

BALINESE TRADITIONAL CALENDAR

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Indian kings professing Hindu and Buddhist religions established their empires in Indonesia between 8th and 13th centuries AD, and during that time the Indian learning and culture greatly influenced the lives and thinking of the people of that country. With the decline of the Hindu kingdom, Moslem power got established in Java, the prominent island state of Indonesia, in the 16th century AD, but Hindu culture and its influence remained without much change in the island Bali where even today about 95% of the people of this island profess Hindu religion, and follow a calendar mainly framed on the Indian system.

However, in addition to the above system of calendar keeping Bali has imbibed the Javanese system, and thus it has two calendric systems running side by side. This has made the Balinese calendar a very complicated one. The Javanese-Balinese calendar is known as *Pawukon*, and has cycle of 210 days comprising of 30 weeks, and the year of this calendar covers two cycles totalling 420 days. During 210-day cycle, ten different weeks of length varying 1 to 10 days run concurrently, though the weeks of lengths of 3, 5, and 7 days are mainly used.

The calendar framed on the Indian system is known as the Balinese Śaka calendar, because the era used is the Indian Śaka. Also it is said that one Pandit Ajit Śaka came to Java from Gujarat in 378 Śaka (456 AD), and was the pioneer in spreading the Indian system of calendar keeping. Balinese Śaka calendar is broadly the same as the luni-solar siddhantic system followed in India with slight modifications, and this clearly exhibits strong Indian influence.

Key words : *Pawukon, Śaka, Tika, Wuku*

BACKGROUND HISTORY

Before describing the old traditional calendar of Bali, which is a part of present Indonesia (also known as Nausantara), it may be interesting to note very briefly its background. Bali is a comparatively small island on the eastern side of Java, and has roughly an area of about 5800 sq. km, and a population of about 2.5 million people, while Java has an area of about 130,500 sq. km. with about 70 million people. The island of Java was colonised by Indian (Hindu) kings from about 1st to 7th century AD who extended their kingdom covering much of Indonesia from 8th to 13th century AD, and

exerted much cultural influence over the people of this great island kingdom, and this still persists. With the decline of Hindu kingdom, Islam gained ground, and Moslem state was established in Java in the 16th century. Portuguese arrived at Indonesia around 1511 AD, but were challenged by the arrival of the Dutch in 1596 AD and the British in 1600 AD. Ultimately, however, Dutch emerged triumphant and the Dutch East India Company firmly established themselves in 1623, and became the chief power in the area. In 1798 the Dutch government took over the territories controlled by the Company, and it became known as Dutch East Indies. During World War II, Java and other islands were occupied by the Japanese (1942-45), and Indonesia was proclaimed as a Republic on 17 Aug 1945. After the War, opposition to Dutch presence intensified, and United States of Indonesia was officially recognised in 1949, and it became a Republic of Indonesia in 1950, and in the new Republic, Bali became one of its province. In Indonesia at present about 90% of the people are Muslims, but in Bali about 95% are said to be professing Hindu religion.

Reign of Indian kings for many centuries over large parts of Indonesia, had left an impact of Indian culture on the people of this great island kingdom, and this can be easily traced in many social customs, and in their old calendric system, which is particularly visible in the traditional calendar of Bali.

JAVANESE-BALINESE CALENDAR : *PAWUKON*

The Javanese-Balinese calendar, known as *Pawukon*, had its origin in Java and it prospered under Majaphit kings. But with the onslaught of Islamic kings in the 16th century, the decaying Majaphit kingdom retreated to Bali, and though vestiges of this calendric system still remain in Java, but it has been flourishing in Bali. The *Pawukon* calendar guides the determination of a large number of religious ceremonies in Bali, market days, personal anniversaries, the days for doing special things, for choosing lucky and unlucky days, etc.

In the *Pawukon* calendric system days are counted in units called '*wuku*', which is a week of usual 7-days, Sunday to Saturday. A *Pawukon* cycle comprises of 30 weeks covering 210 days. *Pawukon* year covers two *Pawukon* cycles totalling 420 days, which is divided into 12 months each of 35 days. The year of *Pawukon* system is referred as '*rati*' (or *tahun wuku* - *wuku* year) (as opposed to '*warsa*' (the year of the luni-solar system), while the month of the *Pawukon* system is called '*tumpek*' as opposed to '*Sasih*' (the lunar month of the luni-solar system). The *Pawukon* years are not counted continuously, like our calendar, by any era, it just passes by.

DIFFERENT WEEK SYSTEMS IN PAWUKON CALENDAR

During the 210 day cycle, ten different weeks of different lengths run concurrently. There is a week that is only one day long, the next has two days, the next three, and so on to the week that is ten days long. Each of these ten different kinds of weeks is given a Sanskrit-derived name, according to the number of days it has. For example, the three day week is called *Triwara*, the five day week *Pancawara*, the seven day week *Saptawara*, and so on. And each of the days of each of the ten different weeks has a name. Any given calendar date, therefore, may have ten different week day names - one for each of the ten weeks that are going on simultaneously. Obviously there is considerable difficulty in remembering what day of the week it is, as the Balinese calendar may have ten different day names for every single day : There are 1 + 2 + 3 + 4 + 5 + 10 different day names. a total of 55.

Some of the ten weeks are more important than others. Most Balinese pay no attention whatsoever to any of them except the 3, 5 and 7 day weeks. The first two are based upon the Balinese and Javanese market weeks, in which there is a village market day that rotates between neighbouring villages, returning to any given village after 3 or 5 days. Three is more common in Bali, five in Java. Three is also important in that it represents the so-called Hindu Trinity, the three important aspects of God as Creator of Life, Preserver of Life, and Dissolver of Life, Brahmā, Viṣṇu and Śiva. Three is also important in many different aspects of Balinese thought and philosophy. Five is an important number because it represents the four cardinal compass directions, plus center. It too is important in many aspects of Balinese, and, indeed Indonesian thought. For example, the foundation of the Indonesian constitution is the *Pānca Śīla*, the five basic principles upon which the Government of Indonesia is based. The seven day week is our familiar one. It is based upon the sun, moon, and the five planets that can be seen with the naked eye. It will be helpful to show the day names of the three most important weeks :-

Three Day Week <i>Triwara</i>	Five Day Week <i>Pancawara</i>	Seven Day Week <i>Saptawara</i>
Pasah	Umanis	Radite
Galang Tegeh*	Paing (or Pahing)	Soma
Kajeng	Pon	Anggara
	Wage	Buda (or Budha)
*(The 2nd day is also called Pekenan or Beteng)	Keliwon (or Kliwon)	Vraspati
		Śukra
		Śaniścara

In the seven day week Redite corresponds to our Sunday, Soma is Monday, and so on.

The other seven less important methods of counting the week-days are listed below :-

- | | | |
|--|--|---|
| (1) <i>Ekawara</i>
<i>1-day week</i>
Luang | (4) <i>Sadawara</i>
<i>6-day week</i>
Tungleh
Aryang
Urukung
Paniron
Was
Maulu | (6) <i>Sangawara</i>
<i>9-day week</i>
Dangu
Jangur
Gigis
Mohān
Ogan
Erangan
Urungan
Tulus
Dadi |
| (2) <i>Dwiwara</i>
<i>2-day week</i>
Menga
Pepet | (5) <i>Astawara</i>
<i>8-day week</i>
Śrī
Indra
Guru
Yama
Ludra
Brahmā
Kala
Umā | (7) <i>Dasawara</i>
<i>10-day week</i>
Pandita
Pati
Suka
Duka
Śrī
Manuḥ
Mānuṣa
Rājā
Dewa
Rāksasa |
| (3) <i>Caturwara</i>
<i>4-day week</i>
Śrī
Laba
Jaya
Menala | | |

30-WEEK CYCLE OF PAWUKON YEAR

The thirty weeks of each cycle of Pawukon calendar cover 210 days, and each of the week has a distinctive name as follows :

- | | | |
|----------------|------------------|-----------------|
| 1. Sinta | | |
| 2. Landep | 12. Kuningan | 22. Uve |
| 3. Ukir | 13. Langkir | 23. Menail |
| 4. Kulantir | 14. Medangsia | 24. Perangbakat |
| 5. Toulu | 15. Pujut | 25. Bala |
| 6. Gumbreg | 16. Pahang | 26. Ugu |
| 7. Wariga | 17. Krulut | 27. Wayang |
| 8. Warigadean | 18. Merakih | 28. Kulawu |
| 9. Julungwangi | 19. Tambir | 29. Dukut |
| 10. Sungsang | 20. Medangkungan | 30. Watugunung |
| 11. Dunggulan | 21. Matal | |

TĪKĀ - A CALENDRIC CHART

One memory aid for the *Pawukon* weeks and days is a table, called the *TĪkā*. It has seven horizontal rows, each corresponding to one of the days of the seven day week, with Redite-Sunday at the top. And it has 30 vertical columns, each representing one of the thirty 7-day weeks that make up the 210 day long *Pawukon*. Each of these thirty weeks has a special name as already mentioned. The *tĪkā* is read vertically downwards. There is usually no writing on the *tĪkā*, which is often carved on wood, Sometimes painted on cloth. In this, certain days are symbolized by geometric figures, such as circles, crosses, plus signs, dots, and triangles. Not all of the 55 week day names can be shown, of course, because the mess would be undecipherable and also because most of them are not terribly important anyway. Appendix 'A' shows a specimen of '*TĪkā*'.

BALINESE PAPER WALL CALENDAR

The pattern of the Balinese paper wall calendar that one sees hanging on walls everywhere is in essence the same as the paper Gregorian calendar in use here or elsewhere. There is a page for each month for this wall calendar, the months being those of the Gregorian calendar. The names of the 12 months are very similar to original Dutch names and are easily recognizable. The table below shows the original Dutch names and the modern Indonesian names of the 12 months of the year.

<i>Original Dutch names of the month</i>	<i>Modern Indonesian name of the month</i>
1. Januari	1. Januari
2. Februari	2. Pebruari
3. Maart	3. Maret
4. April	4. April
5. Mei	5. Mei
6. Juni	6. Juni
7. Juli	7. Juli
8. Augustus	8. Augustus
9. September	9. September
10. Oktober	10. Oktober
11. November	11. Nopember, November
12. December	12. Desember

Februari has become Pebruari because F is not a common letter in Indonesia. The month November is written in some calendars as Nopember, and in some as the normal November. The Indonesian 'c' is pronounced more like 'ch' in English, and December is written as Desember. Apart from the Gregorian calendar dates, which are most prominent, the wall calendar is jammed with multifarious information on different systems of week days and on dates of month of different calendars, etc, which have been detailed in the succeeding paragraphs.

Balinese paper wall calendar has primarily seven horizontal rows, each giving calendrical information concerning the month days falling under each of the seven week days. The 1st week day starts from Sunday as it is generally the practice with paper calendars in India or elsewhere. The names of the seven days of the week are printed downwards from top and each day of the week is expressed in six different languages as follows :

(1) Indonesian, (2) Balinese, (3) English, (4) Indian, (5) Chinese, and (6) Japanese. Indonesian name is displayed more prominently than others in bold capital letters in Roman script. It may be mentioned that script used for writing Indonesian language is Roman which is generally used in the western countries. Obviously this is due to the European influence mainly Dutch, which occupied the country for many years. The calendrical part of the Paper wall calendar has six vertical columns. The first column contains the seven week days as mentioned above, and the other five columns show the dates of the Gregorian calendar months, which are written as follows : (1) January, (2) Februari, (3) Maret, (4) April, (5) Mei, (6) Juni, (7) Juli, (8) Agustus, (9) September, (10) Oktober, (11) November and (12) Desember, as already been explained earlier. Apart from the aforesaid six vertical columns, there is another one on the right where against each day of the Gregorian calendar month and consequently also of other months, astrological information is given serially downwards.

Though generally most of the Balinese wall calendars are the same, detailed description has been given on the basis of the calendar published by K. Kebek Sukarsa, a well known calendrical astronomer living in Denpasar, Bali. This wall calendar uses the name and seal of Parisada Hindu Dharma which is a central Hindu Authority of Indonesia. It is understood that this Parisada's name and seal are also used by other publishers of such calendars. This type of wall calendar has normally twelve sheets, each sheet gives detailed information for each of the twelve months noted in the previous paragraph. At the top of each sheet, under seven different squares, information is given about the era years in use in Indonesia by different communities. These eras have been elaborated below taking the month of Pebruari (February), 1997 AD, as an example.

It may be mentioned that the present day popular wall calendars have become a mixture of traditional and modern system.

DIFFERENT ERAS IN USE

In Balinese calendar, years of different eras are shown which have different national origin, most popular ones being Śaka and Christian. The latter has become prominent because of the official use of the Gregorian calendar. The eras that are generally shown in the calendar are described below:

a) *Kaliyuga era*

The year shown in the calendar for a day of the year under this era is not the same. This is because different years are in use which have different year lengths. (i) *Wuku year* - It comprises of 60 cycles of 7-day (*wuku*) weeks, that is, of 420 days, and for Februari, 1997, the year indicated is 4433, and it becomes 4434 in September; (ii) *Nirayana Solar year* - It is same as in India. *Kali* era year indicated for the same month is 5097, and it increases to 5098 in April; (iii) *Bumi* or *Sāvana year* - It is of 360 days; and the year indicated is 5172 and changes to 5173 in November. 1997, and (iv) *Lunar* or *Cāndra year* - The year shown as 5254, and it increases to 5255 in October, 1997.

b) *Imlek*

This is Chinese system of counting the year. In China this type of calendar is known as '*nongli*' - agricultural calendar. The year of Chinese luni solar calendar starts with new moon occurring in the tropical zodiac sign of Aquarius, which is traversed by the sun from January 21 to February 19, and hence the date of the Chinese luni-solar new year may vary within this date. In Januari 1997 *Imlek* year was 2547 and it changed to 2548 in Februari, 1997, new moon having occurred on 7 Feb at 23^h 06^m Beijing time.

c) *Gengo*

This is a Japanese system of counting the year, but in Japan it has been known as '*kigen*' (or *koki*). After World War II, this system has fallen into disuse in Japan, but is still continued to be shown in Bali wall calendar. In Januari, 1997, *Gengo kigen* year was 2656, and in Pebruari it became 2657.

d) *Budha Parinirvana*

The year of this era is counted from the time of demise of Lord Buddha. In January 1997, the *Buddhā era* is indicated as 2540 (same as in India) and becomes 2541 in May.

e) *Vikrama*

Under *Buddha Parinirvāṇa* year is mentioned *Vikrama era* year which is shown as 2053 in February, 1997, and becomes 2054 in October, 97, a bit different from Indian system where it changes under *Kartikādi* system to 2054 in November, 1997. This era is not much used at present, and has been overshadowed by the use of Śaka era, which is the most popular era in Bali (See (g) below).

f) *Christian era*

Due to use of Gregorian calendar for official purposes, the year of this era has become most prominent, and is very widely used as in most countries of the world. In the wall calendar, it is printed in bold letters in the centre.

g) Śaka

In Bali, the year of this era is very popular and is mostly used when expressing matters concerning traditional calendar. It has come from India, and its epoch is 78 AD, as it is in India. It is mainly used by the Balinese luni-solar calendar whose new year starts from *śukla pratipada* of the month of *Vaiśākha (kadasa)*, which may fall between 15 March and 13 April. Therefore, in February, 1997, Saka year shown is 1918, and it changes to 1919 in April with the appearance of new moon in the solar month of *Caitra (kasanga)* in India which is *Vaiśākha (kadasa)* in Balinese calendar. Śaka year is also used with the solar calendar, but this calendar is not popular in Bali.

h) Śaka Java

This is a Javanese Śaka era and it has now been linked with the Islamic *Hijriyah* calendar. In February 1997, the year of this era was 1929, and in Mei it increases to 1930, the time when the year of Islamic *Hijriyah* calendar changes.

i) *Hijriyah*

At the end of the top of the calendar is shown the year of the Islamic *Hejira* or *Hijriyah* calendar which is 1418 in Januari, and changes to 1419 in Mei. The era is used extensively in Indonesia archipelago (*Nusāntara*), where except Bali, large majority of the people are Muslims.

j) *Pranata Mangsa*

Pranata Mangsa means regulation of seasons, and the era is thus based on a solar calendar. Earlier it was linked loosely with both sidereal and tropical system used in

Java and Bali. To avoid confusion, in 1855, which is its epoch year, it was linked with tropical solar system of calendar keeping, its year starting from 22 June (Summer solstice), when the sun enters tropical *rāśi*, *karkata*, written as *Rekata* in Indonesian language, and the solar month covering this *rāśi* is called as *Kasa*.

Complexity of Balinese Calendar

The complexity of Balinese way of calendar keeping can be further gauged from the information given against each date of the month, which are detailed below :-

a) At the space on the top of each of the thirty/thirty-one days for the months, is given the following information :

- (1) Date and month of the sidereal solar year
- (2) Date and month of the tropical solar year
- (3) Day and month of the luni-solar calendar
- (4) Buddhist mode of reckoning the day
- (5) Date and month of *Pranoto Mongso* (Central Java Calendar)
- (6) Date and month of Vedic *Sāvana* calendar
- (7) Date and month of Javanese lunar calendar
- (8) Date and month of Imlek/Chinese calendar

(b) Again on the left side of the Gregorian calendar date, is shown the week-day names of

- (a) 2-day week,
- (b) 3-day week,
- (c) 4-day week and
- (d) 5-day week

On the right side is shown, the week-day names of

- (a) 6-day week,
- (b) 8-day week,
- (c) 9-day week, and
- (d) 10-day week.

(c) Underneath the Gregorian calendar date is given astrological information concerning that date, and beneath this is shown the date and month in accordance with some old Japanese traditional calendar.

The number of days in the *Pawukon* cycle is 210, and this number is not divisible by 4, 8, and 9, but is divisible by the other seven numbers from one through ten. The consequence of this is that, unless something were done, successive *Pawukon* cycles

would not be identical. Each *Pawukon* cycle would have the same nine or ten day names for each day in the entire cycle except for the day names of the 4, 8 and 9 day weeks, because they would not come out even at the end of the cycle since 210 is not evenly divisible by 4, 8, and 9. It is necessary that successive *Pawukon* cycles be identical. That is, every one of the 210 days in the cycle should have the same week-day names as each corresponding day in the next or in the previous cycle. Some sort of adjustment or intercalation is required. Division of 210 by 9 leaves a remainder of three. There must be three extra days adjusted somewhere for the 9 day week. This is accomplished in the *Pawukon* calendar at the very beginning of the cycle. The first day of the day week, *Dangu*, occurs on Sunday—*Redite* of the first week of the *Pawukon*, *Sinta*. To accomplish the intercalation, the next three days of *Sinta* also have *Dangu* as the day of the nine day week. Then the regular succession of the week continues. The fifth day of *Sinta* has the second day of the nine day week, *Jangur*, the next day is the third day of the nine day week, and so on, regularly, until *Redite-Sinta* occurs again. Division of 210 by 4 or 8 leaves a remainder of two. Therefore, two extra days must be adjusted to both the four and eight day weeks. This intercalation is done during the first three days of the 11th week, *Dunggulan*. The first day of *Dunggulan* contains the third day of the 4-day week, *Jaya*, and the seventh day of the 8-day week, *Kala*. So, the following two days of *Dunggulan*, Monday and Tuesday, *Soma* and *Anggara*, also have *Jaya* and *Kala* as the days of the 4 and 8-day weeks. The regular succession of day names taken up again on Wednesday—*Buda* of *Dunggulan*, which has the day after *Jaya*, *Menala*, as its 4-day week name, and the day after *kala*, *Umā*, as its 8-day week name.

Many Balinese anniversaries are observed according to the *Pawukon* cycle. Period of five seven-day weeks consisting of 35 days is taken by the Balinese as their month. Thus 210 days equal 6 *Wuku* months and is deemed to be one *Pawukon* cycle. 12 *wuku* months equal 420 days and is 1 *wuku* year. It will be seen 20 *wuku* years equal 23 Gregorian years including 5 leap years, $23 \times 365 + 5 = 8400$ days, 20 *wuku* years = $20 \times 420 = 8400$ days. The six-month cycle of Balinese *Pawukon* months are named as (1) *Landep*, (2) *Wariga*, (3) *Kunighu*, (4) *Krulut*, (5) *Uye*, and (6) *Wayang*. The months start on *Redite* (Sunday) and end on *Saniscara* (Saturday).

The end and beginning of the current *Pawukon* cycle is punctuated with ceremonies. The very last day of the *Pawukon*, Saturday of the 30th week, *Watugunung*, is a special day for Saraswati goddess of learning and wife of Brahmā. Her festival day is a time for making offerings for books, especially the sacred '*lontar*' palm leaf books. All books are the subject of devotion on this day. One is not supposed to read on Saraswati worship day. However, schools have special ceremonies, and students jam and big temple *Pura Jagat Natha* in Denpasar, for a special early-morning ceremony in which they pray for success in their studies.

BALINESE ŚAKA CALENDAR

Another very popular calendar followed in Bali which is equally important, perhaps more, is known as Śaka calendar. Really this calendric system is based on old Indian Siddhāntic system, described as Hindu-Balinese calendar, and came from India when Java including Bali was ruled by Indian (Hindu) kings. It is called Śaka calendar because era used for this calendar is Śaka, having its epoch at 78 AD, the same era being in use in India for a long time, and is one of the most prominent one. During the rule of Indian kings a number of learned men came from India to Java and Bali and spread the knowledge of astronomy and the Indian calendric system. It is said that one Pandit Ajit Śaka came to Java from Gujarat in 378 Śaka (456 AD), and he was the pioneer in spreading luni-solar Śaka calendric system in Indonesia.

In India, Śaka era is used both for solar and luni-solar calendars. The solar calendar in India starts generally from *Vaiśākha (kāḍasa)* when the sun moves to the 1st point of nirayana (sidereal) *Meṣa rāśī*, and this initial point on the ecliptic is taken to be the vernal equinoctial point of the vernal equinox day of 285 AD. The New Year's day of this solar calendar at present generally comes about on 13/14th April of the Gregorian calendar. In the case of luni-solar calendar, the 1st day of the year is reckoned to be the *Caitra Śukla pratipada* day, which is the 1st day of the lunar month of *Caitra*. This is the day when *amānta* (new moon to new moon) lunar month of *Caitra* starts, which happens from the time new moon (*Tilem*) occurs in the nirayana solar month of *Caitra*, which is the solar month covering *Mina rāśī*, the last *rāśī*. Therefore, the starting day of this luni-solar year may fall on any day in the nirayana or sidereal solar month of *Caitra*, which may be between the period of 15 March and 14 April. Balinese calendar follows this luni-solar calendric system which is similar to the Indian system except mainly in the manner of naming the lunar months. In India lunar month is named after the solar month in which occurs the new moon from which the lunar month starts. In Bali the lunar month is named after the solar month in which occurs the new moon at which the lunar month ends and the next one starts. In other words, Balinese lunar months have names one month ahead of the Indian ones, that is, *Caitra* of India is named as *Kāḍasa (Vaiśākha)* in Bali. New year's day of this Balinese calendar is known as *Myepi*, and is very important both from religious and social points of view. This day being luni-solar, its occurrence constantly varies in respect of the Gregorian solar calendar, as illustrated below for past three years :

<i>Śaka Year</i>	<i>Gregorian Year</i>	<i>New Year's day (Gregorian calendar date)</i>
1917	1995	1 April
1918	1996	20 March
1919	1997	9 April

CELEBRATION OF EKĀDAŚĀ RŪDRA

Neyepi, the new years day of the start of 20th century of Śaka year, fell on 29 March 1979. This day marked the climax of greatest series religious ceremonies ever held in Bali. Ekādaśā Rūdra, which is one of the elaborate ceremonies of Bali, and is observed on rare occasions, was celebrated on the advent of 20th century of Śaka era. This ceremony normally takes month to celebrate, and is intended to pacify the evil represented as Rūdra, the 'fearful' side of the god 'Śiva'. Rūdra is really a Vedic god. This ceremony is an exorcism in which the evil, incarnate of Rūdra, is driven to eleven (*ekādaśā*) directions of space which are four cardinal points of direction, four intercardinal points, up, down and the centre. The effort, it is said, is to achieve a balance between Śiva and Rūdra, the good and the evil, throughout in all eleven directions of space.

BALINESE LUNAR CALENDAR - PRIME CALENDAR OF BALI

Each lunar month has 30 lunar days, 15 days of waxing moon, called *Tanggal*, and 15 days of waning moon, called *Panglong*, which is sometimes written as *Penanggal* and *Pengelong*. The waxing and waning days are numbered from 1 to 15 as in India. On the widely used Balinese paper calendar, these waxing and waning lunar days are shown, as already mentioned, for each day. Waxing days are shown in red, waning day in black. Waxing day number 15 is full moon, *Purnimā*, indicated with a large red circle and waning day number 15 is new moon, *Tilem*, and is shown by a black circle. The Balinese word for lunar month is *Śasīh* which in Sanskrit denotes Moon. The names of the twelve Balinese lunar months as well as Sanskrit based names of such months have been tabulated below :

<i>Serial No.</i>	<i>Pure Balinese name of month</i>	<i>Sanskrit-origin name of month</i>
1	Kasa	Śrāvana
2	Karo	Bhadravāda or Bhadrapāda

3	Katiga	Āśvina or Asuji
4	Kapat	Kārtika
5	Kalima	Mārgaśīra
6	Kanem	Pauṣa, Poṣya or Posia
7	Kapitu	Māgha or Māga
8	Kaulu	Phālguna
9	Kasanga	Caitra, Cetra, or Madu
10	Kadasa	Vaisaka, Vesaka, or Vesaka
11	Desta	Jyeṣṭha, Jyeṣṭa, or Jeṣṭa
12	Sada	Āsāḍha, Āsāḍa

It will be observed by referring to page 342 that the names of the solar and the lunar months in Bali are the same as it is in India.

It has been mentioned Śāka calendar followed in Bali is a luni-solar calendar, and the months are reckoned from new moon to new moon. The synodic lunar month is 29.531 days and as such the lunar month does not coincide with the number of days of the months of solar calendar. If no correction is made, link between lunar and solar days will get disturbed. In Bali this correction is made by equating 63 solar days with 64 lunar days, which are *tithi* days. The mathematics of this is that $29.531 / 30 \times 64$ days = 63 days. This adjustment is made by counting two lunar days in one solar day at intervals of 63 days. This means one lunar day is missed in the serial counting of lunar days. Such a day is known as *Ngunaratri* (*Nirgunarātri* in Sanskrit), meaning the night of no value, that is minus one night. This procedure of counting two lunar or *tithi* days in a solar day of the calendar is indicated on the wall calendar. From the photocopy of the page showing the month, Pebruari, 1997 of the calendar it will be observed that on February 11th, has occurred 3rd lunar day of the waxing moon, on February 12th have occurred 4th and 5th lunar days, and February 13th is shown to have 6th lunar day, and thus in the serial counting one *tithi* day has been missed or omitted, and this keeps lunar (*tithi*) days adjusted to solar days. Similar adjustment has been made again on 16 April when lunar 8th and 9th *tithi* days fall on the date, and the interval is 63 solar days from the previous such occurrence.

INTERCALARY LUNAR MONTH

Traditional calendar of Bali is luni-solar, and this means that adjustment is made to its lunar calendar to keep it linked with the solar. Length of the lunar year = 12 x

29.531 days = 354.372 days. The length of the sidereal solar year = 365.256363 days, and that of the tropical year = 365.24219 days. Hence lunar year falls short of the sidereal or *nirayana* year by 10.884 days, and that of tropical year by 10.87 days. This difference will increase to one lunar month in 2.714 years or in 2 years 8.6 months, and therefore an extra lunar month, called as 'intercalary' month, has to be added on an average at the above intervals to keep the lunar months adjusted to the solar and consequently with the seasons. If this is not done, lunar months will move through the year as is the case with the months of Moslem *Hijriyah* calendar.

This adjustment can be made by following the principle of Metonic cycle where intercalary-months are added on the basis of 19-year cycles. In this method a total of seven intercalary lunar months are added in a period of 19 lunar years to keep it adjusted to the same length of 19 solar years. The mathematics of this is that 19 solar sidereal years = 19×365.256363 days = 6939.87 days, and 19 tropical years = 19×365.24219 days = 6939.60 days. Now, 19 lunar years plus 7 intercalary lunar months = 235 lunar months = 235×29.531 days = 6939.78 days. It means as mentioned earlier, on an average at intervals of $197 = 2.714$ years, or 2 years 8.6 months, an intercalary month is to be added to the lunar calendar to make it luni-solar, that is, to keep it linked with the solar. In practice, an intercalary month is added at laid down intervals in a manner that a total of 7 intercalary months are provided in a span of 19 years. This principle of mechanically adding intercalary months at laid down intervals is followed by the Balinese lunisolar calendar on the basis of Śaka year.

In India, however, a different method is followed to determine the time when an intercalary month is to be added. This is done by following an ingenious astronomical method on the basis of true motion of the Sun and the Moon. When two new moons occur in a sidereal solar month, the length of which is reckoned as the period of exact time of entry to the linked *rāśī* to the exact time of entry to the next one, then the two lunar months having the same name as the solar month occur. The first lunar month in this case is treated as intercalary month, as is termed as *mala* (dirty) or *adhika* (extra) lunar month, and the second one is called *śuddha* (pure) or *nija* (true) lunar month. Under this method, a *mālamāsa* (intercalary month) is not likely to occur in the short *nirayana* solar month of *Pauṣa* (16 Dec to 14 Jan). Intercalary months under the Indian system may occur at intervals of 2 years 11 months, 2 years 10 months or 2 years 4 months, and the average period of such occurrences calculated over a large number of years works out as 2.7 years, which is the calculated average time interval of adding such months.

In the Balinese luni-solar calendar, the intercalary lunar months are added as per Metonic-cycle rule which is adding 7 intercalary months in each cycle of 19 years. The years taken for this purpose is of Śaka era. Rule adopted is that if by dividing the Śaka

year by 19, the remainders become 2, 4, 7, 10, 13, 15 and 18, then that year will have an intercalary month as follows:

<i>Remainder when Śaka year is divided by 19</i>	<i>Month to repeated as intercalary month</i>	
	<i>Balinese names</i>	<i>Adopted Sanskrit names</i>
2	Destā	Jyāiṣṭha
4	Katiga	Asvina
7	Kasa	Śrāvāna
10	Destā	Jyāiṣṭha
13	Kadāsa	Vaiśākha
15	Karo	Bhādrapāda
18	Sadā	Aṣāḍha

It is understood that the above rule of adding intercalary month was brought into use from 1992. Before, the practice was to add an intercalary month either after the month *Destā* or *Sadā*. The rule followed for this purpose was that if by dividing the Śaka year, the remainder was 0, 6, or 11, then *Destā* month was repeated. If the remainder was found as 3, 8, 14, or 16, then *Sadā* month was repeated.

Adding intercalary month as per Metonic rule is obviously not an indigenous procedure, and it is likely that it came to be known to Indonesians from western scholars. T. Igarashi, who has made a deep study into calendric system of Bali and Sumatra has not been able to trace any old record like palm leaf documents which describe existence of some form of Metonic cycle system of adding intercalary months. It is also not clearly known what system was adopted earlier in Bali to keep the lunar months linked to the solar. Probably an extra month was added at intervals of 30 months.

The Association of Balinese Calendar Compilers decided in a meeting held on 10 December, 1994, to have intercalary months in their calendar by repeating the lunar months in Śaka years as tabulated below, and treat this repeated month as 'Nampih Śasīh', that is, treat it as true or normal month, and the earlier month as neglected or omitted month. It is found that time of occurrence intercalary months as prescribed has become more or less the same as that in India which has been elaborated subsequently.

<i>Year</i>		<i>Repeated month or intercalary month</i>
<i>Śaka</i>	<i>Gregorian</i>	
1918	1996	Sadā (Āṣāḍha)
1921	1999	Destā (Jyāiṣṭha)
1924	2002	Kadāsa (Vaiśākha)

1926	2004	Kasa (Śrāvaṇa)
1929	2007	Sada (Āṣāḍha)
1932	2010	Kadasa (Vaisakha)
1934	2012	Karo (Bhadra)
1937	2015	Kasa (Śrāvaṇa)

For some reason the decision made by Balinese calendar makers on the occurrence of intercalary months in the period from 1918 Śaka to 1937 Śaka, does not completely tally with the occurrence of all such months during this period when calculated as per laid down rules mentioned. But this calculation surprisingly tallies with the happenings of these months under the Indian system. The table below explains the situation.

	<i>Year</i> Śaka	<i>Year</i> Gregorian	<i>Remainder</i> by dividing Śaka year by 19	<i>Inter- calary</i> months on remainders as at col. 2	<i>Inter- calary</i> months decided by Balinese calendar makers	<i>Intercalary</i> months as per Indian procedure
	(1)	(2)	(3)	(4)	(5)	(6)
1.	1918	1996	18	Sada	Sada (Āṣāḍha)	Āṣāḍha
2.	1921	1999	2	Destā	Destā (Jyaiṣṭha)	Jyaiṣṭha
3.	1923	2001	4	Katiga	-	Āśvina (Katiga)
3(a)	1924	2002	5	-	*Kadasa (Vaiśākha)	-
4.	1926	2004	7	Kasa	Kasa (Śrāvaṇa)	Śrāvaṇa
5.	1929	2007	10	Destā	*Sada (Āṣāḍha)	Jyaiṣṭha (Destā)
6.	1932	2010	13	Kadasa	Kadasa (Vaiśākha)	Vaiśākha
7.	1934	2012	15	Karo	Karo (Bhādra)	Bhādra
8.	1937	2015	18	Sada	*Kasa (Śrāvaṇa)	Āṣāḍha (Sada)

* Not as per rules

DETERMINING THE DAYS FOR CELEBRATION OF RELIGIOUS AND OTHER FESTIVALS

The new- moon ending (*amānta*) lunar calendar, which is followed in Bali, is the basis for fixing the days for celebrating various festivals. A few examples are given below:

- a) *Śivarātri* is observed on the 14th *kṛṣṇa-pakṣa* day (14th day of the waning moon) of the month of *Kapitu (Māgha)*. This is an important religious festival in Bali.
- b) *Tawur Agung Kasanga (Caitra)* is celebrated on the day Śaka year ends, and this day falls on *Tilem (amāvasyā)* of *Kasang (caitra)*. The next day is the 1st day of *Kadasa (Vaiśākha)*, which is the new year day of the next year, and is described in the succeeding paragraph.
- c) New year's day in Bali is called as 'Nyepi' and is celebrated to hail the Śaka New year. It occurs on *śukla pratipāda* of the month of *Kadasa (Vaiśākha)*, and follows the ending day of the year mentioned at (b). It is a very important festival and on this *Nyepi* day, a holiday is declared by the Government.
- d) The festival 'Bhatara turun kabeh' (blessings for all the days of the year) is celebrated in the temples on the full-moon or purnima day happening on the 1st month *Kadasa (Vaiśākha)*.
- e) Full-moon or *Purnima* day in the months of *Kapat (Kārtika)* and *Kalima (Mārgasīrṣa)* are also celebrated as auspicious days. As a matter of fact, all full-moon and new moon days are considered as holy days for making offerings in the temples.
- f) For observing many other ceremonies, astrologers decide on the days after considering luni-solar calendar, *Pawukon* calendars, and other factors.

SOLAR CALENDAR

Solar calendar is not in direct use in Bali, and no important festivals or ceremonies are celebrated on the basis of days of this calendar. However, the Balinese Śaka lunar calendar being lunisolar in character, is linked with the solar calendar, and thus solar calendar influences the framing of the prime Balinese lunar calendar. Like the practice followed in India, there are no separate names for solar and lunar months. Lunar months have the same name as those of the solar months where the new moon from which the lunar month starts falls. Below has been placed a table showing the names of the Balinese solar months, corresponding Indian names, *rāśi* or zodiacal signs with which these months are linked, and the starting day of the months in Gregorian calendar dates both for sidereal (*nirayaṇa*) and tropical (*sāyana*) years.

<i>Solar months</i>	<i>Corresponding Indian months</i>	<i>Name of Rāsi</i>	<i>Start of months of sidereal year (Gregorian calendar)</i>	<i>Start of months of tropical year (Gregorian calendar)</i>
1	2	3	4	5
1. Kasa	Śrāvaṇa	Karkata	16 July	22 June
2. Karo	Bhādra	Siṃha	16 August	23 July
3. Katiga	Āśvina	Kanyā	16 September	24 August
4. Kapat	Kārtika	Tulā	17 October	23 September
5. Kalima	Mārgaśīrṣa	Vriścika	16 November	22 November
6. Kanem	Pauṣa	Danuḥ	15 December	22 December
7. Kapitu	Māgha	Makara	14 January	21 January
8. Kaulu	Phālguna	Kumbha	12 February	20 February
9. Kasanga	Caitra	Mīna	14 March	22 March
10. Kadasa	Vaiśākha	Meṣa	13 April	21 April
11. Desta	Jyaiṣṭha	Vṛṣabha	14 May	22 May
12. Sada	Āṣāḍha	Mithuna	14 June	22 June

There is another solar calendar, which may be called 'seasonal month calendar'. It is a tropical year calendar but the months here do not have the normal length of 30 or 31 days. The two winter months of this calendar have each 43 days, and the two summer months have each 41 days. The length of the remaining 8 months vary from 23 to 27 days. There are no specific names for the months of this calendar as in a normal calendar; they are referred by numbers. The months are denoted as *Māsa* (Month) I, *Māsa* II etc to *Māsa* XII. *Māsa* I starts on 22 June, the day following summer solstice, and *Māsa* VII starts on 22 Dec, the day following winter solstice. The table below indicates 'the number denoted' seasonal months, their starting days, and the length of the months.

<i>Seasonal Months</i>	<i>Start</i>	<i>Lengths</i>
<i>Māsa</i> VII	22 December	43 days
<i>Māsa</i> VIII	02/03 February	26/27 days
<i>Māsa</i> IX	01 March	25 days
<i>Māsa</i> X	26 March	24 days

<i>Māsa</i> XI	19 April	23 days
<i>Māsa</i> XII	12 May	41 days
<i>Māsa</i> I	22 June	41 days
<i>Māsa</i> II	02 August	23 days
<i>Māsa</i> III	25 August	24 days
<i>Māsa</i> IV	18 September	25 days
<i>Māsa</i> V	13 October	27 days
<i>Māsa</i> VI	09 November	43 days
<i>Māsa</i> VII	22 December	-

365/366 days

RELIGIOUS AND ASTROLOGICAL ASPECT OF THE *WUKUS* (WEEKS)
OF *PAWUKON* YEAR OF THE JAVINESE-BALINESE CALENDAR

It has been mentioned the year of the *Pawukon* calendar consists of 30 numbers of 7-day week. According to Javinese-Balinese belief each week is presided over by a god or goddess. These gods are portrayed as sitting on a throne surrounded by their regalia such as trees, birds, a treasure chest shaped like a building, sometime a miniature temple and banners.

The character of these gods and the regalia surrounding them of a *Wuku* are believed to influence the character and luck of the person born in the *Wuku*. For example, a person born in *Wuku Tolu* (the 5th *Wuku*) will have the character similar to the presiding god, Bayu (wind) and his regalia. It will mean that the person will have strong conviction, tends to be arrogant, and dangerous, if angry.

It is also believed inherent dangers forecast by this system can be avoided by doing or refraining from doing something. Impending trouble, for example, can be avoided by holding *Slametan* (a ceremonial meal), and giving alms to the needy.

Again restrictions are laid down by astrologers in travelling in certain directions for certain *Wuku* days. For this purpose 30 *Wukus* are divided into ten groups, each group containing 3 *Wukus*. Taking the number of *Wuku Sinta* as 1, Landep as 2, Ukir as 3, etc, Group I gets comprised of *Wuku* serial Nos 1, 11, 21, Group II of 2, 12, 22, and so on. These ten groupings and restriction laid down in the direction of travel for these groupings are shown below :

I	Sinta, Dunggulan, Matal	Northeast
II	Landep, Kuningan, Uve	West
III	Ukir, Langkir, Menail	Southeast
IV	Kulantir, Medangsia, Perangbakat	Below
V	Taulu, Pujut, Bala	Northwest
VI	Gumbreg, Pahang, Uqu	South
VII	Wariga, Krulur, Wayang	Above
VIII	Warigadian, Merakih, Kelavu	North
IX	Julung Vangi, Tambir, Dukut	Southwest
X	Sungsang, Medangkungan, Watugunung	East

On *Wuku* days under VII, a person should avoid moving upwards, like climbing a mountain. Again on *Wuku* days under IV, should not descend a mountain, dig a well, etc. It will be seen that there is a lot similarity with the beliefs of the common people in India, specially of the Hindus, regarding restrictions of movement of persons or taking some actions on certain week days or in certain *muhurtas* of the day or on some *tithi*/days.

It has been mentioned certain gods or goddesses preside over each of the thirty *Wukus*, and the characteristics of these gods influence the persons born in those *Wukus*, and the activities undertaken in those periods. Briefly, particulars of these gods and goddesses who preside over the thirty *Wukus* have been noted below.

1. Sinta : god - 'Yamadipati' : ambitious, stern at first, but becomes lenient at the end.
2. Landep : god - 'Mahadeva' : Unprefudiced, understanding and loves to meditate.
3. Ukir : god - 'Mahayekti' : noble and uncomparable.
4. Kulantir : god - 'Langsur' : patient and undemanding having strong convictions.
5. Tolu : god - 'Vāyu' : strong conviction, candid, tends to be arrogant. Normally pleasing, but becomes dangerous when angry.
6. Gumbreg : god - 'Cakra' : strong willed, impatient for getting his wishes fulfilled. Generous and straightforward.
7. Wariga : god - 'Asmara' : good looking and praised, but jealous, and does not like to socialise.

8. Warigadian : god - 'Maharṣi' : responsible and ambitious.
9. Julungwangi : god - 'Śambu' : arrogant, does not like competition.
10. Sungsang : god - 'Gaṇa' : pessimist, emotional but physically strong
11. Dunggulun : god - 'Kāmajayā' : good looking, sincere, able to comfort others in trouble.
12. Kuningan : god - 'Indra' : superior, noble, holds high ranking position
13. Langkir : god - 'Kāla' : highly temperamental, greedy, hardheaded.
14. Medangsia : god - 'Brahmā' : strong personality, resolute, unable to control his anger, unforgiving.
15. Pujut : god - 'Guritna' : loves to socialise, well-mannered, ambitious.
16. Pahang : god - 'Tantra' : garrulous, impatient, suspicious.
17. Krulut : god - 'Visnu' : intelligent, noble, unselfish, efficient, cautious. superior in all actions.
18. Merakih : god - 'Surengana' : courageous, resourceful.
19. Tambir : god - 'Śhiva' : arrogant, likes to boast. Greedy but stays poor.
20. Medangkungan : god - 'Vāsuki' : eloquent speaker, well balanced personality.
21. Matal : god - 'Sakri' : persistent, does everything well.
22. Uye : god - 'Kuvera' : amiable, impressive in talking, always cautious but easily brokenhearted.
23. Menail : god - 'Citragotra' : indulges in self glorification. active but apt to misunderstand others.
24. Peranqbat : god - 'Bhīṣma' : Soldierlike, skilful, fearless, but shy.
25. Bala : goddess - 'Dūrḡa' : troublemaker, likes to frighten others, fearless, shy and secretive.
26. Ugu : god - 'Siṅajalma' : broadminded, resourceful understanding, conscientious.
27. Wayang : goddess - 'Śrī' : fine looking, softhearted, generous, sympathetic, highly valued by others.
28. Kelawu : god - 'Sadana' : courageous with strong convictions, and generous.

29. Dukut : god - 'Varūṇa' : disciplined, smart, loyal with strong convictions.
30. Watugunung : god - 'Anaavoga' with his daughter goddess Nagagini: likes to meditate, ambitious, frugal, prejudiced.

It will be seen that a large majority of the names of the gods and goddesses are of Indian (Hindu) origin, and it shows the influence of ancient Indian culture brought by Hindu kings when they colonised a part of Indonesia in the early ages as has been mentioned in the beginning.

In conclusion, it may be said that the Javanese-Balinese calendar having 10 different ways of counting the week, and the *Pawukon* calendar having its year consisting of two *Pawukon* cycles of 210 days each, totalling 420 days, and a different Śaka luni-Solar calendar being in use in Bali, have made the calendric system of the island a very complex affair. However, the noteworthy feature to be observed is the great similarity that exists between Bali's Śaka luni-solar calendric system and the Indian traditional system of calendar keeping. This is because, as mentioned before, during the reign of the archipelago by Indian kings in the early ages, Indian astronomers and calendar makers went over to the country and spread the knowledge of astronomy and of calendar keeping. This was based on *Sūrya Siddhānta*, which was then the most prominent and advanced book on this science, and this system is still continuing with some minor adjustments. It may be remarked that knowledge of astronomy was most advanced in India in those days, and the Indian system of calendar keeping influenced not only Bali, but also most other Asian countries like Nepal, Tibet, Cambodia, Laos, Thailand, Burma, Śrī Lankā etc. Also the Indian thought and culture had great impact on the people of these countries, and even now its influence can be noticed. Further, it should be said in conclusion that apart from the aspect of imparting advanced knowledge of astronomy and mathematics to the peoples of these countries by Indian savants, the Indian thoughts and culture made a great influence on the minds of these people, and this can be observed even now in many of their social and religious practices and activities.

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