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TRADITIONAL CALENDAR OF MYANMAR (BURMA)

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The traditional calendar of Myanmar bears a close resemblance to the Indian system. This is because in the early 7th century of the Christian era the king of Burma (Myanmar) brought to his country learned astronomers from India, then known world-wide for their learning, to impart knowledge of this science to the people of Burma. These savants in the process taught the method of calendar keeping which was naturally the same as was followed in India, and this has broadly continued till today. As a matter of fact services of Indian astronomers were sought throughout south-west Asia, and the traditional calendar of the other countries like Thailand, Cambodia, Laos, Bali etc. greatly resembles the Indian pattern. A new era, known as Little Saka era, whose epoch is 638 AD, is said to have started basing its epoch on the time of spread of astronomical knowledge by Indian savants, and this era is in use in Myanmar, Laos and Thailand. In Cambodia, the Indian or Maha Saka era is generally used.

The Burmese Zodiac has been divided into 12 equal parts from more or less the same fixed initial point as that in India, and a number of the zodiac divisions have been named after the Indian names. The months of the Burmese calendar is luni-solar but the year is counted with the sun transiting to Meiktha (Mesa) rasi as generally followed for the solar calendar in India. The lunar months are new moon ending, and has, unlike India, fixed lengths alternating between 29 and 30 days, the 1st month Tago, corresponding to Indian Chaitra, has 29 days. The intercalary month is added on the basis of the Metonic cycle system, when the 4th month Wahso of 30 days is repeated. As in all countries of the world, Burma also follows 7 day week system, but names of some of its days have been adopted from Indian ones.

Key words: Labi, Lagwe, *Meiktha rathi*, Pekha, Wahso

INTRODUCTION

The traditional calendar of Myanmar bears a very close resemblance to the Indian system, and it is apparent that this system of calendar keeping is of Indian origin. As a matter of fact, this knowledge was spread by Indian calendric astronomers who came to the country in the early ages. From 5th century onwards, name and fame of Indian

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astronomers spread throughout the world, more so in Asian countries where civilisation was much more advanced compared to the West. Kings and people of these countries desired the services of Indian savants, learned in astronomy, to come and settle in their lands, to help to spread this science which was then considered to be the highest of human knowledge.

Burmese Calendar introduced by Indian astronomers

In early 7th century, king of Burma (Myanmar) desired to get some Indian astronomers into his country to usher in advanced knowledge of astronomy, but perhaps could not persuade any savants to go to Myanmar and settle down there. However, to achieve this aim, it is said, the king got abducted some Brahmins, learned in astronomy, from Manipur, and settled them in his territory. These Brahmins and their descendants, who were known in Myanmar as "Ponnas" (Ind: Purohits), were responsible for spreading the knowledge of astronomy and the Indian system of calendar keeping. It is also said that some Brahmins learned in calendric astronomy were brought from Varanasi, which was one of the most prominent centre, of learning in India in the early times, settled in Myanmar, and these Brahmins were really the pioneer in spreading the knowledge of calendric astronomy in Myanmar, and were respected highly. Since the annexation of Upper Burma by the British, the successor government continued the practice of notifying every year the essential elements of the calendar by publishing these in Burma Gazette, and these details were continued to be obtained from the Poonas who were brought from India and settled in the country.[1]

Time of start of the new calendar and a new era

It is not definitely known when the new calendrical system came into use. It can only be guessed from the use of the civil era linked with this system. In Myanmar, apart from the Gregorian era, two other eras are now in use, one religious and other is civil. The main religion of Myanmar is Buddhism, and for all religious purpose the Buddha Nirvana era is in use. Its epoch is Vaiśākha full moon day of 544 AD, and the year 2541 of this era started on 22 May, 1997, which was a full moon day in the lunar month of Vaiśākha. However, for civil purposes, apart from the year of the Gregorian calendar which has now gained ground as an international calendar, a civil era is followed whose epoch is 638 AD, which is said to have started by the then king Poppa Saw. This era is used in Myanmar calendar for counting the solar years as well as the lunar years which are linked with the solar. Like India, there is no separate era in Myanmar for counting the lunar years. The same era is used for both the calendars. The years of this civil era is reckoned on the basis of Surya Siddhantic system of the sun entering the 1st point of

Siddhantic Mesa rasi, and this procedure was introduced by the Indian astronomers who were brought from India.

It is believed that at the time the new system of calendar keeping brought to Myanmar by Poonas (Indian Brahmin Purohits), was introduced, a new era for this new system was started, and this was in 638 AD. It will be interesting to note that in South East Asian countries of Thailand, Cambodia and Laos where Indian Surya Siddhantic system was in use and still continues in their traditional calendars, the same era, starting from March 638 AD, called as 'Chulasakarat' (Little Era) is in use. This is known as Little Era, because its epoch date is much later Saka Era, which is the prime era, and known as 'Mahasakarat' (Great Era), has its origin in March 78 AD. It, therefore, transpires that start of this era was not confined to the time of introduction of Indian astronomy and calendar keeping to Myanmar alone but to almost all South-East Asian countries like Thailand, Cambodia, Laos etc.

TWELVE DIVISIONS OF THE ZODIAC

Like the pattern followed in Surya Siddhanta, Myanmar also divides the zodiac into12 parts or signs ('rathi' - Indian *rāśi*), and each rathi is divided into 30 degrees ("antha" - Indian *aṃsa*), each degree into 60 minutes ('leikta'), and each minute divided into 60 seconds (wileikta), as it is now the practice throughout the world. The Myanmar name of the 12 rāśis, and the corresponding Indian as well as English names are given below:

Myanmar	**Indian**	**English**
1. Meiktha	Meṣa	Aries
2. Pyeiktha	Vṛṣabha	Taurus
3. Medon	Mithuna	Gemini
4. Karkat	Karkata	Cancer
5. Thein	Siṃha	Leo
6. Kan	Kanyā	Virgo
7. Tu	Tulā	Libra
8. Pyeiksa	Vṛṣcika	Scorpio
9. Denu	Dhanus	Sagittarius
10. Makara	Makara	Capricornus
11. Kon	Kumbha	Aquarius
12. Mein	Mina	Pisces

Solar year and New Year's Day

It has been mentioned earlier that the calendar of Myanmar is luni-solar. This means that the lunar months of this calendar is kept linked with the solar by adding an intercalary lunar month. This process is carried out in a mechanical manner at the laid down interval which has been discussed later. In Myanmar solar calendar is not followed, and hence the days are not reckoned on the basis of this calendar. But the New year's day, which is an important festival in Myanmar, is celebrated on the basis of the solar calendar, and not on the basis of lunar calendar. The celebration of the New year starts on 13/14 April and ends generally on 17 April which is taken as the New year's day. The reason for it appears that at 638 AD when the new calendar was initiated, the sun entered the 1st point of Meṣa *rāśi*, which was the same as that in India on 14 April. But as *Surya Siddhānta* system was adopted in Myanmar, the length of the solar year was taken as 365.25875 days while the correct length of the sidereal year is 365.256363 days, that is, the Burmese solar year is in excess by 0.002387 day. Hence at present after a period of (1997-638) = 1359 years from commencement, the beginning of the year is occurring 1359 X 0.002387 days = 3.24 days later. So the New year now falls on 17 April, but the celebration starts from the original first New year of 14 April and continues till 17 April, the present New year's day.

It may be noted that the era used for counting the years of the lunar calendar is the normal civil era whose year, as mentioned, starts with the sun transisting to Meiktha rathi (Meṣa rāśi) which happens in the middle of April. But the 1st lunar month Tagu starts sometime in March, and hence a part or full month of Tagu may fall in the previous year.

Sun's entry into different Zodiac Divisions

It is true that Myanmar calendar is not solar based, but many wall calendars show the transit time of the sun to 12 rathis (*rāśis*), perhaps for astrological and allied purposes. These timings are given on the apparent Sun transiting to the different *rāśis*. A chart has been placed below showing the transit time of the apparent Sun to the 12 *rāśis* in accordance with Myanmar calendar as well as the Indian calendar for the years 1990 and 1996. It will be observed from the chart, after remembering that the Myanmar time is ahead by one hour of Indian time, that these timings are broadly the same. This goes to show that the initial point of Myanmar and of Indian sidereal zodiacs is more or less the same, the Indian one being the point on the ecliptic opposite the star Citra (Spica - α Virginis), and is taken to be the vernal equinoctial point of 285 AD.

Table showing the date of transit of the Sun to 12 *rāśis* or zodiacal signs as per Myanmar calendar and Indian calendar for the year 1990 & 1996 AD

Name of the *Rāśi* or Zodiacal sign	Myanmar Calendar	Indian Calendar	Myanmar Calendar	Indian Calendar
1. Makara (Capricorn)	1990 14 Jan	1990 14 Jan	1996 14 Jan	1996 14 Jan
2. Kumbha (Aquarius)	12 Feb	12 Feb	13 Feb	13 Feb
3. Mīna (Pisces)	14 Mar	14 Mar	14 Mar	14 Mar
4. Meṣa (Aries)	14 Apr	14 Apr	13 Apr	13 Apr
5. Vṛsa (Taurus)	14 May	15 May	14 May	14 May
6. Mithuna (Gemini)	15 June	15 June	14 June	14 June
7. Karkata (Cancer)	16 July	16 July	16 July	16 July
8. Siṃha (Leo)	17 Aug	17 Aug	16 Aug	16 Aug
9. Kanyā (Virgo)	17 Sep	17 Sep	16 Sep	16 Sep
10. Tulā (Libra)	17 Oct	17 Oct	17 Oct	17 Oct
11. Vṛścika (Scorpio)	16 Nov	16 Nov	16 Nov	16 Nov
12. Dhanus (Sagittarius)	16 Dec	16 Dec	15 Dec	15 Dec

MONTHS OF MYANMAR CALENDAR

Myanmar calendar is lunar, more correctly luni-solar. The months of this calendar are reckoned from the day following new moon to the day following the next moon. Owing to irregular motion of the moon, this length does not remain constant, but unlike the method followed in the Indian lunar calendar, the length of the lunar months of Myanmar calendar are fixed, and it alternates between 29 and 30 days making a total of 354 days in the year period of twelve months. As the calendar is lunisolar, an intercalary lunar month is added to some years at laid down intervals which has been discussed in detail later, and then the month of Wahso of 30 days is repeated, and is called Wahso II or second Wahso. The length of the year then becomes 384 days. A chart has been placed below showing Myanmar names of the twelve months, their lengths, comparable names of Indian lunar months and the months of the Gregorian calendar in which Myanmar lunar months occur.

Name of Burmese lunar months	**No of days of each month**	**Name of comparable Indian lunar month**	**Gregorian calendar months in which lunar months occur**
1. Tagu	29	Caitra	Mar - Apr
2. Kason	30	Vaiśākha	Apr - May
3. Nayon	29	Jyaiṣṭha	May - June
4. Wahso	30*	Āṣāḍha	June - July
5. Wahgaung	29	Śrāvaṇa	July - Aug
6. Tawthalin	30	Bhādra	Aug - Sept
7. Thadinkyut	29	Āśvina	Sept - Oct
8. Tazaungmon	30	Kārtika	Oct - Nov
9. Natdaw	29	Agrahāyaṇa	Nov - Dec
10. Pyatho	30	Pauṣa	Dec - Jan
11. Tabodwe	29	Māgha	Jan - Feb
12. Tabaung	30	Phālguna	Feb - Mar
	354		

Note : In the years when an intercalary month occurs, the month Wahso of 30 days is repeated and is called as Wahso II, and then the year has 384 days.

The length of the months of Myanmar calendar being fixed, it alternates in a regular manner between 30 and 29 days, and so the 1st day of its month may not always coincide with the day following new moon. In the Indian amānta or new moon-ending month system, however, the months are reckoned on the basis of actual occurrence of new moon, that is, from the start of śukla pratipada, and as such the length of the months which though may be either 29 or 30 days, do not regularly alternate between these two days. It may be interesting to compare the Indian lunar months of a few years with those of the Myanmar, and for this purpose a chart has been placed below showing the length of the lunar months of the Indian lunar calendar for the Śaka years 1916 (1994-95), 1917 (1995-96 AD), and 1918 (1996-97 AD).

Lengths of Indian new-moon ending lunar months for Saka years 1916 (1994-95 AD), 1917 (1995-96 AD), and 1918 (1996-97 AD)

Sl. No.	Name of the months	Length in days for Śaka years			Remarks
		1916	1917	1918	
1.	Caitra	29	29	29	
2.	Vaiśākha	30	30	30	
3.	Jyaiṣṭha	29	30	30	
4.	Āṣāḍha	30	29	29*	* Mala Āṣāḍha
				30**	**Śudha Āṣāḍha
5.	Śrāvaṇa	29	30	29	
6.	Bhādra	30	29	30	
7.	Āśvina	29	30	29	
8.	Kārtika	29	29	29	
9.	Mārgaśīrṣa (Agrahāyaṇa)	30	29	30	
10.	Pauṣa	29	30	29	
11.	Māgha	30	29	30	
12.	Phālguna	30	30	30	
	Total	354	354	384	

Note: In the Indian system, intercalary months are not made to occur in a mechanical manner following the Metonic cycle, but happens on an astronomical basis on the occurrence of two new moons in a sidereal solar month, and hence it may occur in any month other than very short winter months.

INTERCALARY MONTHS

The length of the solar year is approximately 365.25 days, but the length of the lunar year of 12 lunar months is 354 days. This means that the lunar months will stray away from the linked solar months and consequently from the seasons unless the lunar year is kept adjusted to the solar. In Myanmar calendar this is done by adding of intercalary months in the Metonic cycle of 19 years, similar to what is followed in Hebrew luni-solar calendar. Now 19 lunar years of 354 days each plus 7 intercalary months 30 days each equal 6936 days, and 19 sidereal solar years = 19 x 365.256363 = 6939.8709 days. So adding 7 intercalary months in each 19 year cycle very nearly adjusts the lunar calendar with the solar, except that further adjustment of 3.8 days has to be made in the same period, which means adding a day a little more than seven times in cycles of 38 years, or more correctly at an average interval of 5 years. This is done by adding an intercalary day at irregular intervals to the months of Nayon at the time when an intercalary month is added to the year.[2]

As mentioned, for keeping the lunar year adjusted to the solar, 7 intercalary months are added, but there is no laid down rule as to which of the 19 years will be the intercalary years. So the pattern may vary from country to country, and in the same country from time to time. AMB Irwin, ICS, who was resident commissioner of Burma in the late 19th and early twentieth century, states in his book *The Burmese Calendar*, how the pattern of intercalation in 19 year cycle has changed from time to time.[3] Probably, originally the intercalary years occurred in the years 2, 5, 8, 10, 13, 16 and 18 in the cycle of 19 years. In the 19 - year cycle commencing from 1102 B.E., (1740 AD), the pattern was changed to 2, 5, 7, 10, 13, 15 and 18. Again it appears that in the 19 - year commencing from 1254 B.E., (1892 AD) the pattern adopted was 1, 4, 7, 9, 12, 15 and 18.

To find out which year will have an intercalary, month divide the Burmese (Myanmar) year by 19. The quotient is the expired cycles. The remainder if tallies with the laid down sequence number of the years in the 19 - year cycle for the occurrence of the intercalary months, then those years will be intercalary years.

Major General Alexander Cunnigham in his *Book on Indian Eras* while describing the Burmese Common Era mentions intercalary months are inserted in the 2nd, 5th, 7th, 10th, 13th, 15th and 18th year in the 19 - year cycles.[4] Again J.C. Eade in his book *The Calendrical System of Mainland South East Asia* mentions that the original pattern of the years in which intercalary months were added were 2, 5,7, 10, 13, 15 and 18, which is the same as mentioned by Irwin and Cunnigham. He, however, says that in some periods the pattern followed changed to 2, 5, 8, 10, 13, 16 and 18.[5] This pattern has not been mentioned by Irwin. It seems that no fixed pattern has been followed in all years of the Burmese calendar for inserting intercalary months. It has been changed at times

by the calendric astronomers perhaps for better adjustment. At present it appears the intercalary months are added to the years in the sequence of 1, 4, 6, 9, 12, 15 and 18 in the 19 - year cycle. This presumption has been made because it is found that in recent years intercalary months have occurred in Burmese (Myanmar) years of 1353 (1991 AD), 1365 (1993 AD), and 1358 (1996 AD), and these years when divided by 19, leaves respectively remainders of 4, 6, and 9 which tally with the above mentioned sequence numbers.

A question may be asked as to why the intercalary months in Burmese traditional lunisolar calendar is added in a mechanical manner following the Metonic cycle pattern, and not in accordance with the method prevailing in the Indian calendric system which follows a different astronomical device, (See note under the Table on page 149) remembering the fact that the calendric system was introduced in Burma by Indian astronomers, and the basic structure of the Burmese calendric system is broadly the same as that of the Indian.

In the Indian calendric system the lunar months have no separate names, and are named after the solar months have no separate names, and are named after the solar months in which the initial new moon from which the lunar month start, falls. In other words, if the lunar month starts in the month of solar Vaiśākha, the lunar month is named as Vaiśākha. For this purpose, the solar month is taken to be the exact period of time taken by the true sun to traverse the rāśis linked with the months, namely, Meśa with Vaiśākha, Vriṣabha with Jyaiṣtha, etc, each of the twelve *rāśis* covering 30° of arc on the ecliptic. Similarly, in the case of lunar month, it is the exact length of the synodic month, that is, time taken by the true moon to move from one conjuction with the sun (new moon) to the next, (or from one opposition with the sun (full moon) to the next).

Due to elliptical orbit of the earth, the sun, as observed from the earth, does not move uniformly along the ecliptic, the summer months (northern hemisphere) are longer that the winter ones, and the actual length of the months may vary from about 31.4486 days to about 29.4458 days. The total length of twelve solar months or the length of the sidereal year works out as 365.25636 days. This is the mean value, and the actual length each year may differ from this figure by about ±9 minutes. The moon also moves in an elliptic orbit around the earth but of much smaller eccentricity and its motion is very irregular owing to the perturbing forces of attraction of the earth and the sun acting on its comparitively tiny mass. The actual length of the lunar month varies from about 29.2458 days to about 29.8167 days, a difference of about 13.7 hours. The mean length of lunation of lunar month is calculated as 29.5306 days.

On account of the above situation, sometimes two new moons may occur in a solar month, and then there happens two lunar months having the same name as that of the solar month. In such case, the first lunar month which falls completely within the solar month, is treated as an intercalary month, and it is prefixed by the term *mala* or *adhika*,

and the second lunar month is treated as true or *suddha* month, and it is prefixed by the term *suddha*. By this ingenious astronomical method, the intercalary month occurs at intervals of 2 years 4 months, 2 years 10 months, and 2 years 11 months in a manner such that on an average 7 intercalary months happen in a cycle of 19 years as required to keep the lunar year adjusted to the solar.

In the aforesaid procedure of determining the intercalary months, a longer lunar month may at irregular long intervals completely overlap a comparatively shorter solar mont of Agrahāyana, Pauṣa, or Māgha, and then there will be no lunar month after the name of the overlapped solar month as no new moon falls in that month. This missing lunar month is known as *kshaya* month. When a *kshaya* or a missing month occurs in the lunar calendar, it is always accompanied by two *adhika* months, one before and the other after the *kshaya* month. In this case one of the two *adhika* months is treated as an intercalary or *mala* month, and the other as true or *suddha* month, thus restoring the 12 - month structure of the year.

It is not known when exactly this system of having intercalary months on the basis of true motions of the sun and the moon, that is, on true lengths of the solar and lunar months, was introduced. It appears that it came fully into use in the early part of 11th century at the time of the well known astronomer Sripati (1039 AD). Before this, the practice generally followed was to add intercalary months on the basis of mean motions of the sun and the moon at intervals of 32 months and 33 months.

The procedure of adding intercalary months on mean motions has been in use since *Vedāṅga Jyotiṣa* times (C 1100 BC). This book was compiled on the basis of approximate values of solar and lunar periods calculated on their mean motions, and the intercalary months were added at intervals of 30 months. But this period was not correct to keep the lunar calendar adjusted to the solar, and the error must have been noticed after some years, and so it is very likely this period was changed to a more accurate one, which is between 32 and 33 months. In *Paitāmaha Siddhānta*, one of the five *siddhāntas* mentioned by Varāhamihira (550 AD), a system of inserting an intercalary month after every 32 months is indicated. Again from a copper plate inscription found in Gujarat, it is noticed that the practice of adding intercalary month by mean motion at laid down intervals, which is between 32 and 33 months, was in vogue in Śaka 570 or 648 AD. *Vedāṅga Jyotiṣa* system of calendar keeping was in use for more than a millenium and half. It was gradually replaced by a more accurate siddhāntic system, particularly by *Sūrya Siddhānta* based on the true motions of the luminaries, and the general change over seems to have been completed round about 400 AD. But the system of adding intercalary lunar months at calculated intervals based on the mean motions of the sun and the moon, continued for a long time, and as mentioned in above, it was replaced by an ingenious astronomical method based on the true motion of the sun and the moon in the early 11th century.

In Burma the Indian astronomers, who were brought there by the king at about 7th century, spread the science of calendric astronomy which naturally was based on the Indian system. At that time in India the procedure of adding intercalary months was on the basis of mean motion in accordance to which, as earlier mentioned, these months were added at intervals of 32 and of 33 months. This method, it will be observed, is not much different from the Metonic principle of adding 7 intercalary months in each cycle of 19 years, which means an intercalary month at an average interval of 19 + 7 = 2.714 years = 2 years 8.57 months.

It may be mentioned that the knowledge of calendric astronomy was spread by Indian astronomers not only in Burma, but also in many other southeastern countries of Asia, like Java, Cambodia, Thailand, Laos, etc. Some of these countries started to be colonised by Indian kings from 1st century AD, and this progress continued till 13th century AD. Broadly after this time, the domination of Indian astronomers and savants in spreading the knowledge of astronomy, science and other fields of learning started waning, but the influence of Indian culture and the pattern of calendar keeping continued in these countries, and these are persisting even to-day.

The knowledge of science and technology started growing in the western countries, and the western influence started to be left with the coming of Europeans to East Indies originally for commercial purposes. British East India company was formed in 1600 AD and the Dutch East India Company at 1602 AD. Dutch started colonising in 1652 AD, and late in the 19th century French came in, and formed the territory of Indo-China. Britishers conquered Burma in 1886 AD.

Adding of intercalary month on the basis of 19 - year cycle, known as Metonic cycle, named after the Greek astronomer Meton, was in use, it is said, as early as 383 BC in Babylonia, and at about 343 BC in Greece. The old Hebrew or Jewish calendar, which is a lunisolar calendar, adds intercalary months on the principle of Metonic cycle. With the arrival of Europeans in southeast Asia, use of Metonic cycle for correcting lunar calendar came to be well known in southern Asia including Burma. The lunar calendar introduced by the Indian astronomers was based on the mean motion of the moon and had a laid down number of days for the months, like the *Vedāṅga Jyotiṣa* calendar. As mentioned earlier, the Indian lunisolar calendar changed its structure by adopting apparent motions of the sun and the moon for determining its months, sometimes in early 11th century AD, but the Burmese lunisolar calendar continued in its old form having fixed number of days for its months. It seems, therefore, that when the use of Metonic cycle became well known, Burmese calendar easily adopted this method for adjusting its lunisolar calendar. It is not exactly known when the Metonic cycle was first used. A.M.B. Irwin mentions the year 1721 AD when probably it started to be used, but has been unable to trace the sequence of adding the intercalary months in the 19 - year cycle covering the years 1721-1739 AD. In the next cycle 1740-1758

AD, he indicates the sequence of the intercalary years as 2, 5, 7, 10, 13, 15, and 18. This sequence of adding intercalary months have changed from time to time, and the present sequence as mentioned on page 150 is 1, 4, 6, 9, 12, 15 and 18.

Days of the months

The days of the months listed on page 148, are reckoned in two periods, namely waxing and waning. The 15th day of the waxing period is the civil full moon day, known as "labi". The civil new moon day is the last day of the month which may be 14th or 15th day of the waning period, and is called as 'Lagwe' (moon disappears). It is frequently in advance of the real new moon. The fortnightly periods of the Moon is known as 'Pekkha' (Indian *Pakṣa*) - the bright half is known as First Pekkha, and the dark half as Second Pekkha:

Week

As common in all countries of the world, the continuous flow of days is reckoned for the sake of convenience in short cycle of 7 days, known as week and these days are named after the Sun, Moon, and the five planets, as in India and Europe. The table below shows the Myanmar names of the seven days of the week commencing from Sunday, and the corresponding English and Indian names:

	Myanmar	**Indian**	**English**
1.	Taninganwe Ne	Ravibār	Sunday
2.	Taninla Ne	Śombār	Monday
3.	Ingar Ne	Mangalbār	Tuesday
4.	Buddhahu Ne	Budhabār	Wednesday
5.	Kyathapade Ne	Vrihaspatibār	Thursday
6.	Thaukkya Ne	Śukrabār	Friday
7.	Sane Ne	Śanibār	Saturday

Myanmar Wall Calendar

A photocopy of a popular Myanmar wall calendar for the month of March, 1996 has been attached as Appendix 'A' to this monograph. As it is usual now with Asian countries, most of the calendars are now prepared on the basis of Gregorian calendar months and dates, this being now the official calendar, and the traditional calendar dates are shown along with the dates of the Gregorian calendar, and Myanmar wall calendars also follow the same practice. The date system of Myanmar lunar calendar is straightforward as it is not based on *tithi* system of calendar keeping as followed in India. Under

the *tithi*-at-sunrise system of calendar keeping followed in India, continuity of counting the days is broken due to occurrence of *kshaya tithi* and *adhika tithi*, which is not the case in Myanmar system, though the lunar date indicated in the calendar may not always indicate the true phase of the moon. The name of the twelve lunar months and their lengths have been indicated on page 148. As these months are lunar, the dates of these months have no fixed relationship with the dates of the months of the solar Gregorian calendar. Because the lunar year is shorter than the solar year, the dates of the lunar months occur earlier in each subsequent years compared to the solar Gregorian months, and as explained earlier, this shifting is adjusted by the addition of intercalary months at laid down intervals. It will be observed from the attached photocopy of the Myanmar calendar that 1st day of the 1st lunar month Tagu occurs in 1994 on 11 April, and the same day of the same month occurs in 1996 on 19 March, that is, 23 days earlier. An intercalary month in the form of Waso II occurred in 1996, covering the days from 16 July to 14 August, adjusting this shift. This resulted in the 5th month Wahgaung in 1996 starting on 15 August as compared to the same month having started in 1994 on 7 August. This shows how the adjustment is effected in the Myanmar lunar calendar by inserting intercalary months, the process, however, being the same where adjustment is made by adding in a mechanical manner the intercalary months as per Metonic principle.

USE OF MODERN ASTRONOMICAL TABLES

It has been mentioned earlier that in the Burmese wall calendars the transit time of the sun to different *rāśis* is generally shown for the apparent sun. In the same paragraph a chart has been added which indicates the days on which the sun had transited to 12 *rāśis* in the years 1990 AD and 1996 AD as per Burmese (Myanmar) calendar and also as per Indian calendar, and it would be seen that the days of transit in both cases happen to be the same. The dates indicated under Indian calendar were calculated on the basis of modern tables, and as such it may be presumed that Burmese calendar dates had been based also on the same tables. It seems, therefore, that there has been a calendar reform movement in Burma, like that in India in using modern ephemerides for computing various items of the calendar in place of old *Sūrya Siddhāntic* tables which have gone out of date and do not indicate correctly the observed positions of the luminaries in the sky.

The fact that atleast some calendric astronomers in Burma are using modern tables can be further confirmed by studying the information available in the photo copy7 of March 1996 wall calendar placed at Appendix 'A'. In the Burmese 'panchang' system, the sun, the moon, frive planets visible by naked eye, and two nodes of the moon, five planets visible by naked eye, and two nodes of the moon, (Navagraha of Indian calendar) are indicated by fixed numbers as indicated below:

1. Sun (Ravi)
2. Moon (Candra)
3. Mars (Mangal)
4. Mercury (Buddha)
5. Jupiter (Vrihaspati)
6. Venus (Śukra)
7. Saturn (Śani)
8. Rāhu (Ascending node of the moon)
9. Ketu (Descending node of the moon)

In the *rāśi-cakra* given in the wall calendar for the date 14 March 96, when the sun has just transited to Mina *rāśi* (Mein rathi), the position of all the above nine *grahas* (Sun, Moon, five planets, Rāhu and Ketu) in different *rāśis* are shown as follows: (a) Sun, Saturn and Ketu in Mina *rāśi*, (b) Venus in Meṣa *rāśi*, (c) Rāhu in Kanyā *rāśi*, (d) Moon and Jupiter in Dhanus *rāśi* and (e) Mars and Mercury in Kumbha *rāśi*. The aforementioned position of the *grahas* in different *rāśis* tally with that shown in Indian *pañchāṅgs* which follow modern tables, and this confirms that calendar reform movement has also taken place in Burma, and atleast a section of calendric astronomers are compiling their calendars on correct tables.

It will be interesting to study how the initial point of the Burmese sidereal zodiac is at present placed in relation to the intial point of Indian sidereal zodiac, which is taken to be the vernal equinoctial point of 285 AD on the ecliptic, and this point then very nearly coincided with the point opposite the star Citrā (α - Virginis). This means that from this initial point the longitude of the star Citrā was very nearly equal to 180°. This study may be made on the transit time of the sun to various *rāśis*, as indicated in the Burma wall calendar, and comparing these with the Indian time converted to Burmese time which is one hour ahead of I.S.T. This has been done in the chart placed below.

Note : In the above mode of numbering the '*Navagrahas*', number 7, which would have been the number for Saturn or Śani is missing. Number 'O' has taken its place, and this means Saturn or Śani is indicated by 'O', followed by number '8'.

TRANSIT TIME OF THE SUN TO SOME RĀŚIS IN 1996

Rāśis to which sun transits	Date 1996	Time as per Burmese calendar	Time as per Indian calendar converted to Burmese time	Difference between Burmese time and Indian time Cols (3) - (4)		
1	2	3	4	5		
		h	m	*h	m	m
1. Makara	14 Jan	22	49	23	22	-33
2. Kumbha	13 Feb	11	48	12	20	-32
3. Mīna	14 Mar	8	33	9	12	-39
4. Meṣa	13 Apr	17	05	17	44	-39
5. Vriṣa	14 May	14	04	14	39	-35
6. Mithuna	14 Jun	20	38	21	17	-39
				Average		-36^{m}

Sun moves on an average 59'.13 of arc in 25 hours, and therefore, in 36 minutes of time it will move about 1'.5 minute of arc, which is negligible. It, therefore, seems that the initial point on the ecliptic. reckoned by modern Burmese calendric *pandits* is almost the same as followed by most *pañchāṅga* makers in India.

Division of the Day

In Myanmar a day is known as 'Yet' and it includes daytime called 'Nay' and nightime called as 'Nya'. A day is divided as follows:

1 day	= 60 nayi	= 60 Indian *ghatika*
1 nayi	= 60 bizana	= 60 Indian *pala*
1 bizana	= 60 kaya	= 60 Indian *vipala*

Therefore:

1 nayi	= 24 minutes
1 bizazna	= 24 seconds
1 kaya	= 0.4 second

* Indian time means Indian Standard Time, and Burmese time is one hour ahead of IST.

There is also a system of a nay (daytime period) being divided into four equal 'pahos'(Indian - *prahar*), and so also the night period, and thus the entire day-night is divided into 8 pahos covering 24 hours. At present, however, these forms of division of the day have fallen into disuse as in India, and the word 'nayi' has come to mean hour, and along with it, minutes and seconds have come into use.

Different terms in use

a. La is meant lunation, the average period from new moon to new moon.
b. Ata Ne is the solar New Year's Day, or the day of the week when the sun enters the sign of Meiktha (Meṣa).
c. Haragon (Indian - *Ahargana*) is the total number of days elapsed from the beginning of the era to a given point of time.
d. Didi (Indian - *Tithi*) is 30th part of a mean lunation.
e. Yet is day, and it includes daytime called Nay, and night-time called Nya (mentioned earlier).
f. Yet Lun (excess days) is the epoch, or moon's age of midnight of solar New Year's Day expressed in whole number of didis.
g. Mathakein is the total number of whole months elapsed from the commencement of the era to a given point of time.
h. Adimath (Indian - *adhika māsa*) means an intercalated lunar month.
i. La lun - is the number of whole months by which the total number of solar years expired during a period of the era exceed the total number of luni-solar years during the period. The intercalary months may be placed to avoid any la lun.
j. Thagayit is the number of year of the Burmese era. It denotes expired years.
k. Wa is the Buddhist Lent which covers the period from the full moon of Waso to the full moon of Thadinkyut.
l. wa-tat (Lent repeated) which, however, mean leap year.
m. Wa-ngetat (little wa-tat) means an intercalary month without any intercalary day.
n. Wa-gyi-tat (big wa-tat) means both intercalary month and intercalary day. In wa-gyi-tat year, four months in succession (Kason, Nayon, first Waso, and second Waso have thirty days each
o. Yet is entire day-night period, daytime is called Nay and nighttime Naya (mentioned earlier in the text).
p. Rathi is rasi, one twelfth part of zodiac from an initial point.
q. Intha is degree of angular measurement.
r. Leiktha is minute which is 1/60th part of a degree.

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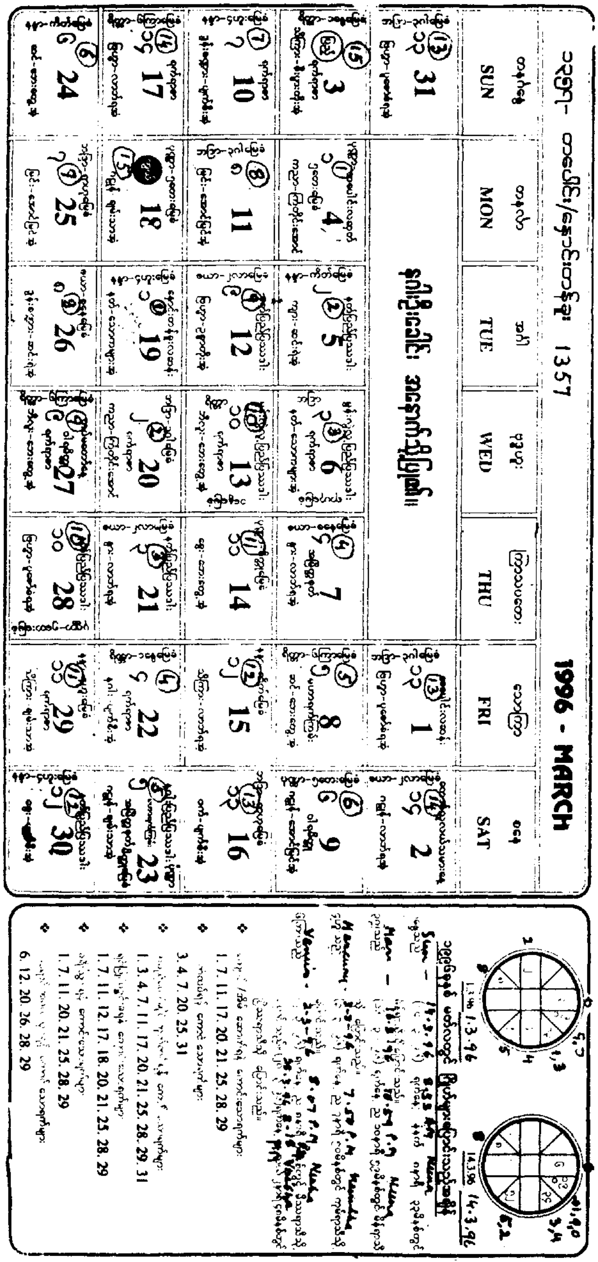
APPENDIX 'A'



Traditional Calendar of Myanmar (Burma)