



*In the Name of Allah, the Beneficent, the Merciful  
With Prayers and Peace upon the Prophet Muḥammad, His Family and Companions*

## **CESAREAN MOON BIRTHS<sup>1</sup>**

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### **Part I**

#### **Introduction**

In the name of God, the Beneficent, the Merciful. Prayers and blessings be upon the best of creation, our master Muḥammad, and upon his family and companions, and all who follow in their footsteps. Glory to the One who made the stars as guides for humanity, and placed the sun and moon in exact courses to provide a means to measure time and learn calculation.

The Qur'an is the last prophetic dispensation revealed by God for humanity. Its guidance will remain until the Last Day, and no other infallible guidance will be given to the world until the return of the blessed prophet of God, Jesus, the Christ, who will affirm the Qur'an and elucidate its meanings conclusively for the community of our beloved Prophet ﷺ.

This paper addresses the current debate over determining the beginning of the lunar month by moon sighting with the physical eye or by using mathematical calculation. It will attempt to explain the reasons for the debate, the positions taken in the past, and my own personal conclusions about the matter. Due to the complex nature of the argument, it assumes some level of knowledge of traditional juristic reasoning, but some terms will be explained in order to facilitate an understanding for the average Muslim. The astronomical information will be accessible to the lay reader. I would also like to state at the outset that the members of the Fiqh Council of North America are personal friends and dear brothers of mine. Nothing in this paper is personal, as my love and respect for them is not negotiable. Note: all emphasis throughout the text is my own.

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<sup>1</sup> This paper is entitled "Cesarean Moon Births" for two reasons. Like a cesarean birth, the early announcements of the lunar months that have historically accompanied a calculated new moon are primarily the result of conforming to the scheduling requirements of modern bureaucratic societies. Also, it was the edict of Caesar that was instrumental in forcing the Jews to abandon their lunar calendar based on actual sighting and resorting to one based on calculations.

## Axioms

There are four agreed upon sources of legislation:

1) The Qur'an, first and foremost, 2) the Sunnah, which comprises the words, deeds, and acknowledgments of the Prophet Muḥammad ﷺ, as transmitted through reliable sources, 3) the consensus of the Muslim scholars (*ijmā'*), and, finally, 4) analogical reasoning (*qiyās*) that is used as a last resort in the absence of definitive proofs. However, of these four, the two sources agreed upon for use as single sources are the Book of God and the Sunnah of the Prophet ﷺ. The Prophet ﷺ stated, "I have left you two things; as long as you hold to them, you will never stray: the Book of God and my Sunnah."

In another hadith, the Prophet ﷺ said to Mu'adh before sending him to Yemen to act as a judge, "What will you base your judgments on?"

Mu'adh replied, "The Book of God."

The Prophet ﷺ then asked, "And should it not be in the Book of God?"

"Then the Sunnah of the Prophet," replied Mu'adh.

"And should you not find it in the Sunnah?" asked the Prophet ﷺ.

"Then I will exert my efforts completely and not falter."

To this, the Prophet ﷺ responded, "Praise is due to God, who has given the messenger of the Messenger of God success."

This hadith elucidates the methodology to be followed by any scholar attempting to understand an issue involving a legal ruling in the sacred law of Islam: first, the scholar looks to the Qur'an, then to the Sunnah, and then to the consensus of the previous scholars, and then, finally, he resorts to independent reasoning (*ijtihād*). However, *ijtihād* is permissible only when there is no decisive and unequivocal text (*naṣṣ*) found in the Qur'an or the Sunnah; this is based upon the juristic principle, "There can be no *ijtihād* in light of an explicit text."

Another important axiom is that both the Qur'an and the Sunnah were revealed in Arabic, and any interpretation must be in accordance with the accepted linguistic meaning of those texts that correspond with their use during the period of revelation, between 610 and 632 CE. It is proscribed to interpret the Qur'an in the Arabic of any other period. One may refer to authentic pre-Islamic poetry to determine the meanings of words because linguistic usages of that period were accepted at the time of the Qur'anic revelation. An immense amount of human effort has been exerted in order to preserve the meanings of the Arabic language of the Prophet's time, and no other religious community on earth has the level of certainty about their sacred scriptures' historical authenticity and lexical signification that Muslims have, due first to God's promise of scriptural preservation, and then to efforts of those scholars who codified the Qur'an and preserved the Arabic language in the voluminous lexicons of the first centuries of Islam.

## The Problem

The Islamic calendar is lunar. Lunar calendars follow the phases of the moon, beginning with the crescent moon and ending with the conjunction of the moon and the sun in their respective perceived movements around the earth. The time of one lunation or complete cycle of the moon in a lunar month is approximately 29.5 days. This must be averaged because the moon does not travel at a constant speed nor does it travel in a

perfect circle but in an elliptical orbit around the earth. The moon's monthly cycle around the earth varies between 29.2 days and 29.8 days, which means that throughout the year there will be approximately six months in which there are twenty-nine days, and six months in which there are thirty days. The total number of days in a lunar year is approximately 354, which is eleven days shorter than the average solar year. This results in the lunar year progressing through the fixed solar year rather than beginning and ending at the same time as the solar. In order to make the lunar years consistent with the solar, many pre-Islamic societies intercalated or added days to the lunar months. This enabled them to follow a lunar calendar without having it depart from the fixed seasons of the solar calendar. This was and remains the practice of the Jewish community, which intercalates a thirteenth month every three years in order to align the lunar calendar with the solar. Interestingly, however, the Jews originally practiced a purely lunar calendar and introduced intercalation later. The pre-Islamic Arabs used a lunar calendar but both calculated and intercalated their calendars when suitable for their needs. Their general practice however was to rely on a physical sighting of the crescent.

The Islamic lunar calendar is not to be tampered with, as the Prophet ﷺ prohibited intercalation in his farewell address to his community during the final pilgrimage. Islam condemns intercalation, regarding it as a rejection of the natural order inherent in the perfection of the lunar calendar that God has provided humanity for measuring their time. For this reason, in a number of hadith that achieve the status of infallible (*mutawātir*) and thus on par with the legislative authority of any verse in the Qur'an, the Prophet ﷺ commanded Muslims to base their month on the physical sighting of the new moon and stipulated that if not seen on the twenty-ninth completed day of the previous month on a clear evening, or if clouds or other atmospheric barriers hindered visibility, then to complete thirty days of the previous month and begin the new month the following sunset, which would mean on the thirty-first day following the previous sighting or a calculation of thirty days.

The modern world, however, is one in which exact times are far more important than they were in the pre-modern world due to many factors, such as precise mechanical clocks, trains, planes, and deadlines. For this reason, Saudi Arabian officials, who have implemented use of the lunar calendar for all governmental activities, decided at a certain point to rely on calculation as a basis for their calendar in order to ensure that people are using the same dates and that the dates can be predetermined to facilitate scheduling and other time concerns of a modern society. The criterion they use for calculation is the conjunction of an astronomical new moon occurring before sunset of the first day of their lunar calendar. Although convenient, this system can be as much as two days off of an actual new crescent sighting. Errors, due to this fact, have occurred in the past.

Muslims in North America do not use a lunar calendar for other than devotional purposes and have, in the past, had recourse to various methods of determining the lunar months. Of late, some leaders within the Muslim community have decided that it would be much better for Muslims to rely on calculation in order to facilitate the start dates for people's scheduling concerns as well as the Eid dates for holidays with the hope that this will help the community gain recognition from the government for Muslim holidays, which would obviously need to be known in the previous year when calendars are prepared. Some financial concerns are also mentioned. And finally, the importance of Muslim unity is cited as a reason for relying on calculation to predetermine the lunar

calendar, given that the community seems split on the subject every year; and this, while not known to have caused any physical altercations in our mosques and communities, nonetheless engenders some bad feeling and conflicts not to mention confusion among community members. In order to address these very real concerns, the Islamic Society of North America (ISNA), working with its Fiqh Council and some highly qualified mathematicians and astronomers, has decided that Muslims in North America should follow lunar months determined by calculation. They argue that astronomical science is highly developed and visibility charts can be generated to high degrees of precision; it is not against the Sunnah, as some scholars of the earliest period have accepted calculations as well as others of the later period; and many modern scholars are inclining toward this position in larger numbers.

In response to this announcement, some of the imams of North America announced their rejection of ISNA's decision and provided different papers substantiating their position from the perspective of sacred law. This has caused a rift in some of our communities and is certainly a problem that must be addressed with care, compassion, and a desire to rectify our communities and edify each other in a civilized discourse that aims at the truth and not any obstinate adherence to one position or the other.

In reality, there are several positions on moon sighting. The most prominent ones include local sighting, sighting anywhere in North America, a physical sighting anywhere globally, calculated sighting, and following Saudi Arabia specifically (as the hajj is there, and some assert that since anyone wishing to make the pilgrimage must follow Saudi Arabia for the hajj determination, it logically follows to include Ramadan as well, especially since Saudi Arabia is the only country in the world that still uses a lunar calendar for its day to day scheduling). Another popular position is following family members who reside in Muslim countries, as the option of simply calling mom, dad, grandma, or grandpa overseas and going along with the dates of their calendar in Damascus, Cairo, Karachi, or elsewhere is emotionally comforting for some, especially when congratulating them at the beginning of the month and celebrating the Eid, irrespective of the fact that they have to call to wish "*Eid mubāarak*" to family back home when they themselves are just getting up to finish the last day of fasting since the family "back home" resides in a time zone that is several hours ahead of the immigrant family. The essential problem, therefore, is that there are indeed various ways that it is possible to start Ramadan in North America and each group puts forward their reasoning for their preferred method. Who then should we follow?

### **The Qur'an and the Moon**

The Qur'an declares that the months with God are twelve lunar months. "Surely the months with God are twelve in the book of God since the day He created the heavens and the earth; four of them are sacred" (9:36). Imam 'Abd Allāh b. Aḥmad al-Nasafī, the noted theologian and exegete, explains the meaning of this verse: "This verse is to clarify that the legal rulings in shariah are to be determined by lunar months that are calculated by the crescent moons irrespective of the solar calendar."<sup>2</sup> Thus, the Qur'an commands Muslims to use the lunar month for their devotional matters, but not necessarily their worldly affairs. Qadi Abū Bakr b. al-ʿArabī explains this, commenting on the verse, "They

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<sup>2</sup> al-Nasafī, *Tafsīr al-Nasafī* (Beirut: Dār al-Nafā'is, 1996), 1,2:181.

ask you about the crescent moons; say they are a means to measure your specific times (*mawāqīt*) and are also for the commencement of the hajj” (2:189):

The wisdom in this is that God has made the sun and moon two of His signs, and it is related in some sources that He assigned to each an angel and decreed for them two points of rising. He moves them between the two [throughout the year] for two benefits: one worldly, which is the solar calendar, and the other religious, which is based upon the lunar.<sup>3</sup>

Since two major obligatory acts of devotion and many minor recommended ones have designated times throughout the year, the lunar months have been given to specify those times. The actual word used for “specific times” is *mawāqīt*, and is derived from the Arabic word *waqt*, which means “time.” The difference between the word *waqt* and the other Arabic word for time, *zamān*, is that “*zamān* is absolute time and [refers to] the movements of the celestial orbs that indicate it from their starting point to their finishing point. So *zamān* is the division of time into past, present, and future, whereas *waqt* is *zamān* when it specifies a point that is for some specific affair.”<sup>4</sup> Thus, the crescent moons were designated for determining specific times within the flow of time. An intriguing aspect of the verse mentioned above is that it was revealed in response to those who asked the Prophet ﷺ about the crescents, and they were seeking to understand the actual mechanism, that is, the *science* of the crescent. They wanted to know how the moon did what it was doing. However, the Qur’anic response enlightened them that more important than their question of how, is why. This is the essential difference between science and religion, and is summed up in this one momentous verse of the Qur’an. The verse immediately following their question and God’s reply is, “Do not enter houses through their back doors.” Some commentators understood that to mean, “Ask the right question: why, not how.”

Our word in English for month is derived from moon. In fact, the earliest human calendars are lunar, and it was through lunar calendars and the human need to determine time’s progression, especially the passage of the year itself, that led to the development of mathematics. This purpose is clearly stated in the verse, “It is God who made the sun shine and the moon glow, and determined the lunar phases that you may know the number of years and calculation” (10:5). According to Ibn ‘Abbās and others, “That you may know the number of years and calculation (*ḥisāb*),” was interpreted to mean that the mansions (*manāzil*) of the moon provided man’s ability to calculate which phase of the month he was in, thus enabling him to measure his days, given that there are twenty-eight phases of the month determined by the lunar mansions and on the twenty-ninth the moon disappears for a day or two only to re-emerge as a newborn crescent. However, it also implies that the challenge of measuring time gave man an impetus to learn and develop mathematics (*ḥisāb*) and by extension science. Hence, the sun and the moon following clear courses enabled humanity to follow them and through doing so increase our knowledge of science.

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<sup>3</sup> Abū Bakr b. al-‘Arabī, *Aḥkām al-Qur’an* (Beirut: Dār al-Kutub al-‘Ilmiyyah, 1988), 1:140.

<sup>4</sup> Abū Sa‘ūd, *Irshād al-‘aql al-salīm ilā mazāyā al-Qur’ān al-karīm* (Beirut: Dār Iḥyā’ al-Turāth al-‘Arabī, 1994), 203.

“A case can be made that science itself was first sparked by a human compulsion to comprehend the passing of time, to wrestle down the forward motion of life and impose on it some sense of order.”<sup>5</sup> The Muslim contribution to mathematics is immense and is due largely to Muslim scientists attempting to forecast the appearance of new moons, find the precise qiblah, and determine inheritance portions accurately. Muslims further developed Greek plane trigonometry as well as spherical trigonometry; interestingly, they placed spherical trigonometry as a separate science from plane trigonometry, as they used it to solve astronomical and geographical problems. This enabled them to make highly sophisticated astronomical predictions that resulted in a greater and more accurate reckoning than previous civilizations, which nonetheless, had highly complex systems of measuring time and the movements of celestial phenomena. To conclude this section, a consensus exists among all Muslims that the basis of our religious calendar is lunar, it is determined by the crescent moons in compliance with the verse, and that intercalation to maintain consistent years is prohibited.

### **Calendars in Pre-Islamic Arabia**

The calendar used by pre-Islamic Arabs was an intercalated lunar calendar, which enabled them to synchronize with certain solar festivals as well as manipulate the beginning and end of the sacred months for fighting purposes. In an earlier period, the Arab calendar was intercalated lunisolar, which is why some of the names of the lunar months reflect the seasons to which they corresponded. However, at the advent of the Prophet’s message, the sacred months, which were initially from the Abrahamic teaching, had lost their specific assignment within revelation’s specified time as a result of the intercalation the Arabs imposed on the months. For this reason, in his farewell address, the Prophet ﷺ prohibited the insertion of days into the lunar calendar.

In his intriguing book of seasons and sky signs, the seventh-century Islamic astronomer and scholar, Abū Ishāq al-Ajdābī, notes that astronomers tended to determine the Arab months based upon the estimated time of separation after the conjunction of the sun and moon (*mufāraqah*). He states that the first month was Muḥarram, to which the astronomers assigned a duration of thirty days, and the next month, Ṣafar, had twenty-nine; they continued to alternate in that order through the remaining ten months, with the last month, Dhū al-Ḥijjah, having twenty-nine days. Every leap year, a thirtieth day was added to Dhū al-Ḥijjah in order to make up for the fraction of a day, which is approximately three-tenths of a day per month. Abū Ishāq al-Ajdābī continues:

This is what astronomers have noted with respect to computing the periods of the Arabian months. This is based on the method of calculating the point of separation after conjunction (*ḥisāb al-mufāraqah*).<sup>6</sup> However, the

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<sup>5</sup> David Duncan, *The Calendar* (London: Fourth Estate, 1999), xvii.

<sup>6</sup> This point must be underscored. It is clear proof that the pre-Islamic Arabs understood conjunction and elongation (*mufāraqah*). According to a hadith, the Prophet ﷺ states, “The month is twenty-nine days, so do not fast until you see the moon, and do not break it [your fast] until you see the moon.” This hadith is miraculous because the month is never greater than 29.8 days. Separation will always occur somewhere on the twenty-ninth day of the lunation, but it will not be seen until the thirtieth, if the hours remaining in the day are not enough to allow the crescent to emerge from the twilight on

Arabs did not adopt this method. They always depended in their civil life on the crescent moons. Whenever they sighted a new moon, with it, they placed the commencement of the month. They commenced the month from the first night in which the new moon had appeared. They called this night the “the month’s forelock” (*ghurrah al-shahr*), on account of the new moon appearing in the beginning like a *ghurrah*, which is a blaze or white spot on the horse’s face. According to the Arabs, the month does not come to an end till the new moon is visible a second time, and from then on, they place the commencement of a second month.... When Islam arrived, it affirmed this practice.<sup>7</sup>

The every-other-month method is primitive and was rejected as unscientific by the polymath and astronomer, Abū al-Rayḥān al-Bayrūnī, who both refuted and mocked it. It was, nonetheless, an easy way to determine the months and is also a self-correcting system. The pre-Islamic Arabs, who were aware of the lunation or synodic month, did not implement it as the basis for their calendars; rather, unlike the later Jewish practice of calculation, the pre-Islamic Arabs chose to sight the crescent moon. While modernists might look askance at these early calendars, the truth is that observational astronomy, for all intents and purposes, has advanced little in the last few thousand years. In fact, more than two thousand years ago, Hipparchus of Nicaea (d. 125 BC) determined the length of the average lunar month to be within one second of today’s accepted value and gave accurate calculations of the inclination of the ecliptic and of the changes of the equinoxes.<sup>8</sup> Moreover, many ancient cultures accurately predicted the conjunction of the sun and moon in the ecliptic nodes, which enabled them to accurately foretell eclipses. What many people today do not understand is that to create a calendar, whether lunar, solar, or

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the thirtieth night then it will be seen definitely on the thirty-first night after the onset of the previous month unless it had been miscalculated, which can occur but will be self-correcting. This point is completely ignored in the arguments for calculation. In fact, some scholars considered the fact that the Prophet ﷺ said the month is twenty-nine days to be problematic, as it is either twenty-nine or thirty, which is how he described the month with his blessed fingers in the other well-known hadith. But the former hadith is also clear and is in congruence with modern science, as it is now known that lunation will never occur in more than 29.8 days, which is less than thirty days, just as the Prophet ﷺ stated! Moreover, the Caliph ‘Umar told people not to concern themselves with the relative size of the new moon. He informed them that some months it will be larger than others, which is consistent with modern knowledge due to the number of hours that have transpired after conjunction. In a sound hadith in the chapter on fasting in Imam Muslim’s collection, Ibn ‘Abbas told people that the Prophet informed him that the reason God gave two days for the moon to be born was to insure that His servants actually saw it! Which is clear proof that sighting is an *‘illah*, or legal rationale as the particle of reason (*lam al-ta‘līl*) is used in the hadith.

<sup>7</sup> Ibn al-Ajdābī, *The Book of Seasonal Periods and Sky Signs* (Islamabad: Pakistan Hijra Council, 1989), 34–35 (from the Arabic side); 24–25 from the English. (Note: I altered the existing translation slightly for accuracy.)

<sup>8</sup> Jan Gullberg, *Mathematics from the Birth of Numbers* (New York: W.W. Norton and Company, 1997), 462.

lunisolar, requires a thorough knowledge of the motions of the stars and many cumulative, learned adjustments. The noted present-day scientist, Stephen Jay Gould, in conversation with Umberto Eco, had this to say:

Why have calendars at all? In order to predict the regular patterns of nature. In an agricultural society you need a solar calendar to know when best to sow your crops. In a society that lives by fishing you need a lunar calendar to know the tides. *Yet it is impossible to establish a simple arithmetical relationship between the two that would bring them into harmony.*<sup>9</sup>

Thus, the Arabs, who used calculating, sighting and intercalation with their calendar, required a level of computation that had some relative complexity, and the ability to do so existed among those pre-Islamic individuals who were directly responsible for keeping time, which, as Gould points out, is a function of any organized society. Indeed, “The calendar is thus a synthesis that draws on scientific knowledge, religious belief, and political will. It reveals the way that power, religion and science interact.”<sup>10</sup>

### **The Jewish Calendar and its Relevance to the Issue at Hand**

The Jewish community is the most similar to the Muslim community in both theology and devotional practice, as indicated by the sound hadith, “You are most like the Children of Israel.” It is, therefore, not surprising that the Jews also follow a lunar calendar for their religious holidays, which was originally a uniquely lunar calendar, as indicated by the Hebrew word, *ḥodesh*, which means “month, or new moon.” At a certain point, in their religious history, however, they began to intercalate in order to align the transitional lunar year with the stationary solar year. Each month is still based upon a lunation or synodic month, in which the Jews add a given amount of days a year, and an extra month every few years in order to maintain the lunisolar congruence. How, then, did the Jews originally determine their lunar month? They did so by eyewitnesses who sighted the new moon and conveyed the information to the Sanhedrin, according to the *Catholic Encyclopedia*, which explains further:

The Hebrew months have always been lunar, and extended from one new moon to another. The beginning of the month with the appearance of the new moon was—as it is still—of great practical importance among the Hebrews, inasmuch as the first of every month was to be observed as New Moon’s Day, and certain feasts were affixed to the 10<sup>th</sup>, 14<sup>th</sup>, or other days of the month. The earliest appearance of the new moon was long ascertained by direct observation, and authoritatively settled by a commission of the Sanhedrin, and the intelligence then made known to the Jews at large, first by means of fire-signals, and later on through special messengers. In the present day, and for many centuries, this very primitive manner of fixing the beginning of the month has given way to a systematic calculation of the latter’s duration, and the Jewish calendar is now

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<sup>9</sup> Jacqueline de Bourgoing, *The Calendar, History Lore and Legend* (n.p.: Discoveries Harry N. Abrams Publisher, n.d.). (Note: emphasis mine.)

<sup>10</sup> *Ibid.*, 36.



constructed on the basis of a mean lunation of 29 days, 12 hours, 44 minutes, and 3.5 seconds.<sup>11</sup>

For more than a thousand years, Jews followed a calendar based upon naked-eye observation of new moons. However, during the reign of the Roman Emperor Constantius (337-361 CE), persecution of the colonized Jews intensified, preventing them from communicating news of a sighted moon to one another. It was Rabbi Hillel II who first introduced to Judaism a new moon based upon calculation and not actual physical sighting, in order to facilitate the observance of holidays for the oppressed Jews. The calendar was introduced in 358. “Its computations were designed to simulate the practical constraints of the observed calendar (including postponements and intercalations) as closely as possible,” according to the Active Bible Church of God,<sup>12</sup> which continues:

*Suggestions have been made that the computations should be changed, or that observation should again be used. It is clear that adjustments need to be made to the computed calendar in order to keep it synchronized with the sun and moon. But there is no consensus as to how this should be done, and, in the modern world, this needs to be done years in advance. Returning to observation is idyllic, but totally impractical. The modern world requires plans for religious observances to be made months, or even years, in advance. Only a computed calendar permits this. It is clear that just as “the Sabbath was made for man,” so also “the Calendar was made for man.” It is a tool to help us worship God. And an essential feature of a tool is that it must be useful and practical.*<sup>13</sup>

One can see from this the compromises the rabbis made in the Jewish community. Arguably, the Jews’ initial abandonment of eyewitness sighting was due to undue hardship at a specific period in their history, and the result of one of their great rabbis’ own human efforts to serve his community. Having said that, according to the principles of Islamic law, when the hardship that allowed the facilitating dispensation (*rukhsah*) in the first place is no longer present, the license is no longer valid, and the original ruling must be restored. The Jews never returned to their original tradition of following a purely lunar calendar determined by eyewitnesses; instead, they continue to determine the new moon calculation. Our Prophet ﷺ clearly warned us not to follow the Jews and the Christians in their abandonment of their own prophetic practices, and to be especially vigilant about this. Lamentably, he also informed us that many Muslims would not heed this advice and would follow their errors anyway. Predetermining our lunar months through calculation is a fulfillment of his prediction:

The Prophet ﷺ said, “You will follow the [erroneous] ways of those before you hand span by hand span, arm’s breadth-by-arm’s breadth, to such a degree that if they went down a lizard’s hole, you would also go down the hole.”

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<sup>11</sup> *The Catholic Encyclopedia: An International Work of Reference on the Constitution, Doctrine, Discipline, and History of the Catholic Church*, ed. Charles G. Herbermann (New York: Robert Appleton Company, 1908), 3:166-7.

<sup>12</sup> <http://www.abcog.org/faqcal2.htm>.

<sup>13</sup> Nathan Bushwick, *Understanding the Jewish Calendar* (New York: Moznaim Pub. Corp., 1989), <http://www.abcog.org/calcomp.htm>. (Note: emphasis mine.)

His companions exclaimed in response, “The Jews and the Christians, O Messenger of God?”

“If not them, then who?” he replied.<sup>14</sup>

Going from sighting to calculation is like following the Jewish abandonment of their original tradition of having to actually sight the crescent moon with naked-eye observers. The Prophet ﷺ also said, according to a sound hadith narrated by Imam al-Tirmidhī, “What happened to the Children of Israel will also happen to my community, step-by-step...”<sup>15</sup> No disrespect is intended toward the Jewish or Christian communities, but this matter of strict adherence to our respective prophetic practices is a crucial point of divergence in our three Abrahamic traditions. The Prophet ﷺ saw himself as a restorer of the true Abrahamic practices that had fallen into dereliction among the Jews and Christians of his time. Among these practices is following a purely lunar calendar for devotional purposes and the determination of its months by the physical appearance and sighting of the moon.

### **Calendars after the Advent of Islam**

All of the acts of ritualized worship incumbent upon Muslims are related to time, and thus the measurement and the detailing of time’s passage is a religious duty. According to ‘Abd al-Ḥayy al-Kattānī, maintaining time is a religious position for which the Prophet ﷺ himself appointed certain people in Medina to hold. Islamic law considers sacred timekeeping (*tawqīt*) a communal obligation, so once someone in a community fulfills this duty, the rest of the community is relieved of it.<sup>16</sup> Not only is it an act of worship to monitor the sun and the moon’s courses for prayer times and for the other acts of worship contingent upon certain months, but, according to the Prophet ﷺ, it is one of the most pleasing and beloved acts to God. The Prophet ﷺ, said, “The most beloved of God’s servants to God are those who monitor the sun and moon, engendering love of God in God’s servants and love of God’s servants in God.” And in a sound narration related by al-Ḥākim, the Prophet ﷺ said, “The best of God’s servants are those who watch the sun, moon, stars, and shadows in order to remember God.”<sup>17</sup>

The Prophet ﷺ commanded the Muslims to keep track of the crescent moons and to inform him when sighted. If a new moon was sighted for the devotional months of Ramadan or Dhū al-Ḥijjah (the month in which hajj is performed), the news was

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<sup>14</sup> Abū ‘Abd Allāh Muḥammad b. Ismā‘īl al-Bukhārī, *Ṣaḥīḥ al-Bukhārī* (Beirut: al-Maktabah al-‘Aṣriyyah, 2005), 612, no. 3456.

<sup>15</sup> Muḥammad Ḥabīb Allāh al-Jakanī, *Zād al-Muslim fī mā ittafaq ‘alayh al-Bukhārī wa Muslim* (Beirut: Dār al-Fikr, 1981), 1:382–4. (Note: The first hadith is agreed upon by al-Bukhārī and Muslim.)

<sup>16</sup> ‘Abd al-Ḥayy al-Kattānī, *Tarātīb al-idāriyyah* (Beirut: Dār al-Kitāb al-‘Arabi, n.d.), 1:77–81.

<sup>17</sup> Abū Bakr al-Khaṭīb al-Baghdādī, *Risālah fī ‘ilm al-nujūm* (Beirut: Dār al-Kutub al-‘Ilmiyyah, 2004), 22–24. (Note: The first hadith has a break in the chain and is considered *mursal* but is strengthened by other similar narrations according to the scholars. The second hadith is sound according to al-Ḥākim and al-Dhahabī. Both hadith refer to the muezzins who traditionally were timekeepers also. The Prophet’s muezzins used to monitor the night stars to see how near dawn was.

announced to all. According to Imam al-Tirmidhī, upon seeing the crescent moon, the Prophet ﷺ would recite the prayer: “O God, cause this new moon to come upon us in safety and sound faith, security and submission.” Then, addressing the moon, he would say, “My Lord and your Lord is Allah.”

According to Abū Dāwūd, the Prophet ﷺ would also say to the new moon, “A crescent of goodness and guidance, a crescent of goodness and guidance, a crescent of goodness and guidance. I believe in the One who created you; I believe in the One who created you; I believe in the One who created you.” Then he would say, “Praise be to the One who caused the previous month to depart and brought us this month.”<sup>18</sup>

In 637 CE, sixteen years after the Hijra of the Prophet ﷺ, the caliph ʿUmar instituted the new Islamic year based upon the first of Muḥarram in the year that the Prophet ﷺ had migrated from Mecca to Medina. The first of Muḥarram 622 CE, which coincided with the sixteenth of July 622 CE, began year one of the Muslim era. We are now in the 1427<sup>th</sup> year since that momentous event occurred.

Since then, throughout these centuries, Muslim astronomers and mathematicians have maintained rigorous and effective calendars for their respective eras, developed accurate ephemerides that detail the phases of the moon, and even provided crescent visibility tables for different climes. The Seljuk minister, Nīzam al-Mulk, desirous of instituting a more accurate working calendar, commissioned the notable polymath ʿUmar Khayyām, known in the West for his *Rubaiyat*, to develop a calendar based on the solar year. Khayyām was able to calculate the duration of the solar year to within decimals of that established by contemporary calculations. The pre-Islamic calendar that he produced has an astronomical basis that is “more accurate than the Gregorian calendar with a discrepancy, it is said, of only one day in 3,770 years.” Unfortunately, his calendar was never adopted to replace the less effective solar calendars still in use.<sup>19</sup> This demonstrates that Muslims in pre-modern times did indeed possess the intricate and detailed knowledge necessary to construct both lunar and solar calendars in order to organize their worldly and religious affairs.

Until very recently, the most widely used solar calendar in the Muslim world was the Coptic calendar. In the eighteenth century, the Ottomans adopted the Julian calendar as their solar calendar while continuing to use the lunar calendar for their devotional practices but nonetheless based it upon physical sighting of the new moons.<sup>20</sup> Shortly after the collapse of the Ottoman Empire, non-Muslim colonialists ran the administrations of much of the Muslim world, which led to the Muslim adoption of the current Gregorian calendar. Despite the almost universal hegemony of the Western calendar, Morocco, the United Arab Emirates, Egypt, Turkey, and Saudi Arabia still produce qualified sacred timekeepers who have studied the traditional science of horology and are capable of maintaining lunar calendars based upon both separation (*mufāraqah*), as is currently practiced in Saudi Arabia, and moon sighting, such as what is practiced in Morocco. My teacher and friend, Shaykh ʿAbd al-Ḥayy al-ʿUmṙāwī, who inherited the position of timekeeper from his father and who still holds the key to the timekeeper’s tower in the Jāmiʿ al-Andalus in Fes, took me up into the tower and showed me the holes in the tower

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<sup>18</sup> Muḥyī al-Dīn al-Nawawī, *al-Adhkār* (Jeddah: Dār al-Minhāj, 2005), 318.

<sup>19</sup> Cyril Glasse, *The Concise Encyclopedia of Islam* (San Francisco: Harper, 1989), 463.

<sup>20</sup> *Ibid.*, 96-7.

that had been precisely positioned to enable the timekeeper to simply look through them at the approximate outset of the corresponding points throughout the year where the new crescent would appear, if it were visible.

### The Meaning of “Crescent” in Arabic

In determining the crescent moon, an important question arises: what exactly does “crescent” (*hilāl*) mean in the classical Arabic language? Furthermore, does our modern understanding of this word differ from the Arab understanding of the seventh century? The earliest and one of the most authoritative lexicons in the Islamic tradition is that of the linguist, al-Khalīl b. Aḥmad, of Oman. His book, *al-ʿAyn*, is the first scientific lexicon in human history. In it, he defines the word “crescent” (*hilāl*) as, “The first light of the moon, when people actually see the crescent at the outset of a month.... It is said, ‘The crescent was seen’ (*uhilla l-hilāl*) and not ‘The crescent appeared’ (*halla l-hilāl*).”<sup>21</sup> While other philologists permitted the use of the active *halla* to mean it appeared, he considered the passive use of the verb to be correct. In both cases, humans are necessary to confirm the crescent moon; i.e., “It appeared” (*halla*) or “It was seen” (*uhilla*) both entail witnessing, which means its birth is not an active event but involves, in this case, witnessing. “The moon was born” (*uhilla*) literally means, “It was seen.”<sup>22</sup>

The exegete and linguist, Rāghib al-Iṣbahānī, explains:

“Crescent” (*hilāl*) denotes, “the moon specifically on the first and second night”; after that, it is simply called “moon” (*qamar*).... “The crescent was born” (*ahalla al-hilāl*) means, “It was seen” (*ruʿiya*).... “Birth” (*ihlāl*) can also refer to the cry one makes upon sighting the crescent, which was later used metaphorically to refer to a baby’s cry upon being born (*ihlāl al-ṣaby*).<sup>23</sup>

In his *Lisān al-ʿArab*, Ibn Manẓūr says that the *hilāl* got its name from the cry of joy that those who saw it uttered upon seeing it. Furthermore, he says that the phrase, “the crescent was born” (*halla l-hilāl*) means “it appeared” (*ẓahara*). He also states that the crescent is “the new moon when people see it” (*yuhilluhu n-nās*).... According to him, “*ahalla r-rajul*” means “He looked at the new moon.”<sup>24</sup> One of the great Turkish exegetes, Imam al-Brusūwī, says: “*Hilāl* (crescent) is the initial light of the moon that *appears to you* up until three days.”<sup>25</sup>

Clearly, according to the above evidence, the crescent moon is something that is *seen*. It is a physical phenomenon that upon seeing it people tend “to cry for joy,” which is another accepted meaning of *ahalla/yuhillu*. Indeed, according to Noah Webster, whose landmark dictionary of 1828 set a new standard for American scholarship and is the eponym for all Webster dictionaries, the English word “hallelujah” comes from the

<sup>21</sup> al-Khalīl b. Aḥmad al-Farāhīdī, *Kitāb al-ʿayn* (Beirut: Dār Iḥyāʾ al-Turāth al-ʿArabī, n.d.), 1017.

<sup>22</sup> Ibid.

<sup>23</sup> Rāghib al-Iṣbahānī, *al-Mufradāt* (Damascus: Dār al-Qalam, 1992), 843.

<sup>24</sup> Ibn Manẓūr, *Lisān al-lisān tahdhīb al-lisān* (Beirut: Dār al-Kutub al-ʿIlmiyyah, 1993), 2:693.

<sup>25</sup> Ismāʿīl Ḥaqqī al-Brusūwī, Abr. Muḥammad al-Ṣābūnī, *Tawī al-adhān min taḥsīr rūḥ al-bayān* (Damascus: Dār al-Qalam, 1988), 1:148.

Hebrew meaning “to praise God” and the Arabic, *halla*, which means “to appear; to begin to shine, as the new moon; to exclaim; to exult; to sing; to rejoice; to praise or worship God.” Webster also surmises that it is related to the English word “howl.”<sup>26</sup> Of note, is our idiom, “howling at the moon”!

### **The Islamic Ruling on Moon Sighting and Calculation**

The foundation of any legal ruling in Islam is the Qur’an and the verified Sunnah of the Prophet ﷺ. All of the Qur’an and the Sunnah fall into four types:

- 1) an evidence that is decisive in its authentic transmission and also unequivocal in its meaning;
- 2) an evidence that is decisive in its authenticity but equivocal in its meaning;
- 3) an evidence that is of only probable authenticity but unequivocal in its meaning;
- 4) an evidence that is probable in its authenticity and equivocal in its meaning.

*Ijtihād* is not permissible in the first category. For instance, the texts that prescribe fasting are both authentic and unequivocal; therefore, no one can make a new ruling concerning the obligation of fasting and its time based on *ijtihād*. However, many texts, such as the majority of hadith, are either probable (*ḥaḥḥanniyyat al-wurūd*) in the authenticity of their narrations or equivocal in their meanings (*ḥaḥḥanniyyat al-dilālah*); this accounts for the differences of opinions among the qualified and authoritative imams in many of their legal rulings.

In the absence of decisively authentic and unequivocal texts, scholars may then and only then resort to *ijtihād*. For instance, the Qur’an states that a divorced woman is to wait three menstrual cycles before the divorce is finalized. However, the Arabic word used is *qur’*, which can mean the time between her cycles or the time of her actual cycles. There is no known hadith in which the Prophet ﷺ clarified to which of the two the verse refers. This forced scholars to perform *ijtihād*, and they arrived at two different conclusions, both of which are accepted as valid. *Ijtihād* is therefore employed only in the absence of a clear and authentic text and cannot be done otherwise.

The second important rule to note about independent reasoning is that any *ijtihād* concerning ambiguous texts must be in conformity with verified Arabic connotations as understood by the Arabs during the Prophet’s lifetime and recorded in the accepted lexicons of the masters of Arabic lexicology. Hence, a thorough knowledge of classical Arabic as understood by the first generation of Muslims as well as of several other sciences is required before one can perform *ijtihād*. The Mauritanian jurist, Shaykh Muḥammad al-Amīn, says the following about *ijtihād*:

It is a condition that anyone performing *ijtihād* must know grammar, morphology, and what is necessary from the rational sciences, such as the definitions, descriptions, and how arguments are set up. Furthermore, he must know philology so that he is able to understand the Arab usage of a word, as well as its common and legal usage. He must also know juristic methodology (*uṣūl*) as well as the science of rhetoric (*balāghah*).

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<sup>26</sup> Noah Webster, *American Dictionary of the English Language* (New York: S. Converse 1828). (Note: No pagination in original edition; see entry under page-heading, “HAL.”)

If an objection is raised against this latter condition—that the one undertaking *ijtihād* have this prerequisite knowledge—arguing that it is unreasonable since the great men of the past who performed *ijtihād* were prodigious and expert legal masters of reasoning before *uṣūl* was even codified, then our response is that the principles of *uṣūl* were inherent in their understanding and known to them even though the principles had not yet been systematically codified, as in the case also of grammar and morphology.<sup>27</sup>

If we understand these foundational principles, we can now look profitably at the differences that arose about how we determine the onset of the two months of Ramadan and Dhū al-Ḥijjah, in particular, and the other lunar months in general. The Qur’an says, “They ask you about the crescent moons; say they are a means to measure your specific times and are also for the commencement of the hajj” (2:189). This text is both decisive in its authenticity, because the entire Qur’an is decisively authentic (*qāṭi‘ al-wurūd*), and it is decisive in its meaning, because there is no ambiguity about what crescents (*ahillah*) mean in the Arabic language, and what the means to measure specific times (*mawāqīt*) denote; hence, *ijtihād* is not an option.

The Qur’an commands us to use the crescent moons as a means for determining our lunar months and our sacred obligations of fasting in Ramadan and performing hajj in Dhū al-Ḥijjah. An important point to note about this verse is that it specifies hajj and leaves Ramadan to be understood in the general meaning of the verse. According to the great commentators, hajj was mentioned in preparation for the final prohibition on determining the hajj based upon intercalation and not sighting, as the pre-Islamic Arabs sometimes predetermined hajj, so they did not need to look for the moon during the hajj season. The magisterial Spanish exegete, Imam al-Qurṭubī comments:

Hajj is specifically mentioned in this verse [as opposed to Ramadan] because it is among the devotional months; the knowledge of its commencement is essential, and [determining it using] intercalation is not permissible, as doing so displaces it from its proper time. *This is in opposition to what the Arabs considered acceptable at the time, as their practice was to perform hajj based upon calculation (‘adad)<sup>28</sup> and alteration of the months. Thus, God nullified their words and deeds.*<sup>29</sup>

Another verse commands Muslims to fast for the month of Ramadan, unambiguously the lunar month known to the Arabs at that time. The verse says, “The month of Ramadan is the one in which the Qur’an was revealed as a guidance for humanity and clarifications of that guidance and a standard. So whoever witnesses (*shahida*) the month among you, let him fast” (2:185). Qadi Abū Bakr b. al-‘Arabī comments on this verse:

<sup>27</sup> Muḥammad al-Amīn b. Muḥammad Mukhtār, *Nathr al-wurūd ‘alā marāqī al-su‘ūd* (Beirut: al-Maktabāt al-‘Aṣriyyah, 2004), 422.

<sup>28</sup> ‘*adad*: “what is numbered, counted, reckoned, or computed,” from E. W. Lane, *Arabic-English Lexicon* (Cambridge: Islamic Texts Society, 1984), 2:1970.

<sup>29</sup> Muḥammad al-Anṣārī al-Qurṭubī, *al-Jāmi‘ li aḥkām al-Qur’ān* (Beirut: Maktabat al-Bāz), 1993, 1-2:229.

“Month” here actually refers to the crescent moon of the month and was called “the month” (*al-shahr*) due to everyone knowing of its arrival (*li shuhratih*). Hence, God has obliged us to fast upon the sighting of the crescent moon (*‘inda ru’yatih*). The Prophet’s words [also add clarity]: “Fast upon sighting the crescent moon, and end the fast upon its sighting. And should it be obscured, then complete thirty days of Sha‘bān.” Thus, he obliged us to complete thirty days of Sha‘bān should the crescent moon be hidden, and thirty days of Ramadan should Shawwāl’s crescent be hidden. This is in order that we enter our [time-dependent] acts of worship with certainty and end them with certainty. Another hadith is even more elucidating: “Do not fast until you see the crescent moon, and do not break the fast until you see it.”<sup>30</sup>

Imam al-Tirmidhī relates on Abū Hurayrah’s authority that the Prophet ﷺ said, “Note the day that the crescent moon of Sha‘bān [appears] in order to determine Ramadan’s crescent.” The next point is God’s word in the verse, “So whoever witnesses the month, let him fast” (2:185). This is normally understood to mean, “see it with one’s eyes”—in other words, sighting the crescent moon. This is reiterated in the Prophet’s words, “Fast upon seeing it, and break the fast upon seeing it.” *However, some of the early scholars stumbled on this issue and claimed that one can depend upon calculation to determine the moon’s phases, as calculations could determine if the moon would indeed be seen if the sky were clear; they based this claim upon the Prophet’s statement, “And if the crescent moon is obscured, then determine it (faqdurū lah).* But the actual meaning among the scholars of consummate expertise is “complete its number.” This is why the Prophet ﷺ said in [another narration], “complete the number of days of Sha‘bān, thirty days.” Furthermore, in yet another narration, he said, regarding the new crescent moon of the month after Ramadan, “If it be obscured, then complete a fast of thirty, and then break your fast”; this is related by al-Bukhārī and Muslim. Some slipped further by claiming that Imam al-Shāfi‘ī said one could depend upon calculating, and this is a fall one cannot arise from.<sup>31</sup>

The Spanish master of the sciences of Islam, Ibn ‘Abd al-Barr, says this about the same verse:

God says, “Whoever witnesses the month, let him fast” (2:185). He means, and God knows best, “Whoever among you knows, with a knowledge that is certain, that the month has indeed begun must fast it.” And knowledge that is certain is [based on] either a clear and widespread sound sighting or the completion of thirty days of the previous month. The shariah also

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<sup>30</sup> This hadith is agreed upon by Imam al-Bukhārī and Imam Muslim. In fact, the hadith, “Fast upon sighting it, and break the fast upon sighting it, and should it be obscured, then complete thirty days of Sha‘bān,” is considered multiply transmitted and has the authority of any verse in the Qur’an by consensus. See: Muḥammad b. Ja‘far al-Kattānī, *Nazm al-mutanāthir min al-ḥadīth al-mutawātir* (Egypt: Dār al-Kutub al-Salafiyyah, n.d.), 129.

<sup>31</sup> Abū Bakr b. al-‘Arabī, *Aḥkām al-Qur’ān* (Beirut: Dār al-Kutub al-‘Ilmiyyah, 1988), 1:117-8.

allows the testimony of two just witnesses who saw the moon on the thirtieth night [of Sha‘bān]. That is also sound, and therefore the previous month was of twenty-nine days. Some consider this sound only if the sky was clear and [the crescent not sighted], which is the meaning of “if not, then determine it (*faqdurū lah*)” among the majority of scholars.... According to Ibn Sīrīn, some of the great scholars among the second generation (*tābi‘īn*) understood it to imply a consideration of astronomy, the mansions of the moon phases, and mathematical calculation. Ibn Sīrīn said about this position, “It would have been better had they not done so.” It is believed he was referring to Muṭarrif b. ‘Abd Allāh b. al-Shikhīr, and God knows best. Muṭarrif was among the great pious and patient second generation scholars of Basra. Ibn Surayj also relates that Imam al-Shāfi‘ī said, “Whoever is schooled in the ability to determine the course of the stars and the mansions and phases of the moon, and it is clear to him from his knowledge that the crescent moon will appear on a given night, but then, it is obscured by clouds, then, in that case, it is permissible for him to consider it time to fast and sleep with the intention [of fasting the next day], and he will be rewarded.” However, what we have found authenticated in his own books is that he considered the month of Ramadan to be valid only by a widespread sighting or sound testimony or completion of thirty days of Sha‘bān.... This is in fact the school of all of the scholars of the Hijaz, Iraq, Greater Syria, and the West. Among those who confer are Mālik, al-Shāfi‘ī, al-Awzā‘ī, Abū Ḥanīfah and his students, and all of the people of hadith, except for Aḥmad b. Ḥanbal and those who conferred with him.<sup>32</sup>

*It is clear that none of these men understood the opinion that allowed calculation to mean bypassing the actual sighting; rather, they understood calculation to be permissible only if the visibility factor was obscured by atmospheric conditions.*

Another important reason for rejecting the interpretation of the hadith, “and if it is obscured then calculate it” to mean use of scientific measurements is that the other narration, “and if it [the new moon of Ramadan] is obscured, then complete thirty days of Sha‘bān.” In *uṣūl*, this is known as *mubayyin* (clarifying), and the former is called *mujmal* (ambiguous). It is a well-known *uṣūlī* principle that if a hadith has one narration that is equivocal and another that is unequivocal, and both are of equal authenticity, then the unequivocal is the one used for legislative purposes. Ibn Rushd clarifies this matter:

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<sup>32</sup> Ibn ‘Abd al-Barr, *al-Istidhkār* (Cairo, Aleppo: *Dār al-Waghā*, 1993), 10:15–9. Aḥmad b. Ḥanbal’s position is that of Ibn ‘Umar. Neither permitted calculating with mathematics but understood the Day of Doubt, on which the Prophet ﷺ prohibited fasting, to be the 30<sup>th</sup> day of Sha‘bān, if the previous night was clear. If it was cloudy, however, Ibn ‘Umar and later Imam Aḥmad understood the command, “*faqdurū lah*” to mean, “consider it a month of twenty-nine days, and fast the following as a precaution. Ibn ‘Umar would sometimes end up fasting thirty-one days of Ramadan. Only a handful of scholars interpreted it this way. The majority considered it prohibited to fast on the Day of Doubt, based upon the hadith, “Whoever fasts on the Day of Doubt has disobeyed Abū al-Qāsim, Muḥammad.”



The difference of opinion about [the commencement of Ramadan] results from the ambiguity in the hadith, “Fast based upon its sighting and break your fast based upon it, and should it be obscured, then calculate it.” But the majority of scholars took the other narration, which states, “Complete the number of thirty days.” Some of them said the measurement (*taqdīr*) mentioned in the first hadith means the new month should be determined with the use of calculation, and others said it simply means that you should fast the next day, irrespective of what your calculations may lead you to conclude. The latter is the way of Ibn ‘Umar. But the majority went with the authentic narration of Ibn ‘Abbās, which states that the Prophet ﷺ said, “And if it [the new moon of Ramadan] should be obscured, then complete the thirty days of Sha‘bān.” And, since the former is ambiguous (*mujmal*) and the latter clarifying (*mubayyin*), then it is an obligation (*wājib*) to interpret the ambiguous one in accordance with the one that clarifies. Furthermore, this methodology is one in which there is no difference of opinion among the scholars, especially given that the two narrations do not involve contradiction. Hence, the way in which the majority [of scholars] have understood it is the correct one. And God knows best.<sup>33</sup>

About this point, Qadi Abū Bakr b. al-‘Arabī, says this in his commentary on the *Muwatta’*:

God has obliged us to fast based upon the sighting of the crescent moon and added to that an injunction to note the commencement of Shawwāl’s crescent. Also, here is an interesting juristic point: some of the scholars of the second generation said that if the crescent moon is obscured, one may use calculation. Thus, if an astronomer says, “Tonight, based upon the crescent’s angle of elongation, it is normally possible to sight the crescent had it not been for atmospheric conditions,” we can act according to his statement in our fasting and breaking of our fast based upon the Prophet’s statement, “determine it.” In other words, they argue that he meant, “Calculate the position of the moon” based upon God’s word, ‘We have fixed exactly the moon’s phases’ (36:39)....”

What a calamitous mistake they have made! I am not, of course, denying the foundation of the science of calculation nor of the discernable patterns of the mansions and moon phases. However, it is not possible that use of scientific calculations was intended in the meaning of the hadith for two reasons: Firstly, Imam Mālik discerned a principle in hadith interpretation which became a basis for those who came after him. Mālik said that the first hadith is equivocal, but the ambiguity in it was clarified in the second hadith, in which the Prophet ﷺ said, “Complete the number thirty.” In other words, the second hadith clarifies what the first meant. As for the second reason, it is not permissible to rely on astronomers and mathematicians, not because their findings are not true but because people’s beliefs must be protected from an association with celestial

<sup>33</sup> Abū al-Walīd Muḥammad b. Rushd, *Bidāyat al-mujtahid wa nihāyat al-muqtaṣid* (Beirut: Dār al-Kitāb al-‘Arabī, 2004), 227

motions and future occurrences of conjunctions and separations. Indeed, that is a vast ocean should people be pulled into it. Moreover, there is a position, stated by people of understanding among the scholars of the second generation, that in the [specific hadith in which the Prophet ﷺ showed the number of days of Ramadan using his fingers], the Prophet ﷺ actually negated the use of the common numerals that mathematicians use. Therefore, it is even more likely that he would negate the use of celestial bodies and their orbits.<sup>34</sup>

What I find profoundly interesting is Qadi Abū Bakr's point that the Prophet ﷺ could very well have used the words "twenty-nine and thirty" when indicating the number of days possible in a lunar month. Had he done so, those he was speaking to would have understood him, as he was wont to state numbers on many other occasions as reported in sound hadith; he used high numbers, such as one million (*alfu alf*); he also used twenty-seven, twenty-five, and five; and he used the number ninety-nine in the sound hadith, "God has ninety-nine Names, one hundred less one; whoever enumerates them will enter Paradise." However, he chose not to state any numbers when showing the number of days in a lunar month, as if to deter people from thinking about enumeration specifically when it comes to determining the lunar months. Hence, instead of saying the words "twenty-nine and thirty," the Prophet ﷺ actually used his blessed hands, showing with his fingers how many days are possible in the month, as if to emphasize using the most basic and fundamental human ability of sight. It is as though he were saying, "Look, see, perceive with your eyes the month, even upon my hands." This insistence upon *sighting* the moon illustrates so well "the sense in Islam that it is the immediate surrounding conditions, rather than any theoretical ones, that reflect the Divine will of God in its relation to men, and that it is these which should determine the sacred acts."<sup>35</sup>

### **The Crescent Moon and its Sighting**

The essence of the issue is sighting the crescent moon, which has been the standard practice of our community for fourteen hundred years with the singular exception of a period during the Fatimid reign of North Africa and Egypt. This is well-illustrated throughout our books and the many examples given by our scholars. We should in no way understand, however, that our scholars were not capable of calculating the month or using astronomers to do so if they had seen it as acceptable. In other words, it was not lack of knowledge that prevented them but rather adherence to the Book of God and the Path of His Prophet ﷺ.

The scholar and astronomer, Ibn al-Ajdābī states the following:

According to the Arabs, the month does not come to an end till the new moon is sighted a second time, and, from then, they place the commencement of a second month. A poet said, "Whenever I pass forth from the month (i.e., I bring it to a close), I enter upon (the period of the new moon of a similar month). / It is sufficient for me to pull from myself the months and to enter upon new moons." One may say, "*salakhtu sh-shahr*," i.e., "I passed forth from the month"; in other words, "I brought

<sup>34</sup> Abū Bakr b. al-ʿArabī, *Qabas* (Beirut: Dār Gharb al-Islāmī, 1992), 2:483-4.

<sup>35</sup> Cyril Glasse, *The Concise Encyclopedia of Islam* (San Francisco: Harper, 1989), 96-7.

the month to a close when I came out of it.” One may say, “*wa nsalakha sh-shahr*” i.e., “and the month was pulled off”; in other words, “It came to an end.” One may also say, “*ahlaltu l-hilāl*,” i.e., “I entered upon the new moon”; in other words, “I sighted it.” The Arabs followed this practice in computing their months. *At the dawn of Islam, this practice of observing dates by sighting the new moons was firmly established, and the obligations of fasting the month of Ramadan, celebrating the Eid al-Fitr, and performing the hajj ceremonies were dependent on this practice.* This is what they always relied upon and, by this method alone, calculated the dates.... When the month of Ramadan was once mentioned to him, the Messenger of Allah ﷺ said, “Do not fast until you sight the new moon, and do not forsake fasting until you are again able to sight it. If it happens to be obscured to you, count the days for its probable appearance.” Another narration ends, “then complete the number thirty.” This narration clarifies the meaning of the former. Furthermore, the calculations made by means of the separation of the moon after the conjunction might coincide with the physical sighting but also might not coincide with it; in fact, the calculation differs with the physical sighting more often than not. Hence, a calculated new moon will generally precede a sighted new moon by a day. It may also precede it by two days, but that is quite rare.”<sup>36</sup>

The encyclopedic scholar and astronomer extraordinaire, Abū Rayḥān al-Bayrūnī, comments about this:

As for the scholars of astronomy and anyone who ponders this [new moon’s] situation extremely well concludes that the *sighting* of the new moon has no continuous pattern. This is due to the variations in the actual observed movement of the moon, which at times is fast and at others slow; sometimes it is nearer to the earth than other times; sometimes it heads north and other times south in its various ascensions and declensions through its ecliptic. Moreover, all of these various states occur throughout every point of the ecliptic. Sometimes its moonset is very fast at the points of elongation and other times it is slow. Not only that—these states also differ based upon the variance of longitude and latitude of the countries [from which one is viewing the moon], as well as the disparity in atmospheric conditions. Add to that the difference in people’s eyesight and the gradations of strength and weakness thereof.<sup>37</sup>

What should be noted in the above quote is that the early Muslims were masters of observational astronomy and far superior in their observations than modern astronomers, who do almost all of their work in theoretical abstractions and mathematics, and are largely uninterested in actual physical observation of objects and events that are discernable to the unaided naked-eye, especially since the ancients have completed that work, and there is little left to be explored. For this reason, many of the modern discoveries of

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<sup>36</sup> Ibn al-Ajdābī, *The Book of Seasonal Periods and Sky Signs* (Islamabad: Pakistan Hijra Council, 1989), 37–38 (from the Arabic side). (Note: my own translation.)

<sup>37</sup> *Ibid.*, 38. (See section on *Tafṣīl wa faḍl bayān fī al-āthār al-bāqiyah.*)

observational astronomy have occurred due to the work of amateur “backyard” astronomers.

An example of the genius of Muslim observational astronomers is ‘Abd al-Raḥmān al-Ṣūfī who was born in Iran in 376 AH/903 CE. His book on fixed stars is considered one of the three greatest works of observational astronomy. He is the first person to have observed the change of star colors, the change of star magnitude, the proper motion of stars, and the long period of variable stars. He discovered the Nebula Andromeda, and the Southern Constellations, which are attributed to modern astronomers in most Western books. He exposed many of Ptolemy’s mistakes and faulty observations. Al-Ṣūfī’s book was definitive until very recently and was quoted in modern astronomy books in the nineteenth century. His book was the foundation of the work done by Stabius, Heinfogel, and Durer, which is the basis of all modern uranometry.<sup>38</sup>

Many modern Muslims, even those highly educated, believe there has been great advancement in observational astronomy. The telescope has undeniably enabled modern man to penetrate the heavens in unimaginable ways, and to understand elliptical cycles of the moons and planets as well as the development of calculus. However, naked-eye astronomy has changed very little. In fact, the reality remains that the observed motion of the sun, moon, planets, and stars is far less understood to the common man as well as most astronomers than to premodern people who, in most areas of the earth, lived with the enchanting night sky much of the year; they navigated their journeys by the celestial phenomena and depended on such knowledge for the sustainability of their crops, harvests, and fishing. The Muslims in large numbers looked every month for the new moon and knew well where to look.

A wonderful account of the earlier Muslim community’s interest in sighting the crescent of Ramadan is given by Titus Burckhardt, who witnessed its sighting in 1931 in the ancient city of Fes:

The keeper of time, *muwaqqit*, must also determine the beginning of each month, which begins with the appearance of the new crescent moon, and especially the beginning of the month of fasting, Ramadan.... On the evening that Ramadan begins, the keeper of time is not the only one on the lookout. On every rooftop people watch impatiently to see whether, following sunset, the young crescent moon will become visible. First one or two, then a quickly increasing number, espy the fine silver horn on the still light horizon. *A cry of joy breaks out, for it was in this month that the Koran was revealed to the Prophet. This joy can be felt throughout the city.*<sup>39</sup>

I have experienced and witnessed the same joy in my fellow Muslims who still adhere to this ancient ritual of moon sighting that profoundly connects us with the heavens and with God’s power and wisdom.

This is not to say that theoretical astronomy is not also of great interest or that it has not advanced since the time of the great Muslim astronomers. On the contrary, building upon Greek and Muslim contributions, Copernicus, Brahe, and Kepler revolutionized the way in which we now understand the heavens. Moreover, since the

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<sup>38</sup> See H. J. J. Winter’s Introduction in al-Ṣūfī, *Ṣuwar al-kawākib* (Beirut: Dār al-Āfāq al-Jadīdah, 1981).

<sup>39</sup> Titus Burckhardt, *Fez: City of Islam* (Cambridge: Islamic Texts Society, 1992), 126.

onset of the technological revolution of the hundred years, unparalleled advances have been made. For most of us, however, we are like “the fool on the hill sees the sun going down, while the eyes in his head see the world spinning round.” In other words, we deny our existential experience of phenomena in favor of theories that, while true, deny our experience of the world. Notwithstanding all of the theories that tell us the sun is not rising or setting but rather it is the earth that is spinning, we cannot exorcise our essential experience from our language. For this reason, even scientists will still speak of the sunrise and sunset!

Our English word “orientation” means, “a person’s attitude or adjustment in relation to circumstances, esp. political or psychological.” In medical use, a person is in sound mind if oriented to time and place. The origin of the word “orientation” means “to know where the East is,” which is something many modern people are incapable of; in other words, many are disoriented to place and certainly to natural time, as without clocks they are incapable of determining the time. The pre-modern peoples of the world were oriented to the sun, moon and stars and such phenomena connected them with the heavens on a daily basis. Sighting the new moon is a practice that maintains this connectedness, and in my personal opinion is one of the legal rationales behind its injunction, but God knows best.

### **Differences among Early Muslims about the New Month’s Determination**

To return to the meaning of *hilāl* in the Qur’an, it has been established that “crescent moon” in Arabic is a physically discernable object to the naked-eye and that the Qur’an requires the crescents to be the basis of our months. The questions arises, did Muslims of the past differ on the subject of sighting the moon and the necessity of a moon sighting to establish the onset of Ramadan? The answer is they did not. Actually, they differed on two points: the first was whether a sighting anywhere on the earth was a legal reason (*sabab*) for fasting in other places and the second was if the possibly visible new crescent be obscured at sunset on the thirtieth day from the onset of Sha‘bān, what then should be done? These were the only two points of contention. According to our great scholars of the past, a consensus existed about the commencement of the lunar month if visibility was possible. Let us now examine the proofs.

The modern day claim that previous scholars held that using calculation to determine the new moon irrespective of visibility is unfounded and is a late innovation (*bid‘ah*) that was instituted in Egypt for a short period under the Fatimid dynasty of General Jawhar in 359/969. Despite this attempt at forcing upon the Muslim community calculations of the new month, it was rejected by the scholars of the time as an unacceptable innovation.<sup>40</sup> According to some historical accounts of the Fatimids in Libya, the Qadi of Barqa was put to death in 953 for observing the fast of Ramadan by sighting the new moon instead of following the astronomical calculations of the Imam.<sup>41</sup> What is

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<sup>40</sup> Cyril Glasse, *The New Encyclopedia of Islam* (Walnut Creek, CA: Alta Mira Press, 2002), 97.

<sup>41</sup> Michael Brett, “The Realm of the Imam: The Fatimids in the Tenth Century.” *Bulletin of the School of Oriental and African Studies*. As quoted in Abdallahi Ahmed An-Na’im, *The Future of the Shari’ah: Secularism from an Islamic Perspective*. 437-8. <http://www.law.emory.edu>.

particularly noteworthy about the Fatimid position is “their practice in using astronomical conjunction as the starting point for Ramadan was not, however, due to the complexity of calculating physical sighting, since that did not have to be calculated at all, it was enough to see it, but rather to their belief that their doctrines were scientific.”<sup>42</sup> Other than the Fatimid innovation, there is no evidence that Muslims have ever advocated calculation in lieu of sighting until the twentieth century. This is a major problem today.

The problem appears to be twofold: the scholars who argue for calculation seem not to understand the limits of modern astronomy vis-à-vis actual sighting predictability, and the astronomers who argue for calculation appear to have little knowledge of jurisprudence. Unlike the earlier scholars who commented on this issue, who were both masters of Islamic law and well-versed in both observational and theoretical astronomy, many of whom were capable of producing moon visibility charts themselves that were highly accurate. Today, however, the two groups tend not to communicate much with each other, and when they do, the jurists generally seem intimidated by the astronomers and fear appearing “backward” or ignorant in the eyes of modern scientists, who often look askance at committed religious people’s adherence to pre-modern texts on issues such as moon sighting. Another serious problem that confronts all of us working in Islamic scholarly pursuits is that, lamentably, those of us engaged in the issue are simply not qualified to make *ijtihād* in the same way the giants of the past were.

*Part II will cover the following topics in sha Allah:*

- ❖ The Scholars who Permitted Calculation
- ❖ The Five Schools’ Positions on Moon Sighting
- ❖ Magnified Crescents and Confusion: Signs of the Last Day
- ❖ Conclusion

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<sup>42</sup> Cyril Glasse, *The New Encyclopedia of Islam* (Walnut Creek, CA: Alta Mira Press, 2002), 97.