

# FAJR AND ISHA

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## 1.0 INTRODUCTION

Determination of the timings for *Fajr* and *Isha* prayers for centuries was based on the natural phenomena of *Subh Sadiq* and the end of *Shafaq*. Accordingly, Muslim *Fuqaha* have discussed how to calculate the timings for *Fajr* and *Isha* based on observations. This discussion became more intense when Muslims migrated and settled in North America, and Northern Europe. At these locations the days and nights were unusually long in certain months and the twilights did not disappear in summer. When the *Ulamaa* with a limited information, were approached for this difficulty, they suggested solutions which did not work or were unsatisfactory, or posed extreme hardships.

The confusion still exists though several international seminars and meetings have tried to solve the intricate issues related to the prayer schedules. For instance, in the last few years the *Ulamaa* in England have switched from 12° to 15° or even 18° to 9°. In temperate climates (0-30° N/S latitudes) this disagreement causes little dislocation in daily life. The twilight in these areas lasts only 1 hour 5 minutes to a maximum of 1 hour 37 minutes after the sunset and before the sunrise. However, at higher latitudes (45-60° N/S latitudes) the timings of these two prayers fluctuate drastically, and pose very serious difficulties. For 50° latitude, *Maghrib* occurs as late as 10:00 pm and *Fajr* around midnight. To overcome this problem in England some prayer schedules were prepared showing *Isha* at 1/7th of the night, leaving *Fajr* at 18°. Miftahi (2007) calculated *Fajr* and *Isha* times in his book, "*Fajr and Isha Times & Twilight*" based on almost whole year observations performed by *Hizbul-Ulamaa* of UK in 1987 and 1988.

Presented here are the guidelines from the *Qur'an*, and the *Sunnah*, scholarly opinions, recent observations, and astronomical information to create a better understanding about *Fajr* and *Isha*. *Ulamaa* may be in a better position with the evidence presented here that will help Muslims prepare the prayer schedules with correct timings for *Fajr* and *Isha* in all locations of the world.

## 2.0 THE QUR'AN

The *Qur'an* and the *Sunnah* did not fix any degrees of the sun's depression for these prayers. Calculations based on the degree of sun's depression are relatively recent phenomenon.

### 2.1 *Fajr* in *Qur'an*

In the *Qur'an*, the following *Ayaat* talk about *Fajr* prayer:

11:114 "And establish prayer in the two ends of the day, and at the approaches of the night."

17:78 "Establish prayer (regularly) from the declension of the sun till the darkness of the night, and the recital at the morn; verily the recital at the morn is witnessed."

20:130 “Therefore be patient with what they say, and celebrate (constantly the praises of thy lord before the rising of the sun, and before the setting; yea celebrate them for part of the hours of the night, and at the sides of the day: that thou may have (spiritual) joy.”

2:187 “And eat and drink until the white thread of dawn appear to you distinct from its black thread; then complete your fast till the night appears.”

## **2.2 Isha in Qur'an**

In the *Qur'an*, the following *Ayaat* talk about *Isha*:

12:16 “Then they came to their father in the early part of the night, weeping.”

24:58 “Ye who believe! Let those whom your right hands possess, and the (children) among you who have not come of age, ask your permission (before they come to your presence), on three occasions: before the morning prayer; the while ye doff your clothes, for the noonday heat; and after the late-night prayer.”

## **3.0 THE SUNNAH**

### **3.1 Fajr in Ahadith**

For the beginning of *Fajr* prayer time the most quoted *Ahadith* are those of *Imamat-i Jibril (AS)*, *Aiysha (RA)*, *Abu-Mas'ud Ansari (RA)*, and *Rafi' b. Khadij (RA)*, etc. The relevant portions of these *Ahadith* are translated:

[Bukhari, Abu-Daud, Ibn-Majah, Tirmizi] The Messenger (*SAW*) prayed *Fajr* on one day when the dawn appeared in the sky ... and the next day delayed it until the ground was very bright.....

#### **3.1.1 Ghalas**

Some *Ahadith* which stress that the *Fajr* prayer should be in *Ghalas* (darkness of night mixed with light) are:

1. [Bukhari] Fully covered Muslim women with their veiling sheets used to attend the *Fajr* prayer with the Messenger (*SAW*), and returned home without being recognized because of the darkness.
2. [Bukhari] The Messenger (*SAW*) used to pray *Fajr* when it was still dark (in *Ghalas*).
3. [Abu-Daud] The Messenger (*SAW*) prayed *Fajr* once in *Ghalas*, then next in *Isfar*; thereafter his *Fajr* prayer was always in *Ghalas* until he died.

4. [Muslim] The Messenger (SAW) ...on one day prayed *Fajr* when the dawn rose, .... and the next day he completed *Fajr* prayer when the brightness spread.

### 3.1.2 *Isfar*

Some *Ahadith* that stress that *Fajr* prayer should be performed in *Isfar* (when the light has spread conspicuously) are given below. Only relevant portions are translated.

1. [Abu-Daud, Nassa'i] The Messenger (SAW) said: Perform *Fajr* prayer when the dawn shines brightly and every thing becomes visible.
2. [Bukhari] The Messenger (SAW) used to pray the morning (prayer) and one of us knew the person sitting next to him, and he used to recite 60 to 100 *Ayaat*.
3. [Muslim] The Messenger (SAW) performed *Fajr* when the morning light gleamed, and people were unable to recognize each other. The next day he delayed *Fajr* prayer until returning people could say that the sun has risen or is going to rise.

### 3.2 *Isha in Ahadith*

*Ulamaa'* agree that the time of *Isha* begins when *Shafaq* disappears. However, there is a disagreement about what is *Shafaq*? The arguments are based on *Hadith* from Jibril, Numan ibn Bashir (RA), Ibn Mas'ud (RA), etc. The most frequently referred *Ahadith*, are quoted here with the translation of only the relevant portions.

1. [Muslim, Tirmidhi] (On the first day) he prayed *Isha* when *Shafaq* disappeared ...(and on the second day) he prayed after 1/3 of the night passed.
2. [Abu-Daud] Among all the people I know, for the time of *Isha*, the Messenger (SAW) prayed when the crescent of the third day set.
3. [Bukhari, Nasaa'i] The Messenger (SAW) used to pray *Isha* early when people gathered, and prayed late when people delayed to gather.
4. [Nasaa'i] I saw the Messenger (SAW) prayed *Isha* when the western horizon became dark.

## 4.0 PRACTICES OF THE COMPANIONS (RA) FOR FAJR, IMSAK, AND ISHA

### 4.1 *Fajr*

It was recorded in Muslim history that the Companions of the Messenger (SAW) prayed *Fajr* when the daylight spread conspicuously, as noticed in the following *Ahadith*. The consensus appears to be that *Fajr* is closer to sunrise, and certainly not as early as the astronomical twilight

which is “night”, when the morning light is absent (sun being 18° below horizon).

1. (Tahavi:) The Companions of the Messenger (SAW) never united on anything as much as they were unanimous on '*Tanwir*' (praying *Fajr* when it is very bright).
2. (Musnad Abu-Ahmed:) The Messenger (SAW) said there are two *Fajrs*; one when eating is permitted, and prayer is forbidden, and the other when praying *Fajr* is permitted, and intake of food is forbidden.
3. Ibn Abbas (RA) narrated: *Fajr* is not what appears in the skies. It is when the light brightens the faces.
4. Ibn Abbas (RA) narrated: *Fajrs* are two: *Fajr* which appears at night, intake of food and water during this *Fajr* is permitted, but (*Fajr*) prayer is not. When the next *Fajr* appears then the prayer is permitted and food and water is forbidden. The second *Fajr* is which shines at the tops of the knolls.
5. Jabir ibn Abdullah (RA) narrated: The Messenger (SAW) said there are two *Fajrs*: the *Fajr* which looks like the tail of a wolf. At such time *Fajr* prayer is not allowed, but the food intake is not forbidden either. The (next) *Fajr* that spreads horizontally in the sky marks the time when *Fajr* prayer is permitted and food is forbidden.
6. *Fajr* is when the alleys and fields are brightly lit by the morning light.

#### 4.2 *Imsak*

'*Imsak*' is the cut-off time for food and water intake when one is fasting. The Messenger (SAW) urged the Muslims to prolong their '*Suhoor*' (early morning meal) until the '*Fajr al-Mustatir*' (horizontally spreading light of dawn) appears. The appearance of '*Fajr al-Mustatir*' (vertically spreading light) on the eastern horizon does not make intake of food forbidden, nor does it mark the beginning of *Fajr* prayer time. The most quoted *Ahadith* on this topic are:

1. [Muslim, Abu-Ahmed, Tirmizi] The Messenger (SAW) said: Don't be misled (into abandoning your *Suhoor*) on hearing the *Adhan* of Bilal (RA), and on observing this whiteness of the bright column of the morning light... It is when the light spreads over the horizon.
2. [Bukhari: *Adhan Qabl al-Fajr*] The Messenger (SAW) said: None of you should give up eating when you hear Bilal's *Adhan*. He calls it when it is still night. *Fajr/Subh* is not like this (that which rises without extending laterally). The Messenger (SAW) closed his fingers and raised his hand upward, and then downward. He (SAW) said *Fajr* is when the light appears like this: He put his index fingers one over the other and then stretched them to the left and the right.
3. [Bukhari] The Messenger (SAW) said, "Bilal pronounces *Adhan* at night so keep on eating

and drinking (*Suhoor*) till Ibn Umm Maktum pronounces *Adhan*." According to Bukhari, Ibn Umm Maktum did not call *Adhan* (of *Fajr*) until the light spread, and the time lag between (Bilal's and Ibn Umm Maktum's *Adhan*) was not very much.

4. The *Fajr* is not what appears in the sky like this (and the Messenger (SAW) closed his palms from up to downward), but it is like this (and he put his index finger one over the other, and spread out all the ten fingers of both hands).
5. The *Fajr* is not what can be described as this, but it is like this (i.e. if when the light scatters over the width of the eastern horizon, and not what is dispersed vertically).
6. [Bukhari: *Bayan al-dukhul fi al-saum*] *Fajr* is not what appears in the sky like this (and the Messenger (SAW) raised his hands upward), until (the light spreads) like this: (and the Messenger (SAW) made his fingers widespread).
7. None of you should be fooled by Bilal's *Adhan* and by the morning light that appears vertically... (The *Fajr*) is when the light (whiteness) appears horizontally over the horizon.
8. The Messenger (SAW) told Bilal: You call *Adhan* when *Fajr* is rising vertically, and that is not '*Subh*'. *Subh* is like this when the light spreads horizontally.
9. The Messenger (SAW) to Bilal: Don't call *Adhan* until *Fajr* rises very clearly to you.
10. Bilal came to the Messenger (SAW) when he was eating his *Suhoor*. He (SAW) told him: Don't call *Adhan* until you see *Fajr*. The next day Bilal came to him and he again told him the same: Don't call *Adhan* until *Fajr* rises. On the third day he (SAW) said to Bilal: Don't call *Adhan* until you see *Fajr* like this (and he closed his fists and then spread both of them fully).
11. Bilal calls *Adhan* in the night. Continue your *Suhoor* until Ibn Umm Maktum calls it.
12. Eat and drink till Ibn Umm Maktum calls *Adhan* because he does not call until *Fajr* appears, and the time lag between the two was not very much. One will come down and the other will climb up shortly.
13. Between *Adhan* (*Takbeer*) for *Fajr* prayer and the ending of *Suhoor* the time lag was no more than for someone to read approximately fifty *Ayaat*.
14. I shared (my *Suhoor*) with the Messenger (SAW) when it was (almost) daylight other than the sun had not come out.

From these *Ahadith* it may be concluded that:

- a. Calculating *Fajr al-Mustatir* at 18° (technically 'night'), or at 15° (when the intensity of light

has not increased much above 18° level) cannot be supported by any *Hadith*, and especially after how the Messenger (SAW) explained the extent and intensity of illumination at *Subh Sadiq*. He extended his hands fully in north-south direction while facing east. The Qur'anic term '*Tabayyan*' also points to a much later time than at 18° or 15°. The intensity of light at 13° is almost equal to that of 'night' or 18°, and it is shown in graphic representation in a later section, where the intensity of light at 18°, 15°, 12°, and 9° can be seen.

- b. *Fajr al-Mustatil* of the *Ahadith*, and *Subh Kadhib/Fajr Awwal* of the *Fiqh* is the Zodiacal light (which is a very faint, roughly triangular, whitish glow seen in the night sky and appears to extend up in the sky only in some parts of the globe in some months). *Fajr al-Mustatir* is when the vertical light spreads horizontally over the eastern skies, as the Messenger (SAW) explained. *Fajr al-Mustatir* appears after *Fajr al-Mustatil*.

### 4.3 Isha

There were many Companions of the Messenger (SAW) who defined *Shafaq* as the "Red glow". They include Hadrat Ibn Abbas, Ibn Umar, etc. Among the *Tabi'in*, Saeed ibn Jubair, 'Ata, Mujahid, Zuhri, Thauri, etc. also support this view. Among the *Fuqaha'*, Imam Malik, Imam Shafe'i, Imam Muhammad, Imam Abu Yusuf, Ishaq, etc. agree with this opinion.

While others who define *Shafaq* as the "Whiteness after the red glow" include Hadrat Abu Bakr, Anas, Abu Huraira, Muadh, Aiysha, etc. among the Companions, and Umar ibn Abdul Aziz, Ibn al-Mundhir, Awzai', and Imam Abu Hanifa, etc. Among *Fuqaha'*, and *Ulamaa'* the discussion continued, each showing the strength of his opinion.

## 5.0 DEVELOPMENTS FROM 8<sup>TH</sup> CENTURY ONWARDS

It was determined in ancient times that the astronomical twilight ended/began when the sun's depression was around 18° below the horizon. For ease of calculations the Muslim astronomers started using 18° for *Fajr* and *Isha*. Closer visual observation revealed that *Fajr al-Mustatir* and *Mughib al-Shafaq* of *Ahadith* and *Fiqh* do not exactly match with 108°. A tradition of sophisticated mathematical computation started in Baghdad during the Abbaside period. The noteworthy names of Muslims for such computations in those times are Ibn Ishaq (704-767 in Tunis), Al-Khwarazmi (780-850 in Persia), Ibn Yunus (950-1009 in Egypt), Ibn al-Haitham (born 965 in Basra – died 1040 in Cairo), Al-Biruni (973-1048 in Khwarazm, (modern-day Uzbekistan)), Nasiruddin Tusi (1201-1274 in Iran), Al-Marrakushi (13<sup>th</sup> century in Morocco), Al-Khalili (1320-1380 in Syria), Ulugh Beg (1394-1449 in Samarqand (modern-day Uzbekistan)).

Prayer tables prepared by Ibn Yunus, Al-Khalili, Al-Marrakushi, Ibn al-Haitham, and Ulugh Beg, were extensively copied and revised for local latitudes. as manuscripts of a modest set of prayer tables for Nablus, Latakia, Aleppo, Tunis, Algiers, etc. preserved in various museums.

In the 13<sup>th</sup> and 14<sup>th</sup> centuries Muslim astronomers decided to average the two traditions of 18°/18° and 20°/16° for *Fajr/Isha*. In the 15<sup>th</sup> century, Ottomans made 19°/17° official.

## 6.0 PRAYER TIME TABLES IN THE 20<sup>TH</sup> CENTURY

In the 20th century, prayer schedules based on standard time were prepared by a government survey department or some other agency, or individuals who used almanacs, often without considering the implications of using astronomical terms for Islamic terms. In some cases, they received tacit approval of the religious authorities, as in Egypt and of individuals like Maulana Ashraf Ali Thanavi in India. In Hyderabad, India a committee of *Ulamaa*’ unanimously agreed on 15° for *Fajr* and *Isha* and this Time Table was officially adopted by Hyderabad State (1932). However, these tables lack uniformity and were never universally accepted or adopted for all cities. For example in Delhi (India) three different tables, each approved by an independent authority (Jama Masjid, Fatehpuri, and *Ahle Hadith*) were in use. A survey of prayer tables (Feb. 1993) from around the world shows the following for various locations from Brunei to USA.

<u>Country</u>	<u>Source</u>	<u>Fajr</u>	<u>Isha</u>	<u>Imsak at</u>
Brunei	Official	20°	18°	-10 min.
Bangladesh		12-18°	14-18°	-15/30 min.
Canada	ISNA mosques	15°	15°	-10/15 min.
Egypt	Official	19°	17.5°	-30 min.
	Husain Kamaluddin	18/19°	18/17°	
England	Qasmi	*18°	*18° or 1/7th. of night	
France (Paris)		*19°	*11°	
Germany	Auchen Center	*19°	*17°	
Hong Kong	Official	1:15	0:55(h:m)	To <i>Fajr</i>
India	Rahimi Dawami	19°	19°	
	Islami Jantari	18-19°	20° (Approved by Thanavi)	
	Fatehpuri	14-17°	14-19°	
	Hyderabad	15°	15°	-10 min.
Indonesia	Official	20°	18°	-10 min.
Kuwait	Official	16.5°	16.5°	At <i>Fajr Adhan</i>
Malaysia	Ilyas	18°	18°	
Morocco	Official	18°	18°	At <i>Adhan</i>
Pakistan	A. Latif	18°	18°	-20/30 min.
	Ludhianavi	15°	15°	
	Traditional	14-19°	14-20°	-10/30 min.
Saudi Arabia	Makkah/Medinah	1:30	1:30/2 hr in <i>Ramadan</i>	
	Rabita	18°	17°	
Taiwan		16°	19°	
Turkey		19°	17°	At <i>Adhan</i>
USA	MSA/Abdali 1976	15°	15°	
	Buffalo	18°	18°	19°
	Los Angeles(Hatout)	20°	18°	

\* In England, Germany, and France various positions are taken for summer months when the nautical twilight does not disappear.

The discussion renewed in recent decades because the Muslims from various regions came to live together in Northern Europe and North America, and tried to justify the practices in their home countries. The opinions now range from 9°-18° for *Isha* and 9°-21° for *Imsak*.

## 7.0 ASTRONOMY

Civil Twilight: Sun @ 6° below horizon.

Nautical Twilight: Sun @ 12° below horizon.

Astronomical Twilight: Sun @ 18° below horizon.

Figure 1 shows all the three twilights with sky brightness.

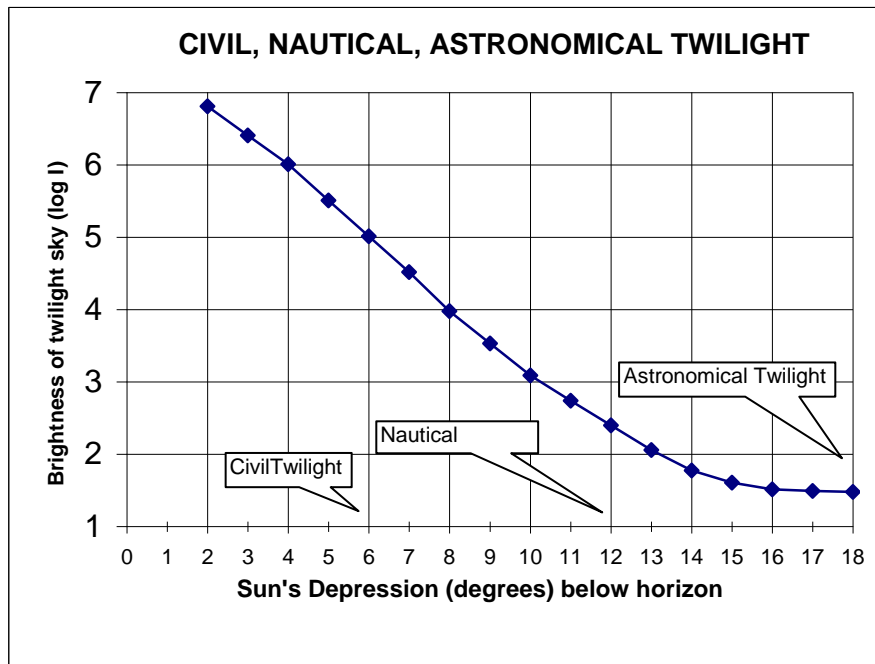


Figure 1. Brightness of the twilight sky as a function of the sun's depression.

## 7.1 Twilight Illumination

Twilight Illumination is caused by the scattering of light from sun in the upper layers of the Earth's atmosphere. It begins at sunset (ends at sunrise) and is conventionally taken to end (or begin) when the Sun reaches a depression angle of 18°. The detailed descriptions of the changes in the illumination of the sky as observed by very sensitive photometers over a long period of time (1930s - 1980s) are available in literature. The variation of the illumination on a horizontal surface, in clear conditions is shown diagrammatically in Figure 2, as a function of the depression angle of the Sun; the rapid flattening of the curve from 15° onwards, showing a small change in the brightness of twilight sky.



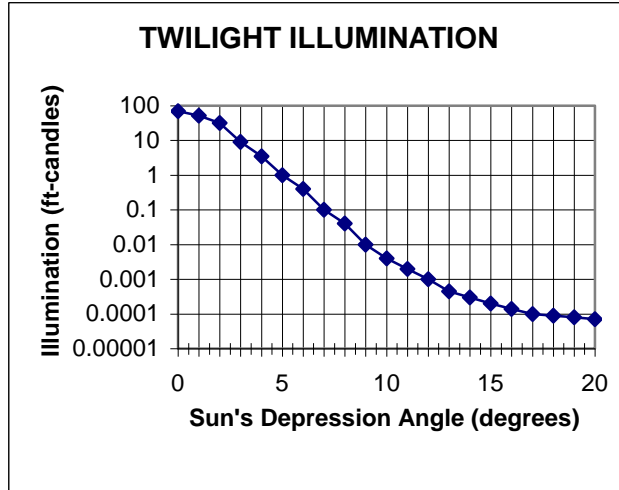


Figure 2. Twilight Illumination on a Horizontal Surface.

## 7.2 Sky Brightness

Sky brightness (flux in  $\text{mW}/\text{cm}^2$ ) on the west horizon plotted against the solar zenith angle (Figure 3), shows that the brightness in the western horizon sky decreases to almost nothing (0.00001) when the sun reaches  $11^\circ$ , where-upon it is slowly lost against the natural illumination of the night sky. This "light of the night sky" is caused by a vast number of stars too faint to be seen individually, and by the air glow originating 37-124 miles above the earth's surface from chemical reactions and an echo of the absorption of sunlight by the high atmosphere.

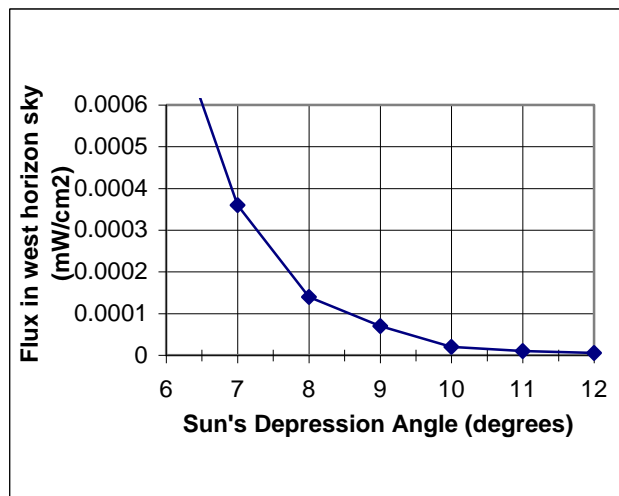


Figure 3. Sky brightness (flux) from civil twilight ( $6^\circ$ ) to nautical twilight ( $12^\circ$ ) on the western horizon.

This shows that the limiting night value (darkness equal to that of "night") is reached when sun is at  $10^\circ$  below horizon.

The following table shows illumination measured in foot candles at different sky brightness. The last column shows values comparative to each other. The illumination from 18° changes substantially around 12°.

<b>Sky Brightness</b>	<b>Sun's Depression angle</b>	<b>Illumination (ft. candles)</b>
Sunrise/sunset	0.833°	6.5x10 or 6,500,000 x 10 <sup>-5</sup>
Civil twilight	6°	7.0x10 <sup>-1</sup> or 70,000 x 10 <sup>-5</sup>
Nautical twilight	12°	9.0x10 <sup>-4</sup> or 90 x 10 <sup>-5</sup>
Arbitrary	15°	2.0x10 <sup>-4</sup> or 20 x 10 <sup>-5</sup>
Astronomical twilight	18°	6.0x10 <sup>-5</sup> or 6 x 10 <sup>-5</sup>

### 7.3 Summary of Astronomical Information

For discussion of *Fajr* and *Isha* timings the following points about the sun's depression below horizon are worth keeping in mind

1. 18° (Astronomical twilight) is "total darkness" or "night" when the illumination of the sky from the stars and the sun below horizon is 6 x 10<sup>-5</sup> ft. candles.
2. At 15° the total illumination from the stars and the sun below the horizon is almost equal to 20 x 10<sup>-5</sup> ft. candles.
3. Instrumental measurements show that sun's depression angle of 13.5° is the value when the limiting night value is reached. At 13.5° the illumination of the sky is 70 x 10<sup>-5</sup> ft. candles
4. At 12° the illumination of the sky is 90 x 10<sup>-5</sup> ft. candles and the sky is so dark that the marine horizon can no longer be seen.
5. The change in illumination between 18° and 15° is small, while it is appreciably large between 18° and 13.5° or 12°.
6. The change in the sky brightness at 15° or at 18° is negligible, while 13.5° is the value where the intensity of light reaches to its minimum and does not change after that.
7. Twilight lasts longer in higher latitudes. It does not end in summer months at 48°+ N/S latitudes, as the sun does not go far enough below the horizon.

### 8.0 OBSERVATIONS

In the discussion of *Fajr* and *Isha* timings several authors have quoted observations by *Ulamaa'* in support of their positions about the beginning of *Subh Sadiq* and *Shafaq*. Ludhianvi (1975 p. 53-58) received strong support from several prominent *Ulamaa'* for his 15° position. A. Latif

(1982 p.75-85) countered Ludhianvi by quoting observations from a team of *Ulamaa'* for 18°. Surprisingly, some of them earlier strongly backed Ludhianvi because of their own independent observations. Qasmi (1989 p.30-37) mentioned several observations by the *Ulamaa'* in England who insisted that *Fajr* prayer should be delayed to 12° or even to 9°. Observations were also made in Chicago IL, Buffalo NY, Miami FL, Tempe AZ, Montreal Quebec Canada, and several other cities with differing interpretations of *Subh Sadiq*.

## 8.1 Suggestions for Making Observations

When making observations by individual or by a group the following must be kept in mind:

1. The objective of the observations.
2. What precisely should they be looking for?
3. The observations must have some consistency.

For observations about *Fajr* and *Isha* to be valid, the observers must be told what they precisely mean, for example:

- a. Does *Fajr* mean the earliest moment when human eye may detect the minimal change in the light on the eastern horizon, or is it when the light spreads over the entire horizon, or is it when human face is recognizable?
- b. For *Isha* to begin, should one wait until the 'red glow' after sunset disappears, or should it be when the last traces of light on the western horizon end?  
Keep in mind that the zodiacal light, atmospheric glow, aurora and other lights in some months in some regions may prolong the twilight much beyond 18° (the astronomical twilight or 'night').

On the question of experimentally determining the chronological expression of the light after 18° (in the morning) a certain number of methodological precautions must be taken:

1. Observers (about *Fajr*) should be at the points of observations about 1/2 hour before the astronomical twilight begins.
2. If several observers are participating in any experiment, no two must be allowed to communicate with each other. They should report their observations at a central point which should know the compass directions or the directions of the markers and take accurate notes without adding or subtracting any information. After several such observations in distinct climatic environments and at various seasons of the year the data should be compiled to detect the patterns.

## 8.2 Discussion of Observations

Observations made by groups of Muslims in support of 18°, 15°, and 12° are presented here.

### 8.2.1 Ludhianvi (1975)

Maulana Mufti Rasheed Ahmed Ludhianvi mentions in his book '*Subh Sadiq*' observations made in Tando Adam, Pakistan on June 11-13, 1970 by a team of eleven *Ulamaa* and experts. On June 11 they noticed 'scattering of light' at 4:19 a.m. On June 12 they reached the observation point at 3:30 a.m. and the night was pitch dark without any lights. At 4:00 a.m. they noticed some faint light that they determined was similar to *Subh Kadhib*. *Subh Sadiq* was observed at 4:17 a.m. In Karachi on June 13, 1970 they observed complete darkness up to 4:11 a.m. Then *Subh Kadhib* appeared followed by *Subh Sadiq* much later. After these observations Maulana Mufti M. Shafi', Karachi, issued a *Fatwa* which stated that:

"The time of *Subh Sadiq* given in the charts based on 18°, and in common use in Karachi are given as an extreme precaution for the Muslims to stop *Suhoor* in *Ramadan*. Certainly, there is an intervening time between it and the real *Subh Sadiq*, and it cannot be 12 minutes in all places, **but it is different in different seasons and different latitudes**. Therefore the times given in these charts are incorrect. If *Adhan* is called at least 20 minutes later and *Fajr* prayer held after that, then it will be correct and valid in all seasons. Therefore this should be duly observed and followed."

Another observation worth noting was done by Ludhianvi himself with another friend in December of 1971 in Karachi during the blackout opportunity of 1971 war of India and Pakistan. On December 24, 1971, the local time for sun's depression of 18° on that day was 5:49 a.m. so they started early at 3:00 a.m. for observation. At 4:30 a.m. they saw very faint vertical whiteness on eastern horizon and later they saw a star rising above the horizon. That star was the reason of that whiteness. This kind of observation may mislead people to think that this is *Subh Sadiq*.

In a meeting in Karachi on Dhul-Qa'da 1392 (1972) it was unanimously agreed upon by all the observers that *Subh Sadiq* did not occur at the time given in charts used for determining prayer times (based on 18°). It occurred much later (See Ludhianvi: p. 53-56).

### 8.2.2 Abdul Latif (1982)

Abdul Latif mentions nine observations (p. 75-85) made between April 1973 and March 1975, by a minimum of 3 to a maximum of 17 observers. According to him most observers were positive in their identification of *Subh Sadiq*. He has given a summary as follows:

1. *Subh Kadhib* was not noticed in any of the nine observations made by any member of the team, either at 18° or earlier.
2. Some observers noticed *Subh Sadiq* (the light spreading horizontally) exactly at sun's depression of 18°. Others noticed it a little later.
3. The illumination at 15° was far greater than what could be acceptable for *Subh Sadiq*.

4. Later observations yielded consensus that the real *Subh Sadiq* is at 18° (and not at 15°, as Ludhianvi claimed).

### 8.2.3 Observations Made in 1987-1988 at Blackburn (England)

Observations reported below provided by Molvi Yaqub Ahmed Miftahi, published by Hizbul Ulama U.K. throw some light to the questions of *Fajr* and *Isha* times in England (and Northern Europe). A group of five *Imams* and *Ulamaa* ' made these observations from September 1987 through August of 1988 at Blackburn (England). It is the first time any group of *Ulamaa* ' tried to measure '*Tabayyan*' for *Fajr*. They also observed red and white *Shafaq*. Times shown in the following tables are Standard Times from October to March, and Daylight-Saving Times from March to October as practiced in UK.

Blackburn, Lancashire, UK Latitude 53:45N, Longitude 2:29W

Time Zone = GMT+ 0 Summer Time Zone = GMT+ 1

Dates	Subh Sadiq Observed	Tabayyan	18°	15°	Sun Rise	Sun Set	RedSafaq Observed	WhiteShafaq Observed	15°	18°
09/21/87	5:30		4:52	5:14	6:53					
09/22/87						19:15	20:10	20:37	20:48	21:10
09/23/87	5:35		4:56	5:18	6:57					
09/24/87						19:10	20:10	20:30	20:42	21:04
09/26/87	5:37		5:02	5:24	7:02	19:05	20:00	20:25	20:37	20:59
09/28/87	5:40		5:07	5:28	7:06					
10/01/87						18:52	20:00	20:15	20:24	20:45
10/06/87						18:40	No			
10/07/87						18:39	No			
10/10/87						18:31	19:35	19:55	20:02	20:23
10/15/87						18:20	No			
10/16/87						18:17	No			
10/22/87	6:20		5:52	6:12	7:49					
10/23/87						18:02	No			
10/24/87						17:59	No			
10/25/87	5:30		5:57	6:18	6:55	16:57	17:55	18:15	19:29	19:50
10/28/87	5:33		6:03	6:23	7:01					
10/29/87	5:33		6:04	6:25	7:04					
11/11/87	5:57		5:26	5:46	7:29					
11/14/87						16:41	No	17:40	17:57	18:17
11/25/87	6:09		5:47	6:07	7:54	16:04	No	17:26	17:46	18:06
11/26/87	6:13		5:48	6:09	7:55	16:03	No	17:25	17:45	18:06
11/27/87						16:02	17:10	17:30	17:44	18:05
11/28/87	6:14		5:51	6:12	7:59					
12/08/87						15:55	17:15	17:35	17:40	18:01

Dates	Subh Sadiq Observed	Tabayyan	18°	15°	Sun Rise	Sun Set	RedSafaq Observed	WhiteShafaq Observed	15°	18°
12/09/87	6:35		6:03	6:25	8:14	15:55	17:15	17:33	17:39	18:01
12/10/87						15:54	No	17:30	17:39	18:01
12/12/87						15:54	17:00	17:20	17:39	18:01
12/14/87						15:54	No	17:27	17:40	18:01
12/25/87						15:58	No	17:30	17:44	18:05
01/07/88						16:05	17:11	17:43	17:56	18:17
01/24/88						16:35	17:25	18:05	18:19	18:40
02/06/88	6:10		5:48	6:08	7:45					
02/07/88	6:09		5:46	6:06	7:47					
02/21/88						17:31	No	18:50	19:08	19:28
02/23/88	5:32		5:16	5:36	7:14					
03/01/88						17:46	No	19:14	19:24	19:45
03/02/88	5:20		5:00	5:21	6:55					
03/04/88						17:52	No	19:17	19:30	19:51
03/21/88						18:24	No	19:48	20:05	20:27
03/30/88						19:46	20:42	21:21	21:24	21:48
04/01/88	5:10		4:39	5:03	6:43					
04/11/88						20:08	No	21:33	21:53	22:21
04/28/88						20:39	No	22:06	22:42	23:20
05/02/88	3:53		2:44	3:25	5:34					
05/05/88						20:52	21:49	22:47	23:05	23:55
05/06/88	3:35			3:11	5:26					
05/10/88	3:23		1:56	2:56	5:18					
05/15/88	3:14	3:36	----	2:36	5:09					
05/19/88						21:16	22:31	23:24	0:04	----
05/20/88	2:45		----	2:13	5:01	21:17	22:29	23:37	0:09	----
05/21/88	2:38	3:28	----	2:08	5:00					
05/24/88						21:24	No	0:40	0:37	----
05/25/88	2:10	3:10	----	1:43	4:54					
06/05/88						21:39	23:00	0:46	----	----
06/06/88	1:45	3:00	----	----	4:43					
06/12/88						21:45	23:05	not gone	----	----
06/13/88		2:45	----	----	4:39	21:46	23:10	not gone	----	----
08/01/88						21:13	22:20	23:25	23:30	0:36
08/06/88						21:04	22:12	23:15	23:12	0:00
08/07/88	3:38	4:10	2:27	3:17	5:33					
08/16/88	3:55	4:25	3:09	3:46	5:49					

For *Fajr* the first light was noticed between 12°-15° (*Fajr al-Mustatir*), while *Tabayyan* was noted at about 10.5°. Similarly, for *Isha* the redness ended at around 9°-11°, while the whiteness ended at 12°-14° except in summer months.

#### 8.2.4 Qasmi (1989)

Maulana Yaqub Ismail Qasmi of England has compiled a list of contradictory observations. In a meeting held on April 18, 1984 a team of two *Ulamaa* claimed that *Subh Sadiq* is at 12°. In another report a group of three *Ulamaa* stressed that in summer *Subh Sadiq* is one hour and thirty-five minutes before sunrise, and in winter one hour and forty minutes before sunrise. The chart given on p.28-29 shows a time lag of a maximum of 2 hours and 20 minutes and a minimum of 1 hour and 22 minutes between *Subh Sadiq* and sunrise. On page 30 the results of another set of observations are tabulated with a minimum of 1 hour 15 minutes to a maximum of 1 hour 40 minutes between sunset and end of white *Shafaq*. The redness of *Shafaq* lasted from 50 minutes to 1 hour 68 minutes. Another seven observations reported on pages 31-37 suggest that *Subh Sadiq* is later than the time given for astronomical twilight in most months in England but not by as much as claimed by others.

#### 8.2.5 Other More Recent Observations

A number of observations were recorded by Dr. Omar Azal, and by members of the Committee for Crescent Observation (CFCO), on various occasions between 1984 and 1991 from different locations such as Miami FL, Buffalo NY, Chicago IL, San Francisco CA, Tempe AZ, Houston TX, Montreal (Canada).



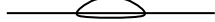




From 1998 through 2001, several additional reports of independent observations were collected by Engr. Khalid Shaukat, founder of Moonsighting.com from places around the world e.g., Riyadh (Saudi Arabia), Durban (South Africa), Auckland (New Zealand), Sydney (Australia), St. Joseph MI (USA), Washington DC (USA), High Wycombe (UK) and Dewsbury (UK). The team in Chicago found that *Subh Sadiq* was usually between the times when sun's depression was 12° to 15° below horizon. When *Subh Sadiq* is defined as 'the light spreading horizontally' (*Fajr al-Mustatir*) the consensus appears to be a little earlier than the sun at 15°. In some cases the observers felt that *Subh Sadiq* occurred much later that is when sun was 12° below horizon.

If *Subh Sadiq* is defined as '*Tabayyan*' of the *Qur'an* and '*Yantashiru fi wujuh al-rijaal*' of the *Hadith* (the light intensity reaches a degree when human faces are recognizable clearly) then it is much later than even 15°, and often as late as 30 minutes before sunrise.

For *Isha* if the earliest limit is placed at the end of redness then the observations range from 40 to 55 minutes after sunset. If the limit for the beginning of *Isha* is the end of whiteness as well then it varies from 1 hour 10 minutes to 1 hour 40 minutes for places between 20°-50° latitudes.

Dr. Omar Afzal with two other participants made observations of different phenomena on September 28 and 29, 1991 at Ithaca, NY. The horizon was very clear on both days and all the three participants observed the glow-set both redness and whiteness. No snap shots were taken.

These observations are shown with graphics representations and their descriptions tabulated below:

	<u>September 28, 1991</u>	<u>September 29, 1991</u>
5:50 a.m.	 No light except moon light	No light except moon light
6:02 a.m.	 Very faint redness on lower horizon	Faint redness on lower horizon
6:11 a.m.	 Whiteness below and redness starts spreading	Moonlight/shadow but not bright enough
6:17 a.m.	 Red/white spread on the horizon but not completely	Lower whiteness spreads but redness is not diffused
6:20 a.m.	 Diffused light over the whole eastern horizon	
6:29 a.m.	 <i>Tabayyan</i> (when human features may be recognized)	
7:01 a.m.	 Sunrise	Sunrise

### 8.2.6 Observations and Discussions in Pakistan (2007 AD to 2010 AD)

In recent times (2007 AD to 2010 AD) the discussion about *Fajr* and *Isha* surfaced again in Pakistan. There are proponents of 15° and some justify 18° based on independent observations. Practices in *Darul-Uloom* Karachi have been to use 18° for *Imsak* and 15° for *Fajr Adhan*. For *Isha* they use 18°. For latitudes like Pakistan this seems to agree with the observations made at such latitudes for both *Subh Sadiq* and white *Shafaq*.

## 9.0 CORRELATION

Ludhianvi of Pakistan (1975) made an assertion that *Fajr Thani/Subh Sadiq* is at 15° which appears to be wrong as it is against very reliable observations by others.

Abdul Latif of Pakistan (1982) has collected an array of arguments in support of 18° position for *Subh Sadiq*. He brushed aside as 'negligible' or inconsequential whatever he found going against him. At several places he omitted phrases, or translated only the portions which support him. For example, he did not provide the translation of the pages from *Umdat al-Qari – Sharah Sahih Al-Bukhari* (p.107-113). Most of the *Ahadith* and *Athaar* contained in those pages refute almost all of his assertions about *Subh Sadiq*. Abdul Latif insists on 18° for *Fajr* and *Isha* and argues in his book that Al-Biruni (and many other *Ulamaa* ') determined 18° to be the correct position of



the Sun for *Subh Sadiq* and *Isha* (p. 23), though the *Qur'an* and the *Sunnah* or early *Fuqaha'*, and *Mufasssireen* did not fix any degree of the sun's depression below the horizon (p. 17-20). Abdul Latif also says, that Maulana Ashraf Ali Thanavi accepted 18° as valid after his own observations. Observations in Pakistan and Saudi Arabia (Latif 1982, p.86-100) also confirmed 18°. Prayer tables used in India for several centuries are also based on 18°.

Qasmi of U.K. (1989) is less emphatic but is generally in agreement with Abdul Latif. As he faced some critical situations in England where the twilight does not disappear completely in summer he was forced to accept a compromise. For *Fajr* he insists on 18°, but reduces *Isha* to 1/7 of the "night". 1/7th of the night rule is proposed to be used, when other methods give times that become hardship for those areas. Hakim-ul Ummat Ashraf Ali Thanwi of India writes: 'by splitting the night into 7 parts, a person can eat in the first 6 parts.' (*Imadatul Fatawa*, vol 2, p98, 12/12/1322 Hijri). There is a similar statement of 1/7th of the night rule by Allamah Shami in *Durre Mukhtar*. As a matter of fact, the Messenger (SAW) used to delay *Isha*, and pray *Fajr* in diffused light. For England if *Fajr* and *Isha* both are calculated at 10° (sun's depression below horizon) then most of the problems can be avoided.

When prayer schedule published in India were collected, it was found that prayer schedules in the early decades of twentieth century were not very accurate. They were roughly calculated on the basis of 12°-20° with minor adjustments for sunrise, sunset and *Zawaal*. Many large cities like Delhi used several parallel time tables, and most of the rural mosques had no tables to follow. Generally, they worked out very crude estimations based on the nearest city. For example, the Jantari used in Saharanpur and the surrounding areas used the time-table for Delhi.

As a result of all these efforts, it was concluded that almost all observers in different groups could not identify what may be called *Subh Kadhib*. Most of them reported not seeing any light resembling the description of *Fajr al-Mustatil* in *Ahadith*. Many including Mufti M. Shafi' stressed the point that there was no light on the eastern horizon when the sun reached 18° before sunrise. Some 20 or more minutes later they noticed the first traces of light. These observations support the earliest *Fajr* (*Subh Kadhib?*) at around 13° in Sindh and Karachi, Pakistan. Those who claimed *Fajr* at 18° are being conservative for end of Suhoor, and recommend to start *Fajr* prayer 10 to 15 minutes later.

Keep in mind that the amount of reddening in the sky depends on the moisture content, temperature, and pressure conditions in the atmosphere. On a clear day the sun will appear hardly reddened at sunset, On the other hand, on a hazy or cloudy day a heavily reddened sunset is assured. In a desert very rapid darkening of the horizon after sunset is a common experience.

As human eye can notice very faint light (up to 0.55 $\mu$ ) one may stretch *Inshaqqa*, *Infajara*, etc. to the maximum, and yet not reach 18°-15°. Those who are looking for *Fajr al-Mustatil* (vertically diffused light) will have to wait till around 13°, and for *Fajr al-Mustatir* (horizontally-spread light) till 12°-15°. *Tabayyan* will be around 8°-10° on a clear sky. The sun does not reach 12°-18° in all locations at 48° N/S latitude and beyond. Hence 18° or 15° degrees will create a very large "exempt" zone which is against the universality of Islamic practices.

## 10.0 RESEARCH BY MOONSIGHTING.COM

Moonsighting.com collected limited observations done in many places in the world [e.g., Riyadh (Saudi Arabia), Karachi and Tando Adam (Pakistan), Durban (South Africa), Auckland (New Zealand), Sydney NSW (Australia), Miami FL (USA), Washington DC (USA), Toronto (Canada), High Wycombe (UK), Dewsbury (UK), and Blackburn (UK)]. All these observations including the year round observations of Blackburn UK point to the fact that no fixed degrees can be applied to calculate *Fajr & Isha*. A decade long research by Moonsighting.com (<http://www.moonsighting.com/how-we.html>) found that any fixed degree is not correct for *Subh-Sadiq* or disappearance of *Shafaq*. The *Subh-Sadiq* and *Shafaq* are functions of latitude and seasons (day number of the solar year). All collected observations from different latitudes were plotted against day number of the year. With curve-fit technique, moonsighting.com came up with a function of latitude and seasons. In 2007 independent Muslim scientists, who studied this subject in Pakistan, and made discussions, also confirmed that degrees fluctuate with seasons.

Moonsighting.com uses the **functions of latitude and seasons** for calculating *Fajr* and *Isha* times based on observations. The mathematics of these functions is given in the next chapter, which may not be useful to most readers, but can be used by computer programmers. For *Fajr*, *Subh Sadiq* that is considered as (*Fajr-al-Mustatir* of *Ahadith*) when morning light in the sky spreads horizontally is used. For *Isha*, Imam Shafi'i, Imama Maalik, Imam Ahmad bin Hanbal, and two prominent pupils of Imam Abu-Hanifa (Imam Abu-Yusuf and Imam Muhammad) all prefer *Shafaq Ahmer*. Imam Abu-Hanifa prefers *Shafaq Abyad*. Moonsighting.com uses a combination of *Shafaq Abyad* when nights are long (winter in Northern hemisphere and summer in Southern hemisphere) and *Shafaq Ahmer* when days are long (summer in Northern hemisphere and winter in Southern hemisphere). This is chosen to avoid hardship at higher latitudes, when *Shafaq Abyad* becomes too late. Transition from *Abyad* to *Ahmer* is used in spring and fall seasons. These formulae are good up to the 55° latitude.

At latitudes between 55° and 65°, the rule of *Sab'u Lail* (1/7th of the night) is used, when other methods give times that become hardship for those areas. This has been permitted by Hakim ul Ummat Ashraf Ali Thanwi (*Imadatul Fatawa*, vol 2, p98, 12/12/1322 Hijri) and also by Allamah Shami in *Durre Mukhtar*. Mufti Shafi Usmani said: 'This statement is presented via assumption, that in those countries where *Subah Sadiq* cannot be clearly distinguished (the UK in the summer months) it is permissible to act upon this advice. However, erring on the side of caution, one should stop eating 10 minutes before this time.' Therefore, two things are calculated for *Isha*; disappearance of *Shafaq* and first 1/7th of the night. *Isha* time is earlier of the two. Similarly, two things are calculated for *Fajr*; *Tabayyan* (when morning light in the sky spreads horizontally) and the last 1/7th of the night. *Fajr* time is later of the two.

At latitudes higher than 65°, the sun does not set in summer, or does not rise in winter for a few or number of days. All Muslim scholars agree that whenever there is perpetual day or perpetual night for 24 hours or more, the prayer times during the affected days should be approximated. This is because the Messenger (SAW) said: "There will come a time when there will be a day like a year, a day like a month, and a day like a week..." The people asked him (SAW) if during the

day like a year, should they offer each prayer only once. He (SAW) replied: "You should approximate the times," [Sahih Muslim]. Therefore, for such situations, a suggestion by *Fuqaha'* is to calculate for nearest lower latitudes where the sun sets and rises, and that is used.

In the Tables below moonsighting.com calculations are shown for cities at various latitudes for comparison purposes. Fajr18 is calculated at sun's depression angle of 18°. FjrCalc is the calculated time based on latitude and seasons and next column shows the corresponding sun's depression angle. Similarly, Isha18 is calculated at 18° and IshaCalc is the calculated time based on latitude and seasons and next column shows the corresponding sun's depression angle.

<b>Quito ECUADOR (Almost at Equator) Lt= 0:14S Lg= 78:30W TZ=GMT-5</b>								
Date	Fajr18	FjrCalc	Degrees	Sunrise	Sunset	Isha18	IshCalc	Degrees
Dec 21	4:53	4:53	18.00	6:08	18:19	19:31	19:31	18.00
Mar 22	5:09	5:09	18.00	6:17	18:27	19:33	19:33	18.00
Jun 22	4:58	4:58	18.00	6:13	18:22	19:34	19:34	18.00
Sep 22	4:55	4:55	18.00	6:03	18:13	19:18	19:18	18.00

<b>Karachi PAKISTAN Lt=24:51N Lg= 67:02E TZ=GMT+ 5</b>								
Date	Fajr18	FjrCalc	Degrees	Sunrise	Sunset	Isha18	IshCalc	Degrees
Dec 21	5:50	5:50	18.00	7:12	17:51	19:09	19:09	18.00
Mar 22	5:18	5:18	18.00	6:34	18:47	20:00	20:00	18.00
Jun 22	4:14	4:14	18.00	5:43	19:27	20:53	20:42	16.00
Sep 22	5:04	5:04	18.00	6:20	18:31	19:44	19:44	18.00

<b>Los Angeles, CA, USA Lt=34:00N Lg=118:15W TZ=GMT-8 Summer TZ=GMT-7</b>								
Date	Fajr18	FjrCalc	Degrees	Sunrise	Sunset	Isha18	IshCalc	Degrees
Dec 21	5:25	5:25	18.00	6:54	16:51	18:17	18:17	18.00
Mar 22	5:30	5:30	18.00	6:53	19:10	20:30	20:23	16.60
Jun 22	3:58	3:58	18.00	5:43	20:11	21:52	21:26	14.13
Sep 22	5:18	5:18	18.00	6:41	18:52	20:12	20:05	16.63

<b>Sydney AUSTRALIA Lt=33:55S Lg=151:10E TZ=GMT+ 10 Summer TZ=GMT+ 11</b>								
Date	Fajr18	FjrCalc	Degrees	Sunrise	Sunset	Isha18	IshCalc	Degrees
Dec 21	3:56	3:56	18.00	5:41	20:09	21:50	21:24	14.19
Mar 22	5:36	5:36	18.00	7:00	19:07	20:27	20:20	16.67
Jun 22	5:31	5:31	18.00	7:00	16:57	18:24	18:24	18.00
Sep 22	4:22	4:22	18.00	5:45	17:55	19:15	19:08	16.66

**Chicago, IL, USA Lt=41:50N Lg= 87:45W TZ=GMT- 6 Summer TZ=GMT- 5**

Date	Fajr18	FjrCalc	Degrees	Sunrise	Sunset	Isha18	IshCalc	Degrees
Dec 21	5:34	5:38	17.38	7:15	16:26	18:04	17:57	16.86
Mar 22	5:17	5:20	17.50	6:50	19:09	20:40	20:22	14.89
Jun 22	3:05	3:25	15.93	5:16	20:33	22:42	21:49	12.15
Sep 22	5:05	5:09	17.37	6:39	18:50	20:21	20:04	15.10

**Montreal Quebec CANADA Lt=45:30N Lg= 73:36W TZ=GMT-5 Summer TZ=GMT-4**

Date	Fajr18	FjrCalc	Degrees	Sunrise	Sunset	Isha18	IshCalc	Degrees
Dec 21	5:43	5:53	16.41	7:31	16:17	18:02	17:50	16.12
Mar 22	5:13	5:21	16.77	6:53	19:13	20:51	20:27	14.17
Jun 22	2:28	3:11	14.63	5:06	20:50	23:25	22:07	11.09
Sep 22	5:02	5:11	16.52	6:42	18:54	20:31	20:08	14.29

**London ENGLAND UK Lt=51:30N Lg= 0:10W TZ=GMT+ 0 Summer TZ=GMT+ 1**

Date	Fajr18	FjrCalc	Degrees	Sunrise	Sunset	Isha18	IshCalc	Degrees
Dec 21	5:59	6:22	14.68	8:04	15:57	17:58	17:32	14.24
Mar 22	4:04	4:25	15.12	5:58	18:21	20:12	19:34	12.55
Jun 22	----	2:44	11.86	4:44	21:25	----	22:42	8.99
Sep 22	4:53	5:14	15.03	6:47	19:01	20:51	20:15	12.74

**Blackburn LANCASHIRE Lt=53:45N Lg=2:29W TZ=GMT+ 0 Summer TZ=GMT+ 1**

Date	Fajr18	FjrCalc	Degrees	Sunrise	Sunset	Isha18	IshCalc	Degrees
Dec 21	6:12	6:42	13.92	8:25	15:54	18:03	17:30	13.42
Mar 22	4:06	4:32	14.61	6:07	18:31	20:29	19:45	12.09
Jun 22	----	2:38	10.63	4:39	21:48	----	23:05	8.12
Sep 22	4:55	5:22	14.41	6:56	19:11	21:08	20:25	12.21

**Oslo NORWAY Lt=59:56N Lg= 10:45E TZ=GMT+ 1 Summer TZ=GMT+ 2**

Date	Fajr18	FjrCalc	Degrees	Sunrise	Sunset	Isha18	IshCalc	Degrees
Dec 21	6:32	7:32	11.11	9:18	15:15	17:58	16:54	10.70
Mar 22	3:45	4:35	12.69	6:12	18:40	21:05	19:54	10.29
Jun 22	----	3:10	3.62	3:54	22:47	----	23:28	3.62
Sep 22	4:35	5:26	12.47	7:02	19:19	21:41	20:33	10.44

**Fairbanks AK Lt=64:50N Lg=147:50W TZ=GMT-9 Summer TZ=GMT-8**

Date	Fajr18	FjrCalc	Degrees	Sunrise	Sunset	Isha18	IshCalc	Degrees
Dec 21	7:19	9:10	7.79	10:58	14:43	18:20	16:25	7.49
Mar 22	4:41	6:04	10.99	7:42	20:19	23:19	21:33	8.89
Jun 22	----	2:40	1.29	2:59	0:51	----	1:07	1.30
Sep 22	4:36	5:58	10.87	7:36	19:53	22:47	21:07	8.99

The following Tables show *Fajr & Isha* times in terms of how many hours and minutes *Fajr* is before sunrise and how many hours and minutes *Isha* is after sunset. *Fajr & Isha* are also calculated for 18°, 15°, and 12° for comparison.

In The following Tables, just for illustration purposes, Greenwich meridian (+0:00 longitude) is selected for different latitudes ranging from 0° North to 55° North.

0° North & Greenwich Meridian				Lat=0:00N	Long= 0:00E	TZ=GMT+ 0		
Date	Fajr Hour:Minute before Sunrise				Isha' Hour:Minute after Sunset			
	FjrCalc	Fjr18	Fjr15	Fjr12	IshCalc	Ish18	Ish15	Ish12
Jan 22	1:13	1:13	1:00	0:48	1:13	1:13	1:00	0:47
Feb 22	1:10	1:10	0:58	0:45	1:10	1:10	0:58	0:45
Mar 22	1:09	1:09	0:57	0:45	1:09	1:09	0:57	0:45
Apr 22	1:10	1:10	0:58	0:46	1:10	1:10	0:58	0:46
May 22	1:13	1:13	1:01	0:48	1:13	1:13	1:01	0:48
Jun 22	1:15	1:15	1:02	0:49	1:15	1:15	1:02	0:49
Jul 22	1:13	1:13	1:01	0:48	1:13	1:13	1:01	0:48
Aug 22	1:10	1:10	0:58	0:46	1:10	1:10	0:58	0:46
Sep 22	1:09	1:09	0:57	0:45	1:09	1:09	0:57	0:45
Oct 22	1:10	1:10	0:58	0:45	1:10	1:10	0:58	0:46
Nov 22	1:13	1:13	1:01	0:48	1:13	1:13	1:00	0:48
Dec 22	1:15	1:15	1:02	0:49	1:15	1:15	1:02	0:49

10° North & Greenwich Meridian				Lat=10:00N	Long= 0:00E	TZ=GMT+ 0		
Date	Fajr Hour:Minute before Sunrise				Isha' Hour:Minute after Sunset			
	FjrCalc	Fjr18	Fjr15	Fjr12	IshCalc	Ish18	Ish15	Ish12
Jan 22	1:14	1:14	1:01	0:48	1:14	1:14	1:01	0:48
Feb 22	1:10	1:10	0:58	0:46	1:11	1:11	0:58	0:46
Mar 22	1:10	1:10	0:57	0:45	1:10	1:10	0:58	0:45
Apr 22	1:12	1:12	0:59	0:47	1:12	1:12	0:59	0:47
May 22	1:16	1:16	1:02	0:49	1:16	1:16	1:02	0:49
Jun 22	1:18	1:18	1:04	0:50	1:18	1:18	1:04	0:50
Jul 22	1:16	1:16	1:02	0:49	1:16	1:16	1:02	0:49
Aug 22	1:12	1:12	0:59	0:47	1:12	1:12	0:59	0:47
Sep 22	1:10	1:10	0:58	0:45	1:10	1:10	0:58	0:45
Oct 22	1:11	1:11	0:58	0:46	1:11	1:11	0:58	0:46
Nov 22	1:14	1:14	1:01	0:48	1:14	1:14	1:01	0:48
Dec 22	1:16	1:16	1:02	0:49	1:15	1:15	1:02	0:49

20° North & Greenwich Meridian				Lat=20:00N	Long= 0:00E	TZ=GMT+ 0		
Date	Fajr Hour:Minute before Sunrise				Isha' Hour:Minute after Sunset			
	FjrCalc	Fjr18	Fjr15	Fjr12	IshCalc	Ish18	Ish15	Ish12
Jan 22	1:17	1:17	1:04	0:50	1:17	1:17	1:03	0:50
Feb 22	1:14	1:14	1:01	0:48	1:14	1:14	1:01	0:48
Mar 22	1:13	1:13	1:00	0:47	1:13	1:13	1:01	0:48
Apr 22	1:16	1:16	1:03	0:49	1:17	1:17	1:03	0:49
May 22	1:21	1:21	1:07	0:52	1:21	1:22	1:07	0:52
Jun 22	1:24	1:24	1:09	0:54	1:21	1:24	1:09	0:54
Jul 22	1:21	1:21	1:07	0:52	1:21	1:21	1:07	0:52
Aug 22	1:16	1:16	1:03	0:49	1:16	1:16	1:03	0:49
Sep 22	1:13	1:13	1:01	0:48	1:13	1:13	1:00	0:48
Oct 22	1:14	1:14	1:01	0:48	1:14	1:14	1:01	0:48
Nov 22	1:17	1:17	1:04	0:50	1:17	1:17	1:04	0:50
Dec 22	1:19	1:19	1:05	0:52	1:19	1:19	1:05	0:52

30° North & Greenwich Meridian				Lat=30:00N	Long= 0:00E	TZ=GMT+ 0		
Date	Fajr Hour:Minute before Sunrise				Isha' Hour:Minute after Sunset			
	FjrCalc	Fjr18	Fjr15	Fjr12	IshCalc	Ish18	Ish15	Ish12
Jan 22	1:23	1:23	1:09	0:55	1:23	1:23	1:09	0:55
Feb 22	1:20	1:20	1:06	0:52	1:20	1:20	1:06	0:52
Mar 22	1:20	1:20	1:05	0:51	1:20	1:20	1:06	0:52
Apr 22	1:24	1:24	1:09	0:54	1:24	1:25	1:09	0:54
May 22	1:29	1:32	1:15	0:58	1:24	1:32	1:15	0:59
Jun 22	1:29	1:37	1:18	1:01	1:24	1:37	1:18	1:01
Jul 22	1:29	1:32	1:15	0:59	1:24	1:32	1:15	0:58
Aug 22	1:25	1:25	1:09	0:54	1:24	1:24	1:09	0:54
Sep 22	1:20	1:20	1:06	0:52	1:20	1:20	1:06	0:52
Oct 22	1:20	1:20	1:06	0:52	1:20	1:20	1:06	0:52
Nov 22	1:24	1:24	1:09	0:55	1:23	1:23	1:09	0:55
Dec 22	1:26	1:26	1:11	0:56	1:24	1:26	1:11	0:56

40° N	Fajr Hour:Minute before Sunrise				Isha' Hour:Minute after Sunset			
Date	FjrCalc	Fjr18	Fjr15	Fjr12	IshCalc	Ish18	Ish15	Ish12
Jan 22	1:33	1:34	1:18	1:02	1:28	1:35	1:19	1:02
Feb 22	1:30	1:30	1:14	0:59	1:28	1:30	1:15	0:59
Mar 22	1:31	1:31	1:14	0:58	1:28	1:31	1:15	0:59
Apr 22	1:33	1:39	1:20	1:03	1:28	1:40	1:21	1:03
May 22	1:33	1:54	1:31	1:10	1:28	1:54	1:32	1:10
Jun 22	1:33	2:03	1:38	1:15	1:28	2:03	1:38	1:15
Jul 22	1:33	1:54	1:32	1:10	1:28	1:54	1:31	1:10
Aug 22	1:33	1:39	1:21	1:03	1:28	1:39	1:20	1:02
Sep 22	1:31	1:31	1:15	0:59	1:28	1:31	1:15	0:58
Oct 22	1:31	1:31	1:15	0:59	1:28	1:30	1:15	0:59
Nov 22	1:33	1:35	1:19	1:03	1:28	1:35	1:19	1:03
Dec 22	1:33	1:38	1:21	1:05	1:28	1:38	1:21	1:05

50° N	Fajr Hour:Minute before Sunrise				Isha' Hour:Minute after Sunset			
Date	FjrCalc	Fjr18	Fjr15	Fjr12	IshCalc	Ish18	Ish15	Ish12
Jan 22	1:38	1:54	1:35	1:16	1:31	1:54	1:35	1:16
Feb 22	1:38	1:47	1:29	1:10	1:31	1:48	1:29	1:10
Mar 22	1:38	1:49	1:29	1:10	1:31	1:50	1:30	1:11
Apr 22	1:38	2:08	1:42	1:18	1:31	2:09	1:43	1:19
May 22	1:38	2:58	2:11	1:36	1:31	3:01	2:12	1:37
Jun 22	1:38	3:51	2:40	1:50	1:31	----	2:40	1:50
Jul 22	1:38	3:00	2:12	1:37	1:31	2:57	2:10	1:36
Aug 22	1:38	2:09	1:43	1:19	1:31	2:07	1:42	1:18
Sep 22	1:38	1:51	1:30	1:11	1:31	1:50	1:30	1:10
Oct 22	1:38	1:48	1:30	1:11	1:31	1:48	1:29	1:10
Nov 22	1:38	1:55	1:36	1:17	1:31	1:55	1:36	1:16
Dec 22	1:38	2:00	1:40	1:20	1:31	2:00	1:40	1:20

55° N	Fajr Hour:Minute before Sunrise				Isha' Hour:Minute after Sunset			
Date	FjrCalc	Fjr18	Fjr15	Fjr12	IshCalc	Ish18	Ish15	Ish12
Jan 22	1:40	2:10	1:48	1:27	1:32	2:10	1:49	1:27
Feb 22	1:40	2:00	1:39	1:18	1:32	2:01	1:40	1:19
Mar 22	1:40	2:04	1:41	1:19	1:32	2:05	1:42	1:20
Apr 22	1:40	2:37	2:02	1:32	1:32	2:40	2:04	1:33
May 22	1:40	3:42	3:42	2:09	1:32	----	----	2:11
Jun 22	1:40	3:21	3:21	3:21	1:32	----	----	----
Jul 22	1:40	3:51	3:51	2:11	1:32	----	----	2:09
Aug 22	1:40	2:38	2:03	1:33	1:32	2:36	2:01	1:32
Sep 22	1:40	2:06	1:42	1:20	1:32	2:04	1:41	1:19
Oct 22	1:40	2:02	1:41	1:20	1:32	2:01	1:40	1:19
Nov 22	1:40	2:11	1:50	1:28	1:32	2:10	1:49	1:27
Dec 22	1:40	2:18	1:56	1:33	1:32	2:18	1:56	1:33

## 11.0 FUNCTIONS OF LATITUDE AND SEASONS FOR *FAJR* AND *ISHA*

In the calculations shown here, “abs” means absolute value.

“LT” means latitude in degrees (+ for North and – for South).

“DYY” means day number of the year: For Northern Hemisphere start from December 21

(DYY=0 for December 21, and counting forward, DYY=11 for January 1 and so on).

For Southern Hemisphere start from June 21 (DYY=0 for June 21, and counting forward)

### 11.1 *Fajr* – Function of Latitude and seasons

For *Subh-Sadiq*, Constants A, B, C, D are calculated as follows:

$$A = 75 + 28.65 / 55.0 * \text{abs}(LT); \quad B = 75 + 19.44 / 55.0 * \text{abs}(LT);$$

$$C = 75 + 32.74 / 55.0 * \text{abs}(LT); \quad D = 75 + 48.1 / 55.0 * \text{abs}(LT);$$

if ( DYY < 91 )

$$\text{MIN} = A + ( B - A ) / 91.0 * \text{DYY}; // '91 DAYS SPAN$$

else if ( DYY < 137 )

$$\text{MIN} = B + ( C - B ) / 46.0 * ( \text{DYY} - 91 ); // '46 DAYS SPAN$$

else if ( DYY < 183 )

$$\text{MIN} = C + ( D - C ) / 46.0 * ( \text{DYY} - 137 ); // '46 DAYS SPAN$$

else if ( DYY < 229 )

$$\text{MIN} = D + ( C - D ) / 46.0 * ( \text{DYY} - 183 ); // '46 DAYS SPAN$$

else if ( DYY < 275 )

$$\text{MIN} = C + ( B - C ) / 46.0 * ( \text{DYY} - 229 ); // '46 DAYS SPAN$$

else if ( DYY >= 275 )

$$\text{MIN} = B + ( A - B ) / 91.0 * ( \text{DYY} - 275 ); // '91 DAYS SPAN$$

### 11.2 *Isha* – Function of Latitude and seasons

For *Shafaq Ahmer*, Constants A, B, C, D are calculated as follows:

$$A = 62 + 17.4 / 55.0 * \text{abs}(LT); \quad B = 62 - 7.16 / 55.0 * \text{abs}(LT);$$

$$C = 62 + 5.12 / 55.0 * \text{abs}(LT); \quad D = 62 + 19.44 / 55.0 * \text{abs}(LT);$$

For *Shafaq Abyad*, Constants A, B, C, D are calculated as follows:

$$A = 75 + 25.6 / 55.0 * \text{abs}(LT); \quad B = 75 + 7.16 / 55.0 * \text{abs}(LT);$$

$$C = 75 + 36.84 / 55.0 * \text{abs}(LT); \quad D = 75 + 81.84 / 55.0 * \text{abs}(LT);$$

For *Shafaq (General)* – combination of *Shafaq Abyad* and *Shafaq Ahmer* for high latitudes

Constants A, B, C, D are calculated as follows:

$$A = 75 + 25.6 / 55.0 * \text{abs}(LT); \quad B = 75 + 2.05 / 55.0 * \text{abs}(LT);$$

$$C = 75 - 9.21 / 55.0 * \text{abs}(LT); \quad D = 75 + 6.14 / 55.0 * \text{abs}(LT);$$

In the equations above, in Sections 11.1 and 11.2, there is a number 75, that is the base time in minutes before sunrise for *Fajr*, and after sunset for *Shafaq Abyad*, and *Shafaq General*., which is time for disappearance of *Shafaq Abyad* observed at 18 degrees at equator. For *Shafaq Ahmer*



that number is 62. A, B, C, D are values in minutes that are functions of latitude. Now calculate MIN. *Fajr* is sunrise – MIN and *Isha* is sunset + MIN.

```

if ( DYY < 91)
    MIN = A + ( B - A ) / 91.0 * DYY; // '91 DAYS SPAN
else if ( DYY < 137)
    MIN = B + ( C - B ) / 46.0 * ( DYY - 91 ); // '46 DAYS SPAN
else if ( DYY < 183 )
    MIN = C + ( D - C ) / 46.0 * ( DYY - 137 ); // '46 DAYS SPAN
else if ( DYY < 229 )
    MIN = D + ( C - D ) / 46.0 * ( DYY - 183 ); // '46 DAYS SPAN
else if ( DYY < 275 )
    MIN = C + ( B - C ) / 46.0 * ( DYY - 229 ); // '46 DAYS SPAN
else if ( DYY >= 275 )
    MIN = B + ( A - B ) / 91.0 * ( DYY - 275 ); // '91 DAYS SPAN

```

Instead of using any fixed degrees to calculate *Fajr* & *Isha* for all seasons, it makes more sense to use a **function of latitude and seasons** which are determined by observations keeping in mind the hardship for higher latitudes.

## 12.0 CONCLUSIONS

Among the *Fuqaha*' there is a consensus that *Fajr al-Mustatir/Imsak* begins at *Subh Sadiq/Fajr Thani*, and *Isha* begins when *Shafaq* disappears. From the discussions presented here it is quite obvious that, *Subh Sadiq* and end of *Shafaq* cannot be tied to the astronomical twilight (18° sun's depression).

1. Observations and instrumental measurements both do not support this claim.
2. Prayer schedules prepared on the basis of 18°/15° create undue hardship and result in a large "exempt" zone for higher latitudes.
3. Islam's universality and 'ease' require a broader interpretation of *Fajr* and *Shafaq*.

The conclusions of the research by Moonsighting.com can be stated as follows:

- From equator to 55°, the 18° depression angle calculations are compared with the values given by the functions of latitude and seasons and most favorable values are used, which means; for *Fajr*, the later of the two and for *Isha* the earlier of the two.
- At latitudes between 55° and 60°, the rule of *Sab'u Lail* (1/7th of the night) is used, because other methods give times that become hardship for those areas. This has been permitted by Hakim ul Ummat Ashraf Ali Thanwi (*Imdadul Fatawa*, vol 2, p98, 12/12/1322 Hijri) and also by Allamah Shami in *Durre Mukhtar*. Mufti Shafi Usmani said: "This statement is presented via assumption, that in those countries where *Subah Sadiq* cannot be clearly distinguished (e.g., Northern Europe in the summer months) it is permissible to act upon this advice". Therefore, two things are calculated for *Fajr*; one is *Tabayyan* (when morning light

in the sky has spread) and the other is last 1/7th of the night. *Fajr* time is later of the two. Similarly, two things are calculated for *Isha*; disappearance of *Shafaq* and first 1/7th of the night. *Isha* time is earlier of the two.

- At latitudes more than 60°, hardship prevails and at latitudes more than 65°, the sun does not set/rise for a number of days every year. All Muslim scholars agree that whenever there is perpetual day or perpetual night for 24 hours or more, the prayer times during the affected days should be approximated. This is because the Messenger (SAW) said: "There will come a time when there will be a day like a year, a day like a month, and a day like a week..." The people asked him (SAW) if during the day like a year; should they offer each prayer only once. He (SAW) replied: "You should approximate the times" [*Sahih Muslim*]. Therefore, for such situations, a suggestion by *Fuqaha'* is to calculate on the basis of "*Aqrabul-Ayyam*" or "*Aqrabul-Bilad*". Some *Fuqaha'* suggest to use Makkah times for all five prayers. Another jurisprudence (*Fatwa*) by *Dar al-Ifta*, stipulated by Sheikh Mohammed Rashid Ridha, citing Sheikh Mohammed Abdou, the former Grand Mufti of Egypt dated 08/08/2010 is as follows:

**Any location where the duration of fasting exceeds 18 hours or is less than 6 hours should refer itself to the times valid for the closest “balanced” location in order to determine the moment of breaking the fast. It is certainly not logical, nor sensible nor reasonable to “jump” from 18 hours to 14 hours and 54 minutes – the longest day in Makkah.**

**An example of such a location is Hammerfest, Norway, probably the northernmost town in the world. The Muslim population of Norway is about 300,000 and that of Hammerfest is around 250. Hammerfest is situated at 70.65° N and 23.68° E.**

**Now take Oslo (latitude = about 60°) and using the rule of *Sab'u Lail*, we calculate the longest day to be 19 hours 38 minutes and the shortest day to be 7 hours and 43 minutes. Of course, we are beyond the 18 hour limit fixed by the Fatwa, but since the inhabitants of Oslo seem to admit to these timings without difficulty, we will retain 60° as the latitude based on "*Aqrabul-Bilad*" concept.**

Therefore, at latitudes more than 60°, first we calculate the interval from sunrise to sunset and being a little conservative assume it to be the day length (which is an interval from *Fajr* to *Maghrib*). If day length is more than 18 hours or less than 6 hours, then we slide down to 60° and calculate *Fajr* & *Isha* using the rule of *Sab'u Lail*. But then we keep whatever values are obtained at this new latitude, even if they are more than 18 hours. This will thus respect both the jurisprudence and the practices of Muslims in cities around 60 degrees latitude.

All knowledge is from *Allah* (SWT). If I wrote the right things, they come from *Him*. If I made a mistake, I seek forgiveness from *Him* and I beg that the readers will forgive me too.

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