	10	Nov.	21	11	Déc.	10	11	Déc.	29	11	Déc.	17	11	Nov.	28	10	Nov.	16	11	Nov.	16
11	Déc.	14	12	Janv.	1	11	Déc.	21	12	Janv.	9	12	Déc.	29	12	Déc.	17	12	Janv.	5	11	Déc.	16	12	Janv.	16
12	Janv.	13				12	Janv.	20											Janv.	12	12	Janv.	14			

Figure 3: The intercalary moons from 1803 to 1811 in Deloustal's calendar.

壬申	辛未	庚午	己巳	戊辰	丁卯	丙寅	乙丑	甲子	癸亥	壬戌	正
一七 二乃 三乃 四乃 五乃 六乃 七乃 八乃 九乃 十乃 十一乃 十二乃	一六 二乃 三乃 四乃 五乃 六乃 七乃 八乃 九乃 十乃 十一乃 十二乃	一五 二乃 三乃 四乃 五乃 六乃 七乃 八乃 九乃 十乃 十一乃 十二乃	一四 二乃 三乃 四乃 五乃 六乃 七乃 八乃 九乃 十乃 十一乃 十二乃	一三 二乃 三乃 四乃 五乃 六乃 七乃 八乃 九乃 十乃 十一乃 十二乃	一二 二乃 三乃 四乃 五乃 六乃 七乃 八乃 九乃 十乃 十一乃 十二乃	一一 二乃 三乃 四乃 五乃 六乃 七乃 八乃 九乃 十乃 十一乃 十二乃	一〇 二乃 三乃 四乃 五乃 六乃 七乃 八乃 九乃 十乃 十一乃 十二乃	九 二乃 三乃 四乃 五乃 六乃 七乃 八乃 九乃 十乃 十一乃 十二乃	八 二乃 三乃 四乃 五乃 六乃 七乃 八乃 九乃 十乃 十一乃 十二乃	七 二乃 三乃 四乃 五乃 六乃 七乃 八乃 九乃 十乃 十一乃 十二乃	正 二 三 四 五 六 七 八 九 十 十一 十二 閏 四

Figure 4: The Chinese calendar mentioned in 二十史朔闰表 by 陳垣 (1962) that also was used in the calendars by Deloustal and Cordier and Le Duc Hoat.

	壬戌	癸亥	甲子	乙丑	丙寅	丁卯	戊辰	己巳	庚午	辛未	壬申
癸亥/閏 1月 =>	一	二	三	四	五	六	七	八	九	十	十一
辛未/閏 2月 =>	十二	十三	十四	十五	十六	十七	十八	十九	二十	二十一	二十二
戊辰/閏 6月 =>	二十三	二十四	二十五	二十六	二十七	二十八	二十九	三十	三十一	三十二	三十三
乙丑/閏 8月 =>	三十四	三十五	三十六	三十七	三十八	三十九	四十	四十一	四十二	四十三	四十四

Figure 5: The Vietnamese calendar produced by the Nguyễn Dynasty Observatory. Key: the black ellipses mark the leap years that had 13 moons, and the arrows on the left indicate intercalary moons.

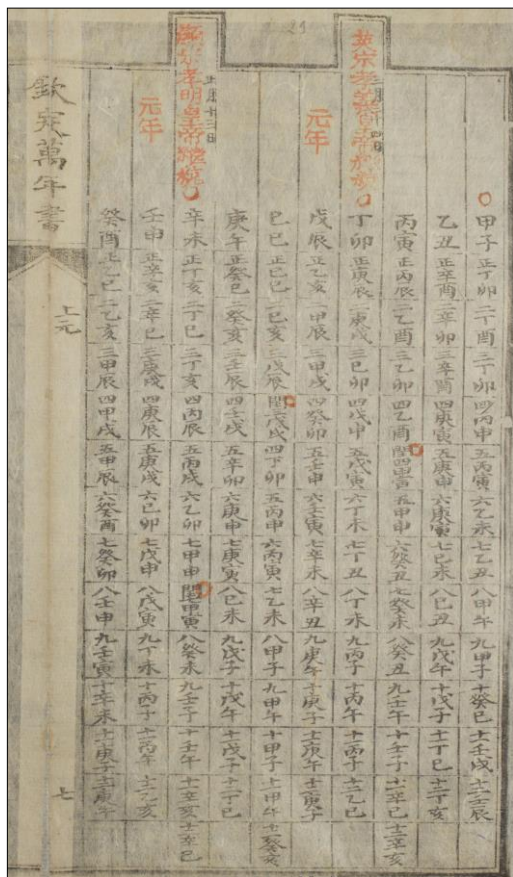


Figure 6: Two examples of Vietnamese calendars that were printed with woodblocks.

Vietnamese calendar. Regrettably, the above-mentioned book is now lost.

In 1976, in the Preface of the book *Tables of the Collated Lunar and Solar Calendars and Historical Chronology for 2000 Years* (Bình, Linh and Nghi, 1976; our English translation), Nguyễn Linh wrote about the *Bách trung kinh Calendar* as a printed calendar of the Lê Dynasty. However, the author of *Tables ...*, Nguyễn Trọng Bình, was unaware of the *Bách trung kinh Calendar* and therefore he did not consult it. His book only refers to the Chinese calendar, and so he missed the chance to investigate an ancient Vietnamese calendar.

In 1984 Lân (1986b) examined a copy of the *Bách trung kinh Calendar* (n.d.), coded A3873, which had been printed in 1850. This Vietnamese calendar spanned the period 1624–1785, and was compiled by the Observatory of the Lê Dynasty. The calendar (see Figure 6) was printed with woodblocks and has survived through to the present day. Thus, it is an irreplaceable heritage object and an invaluable research tool. We presume that it was a version of this same *Calendar* printed using woodblocks that Hoàng Xuân Hãn examined back in 1944, and so its existence finally was confirmed.

The results of an examination of this ancient *Calendar* were then announced in two research papers (Lân, 1986b, 1987a). Fortunately, a photographic copy of the *Bách trung kinh Calendar* was included in the book *Calendars for Five Hundred Years of Vietnam (1544–2043)* (Lân, 2010: 777–948), so it is now in the public domain and is freely available to scholars.

In 1993 Lân read the book *Khâm định vạn niên thư* (欽定萬年書; *Calendar of Thousands of Years Issued by the King*) which was compiled by the Observatory of the Nguyễn Dynasty in 1849 or 1850 and was printed from wood-blocks in two colors (see Figure 6). This book includes the calendar of the Restored Lê Dynasty from 1544 to 1630, the calendar of the Nguyễn Lords in Cochinchina from 1631 to 1801 and the calendar of the Nguyễn Dynasty from 1802 to 1903, so it collectively spans 360 years. Results of an investigation of this book were published in two papers (Lân, 1994a, 1994b), and a photographic copy of these calendars was included in *Calendars for Five Hundred Years ...* (Lân, 2010: 950–999).

The *Khâm định vạn niên thư* book was only available in 1993 because initially it was included in a consignment of precious books that had been removed from the National Library and placed in a safe hiding place in case the Frontier War expanded to Hanoi. These precious books were only returned to the National Library in the early 1990s. When we found the book listed in the

Library catalogue, we did not expect that it would be important, especially knowing that a book with a similar title, *Hoàng triều Minh Mệnh Khâm định vạn niên thư*, had been mentioned by calendar-researchers in 1967, but this did not contain anything about ancient Vietnamese calendars.

These two calendars mentioned above provide irrefutable evidence that an ancient Vietnamese calendar existed that was different from the Chinese calendar.

In 1987 Lân began researching the handwritten book *Lịch đại niên kỷ bách trúng kinh* (歷代年紀百中經, *The Completely Accurate Calendar of Many Dignitaries*, n.d., b), which contained calendars from the Restored Lê (1740–1788) and the Tây Sơn (西山, 1789–1801) Dynasties, a calendar from 1802 to 1812 based on the Đại Thống (大統) method, and 71 years of the calendar from the Nguyễn Dynasty (1813–1883). Initial results of the investigation were published in Lân (1987b). *Lịch đại niên kỷ bách trúng kinh* is especially important and valuable because it is the only document that shows the calendar from the Tây Sơn Dynasty (1789–1801), and it also includes calendars from the Nguyễn Dynasty, especially for the years 1850–1883 that *Khâm định vạn niên thư* only provided a preliminary draft calendar of, without any historical characteristics.

Because the *Lịch đại niên kỷ bách trúng kinh* was handwritten, it contains 76 errors, and we used an error-correction code to correct them. We then included photocopies of some of the important pages in the *Calendar for Five Hundred Years ...* (Lân, 2010). In this book, pages 947–949 show calendars from the Restored Lê Dynasty for the period 1786–1788; pages 1000–1014 calendars from the Tây Sơn Dynasty for the years 1789–1801; and pages 1115–1118 the calendars from the Nguyễn Dynasty for the years 1849, 1856, 1866 and 1869.

In these three Vietnamese calendars, any book named *Bách trúng kinh* is the same as *Lịch đại niên kỷ bách trúng kinh* (歷代年紀百中經; n.d., b), and although written or printed at different times they were used contemporaneously. All of them have the three characteristics of a calendar: they are scientific, legitimate and historical. Meanwhile, the book named *Vạn niên thư* (萬年書) is identical to the books *Khâm định vạn niên thư* (1849 or 1850) and *Hoàng triều Minh Mệnh Khâm định vạn niên thư*, which usually has two quite different sections: the first contains a recorded calendar of years (thus in book R2200 it is from 1544 to 1850). The second section, from 1851 to 1883, has only a preliminary draft calendar for each year, so although based upon computations it cannot automatically be relied upon.

The study of the text of ancient calendars is an important task, but is very difficult as it requires meticulousness. What needs to be done includes identifying: the author (the person or the compiling agency); the person who actually wrote the calendar (if it was not the author); the years in which the calendar was written, printed and subsequently copied; and any defective copying or printing errors (which must then be corrected and compared with the original). The corrected calendar must then be compared with the Chinese calendar and any differences noted. The calendar should then be searched for evidence of different historical events, and any information that expands on or explains the historical account, and particularly its dating, should be noted. This is demanding work and cannot always be carried out at the one time, especially if collaborators (who are hard to find) are required, so the work proceeds slowly. Another major difficulty is that scientific authorities do not show any interest in such projects, so are not keen to fund them. Thus, we have had to carry out most of our research independently.

2 A STUDY OF THE TEXTS OF THREE OLD VIETNAMESE CALENDARS

Calendars are like instruments that need to be absolutely accurate. It is therefore necessary to develop rigid scientifically-based methods for the revision of these old calendars. In this paper we use error-correcting code rules³ to design mathematical formulae in accordance with congruence mathematics that can be used to detect possible remaining errors and fix them.

The more ‘signals’ a calendar has,⁴ the more information redundancy it has, and therefore it is easier to detect any errors. Such a situation, however, often requires greater effort in checking the evaluation. In writing the lunar calendar, for example, two signals were used in the *Khâm định vạn niên thư*, five in the *Bách trúng kinh* and three in the *Lịch đại niên kỷ bách trúng kinh*.

2.1 The Khâm định vạn niên thư

This old calendar is now preserved in the National Library in Hanoi, and has the code R 2200.

2.1.1 The Original Text

This calendar is very valuable since it was printed using woodblocks, except for the title on the cover “Tu Duc nguyen nien Mau Than trung thuyen”. This title indicates that the woodblocks were carved in the first Tu Duc (嗣德) year, Mau Than 戊申, i.e. 1848). However, according to our research this is wrong, and R2200 actually was printed in Ky Dau (己酉; 1849) or Canh Tuat (更戌; 1850).

This calendar was thoroughly studied before two papers were written about it (Lân, 1995, 1997c). According to the *Dateni Nam thuc luc* (大南寔錄, *Chronicle of Đại Nam*, 1963), the *Khâm định vạn niên thư Calendar* was compiled during the Nguyễn Dynasty, starting from the year 1820. It was carved on woodblocks, printed at least three times, and was revised each time. The first carving and printing was in the year Binh Than (丙申, 1836). As we have seen, the second printing (R 2200) took place in either the 1849 or 1850, not in 1848. The third printing occurred in the year Tan Dau (辛酉, 1861). R2200 is the only old Vietnamese calendar to be printed in two colors.

The idea of using mathematics to proof-read old calendars was first presented in Lân (2005), and was tested in Lân (2006b; cf. *Khâm định vạn niên thư*, 1849 or 1850: 83–93; Lân, 1995b).

According to Lân (2006b; cf. Lân, 1997c), R2200 has three errors. Lunar months can only have 29 (hollow-小) or 30 (full-大) days, but we found in R2200 three violations of this rule:

- Month V in the year Binh Than (丙申, 1596) has 31 days. Possibly this is a carving error and can be corrected so that both months IV and V were full (30 days)—see Lân (1987a: 87–90, 965–966).
- Month X in the year Canh Thin (庚辰, 1880) has 41 days, whereas month XII has 17 days. Probably this needs to be revised so that each Moon is hollow (29 days)—see Lân (1987a: 90–91, 995–996).
- Month II in the year Giap Than (甲申, 1884) has 31 days. But according to the *Chronicle of Đại Nam* (1902, Volume XXXVI: 93), the historians still used this calendar, which means that an inaccurate calendar was in regular use. We have to accept this lack of accuracy (see Lân, 1987a: 91–92, 997–998).

2.1.2 Content

R 2200 consists of three parts:

- (i) Part 1 covers a period of 97 years, from the year Giap Thin (甲辰, 1544) to the year Canh Ty (庚子, 1630), and is the calendar of the Restored Lê Dynasty. It may be regarded as the calendar of Le-Trinh or of The Tonkin (Northern Vietnam—Bac ha—北河).
- (ii) Part 2 covers a period of 171 years, from the year Tan Suu (辛丑, 1631) to the year Tan Dau (辛酉, 1801), and is the calendar of the Nguyễn Lords of Cochinchina (Southern Vietnam—Nam ha—南河).
- (iii) Part 3 covers a period of 102 years, from the year Nham Tuat (壬戌, 1802) to the year Quy Mao (癸卯, 1903), and is the calendar of the Nguyễn Dynasty. This Part has two sections. The first, covering 49 years from the year

Nham Tuat (壬戌, 1802) to the year Canh Tuat (庚戌, 1850), meets the three current requirements for a calendar: it is scientific, it is legitimate and it is historical. The next section, covering 53 years, from the year Tan Hoi (辛亥, 1851) to the year Quy Mao (癸卯, 1903), was a calendar to be used as a preliminary draft for those years, and therefore only meets one of these calendar requirements: it is scientific. For this reason, one needs to consider it carefully. The first section has two subdivisions: the first 11 years, from the year Nham Tuat (壬戌, 1802) to the year Nham Than (壬申, 1812), is the calendar of the early Nguyễn Dynasty. Therefore, it was modelled on the Dai Thong (大統) calendar-making method and is quite distinct from the Chinese calendar (see Table 1 and Figure 2). The second sub-division covers the following 38 years, from the year Quy Dau (癸酉, 1813) to the year Canh Tuat (庚戌, 1850), and was modelled on the Thoi Hien (時憲) calendar-making method of the Chinese Qing Dynasty, and so it is very similar to the Chinese calendar.

R2200 includes the 80-year calendar of the Restored Lê Dynasty, from 1544 until the year Quy Hoi (癸亥, 1623), and continues into the period of the *Bách trúng kinh*, as we wrote in “A calendar of the Restored Lê Dynasty” (Lân and Dũng, 1995b). It also shows us the calendar of the Nguyễn Lords at Cochinchina (Lân and Dũng, 1995a). We are based in Hanoi and can only conduct our research part-time, so have not had a chance to carry out further fieldwork.

2.2 Bách Trúng Kinh

This old calendar (*Bách trúng tinh*, 1850) was found by the École Française d’Extrême-Orient (French School of the Far East), and is now preserved at the Institute of Han-Nom Studies in Hanoi, where it has the code A 2873.

According to the book list at the Han Nom Library, there are two books with the name *Bách trúng kinh*. The first is A2873 (a printed version) and the second is A2872, a hand-written version that contains a calendar from 1624 to 1799. Unfortunately, A2872 is now lost, but presumably this was the document that Hoàng Xuân Hãn saw and reported on in 1944.

A2873 contains a calendar for 160 years of the Restored Lê Dynasty, from 1624 to 1738. This was printed with woodblocks, but there is also a hand-written calendar that extends from 1739 to 1785.

2.2.1 The Original Text

The calendar is merely the calendar of the Restored Lê Dynasty, so it covers the period from the year Giap Ty (甲子, 1624) to the year Ky Ty (己巳,

1785). Due to a damaged page, the calendar for the two years At Mui (乙未, 1775) and Binh Than (丙申, 1776) is missing. The calendar therefore only spans 160 years.

The calendar for the period 1624–1738 is an invaluable historical document, but the calendar for 1739–1785 is even more precious for it proves that these early calendars were originally handwritten.

The two calendars in A2873 contained three errors, which we discovered and corrected (Lân, 2006a; cf. 1987a: 76–77):

- Year Giáp Ngọ (甲午, 1714). In this year the woodblocks for the calendar were carved. Day 1 in month II was printed Quy Suu (癸丑), but has to be changed to Quy Dau (癸酉), to make month I hollow and month II full (Lân, 2006a; cf. Lân, 1987a: 77, 868–869).
- Year Mau Ngo (戊午, 1738). This is the last year that woodblocks for the calendar were carved. Day 1 in month X was printed Canh Tuat (庚戌), but has to be changed to Canh Thin (庚辰), so that month IX is full and month X is hollow (Lân, 2006a; cf. Lân, 1987a: 77, 893–894).
- Year Đinh Hoi (丁亥, 1767). This year the calendar was handwritten. Day 1 in month VII was copied Quy Mao (癸卯), but must be changed to Quy Hoi (癸亥), in order to make month VI full and month VII hollow (Lân, 2006a; cf. Lân, 1987a: 78, 925–926).

2.2.2 The Content

This calendar may be divided into two parts.

- (i) This part was printed using woodblocks, and covers 115 years, from the year Giáp Ty (甲子, 1624) to the year Mau Ngo (戊午, 1738). This part has very high historical value. Our research (see Lân, 1997d) revealed that the first woodblock carved for this calendar was possibly made in 1636, covering the first 12 years, from 1624 to 1635. Other carvings were made later, and not concurrently. The carving usually took place near the end of the preceding year, at the latest, before the year when the calendar was printed. For instance, the woodblocks for the calendar of 1738 were carved in the late 1737. This part of the calendar was perhaps printed after 1739, but not later than 1746, a fact which we learned from the book *Phuong Duc dang khoa luc* (鳳翼登稞錄) (Nhi, 1995) and *Vu toc the he su tich* (武族世系事迹) (Đình, 2004). It is relatively certain that this calendar was printed and distributed widely by the Le-Trinh Royal Court.
- (ii) This part was handwritten and it covers 45 years. The owner of the calendar perhaps

wrote with his own hand the calendar for each succeeding year for the period from the year Ky Mui (己未, 1739) until the year At Ty (乙巳, 1785), when he was no longer able to complete the calendar for the last three years (1786–1788) of the Cảnh Hưng (景興) Dynasty.

On the last page, it is written: “Cảnh Hưng tứ thập thất niên tuế thứ Bính Ngọ” (Year of Binh Ngo (丙午), the 47th year of the Cảnh Hưng Dynasty (1786) (景興四十七年歲次丙午), but the owner of the book did not manage to copy the calendar of that year (Lân, 1987c: 945; 1997d).

The handwriting is not very fine, but it is easy to read.

2.3 Lịch đại niên kỷ bách trúng kinh

This old calendar also was found by the French École Française d'Extrême-Orient (i.e. French School of the Far East), and is now preserved at the Institute of Han-Nom Studies, where it has the code A1237.

2.3.1 The Original Text

This calendar contains too many errors, so it is of low scientific value. According to our research results (Lân, 1987b, 2009), the A1237 calendar was hand written by the French School of the Far East during the period 1904–1907 from the *Trung dinh Lịch đại niên kỷ bách trúng kinh* (重訂歷代年紀百中經). Perhaps the latter was reproduced verbatim, just shortly after 1883, from four different calendars corresponding to the four parts that we will address below. Unfortunately, the *Trung dinh Lịch đại niên kỷ bách trúng kinh* no longer exists.

With respect to the A1237, this hand-written copy contains many errors and we had to use the error correcting-code method to correct these. In all we detected 76 errors, and we corrected 74 of them. For the two particular years, Mau Dan (戊寅, 1758) and Quy Suu (癸丑, 1793) there were just two major errors and we were unable to correct these (Lân 2007a, 2009). Meanwhile, the use of mathematics to correct the 74 errors is presented in the former research paper.

We discovered that the copier had inadvertently taken the calendar of the year Dinh Suu (丁丑, 1757) and wrote in place of it year Mau Dan (戊寅, 1758) and taken the calendar of the year Canh Tuat (庚戌, 1790) to put it into year Quy Suu (癸丑, 1793).

After making the 74 corrections we compared those parts of this calendar that also were preserved in other calendars and found that they were virtually identical. This gives us great confidence in the method of correction that we used and it also implies that those sections that were

not contained in other calendars were also reliable. On the whole, because A1237 was hand written we cannot insist on its legitimacy, but since it was copied by hand soon after 1883, it is indeed historical. Obviously it also is scientific, and it contains many parts that are very useful, particularly the sections from 1789 to 1801 (Lân, 2009) and from 1851 to 1883 when the calendars of the Tây Sơn Dynasty and the Nguyễn Dynasty respectively were in vogue.

2.3.2 Contents

This calendar consists of four parts.

- (i) Part 1 covers 49 years of the reign of Lê-Trinh (黎-鄭) from the Restored Lê Dynasty, and extends from the year Canh Than (庚申, 1740) to the year Mau Than (戊申, 1788). After correction this part becomes totally identical with the calendar in the *Bách trúng kinh*.

We used this calendar for the two years 1775 and 1776 to replace the missing calendars in the *Bách trúng kinh* where the sheet was torn out. We also used the calendar for the three years, Binh Ngo (丙午, 1786), Dinh Mui (丁未, 1787) and Mau Than (戊申, 1788), for the last years of the Restored Lê Dynasty that 百中經 lacks.

- (ii) Part 2 covers 13 years of the Tây Sơn Dynasty, from the year Ky Dau (己酉, 1789) to the year Tan Dau (辛酉, 1801). This is the most valuable part of the calendar since it is the only one that contains the calendar of the Tây Sơn Dynasty.
- (iii) Part 3 covers 11 years, from the year Nham Tuat (壬戌, 1802) to the year Nham Than (壬申, 1812). This part was precisely constructed using the Dai Thong calendar method. In our opinion, this part is not from the calendar that was circulated during the Nguyễn Dynasty. It was probably prepared by officials from the Tu thien giam (司天監, Observatory) of the Lê Dynasty for use afterwards, and the person who copied the *Trung Dinh Lịch đại niên kỷ bách trúng kinh* erroneously recopied it. Probably when Phan Thuc Truc (潘叔直) came to the North, he also made use of this *Tu thien giam* (司天監) *Calendar* when writing his *Quoc Su Di Bien* (國史遺編) (Phan, 1973). We will discuss this in more detail on another occasion.
- (iv) Part 4 covers 71 years, and should be divided into two sub-sections. The first of these covers 38 years, from the year Quy Dau (癸酉, 1813) to the year Canh Tuat (庚戌, 1850). After correction this part is identical to the calendar in the *Khâm định vạn niên thư*. The second sub-section, covering the period from the year Tan Hoi (辛亥, 1851) to the year Quy

Mui (癸未, 1883), differs in three instances from the calendar in the *Khâm định vạn niên thư*. Due to its historical characters, this calendar was used contemporaneously. This can be confirmed by studying of a few events described in the *Chronicle of Đại Nam* (Quốc sử quán Thế kỷ 19, 1963), as briefly discussed in Lân (1987b, 2009) and addressed in more detail in Lân (1997d).

Calendars for the five years At Mui (乙未, 1775), Binh Than (丙申, 1776), Binh Ngo (丙午, 1786), Dinh Mui (丁未, 1787) and Mau Than (戊申, 1788) in the book *Lịch đại niên kỷ bách trúng kinh* (Lân, 1987a: 947–949) were used to complement the calendar for those years lost or missing in the *Bách trúng kinh Calendar* (n.d., a) so that we now have a complete calendar for all years through to the end of the Lê Dynasty.

The calendar from the year Ky Dau (己酉, 1789) to the year Tan Dau (辛酉, 1801) is the calendar of the Tây Sơn Dynasty (see Lân, 2010: 1003–1014).

Calendars for the years Ky Dau (己酉, 1849), Binh Thin (丙辰, 1856), Binh Dan (丙寅, 1866) and Ky Ti (己巳, 1869) were used during the Nguyễn Dynasty (Lân, 2010: 1015–1018) whereas the calendar for these years in the *Khâm định vạn niên thư* was not used because it was not always reliable, and therefore does not satisfy the historical calendar requirement.

The research on this particular calendar was much more meticulous and difficult compared to the two other calendars mentioned above. Currently we do not have the conditions or facilities to complete this research, or to publish the calendar after it has been proofread and corrected. This is regrettable because we only were able to publish a small number of pages from this calendar in *Calendar for Five Hundred Years ...* (see Lân, 2010: 947–949, 1003–1018).

3 VIETNAMESE ANCIENT CALENDARS

In comparing the calendars, we pay attention to their differences according to three criteria:

- (i) First is the 'soc' day (朔, the first day of a lunar calendar month), which is regarded as being a minor difference. The discrepancy is only one day between calendars, but it carries over the whole Moon.
- (ii) Second is the intercalary Moon (閏月), which is regarded as a major difference. In this case the difference between the calendars continues over many Moons, and even the name of the Moons also differ.
- (iii) Third is the Tet (春節, New Year, the New Year's Day of the lunar calendar); this is a fact

of special interest and is regarded as an extreme difference.

In some instances, the differences that occurred related to two different criteria.

With the three ancient calendars mentioned above we have been able to reconstruct Vietnamese calendars from 1544 through to the present day. A summary of the main finding is given below.

3.1 The Periods of Newly Regained Independence

While it was under Chinese domination of course Vietnam used the Chinese calendar. However, when Vietnam regained its independence during the Ngô (吳, 939–968), Đinh (丁, 968–980) and Tiền Lê (前黎, 980–1009) Dynasties and the first years of the Lý Dynasty these were short intervals and officials were busy establishing and strengthening the Government, so they did not pay attention to calendrical calculations. Consequently, people continued to use the Chinese calendar.

3.2 The Lý and Trần Dynasties

Hoàng Xuân Hãn studied ancient documents such as the *Abridged Chronicles of Dai Viet* (大越史略), the *Complete Annals of Dai Viet* (大越史記全書), *Thiên uyển tập anh* (禪苑集英), etc. in order to find the dates of historical events and compare them

with those listed in the Chinese calendar. He found intercalary lunar months (intercalary Moon) or hollow Moon (29 days) and full Moon (30 days) different from those in the Chinese calendar and included them in a table in his *Calendar and Vietnamese Calendar* (Hân, 1982, my English translation). We took part of that table to create Table 2. From Table 2 we can see that the calendar of the Lý and Trần Dynasties (1080–1300) is markedly different from the Chinese calendar (with 11 differences). There are six major differences about the intercalary months (1–5, 13 in Table 2), two extremely large differences (both New Year and intercalary Moon; entries 6, 10) and three minor differences (the first day of the Moon; entries 8, 11 and 12).

According to research by Hoàng Xuân Hãn and by us, from AD 1080 Vietnam compiled a calendar that differed from the Chinese calendar, and these differences lasted until the end of the Nguyễn Dynasty in the twentieth century. Sometimes these differences were major, but at other times they were very minor. Unfortunately, we have yet to find a Vietnamese calendar from the period 1080–1543, so this issue is still not fully resolved.

3.3 The Calendar of the Restored Lê and the Waning Lê (末黎) Dynasties

This calendar covers 245 years during the Restored Lê and the Waning Lê (末黎) Dynasties,

Table 2: Differences between the Vietnamese and Chinese calendars.

No	year		Vietnamese Cal.		Chinese C.	Different types
	干支	solar	Name intercalary moon	Literature	Name intercalary moon	
1	Canh Thân 庚申	1080	8	VSL	9	Major
2	Giáp Thìn 甲辰	1124	1	TT	3	Major
3	Bính Ngọ 丙午	1126	11	TT	11	Major
4	Kỷ Dậu 己酉	1129	8	TT	8	Major
5	Nhâm Tý 壬子	1132	5	TT	4	Major
6	Ất Sửu 乙丑	1145	No		11	Extremely
	Bính Dần 丙寅	1146	6	TT	No	
7	Tân Mùi 辛未	1151	4	TUTA	4	No
8	Canh Ngọ 庚午/9	1210	9 hollow	TT	9 full	Minor
9	Tân Mùi 辛未	1211	2	VSL	2	No
10	Bính Thân 丙申	1256	3	TT	No	Extremely
	Đinh Tỵ 丁巳	1257	No		4	
11	Ất Dậu 乙酉/2	1285	2 full	TT	2 hollow	Minor
12	Đinh Hợi 丁亥/12	1287	12 full	TT	12 hollow	Minor
13	Canh Tý 庚子	1300	3	TT	8	Major

Key:

Different Types: Minor for First day of Moon. Major for Intercalary Moons. Extreme differences for Intercalary Moons and New Year.

Literature: VSL for *Việt sử lược* (越史略);

TT for *Đại Việt sử ký toàn thư* (大越史記全書);

TUTA for *Thiên uyển tập anh* (禪苑集英).

Table 3: Differences between Vietnamese and Chinese calendars.

Period	Dynasty	Diff. w. Chinese C.			
		General	Minor	Major	New year
1544-1788	Restored Lê	89	63	34	11
1789-1801	Tây Sơn	3	3		
1802-1812	Nguyen	4		4	
1813-1903	Nguyen	4	4		
1530-1801	Chua Nguyen	92	69	21	8

from the year Giáp Thìn (甲辰, 1544) to the year Mậu Thân (戊申, 1788), and its existence was announced in the book, *Calendar for Five Hundred Years of Vietnam ...* (Lân, 2010: 133–380).

The calendar of this period is also found in all three above-mentioned ancient calendars. Those parts that are in accord in two of the three calendars are in general identical. Compared to the Chinese calendar, there were 89 differences for this period of 245 years, which included 63 minor differences (朔, first day of Moon days), 34 major differences (閏月, intercalary Moons) and 11 extreme differences (春節, New Year) (see Table 3). So, in the past there were many instances when

Vietnam and China did not celebrate the New Lunar Year on the same day, and we published the results of a comparison in Lân (1987a) and Lân and Dững (1995b).

3.3.1 Further Discussion

According to Hoàng Xuân Hãn (1982), prior to 1644 both Vietnam and China adopted the Dai Thong calendar-making method, and so Vietnamese and Chinese calendars were similar. Our study of the book *Khâm định vạn niên thư* revealed that this assertion is not correct (Lân and Dững, 1995b). The fact is, within 100 years, from the year Giáp Thìn (甲辰, 1544) to the year Quý Mao (癸卯, 1643), there were 12 differences between the two calendars, which included 11 minor disagreements and one major discrepancy (see Figure 7). The calendar of the Restored Lê Dynasty has three intercalary Moons, while the Chinese calendar has two, and there are three extreme differences. Looking at the ratio 100/245 years and the ratio 12/89 differences we see that, when using the same method of construction, the two calendars differed very little although there were clear differences nonetheless. This leads us to make an educated guess that from 1300 to 1543, although historical documents do not show a clear disparity between the Vietnamese and Chinese calendars, there must have been differences between the two, but these differences are perhaps small in number (Lân, 1987c). As we have yet to discover a Vietnamese calendar for this period, we cannot test this proposition.

3.4 The Calendar of the Tây Sơn Dynasty (1789–1801)

This calendar covers just 13 years, from the year Kỷ Dậu (己酉, 1789) to the year Tân Dậu (辛酉, 1801), and its existence was announced in the book *Calendar for Five Hundred Years ...* (Lân, 2010: 381–395).

Otherwise, a calendar of the Tây Sơn Dynasty can only be found in the hand-written *Lịch đại niên kỷ bách trúng kinh* (n.d., b), which is quite reliable. Compared with the Chinese calendar, there were only three differences, all on ‘soc’ days, and therefore they are only minor (see Table 3). Hãn (1982) asserts that the Tây Sơn calendar is a direct copy of the Chinese calendar, but much earlier, after studying the hand-written *Bách trúng kinh*, he had stated (Hãn, 1944) that the Tây Sơn calendar was only somewhat similar to the Chinese calendar. We believe that his 1944 assertion is correct, and in two different research papers (Lân and Dững, 2003; Lân, 2014) we explain why Hãn changed from a correct conclusion to an incorrect one.

The results of our research indicate that the Tây Sơn calendar is different from the Chinese

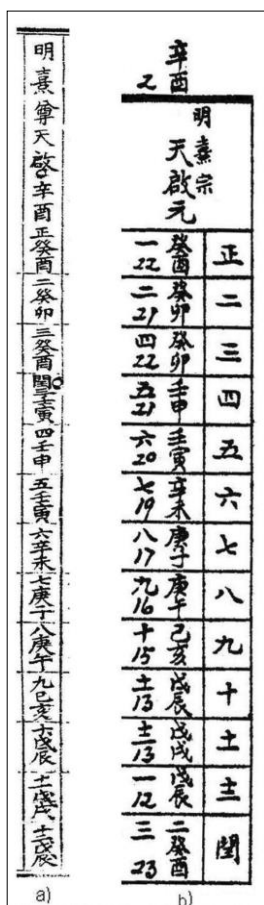


Figure 7: Calendars for the year 1621. a) the Restored Lê calendar; b) the Chinese calendar.

calendar. This conclusion is reached, thanks to the help of a sophisticated mathematical construction, making use of coding theory and the theory of mathematical congruence (see Lân, 2009). In our opinion, King Quang Trung (光中) had a local (Vietnamese) calendar made for his Dynasty. This is quite conceivable if we recall that from the Lý Dynasty, Vietnam already had its own calendar and in the later period the Nguyễn Lords in the Cochinchina also had their own calendar.

3.5 The Calendar of the Nguyễn Dynasty (1802–1903)

This calendar spans 102 years, from the year Nham Tuất (壬戌, 1802) to the year Quy Mao (癸卯, 1903), and was first announced in book *Calendar for Five Hundred Years ...* (Lân, 2010: 396–543).

The calendar for this period is found in the *Khâm định vạn niên thư* (1849 or 1850) and the *Lịch đại niên kỷ bách trúng kinh* (n.d., b). For the purposes of our study, this period was divided into two sub-periods:

- (i) The first period covers 11 years, from 1802 to the year Nham Than (壬申, 1812), during which the Nguyễn calendar adopted the Dai Thong calendar-making method while the Chinese Qing Dynasty used the Thoi Hien method. For this reason, although the period is short there were four differences between the two calendars. All of them were in intercalary Moons, and in each case the differences are major (see Tables 1 and 3 and Figure 2).
- (ii) The second period covers 91 years, from the year Quy Dau (癸酉, 1813) to the year Quy Mao (癸卯, 1903). By then both countries used the Thoi Hien method of calendar-making so their calendars showed very little difference: there were only four differences, all in ‘soc’ days, and therefore only minor (see Table 3).

Preliminary research results were presented in Lân (1995c, 2000) and further details were provided in Lân (2007b, 2010).

3.6 The Calendar of the Nguyễn Lords of Cochinchina (1631–1801)

This calendar covers the 171 years from the year Tan Mui (辛未, 1631) to the year Tan Dau (辛酉, 1801). Initially Hoàng Xuân Hãn (1982) posed the question: Did the Nguyễn Lords have their own calendar? The answer was provided by the *Khâm định vạn niên thư* (1849 or 1850): yes they did.

This Southern Vietnamese calendar was printed in the *Khâm định vạn niên thư*, and differed from the Chinese calendar in 92 instances: 69 ‘soc’ days (minor differences), 21 intercalary Moons (major differences) and eight Tets (extreme

Table 4: The differences between the calendars of Vietnamese Dynasties and the Nguyễn Lords.

Period	Dynasty	D. w. Nguyen lords C			
		General	Minor	Major	New year
1631-1788	Restored Lê	45	36	11	4
1789-1801	Tây Sơn	5	2	3	1

differences), as listed in Table 3.

In a period of 158 years, from 1631) to the year Mau Than (戊申, 1788), this calendar existed concurrently with the calendar from Le-Trinh’s Restored Lê Dynasty from the Tonkin area in Northern Vietnam. These two calendars have 45 differences, including 36 ‘soc’ days, 11 intercalary Moons and four Tets (see Table 4). So during this period there were times when the people living in the two regions of Vietnam did not celebrate Tet (New Year) on the same day (see Figure 5, where in the year Mau Ngo (戊午, 1678) all three calendars shown here were different).

For 13 years, from the year Ky Dau (己酉, 1789) until the year Tan Dau (辛酉, 1801), this calendar of the Nguyễn Lords existed concurrently with the Tây Sơn calendar. The two calendars differed in five instances: two ‘soc’ days, three intercalary Moons and one Tet (see Table 4). Therefore, the population living in the two overlapping administrations also did not celebrate Tet on the same day.



Figure 5: Three calendars for the year 1678. a) the Restored Lê Dynasty calendar; b) the Nguyễn Lords calendar; c) the Chinese calendar.

3.7 The Calendar of the Late Nguyễn Dynasty (1904–1945)

This calendar covers the period from the year Giáp Thìn (甲辰, 1904) to the year Ất Dậu (乙酉, 1945). However, there are unresolved issues associated with this calendar, and although they are not major ones we will not discuss this calendar here.

3.8 Summary

The results of research published by Hoàng Xuân Hãn (1944, 1982) and those reached recently by us show that since AD 1080 Vietnam has always had its own calendar. In particular, we reconstructed the Vietnamese calendar dating from 1544, and we found that when the country was divided, for 171 years there were two different calendars that existed concurrently. We found that when Vietnam used a calendar-making method abandoned by the Chinese, the calendars of the two countries generally diverged from one another, but when the method used in Vietnam was the same as that adopted in China the two calendars differed very little.

4 HISTORICAL INFORMATION

4.1 Official Calendar Names

The Trần Dynasty had the *Thu Thoi Calendar* (授時), which later was changed to the *Hiep Ky Calendar* (協紀); the Hồ Dynasty (胡) had the *Thuan Thien Calendar* (順天); the Lê Dynasty had the *Kham Thu Calendar* (欽授); the Nguyễn Lords had the *Van Toan Calendar* (萬全); and the Nguyễn Dynasty, in its early days, continued to use the *Van Toan Calendar*, and then adopted the *Hiep Ky Calendar*.

4.2 Calendar-making Offices

The Lau Chinh duong (正陽樓) was established during the Lý Dynasty; during the Lê Dynasty there was the Thai su vien (太史院); during the Restored Lê Dynasty there was the Tu thien giam (司天監); under the Nguyễn Lords there was the Chiem hau ty (占候司); and during the Nguyễn Dynasty there was Kham thien giam (欽天監).

4.3 Calendar-makers

Although they are rarely mentioned in the historical records, some individuals are known to have contributed to the construction of ancient Vietnamese calendars.

Hãn (1982) believes that at the beginning of the Lý Dynasty, the ambassadors Mai Canh Tien, Ly Ke Tien (1063) and Quach Si An, Dao Sung Nguyen (1069) may have had an opportunity to learn calendar-making from the Song Dynasty (宋). But at that time the Song Dynasty calendar-makers frequently changed their way of

calculating calendars, whereas the Vietnamese calendar-makers did not do this, but instead often used methods no longer in vogue in China, which explains why between 1080 and 1300 the Vietnamese calendar differed markedly from the Chinese calendar.

In 1301, the King's envoy Đặng Nhữ Lâm returned from an audience with the Chinese Yuan (元) Imperial Court and brought with him a forbidden book, which probably dealt with the art of calendar-making. Lân (2013) has suggested that this may have led to the adoption of the Chinese method of calendar-making in Vietnam, so that the Vietnamese and Chinese calendars were similar.

Then in 1339, Đặng Lộ, a son of Đặng Nhữ Lâm, was appointed to the post of 'Hau nghi dai lang thai su cuc'. He was an expert calendar-maker, and he created a 'linh lung nghi' for the study of cosmic phenomena. It was he who suggested the conversion of *Thu Thoi Calendar* into the *Hiep Ky Calendar* (see Lân, 2011).

Near the end of the Trần Dynasty, Trần Nguyên Đán wrote the *Bach the thong ky* (百世通紀), a book dealing with the method of calendar making. Unfortunately this book has been lost, otherwise we would have been able to learn much about the Vietnamese calendar up to that time.

During the Nguyễn Dynasty, Nguyễn Hữu Thận also made a significant contribution to the creation of the Vietnamese calendar. In 1810 he led a Vietnamese delegation to the Chinese Qing Imperial Court, and brought back the *Lich tuong khao thanh* (曆象考成), a book dealing with the Thoi Hien calendar-making method of the Qing Dynasty. In 1812, he assumed additional responsibilities as Deputy Head of the Kham thien giam (Observatory). After that, the *Hiep Ky Calendar* of the Nguyễn Dynasty was modelled on the Thoi Hien method, so the Vietnamese and Chinese calendars were quite similar. It should be noted that the *Hiep Ky Calendar* that he proposed was in continuous use for 133 years, from 1813 to 1945. In 1816, King Gia Long said in praise of Nguyễn Hữu Thận:

The art of calculation in the making of a calendar is extremely complicated, only Nguyen Huu Than is knowledgeable enough to be able to master it. (The Nineteenth Century National Historical Office, 1963; our English translation).

4.4 Dating Historical Events

Vietnamese calendars have been used to date some important historical events. For example, the date of entry into Đồng Hới (洞亥) by the Tây Sơn troops was 21 June 1786 (i.e. day 25 of the 5th Moon of the year Binh Ngo (丙午) (Lân, 1987c); and the date of Ngô Thì Nhậm's (吳時任) death (the day Tan Ti (辛巳) was 7 April 1803, that is

day 16 of the 2nd Moon of the year Quy Hoi (癸亥) (Lân, 1999). These calendars also have been used to establish the date of King Lý Bí's (李贲) death (Lân, 2006c); the hour and date when King Quang Trung (光中) died (Lân, 2006d); and the date when King Lý Thái Tổ (李太祖) ascended the throne (Lân, 1996b).

5 ESTABLISHING AN EXACT CHRONOLOGY FOR THE MẠC DYNASTY

A brief summary is provided above of some of the results of research on ancient Vietnamese calendars published in Lân (2000) and Lee (2010).

The first of these books (Lân, 2000) also presented Vietnamese and Chinese chronologies, and compared them. The method of presentation of these chronologies had several novel features: they were systematic, exact, used multiple criteria, and were easy to use (cf. Lân, 2016). But in particular, a new and exact chronology for the Mạc Dynasty (莫, 1533–1593) was reconstructed on the basis of epigraphical texts.

In our opinion, dates of contemporary events carved on stone are more reliable than those in historical records, particularly when these dates are combined together into a system. For this reason, Lân and Dũng (1999) and Lân (1997a) relied on 60 out of 148 epigraphical texts printed in the book *Định Khắc Thuần (sưu tầm, khảo cứu, dịch chú): Văn bia thời Mạc* (1996) and on 22 competitive examinations held during the Mạc Dynasty, as recorded in the book *Đăng khoa lục* (n.d., a), to construct a new and exact chronology for the Mạc Dynasty, until the end of the reign of Mac Mau Hop Hop (莫茂合). Lân (1997b) also observed that inscriptions on ceramics fully agreed with the epigraphical texts. This new chronology is completely different from the old one that was published by Bình, Linh and Nghị (1976), and is similar to one that was produced by the Vietnamese Conservation Department (1970) and based on data in the *Ngô Sĩ Liên và các sử quan nhà Lê* (1993) for eight reigning

years: Cảnh Lịch, Quang Bảo, Thuần Phúc, Sùng Khang, Diên Thành, Đoan Thái, Hưng Trị and Hồng Ninh (景曆, 光寶, 淳福, 崇康, 延成, 端泰, 興治, 洪寧; see Table 5 and Lân, 2016). In particular, the Thuan Phuc reigning years were recorded as 1562–1565 in the old chronology, which was wrong by three years. The correct date is 1565–1568, as given in the stone inscriptions (see Lân and Dũng, 1996; Lân, 2016: 46–47). This allowed us to argue that Lê Quý Đôn's *Đại Việt thông sử* (1978) provided the correct dates for the birth and the ascension to the throne of Mac Mau Hop whereas these dates as provided by the *Ngô Sĩ Liên và các sử quan nhà Lê* were wrong. This was pointed out by Lân (1996a).

A host of chronologies relating to the Mạc Dynasty given by the *Ngô Sĩ Liên và các sử quan nhà Lê* (1993) and the *Quốc sử quán Thế kỷ XIX* (1957–1960) now need to be modified in order to conform to the correct chronologies. Initially, Lân (1998) proposed 53 modifications, and later he suggested 40 other modifications (Lân, 2002). These errors also exist in other works (e.g. Ngô, 1993, which has more than 150 errors—see Lân and Dũng, 1999).

It is a fact that historians of the Restored Lê Dynasty had a prejudice against the Mạc Dynasty, and therefore their writing on dates in the Mạc Dynasty was based on sloppy research and hence filled with errors. This prejudice against the Mạc Dynasty by the historians of the Restored Lê Dynasty manifests itself most clearly in their failure to assign the Mạc Dynasty to a separate chapter in *Ngô Sĩ Liên ...* (1993). This leads one to suspect that many of the historical events ascribed to the Mạc Dynasty by these historians are not necessarily reliable.

6 CONCLUSION

In this chapter we have summarized some of the research by Hoàng Xuân Hãn and ourselves on ancient Vietnamese calendars. We found clear evidence of such calendars from 1544 onwards,

Table 5: Duration of use of eight reigning years of the Mac Dynasty.

Nr	Reigning years		Duration for use		New redefined day for use of reigning years
			Old	New	
1	Cảnh Lịch	景曆	1548-1553	1548-1554	1 st moon 1, 戊申 – 1548
2	Quang Bảo	光寶	1554-1561	1555-1564	1 st moon 1 乙卯 – 1555
3	Thuần Phúc	淳福	1562-1565	1565-1568	1 st moon, 1 乙丑 – 1565
4	Sùng Khang	崇康	1566-1577	1568-1578	In year 戊辰 – 1568
5	Diên Thành	延成	1578-1585	1578-1585	7 th moon 戊寅 – 1578
6	Đoan Thái	端泰	1586-1587	1585-1588	6 th moon 28, 乙酉 – 1585
7	Hưng Trị	興治	1588-1590	1588-1591	In year 戊子 – 1588
8	Hồng Ninh	洪寧	1591-1592	1591-1592	In year 辛卯 – 1591

and during the period from 1631 to 1801 two different calendars coexisted. These results are promising, but the Vietnamese calendar from 1080 to 1543 has yet to be discovered, although during that period it definitely differed from the Chinese calendar.

As we wrote above, during the past decades two important calendars were lost, the hand-written *Bách trúng kinh* that Hoàng Xuân Hãn read in 1944 and the book *Hoàng triều Minh Mệnh Khâm định vạn niên thư*, which the compilers of the calendar for the Vietnamese Meteorological Service read sometime before 1967. At least the first of these books gave us the calendar of the year Quý Sửu (癸丑, 1793) during the Tây Sơn Dynasty which the *Lịch đại niên kỷ bách trúng kinh* incorrectly copied from another year. But the hand-written book *Lịch đại niên kỷ bách trúng kinh* has not been printed, so most scholars cannot easily read and study this calendar. There also are other calendars found in libraries (e.g. Lê Hữu Ích, n.d.), but we have not had an opportunity to research these yet. Nor have we ventured outside Hanoi to search for calendars that are stored in libraries and private collections within Vietnam and overseas. As such, ancient Vietnamese calendars still offer enormous opportunities for further research.⁵

7 NOTES

1. This paper is a slightly revised version of Lân and Nguyễn (2017). This is the third paper in a series on the historical calendars of Southeast Asia. The first paper (Gislén and Eade, 2019a) provides an introduction to the series, and the second paper (Gislén and Eade, 2019b) deals with the calendars of Burma, Thailand, Laos and Cambodia.
2. Nowadays, people tend to use the book 二十史朔闰表 by 陳垣 (1962), and we also use this book for our figures about the Chinese calendar that are reproduced in this Chapter (rather than using Hoang's book).
3. For an explanation of the error-correcting code rules, contact the first author of this paper.
4. 'Signals' are the length of the negative month, 10 stems, 12 branches, constellations and 'guardian stars'. Anyone interested in details of these signals and the ways in which they are used in Vietnamese calendrical analysis should contact the first author of this chapter.
5. Although this chapter has focussed primarily on our own research, based in Hanoi, and the work of a small number of other Vietnamese calendar-researchers, it is important to recognise that this topic also has attracted overseas scholars. For example, see Okazaki (2017).

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Associate Professor Lê Thành Lân was born in Hai Hung, Vietnam, in 1943. He has a Bachelor of Electrical Engineer from Hanoi University of Technology and a Doctorate in Biomedical Technology and Cybernetics from Ilmenau University of Technology in Germany. For many years he taught at Hanoi University of Technology. He also worked on Numerical Methods for Dynamic Systems and Information Technology at the Institute of Information Technology of the Vietnam Academy of Sciences and Technology. Dr Lân spent many years independently researching ancient Vietnamese calendars, and he found the Vietnamese calendar of 1544–1903. He has published extensively on Vietnamese calendars.