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# Calendars and Almanac in Islamic Civilization

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## CALENDARS AND ALMANAC IN ISLAMIC CIVILIZATION

Dr. Salim Ayduz<sup>\*</sup>

*Neither astrologers nor timekeepers know the long midwinter night*

Ask he who is sunk in despond how many hours the nights last.

Islam attaches importance to the structuring of each day, so as to make the best use of time. Daily, weekly and yearly worship is laid out in a specific regular system that enables people to lead their life in a productive way. Daily affairs and work are organised within this framework of times of prayer, defined according to the sun by day, and the moon and its phases by night. Therefore, from early on Muslim scholars began to follow the movements of these heavenly bodies in their endeavour to accurately measure time, and came to play a leading role in the advance of astronomical science.

The concept of time was widely debated by Islamic philosophers, many of whom tackled the question of time and space. *Munajjim*, who were both astrologers and astronomers, sought to understand the abstract concepts relating to time in the course of their astronomical work. From their astronomical observations and calculations, and in particular the task of drawing up calendars, they attempted to make deductions about time itself. Pinning down this controversial dimension in concrete terms had preoccupied human beings everywhere for many centuries. St Augustine remarked on the difficulty of finding a satisfactory answer to the question:

*What then is time? If no one asks me, I know what it is. If I wish to explain it to him who asks, I do not know.*

The modern philosopher Alfred North Whitehead said:

*It is impossible to meditate on Time and the mystery of the creative process of nature without an overwhelming emotion at the limitations of human intelligence.*

For this reason no one can have the last word where explaining time is concerned. Time is one of the great puzzles with which human beings have grappled throughout history, and its enigmatic nature is expressed by the Famous Turkish poet Necip Fazil Kisakurek in one of his poems,:

*What is time, what?*

*A flowing river, a flying bird?*

*What is time, what?*

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*A descent, or an ascent?*

## Calendars

For desert tribes and caravans, which kept their activity to a minimum in the pitiless heat of day, preferring to travel by night, it was natural that the moon should take precedence over the sun. The lunar calendar used by pre-Islamic Arabian tribes continued to be used, with modifications, to regulate social and religious life following the advent of Islam.



*Figure 1. A cover page of an astrological Table and. Topkapi Palace Museum Library, K 1069.*

This calendar was important in defining the times of religious observances that were new to the Arab people. The Islamic religion, whose rituals were based on the lunar calendar, frequently calls the attention of Muslims to the heavens in the Koran, demonstrating the close relationship with astronomy in Muslim culture. This message, combined with the natural inclination of Arab nomads living in vast deserts to use the stars in the dome of sky to guide them on their way, meant that right from the beginning Islamic culture lent new momentum to the study of astronomy, which acquired a special importance.

The primary concerns of astronomers were the preparation of calendars specifying times of prayer, and the accurate determination of direction since worshippers prayed facing Mecca. Muslims were accustomed to the lunar calendar, which they had used prior to Islam, but as they spread rapidly into new regions, they made the acquaintance of other calendars based on the movement of the sun.

Some of these solar calendars were used side by side with the lunar calendar throughout Islamic history for the purpose of regulating agricultural and those administrative activities for which a solar calendar was more convenient. The *Hijri takvim* or lunar calendar based on the Hegira was fundamental to social and

religious life, and that which principally preoccupied Muslim astronomers until the introduction of the Jalâlî calendar devised by Seljuk astronomers, among them Omar Khayyam. The Jalâlî calendar was a very reliable and precise solar calendar that came to be widely used.



**Figure 2.** *Traditional Turkish Calendar (1452). The traditional Turkish calendar was based on a cycle of 12 months, each corresponding to a different animal. This calendar for the year of the monkey by Hamdi Mustafa b. Sunbul was presented to Mehmed II. (Topkapı Palace Museum Library, B 309).*

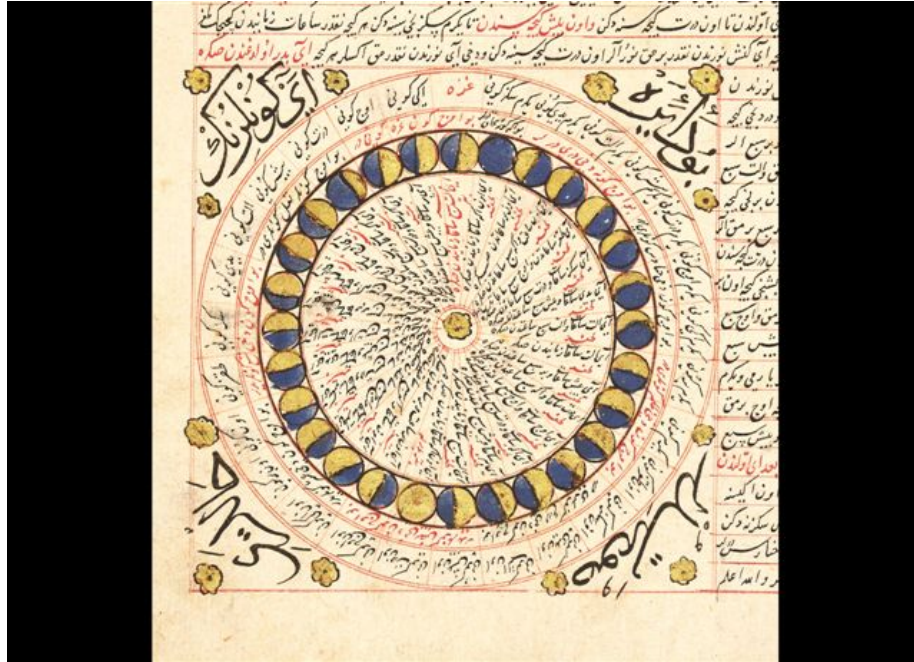
## The Islamic Calendar

The starting year of the *Hijrî takvim* or Islamic lunar calendar is 622 AD, when the Hegira, or emigration of Muhammed and his followers from Mecca to Medina took place. It is based on the revolution of the moon around the earth, and consists of twelve months of 29 or 30 days: Muharrem (30), Safer (29), Rebîulevvel (30), Rebîulâhir (29), Cemâziyelevvel (30), Cemâziyelâhir (29), Receb (30), Saban (29), Ramadan (30), Sawwal (29), Zilkâde (30) and Zilhicce (29, 30). (For an astrological and the Ramadan page of a calendar see Figure 1). The lunar year consists of 354 days, which is 11 days less than the solar year, and every 33 years falls one year behind the Gregorian calendar. The discrepancy with the solar year, which follows the seasons, meant that Muslim countries also used the solar calendar, and some calendars drawn up by astronomers include the dates according to the European Gregorian calendar introduced by Pope Gregory XIII in 1582.

## Rumî Calendar

Ottoman Turkey used both the Islamic lunar calendar, and a solar calendar known as the Rumî or Roman calendar, which was based on the Julian calendar introduced by Julius Caesar in 46 BC. This calendar was inherited from the Byzantines, and used by the Ottomans for the taxation of agricultural revenues. The year

according to the Rumî or Julian calendar began on 1 March, and the Ottomans took the starting year to be that of the Hegira. To make up for the gain of 11 days made by the solar Rumî calendar over the Islamic calendar, a leap year was deducted from the Rumî calendar every 33 years.



**Figure 3.** A detail of an Almanac Cover Page. This calendar by Hamdi Mustafa bin Sunbul was presented to Sultan Mehmed II. Topkapi Palace Museum Library, B 309.

## Rûzname

A *rûzname* is a set of tables giving the first days of the months in both the Islamic and Rumî calendars, the date on which the sun enters each sign of the zodiac, and eclipses of the sun and moon. Also known as *takvîm-i dâimî* (perpetual calendar) or *takvîm-i devr-i dâim* (calendar of perpetual motion), they were permanently valid whatever the year. There is no evidence that such calendars were produced in pre-Ottoman times, and they may therefore be regarded as a type unique to Ottoman Turkey.

The earliest known *rûznâme* is the *Rûznâme-i Seyh Wafâ* dated 1488 by Seyh Vefâ, whose full name was Muslihûddin Mustafa bin Ahmed ibn al-Wafâ al-Sadrî al-Konevî. The first part of the calendar consists of tables and various astronomical diagrams relating to the motion of the heavenly bodies, with some information about astrology. The second part gives the equivalence of the names of the months used by the Ottomans in numerous different languages, and evaluates them from the astrological point of view. Translations of Seyh Vefa's *Rûznâme* in several languages are to be found in libraries.

*Rûznâme* tables were written in different colours of ink, and usually had some decorative gilding. They occasionally include astronomical information. Some were in the form of books of ten to fifteen pages, while others were in the form of scrolls, which made them easier to use. Seyh Vefa's *Rûznâme* (Topkapi Palace Museum Library, Y. 1693) is a scroll.





*Figure 4. A miniature detail of an eclipse from a Turkish Almanac that presented to Mehmed II. Topkapi Palace Museum Library, B 309.*

Another famous *rûznâme* is that written by Mehmed Efendi of Darende in 1739. It was translated into Latin, and of this translation Prince Dimitri Cantemir remarked: 'The Turks are able to calculate the days, hours and even the minutes of each new month with accuracy, by means of what they call a ruz-nameh.'

## OTTOMAN ALMANACS

The methods used for formulating calendars by Ottoman astrologers (*munajjim*), who as explained above combined the role of astrologer and astronomer, had their origins in earlier Islamic states, particularly the Seljuks. Ottoman court astrologers played a particularly important role in calendar and almanac production.

The earliest known Ottoman calendars are dated 848 H/1444 CE (Paris, Bibliothèque Nationale, Manuscrits turcs, no. 180) and 850 H/1446 (Oxford, Bodleian Library, Hunt. donat. 16). Both these calendars are by the same person. These are followed by two-dated 856 H/1452 (Topkapi Palace Museum Library, B.K. 309, For some of this calendar pages see Figure 2, 3, 4, 5) and 858 H/1454 (Nuruosmaniye Library no. 3080).

Subsequently the number of Ottoman astrologers increased, and consequently the number of calendars. From the late 15<sup>th</sup> century onwards, calendars began to be produced regularly, and this continued until the end of the Ottoman Empire.

The office of court astrologer was established towards the end of the 15<sup>th</sup> century. The astrologer, his deputy and five clerks produced almanacs annually for presentation to the sultan and statesmen, and this official institution was important for the study of astronomy in the Ottoman Empire.



*Figure 5. Almanac Page. This page from an almanac by Hamdi Mustafa bin Sunbul presented to Sultan Mehmed II describes the effects of the signs of the zodiac according to the different seasons. Topkapi Palace Museum Library, B 309.*

## Nawrûziyye

The court astrologer presented the almanac for the New Year to the sultan on 21 March, at a ceremony marking the occasion. These imperial almanacs were beautifully produced, being handwritten and ornamented using coloured inks and gilding. The calendar presentation ceremonies at the palace were attended not only by the court astrologer, but by the royal physician, royal surgeon, and royal ophthalmic. The royal physician presented a sweet electuary composed of herbs and spices known as *Nawrûziyye* to the sultan, his ministers and officers of the court at the ceremony, while the sultan rewarded the court astrologer and the royal physician with gifts and sums of money. (For an Almanac page reign of Bayezid see Figure 6).

## Astronomical Tables

Calendars made use of astronomical tables known as *zîc*. Ottoman astronomers and astrologers based their astronomical and astrological calculations on the *zîc* prepared by Ulugh Beg (1394-1449), grandson of Timur (Tamerlane) at his observatory in Samarkand. In time, however, these tables became outdated and some miscalculations were discovered in them, as a result of which new and more accurate astronomical tables drawn up at European observatories began to be used, such as that of Noel Durret (d. after 1648), and after 1800 those of the French astronomer Jack Dominic Cassini (d. 1756). From 1832, when the Cassini tables became inadequate, those of Lalande replaced them, and subsequently from the middle of the century all of these were abandoned in favour of astronomical tables prepared by the French Observatory.

Ottoman calendars were of two different types, one astronomical, known as *rakam takvimi*, and the other astrological, known as *ahkâm takvimi* or 'calendar of predictions.' The *rakam takvimi* showed the months and days of the year, while the other gave the court astrologer's predictions for the New Year, and listed activities that it was appropriate to engage in or avoid.

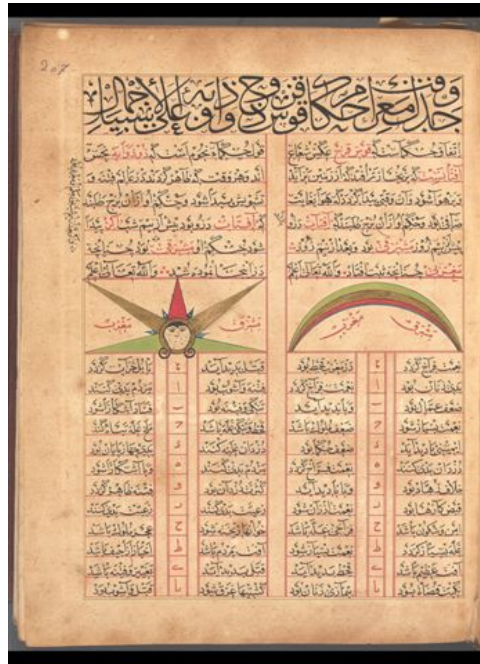


Figure 6. Almanac Page Reign of Bayezid II (1481-1512). Topkapi Palace Museum Library, R 1711.

## Almanacs

Almanacs usually consisted of three main sections: a brief history of the world, a calendar with a page for each of the 12 months, and a page devoted to astronomical and astrological events for the year. These pages included information about the seasons, activities appropriate to be carried out or avoided, pronouncements and predictions for particular days, and tables listing certain important days.

The types of information are given varied over the centuries. Some almanacs, particularly prior to the 17<sup>th</sup> century, began with a brief account of major historical events from the time of Adam up to the present, together with their dates, most of the ancient events being based on a legendary view of the history of the world.

This section was followed by a calendar, together with various astrological information, such as predictions for the year, and interpretations of dreams. Almost all such almanacs also listed auspicious and inauspicious dates for activities concerning government. The third section was devoted to eclipses of the sun and moon. (For the last page of an Almanac that consisting of calendar, horoscope and describing the partial eclipse and horoscope for the year see Figure 7.)



The calendar, called *Nawrûz-i Sultanî* (Royal New Year), which commenced on 21 March, consisted of thirteen pages. This was drawn up in the form of a Jalâlî solar calendar, with a line for each of the 29 or 30 days. The thirteenth page was devoted to the five or six additional days arranged into columns, the first headed *al-Arabî* listing the days of the Islamic calendar, and the second headed *al-Rûmî* giving the equivalent days of the Rumî calendar. In this section there were also columns devoted to astrological and other information, such as predictions, signs, the seasons, events and the signs of the zodiac.



**Figure 7.** Almanac Page. Last page of the almanac consisting of calendar and horoscope produced by court astrologer Chief Astronomer Seyyid Sadullah Mehmed Efendi, and describing the partial eclipse and horoscope for the year. Topkapı Palace Museum Library, R 1712.

With minor modifications and variations, this form continued to be used for Ottoman almanacs over the centuries.

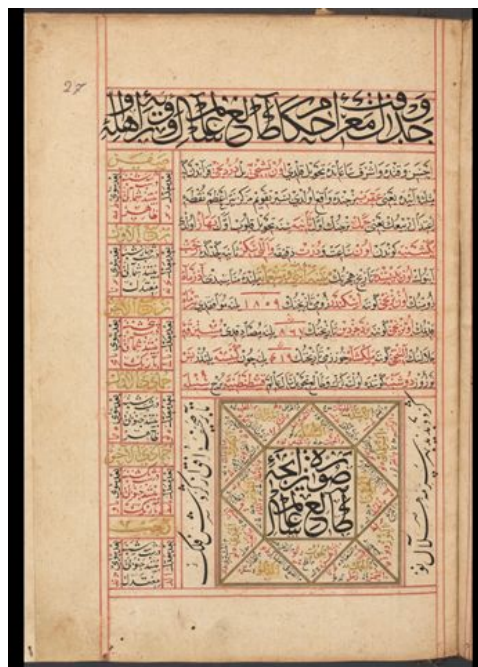
### First section:

This preliminary section of the almanacs could include both historical and astrological subjects. The brief history of the world began with Adam, and went on to list the prophets, caliphs, the Seljuk's, Turkish and Muslim principalities, and the Ottomans in chronological order. This was followed by various astronomical and astrological information, such as celestial events that were to take place on particular days and months, the seasons, dream interpretation, and advice about which foods and beverages should be taken or avoided during particular months and seasons.

This section varied widely in content and length between different almanacs, sometimes being extremely long, sometimes extremely brief, or even missed out entirely.

Sometimes it included a sub-section entitled *Zayıce ve Ahkâm* (Horoscopes and Predictions), in which astrological predictions were given for the year ahead, with the most auspicious times for engaging in particular activities, and the position of the stars on these days specified. (For a horoscope page according to the traditional Turkish calendar see Figure 8). Predictions and signs relating to the sultan, ministers and statesmen, sacred days and nights, the first days of each month in the lunar calendar, the position of the stars and planets on particular days, and meteorological events for each season were given under the heading *Mevâsim* (Seasons), or *Mevâsim ve Ahvâl-i Kevâkib* (Seasons and Astral Events).

Finally this section gave the years according to the ancient Turkish calendar based, like the Chinese, on a cycle of twelve years corresponding to different animals. This calendar was known as *Tarih-i Turkî* or *Sâl-i Turkân*.



*Figure 8. Almanac Page Reign of Bayezid II (1481-1512). Tables giving horoscopes according to the traditional Turkish calendar. Topkapi Palace Museum Library, R 1711.*

## Second section:

This consisted of the calendar proper in twelve or thirteen pages of tables giving both the Islamic lunar (*Hijrî*) and solar (*Rumî*) days in comparative form for each month. Further columns explain tasks that should be carried out or avoided, and similar information. On the page showing the twelve months are predictions for the year, positions of the twelve signs of the zodiac, and the positions of the planets and which sign they will be in.

Next to the columns listing the days, are other columns containing further astrological information, under such headings as *Ihtiyârât*, *Delâlat*, *Tevkiât*, *Cum'uat*, and *Mevâki'-i Burûc*.

*Ihtiyarât*: This column explains which tasks should or should not be carried out on that particular day, and indicates days when important ventures should be avoided with the word *mahzurât* (inauspicious), and those appropriate for such ventures *mubarektir* (it is auspicious), or phrases to similar effect.

Lunar and solar eclipses are also given in this column.

*Delâlât*: This section specifies the activities of the sultan, statesmen and other high-ranking functionaries for which each month is auspicious or inauspicious. It also includes advice and warnings concerning daily life. Where a particular admonition refers to a certain day or period, this is specified in the opening sentence. For example, 'This refers to the sixteenth day of the holy Seval until the sixteenth of Zilkade.' Then follow the words *Allahu 'alem* (God the Omniscient), a reminder that only God can know all, as a precaution against the predictions of the *munajjim* turning out to be mistaken. This was repeated at the end of the column, with the addition of the words 'and his Prophet.'

*Tevkiât*: In this column various information is given, such as the dates of religious festivals and other important days, meteorological information, the names of the months, and the daily positions of some of the planets.

*Cum'ûât*: Also called *el-usbu* in some almanacs, this column contains the names of the days of the week, which are always in Persian whatever the language of the rest of the almanac.

*Mevâki-i burûc*: This column specifies which constellation of the zodiac the moon will be in during a particular month. The signs of the zodiac were always given in Arabic as follows: Kavs (Sagittarius), Cedi (Capricorn), Deliv (Aquarius), Hût (Pisces), Hamel (Aries), Sevr (Taurus), Cevza (Gemini), Seratan (Cancer), Esed (Leo), Sunbule (Virgo), Mizan (Libra), Akreb (Scorpio).

Some almanacs give the times of the five daily prayers, and other times relating to religious worship. The times of prayer are specified to the minute for each day, since these vary as the length of daylight changes throughout the year. Other times given include *istibâk-i nucum* (the moment when the stars first appear), the *isâ-i sani* (bedtime prayer), *imsak* (the hour at which the fast begins each morning during Ramazan), *tulu'-u afîtab* (sunrise), *vakt-i israk* (rising of the moon), *dahve-i kubra* (noon) and the phases of the moon. Some astrologers drew up calendars confined specifically to the times of prayer (such as that for the year 1241 H in Topkapi Palace Museum Library, E. 6536/3).

### Third section:

The final section was devoted to astronomical information, such as lunar or solar eclipses, with the times and other details of each, together with astrological interpretations.

### Marginal notes

Diverse notes added to almanacs are of great interest. These include notes made by the authors themselves, which are sometimes of considerable historical importance, throwing light on recent events of the time. However, the notes, which are of most significance, are those made by owners who used the calendars as diaries for jotting down events that they personally regarded as important or interesting. Among these we can discover many fascinating details, ranging from such mundane private matters as

when their hens laid eggs, to major historic and natural occurrences. Most such notes specify the date, and sometimes even the precise time, at which they happened. Among them are references to political events, social and cultural subjects, and details of the force of earthquakes, which occurred.

Fires, eclipses, rain, snow and hail, storms, rainbows, comets, and the launching of ships are among the most common facts noted in this way. Additionally we find observations on the subject of dismissal of statesmen from their posts, exiles, uprisings, riots, declarations of war and peace and other important political events. Family events recorded include marriages, circumcisions, deaths, and births.

A selection of such notes from almanacs of various dates in the library at Kandilli Observatory in Istanbul is given below:

'Today in the mid-afternoon we were invited to the Porte for consulting.'

'A great fire in Sultan Bayezid district.'

'His majesty Sultan Abdulmecid boarded ship for a sea voyage. Then a storm broke out in the Black Sea, and in fear he commanded that they return. Later, on Wednesday at 32 minutes past the hour of two, he ordered the departure by land in the direction of Rumeli.'

### **Almanac 234.**

'Fire broke out in the Imperial Harem at Besiktas district, and the hearts of the faithful burned with grief at the death of Emine Sultan, the young daughter of the Sultan.'

'A great and violent earthquake.'

### **Almanac 39**

'A violent earthquake occurred at nightfall. The town of Hafsa was entirely destroyed, and there was partial destruction in Edirne.'

### **Almanac 48**

'Sadullah Efendi, Director of the Powder Factory, passed away.'

'A full eclipse began at eight o'clock, and lasted for 23 minutes.'

27 Zilkade 1145 H/1732

'The High Admiral sailed for the Mediterranean with a few galleys and a couple of galleons that were in Istanbul.'

### **Safer 1146 H/1733**

'Resident of the madrasa, Mulla Osman, was given permission to visit his family in the city of Bartin, on the condition he returned within four months.'



'We met with Seyh Muhammed Niyaz, who is in the retinue of the Uzbek ambassador, at the home of Veliyudden Efendi.'

'High Admiral Canim Hoca arrived from the Black Sea. From the waterfront pavilion we attended him, and then they confined us in Kutahya. In order to exchange he went through Laz Ali Gate.'

'Seyhulislam Ataulah Efendi was dismissed and Arabzade Arif Efendi appointed on Thursday 27 Ce. of the year 23.'

### Almanac 30

'A great earthquake occurred in the land of Azerbaijan, destroying the buildings, and governor Suleyman Pasa and most of his servants were buried beneath the rubble of the palace.'

'I extracted my tooth, which had no root, without difficulty.'

'A light earthquake took place. They say it was violent in the province of Bursa, extremely violent around Amasya, and entirely destroyed the town of Corum, where half the inhabitants were killed.'

Drawing up calendars and almanacs was one of the foremost duties of astrologers and horologers in Ottoman times, as it had been in Turkish and Islamic states of earlier centuries. Calendars were a source of information about the times that regulated the lives of every one of all classes. Almanacs, which were presented to the sultans and state functionaries, were decorative as well as functional, and the astrologers were rewarded generously for them each year. Most of those produced by the court astrologers have survived, and are valuable documents that provide a wealth of diverse information, particularly about astronomy and astrology, but also social and other aspects of their period.

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