Al-Ahkam, Vol. 35 No. 2 (2025): 429-458
DOI: 10.21580/ahkam.2025.35.2.27687


AL-AHKAM

# Traditional Islamic Legal Epistemology in *Pesantren*'s Practice of *Ḥisāb*

**Marwadi Marwadi,**[1*] **Eva Mir'atun Niswah,**[1] **Muhammad Fuad Zain,**[1] **Ahmad Rezy Meidina,**[2] **Muhammad Akmal Kafi**[3]

[1]Universitas Islam Negeri Profesor Kiai Haji Saifuddin Zuhri Purwokerto, Purwokerto – Indonesia; [2]Sekolah Tinggi Agama Islam Al-Hikmah 2, Brebes – Indonesia; [3]Al-Ahgaff University, Mukalla – Yemen
[*]Corresponding author. Email: marwadi2005@uinsaizu.ac.id

## Abstract:

This study examines the epistemological basis behind the choice of four traditional Islamic boarding schools affiliated with Nahdlatul Ulama (NU) in East Java to prioritize *ḥisāb* (astronomical calculations) over *ru'ya* (crescent sighting) in determining the beginning of the Hijri month, even though NU institutionally prioritizes *ru'ya*. Through qualitative, empirical-legal research based on interviews, document analysis, and field observations, this study shows that the practice of *ḥisāb* is not merely a technical choice, but rather an expression of an epistemic orientation rooted in classical astronomical literature, the continuity of scientific chains of narration, and *burhānī* reasoning that emphasizes rational certainty. The use of *ḥisāb* is legitimized by classical al-Shāfi'iyya *fiqh* and the *pesantren* ethos, which emphasizes that knowledge must be put into practice (*taṭbīq al-'ilm*). Thus, *ḥisāb* functions as a marker of scholarly authority, legal certainty, and the *pesantren*'s institutional identity. Despite technical variations, all four *pesantren* demonstrate a common epistemological commitment: the integration of the *bayānī* textual approach with the *burhānī* scientific rationality. This study highlights how traditional institutions negotiate textual authority and scientific rationality in contemporary religious practice.

## Keywords:

Islamic legal epistemology; *ḥisāb–ru'ya*; *pesantren*; Hijri calendar

## How to cite:

Marwadi Marwadi, Eva Mir'atun Niswah, Muhammad Fuad Zain, Ahmad Rezy Meidina, Muhammad Akmal Kafi "Traditional Islamic Legal Epistemology in *Pesantren*'s Practice of *Ḥisāb*." *Al-Ahkam* 35, no. 2 (October 21, 2025): 429–458. https://doi.org/10.21580/ahkam.2025.35.2. 27687.


p-ISSN: 0854-4603; e-ISSN: 2502-3209
Submitted June 30, 2025; Received in Revised Form August 07, 2025; Accepted December 31, 2025

## Introduction

*Pesantren*, as traditional Islamic educational institutions in Indonesia, have long been centers for the transmission of religious knowledge, including the science of astronomy (*ḥisāb*), which is used to determine the start of the Hijri month. However, within the context of Indonesia's most prominent religious organization, Nahdlatul Ulama (NU), there are significant differences in opinion regarding the method of determining the start of the month, particularly for Ramaḍān, Shawwāl, and Dhū al-Ḥijja. NU officially reaffirms its commitment to direct observation of the crescent (*ru'ya*) as the primary method. At the same time, *ḥisāb* is positioned as a supplementary method. A contradiction arises when some *pesantren* under NU's scholarly tradition continue to prioritize *ḥisāb* as the primary method, even considering it as a mandatory practice of astronomical knowledge that astronomers must carry out.[1]

The tension between NU's official position, which prioritizes *ru'ya*, and the practice of *ḥisāb* in this *pesantren* raises a fundamental epistemological question: why do some *pesantren* continue to choose *ḥisāb* as the authority for determining the beginning of the month, even though their parent organization places *ru'ya* as the standard? This tension is the focus of this study, not merely as a technical difference, but as a reflection of the epistemological dynamics of Islamic law that are alive in the *pesantren* space. In other words, this research stems from the issue that the use of *ḥisāb* in *pesantren* is not merely a technical choice, but also a statement of scholarly authority and religious legal certainty.[2]

This study is not the first of its kind, as there have been several previous studies discussing the *ḥisāb–ru'ya* debate in Indonesia in general, including

[1] Abd Jabar Abdul, "Perjumpaan Pendidikan Islam *Pesantren* Persis dengan Nilai-Nilai Nasionalisme Kultur Indonesia" (Yogyakarta: Pustaka Pelajar, 2022), 4; Ahmad Musonnif, "Islamic Law and Science in NU-Muhammadiyah's Lunar Calendar Determination," *Al-Hilal: Journal of Islamic Astronomy*, October 31, 2024, 199–220, https://doi.org/10.21580/al-hilal.2024.6.2.23995; 9.

[2] Mufidah Ch, *Gender di Pesantren Salaf, Why Not?: Menelusuri Jejak Konstruksi Sosial Pengarusutamaan Gender di Kalangan Elit Santri* (UIN-Maliki Press, 2010), 1; Ridwan and Muhammad Fuad Zain, "Religious symbol on determining the beginning and end of Ramadan in Indonesia" *HTS Teologiese Studies/Theological Studies*, 77(4), 2021, 1-9. https://doi.org/ 10.4102/hts.v77i4.6397.

those by Susiknan Azhari (2006)[3], Syamsul Anwar (2016)[4], Ahmad Izzuddin (2015)[5], Isfihani (2023)[6], Thomas Djamaluddin (2005)[7], and Tono Saksono (2007)[8]. These researchers examined *ḥisāb-ru'ya* as a method of *istinbāṭ* (derivation) for determining the beginning of the Hijri month in Indonesia. Building on previous studies, this research aims to complement existing work by highlighting the differences in practice among traditionalist institutions. In general, traditionalist institutions derive legal rulings in a *qawlī* manner, in this case using *ru'ya* as a method for determining the beginning of the month. Meanwhile, the four *pesantrens* that were the subjects of this study derive legal rulings using the *manhajī* method, specifically employing *ḥisāb* to determine the beginning of the month.[9]

In the context of *pesantren*, astronomy has long been part of the curriculum, especially in *pesantren salaf* (traditional Islamic boarding school). Several classical works, such as *Sullam al-Nayyirayn, Fatḥ al-Ra'ūf al-Mannān*, and *Badi'a al-Mithāl*, are the primary references. The use of *ḥisāb* in *pesantren* is often driven by the principle that every science studied must be applied in practice. However, most of the existing literature emphasizes the sociological or educational dimensions of *pesantrens*, such as the teaching methods of the

[3] Susiknan Azhari, "Karakteristik Hubungan Muhammadiyah dan NU dalam Menggunakan *Ḥisāb* dan *Ru'ya*," *Al-Jami'ah: Journal of Islamic Studies* 44, no. 2 (December 30, 2006): 453–86, https://doi.org/10.14421/ajis.2006.442.453-485.

[4] Syamsul Anwar, "Unified Islamic Calendar in the Perspective of Islamic Legal Philosophy," *Al-Jami'ah: Journal of Islamic Studies* 54, no. 1 (June 25, 2016): 203, https://doi.org/10.14421/ajis.2016.541.203-247.

[5] Ahmad Izzuddin, "Dinamika *Ḥisāb Ru'ya* di Indonesia," *Istinbath: Jurnal Hukum* 12, no. 2 (2015): 248–73.

[6] Isfihani Isfihani, "*Ḥisāb Ru'ya* untuk Penentuan Awal Bulan Hijriah dalam al Qur'an dan al Hadis," *Sanaamul Quran : Jurnal Wawasan Keislaman* 4, no. 1 (February 1, 2023): 1–23, https://doi.org/10.62096/sq.v4i1.50.

[7] Thomas Djamaluddin, *Menggagas Fiqih Astronomi* (Bandung: Kaki Langit, 2005).

[8] Tono Saksono, *Mengkompromikan Ru'ya & Ḥisāb* (Amythas Publicita: Center for Islamic Studies (CIS), 2007).

[9] Affandi Mochtar, *Kitab Kuning & Tradisi Akademik Pesantren* (Bekasi: Pustaka Isfahan, 2009), 26-28; Doni Azhari and Asmuni, "Istinbathh Method Analysis of Nahdlatul Ulama in Determining Islamic Law in Indonesia," *NAHNU: Journal of Nahdlatul Ulama and Contemporary Islamic Studies.* 1, no.2 (2023), 107-118.

classic Islamic books or the dynamics of student life, without delving deeply into the epistemological legitimacy of *ḥisāb* as part of Islamic law.[10]

This research gap becomes clear when we observe that, although *pesantren* have been extensively studied from social, educational, and historical perspectives, very few studies focus on how *ḥisāb* is justified epistemologically within the Islamic legal tradition of *pesantren*. In fact, studies linking *ḥisāb* with traditional epistemologies such as *burhānī*, *bayānī*, and *'irfānī* are almost non-existent in studies of *pesantren* in Indonesia. As a result, the public's understanding of *ḥisāb* practices in *pesantren* is often reduced to merely a practical choice or traditional heritage, whereas behind it lies a complex epistemological construction.[11]

This study aims to fill this gap by analyzing the practice of *ḥisāb* in traditional *pesantren* from the perspective of Islamic legal epistemology, particularly within the *burhānī* framework, which emphasizes rationality and certainty. The focus of this research is on how *kiai* (religious leader) and *ustādh* (religious teacher) in *pesantren* understand, justify, and defend the use of *ḥisāb* despite being part of a larger organization that prioritizes *ru'ya*. The research questions addressed in this study are: Why do the traditionalist scholars in the four NU-affiliated *pesantren* in East Java tend to adopt the *ḥisāb* method rather than *ru'ya*? And how does this epistemological preference influence the dynamics of scientific authority and legal certainty within their religious practice?

Historically, *pesantren* have a unique character as Islamic educational institutions that combine the transmission of traditional knowledge with concrete religious practices, such as the *fiqh* of *ḥisāb–ru'ya*.[12] The science of

[10] M Masyhuri Mochtar, *Dinamika Kajian Kitab Kuning di Pesantren* (Pasuruan: Pustaka Sidogiri, 2015), 8.; Zainal Muttaqin, "Formalization of Islamic Law in Indonesia in the Framework of Social Engineering Theory by Roscoe Pound," *El-Mashlahah* 11, no. 2 (December 23, 2021): 97–115, https://doi.org/10.23971/elma.v11i2. 2825.

[11] Muh. Fathoni Hasyim, *Dinamika Pesantren di Jawa Timur: Tipologi dan Akomodasi Pesantren terhadap Pendidikan Formal* (Surabaya: Sinar Terang, 2009), 2; Alimuddin Alimuddin, "Hijriyah Months and The Construction of Religious Moderation in The Sombaopu Community of Gowa, South Sulawesi," *Al-'Adalah* 20, no. 1 (June 25, 2023): 137, https://doi.org/10.24042/adalah.v20i1.16818.

[12] Ahmad Izzuddin, *Fiqh Ḥisāb Rukyah di Indonesia: Upaya Penyatuan Mazhab Rukyah dengan Mazhab Ḥisāb* (Yogyakarta: Logung Pustaka, 2003), 47; Suhar AM et al., "Collective Ijtihad Practice in Indonesia: The Role of Isbat Sessions in Addressing Legal Paradigm Differences Between *Ḥisāb-Ru'ya*," *Al-Risalah: Forum Kajian Hukum dan Sosial Kemasyarakatan* 24, no. 2 (December 30, 2024): 105–23, https://doi.org/10.30631/alrisalah.v24i2. 1537; Ansori Ansori, "Position of Fatwa in Islamic Law: The Effectiveness of MUI, NU, and Muhammadiyah Fatwas," *Ijtihad : Jurnal Wacana Hukum Islam dan Kemanusiaan* 22, no. 1 (July 29, 2022): 53–72, https://doi.org/10.18326/ijtihad.v22i1.53-72.

astronomy taught in *pesantren* does not stand alone, but is integrated into the framework of *fiqh al-'ibāda*, especially in relation to determining prayer times, the direction of the qibla, and the beginning of the Hijri month. This connection makes *ḥisāb* not merely an astronomical tool but a legal instrument with religious legitimacy. In the epistemology of traditional Islamic law, this legitimacy is reinforced by the view of scholars that experts in *ḥisāb* are obligated to apply their knowledge and expertise.[13]

The debate over *ḥisāb–ru'ya* has deep historical roots in the Islamic world. Since classical times, scholars have differed on whether *ru'ya* is the only valid method or whether *ḥisāb* is also acceptable. In the Nusantara region, this debate has evolved into institutional differences, especially after NU established *ru'ya* as the standard method. However, for some *pesantren*, *ḥisāb* offers greater legal certainty as it is not dependent on weather conditions or visual limitations of the crescent. This perspective aligns with the principle of *istiqrā' burhānī* in Islamic epistemology, which assesses truth based on rational and empirically tested evidence.[14]

Thus, this study contributes to two fields at once: the study of *pesantren* and the study of Islamic legal epistemology. From the perspective of *pesantren* studies, this study highlights a rarely discussed scientific dimension, namely, how the method of determining the beginning of the month has become part of the epistemic identity of *pesantren*. From the perspective of Islamic legal epistemology, this research offers new insights into how the *burhānī* tradition operates within the dominant *bayānī* framework in *pesantren*. It also reveals that the use of *ḥisāb* in *pesantren* is not merely technical but serves as a form of affirming scholarly authority.

---

[13] Arwin Juli Rakhmadi Butar-Butar, *Kajian Astronomi Islam di Indonesia* (Yogyakarta: Suara Muhammadiyah, 2020), 43-50; Ismail Koto et al., "Islamic Holy Days: The Contention of Ru'yatul Hillal and Ḥisāb Hakiki Wujudul Hilal Disputes for Muslims in Indonesia," *Pharos Journal of Theology*, no. 105(2) (March 2024), https://doi.org/10.46222/pharosjot.105.210; Marwadi, Mughni Labib, and Muhammad Fuad Zain, "Reforming the Islamic Calendar and Religious Authority: Dynamics of Hijri Calendar Calculation in Indonesia within Persatuan Islam's Thought," *Al-Manahij: Jurnal Kajian Hukum Islam*, June 30, 2025, 149–66, https://doi.org/10.24090/mnh.v19i1.10574.

[14] Zufriani Zufriani et al., "*Ru'ya* as Determination of the Lunar Month Beginning: A Method, Obstacles, and Debate in Indonesia," *Juris (Jurnal Ilmiah Syariah)* 22, no. 1 (June 13, 2023): 53, https://doi.org/10.31958/juris.v22i1.6570; Muhyiddin Khazin, *Ilmu Falak dalam Teori dan Praktik: Perhitungan Arah Kiblat, Waktu Shalat, Awal Bulan dan Gerhana* (Yogyakarta: Buana Pustaka, 2004), 31;

The structure of this article begins with an introduction that describes NU *pesantren* that use *ḥisāb*, a review of related literature, and the research methods employed. The results and discussion section will analyze field findings regarding the legal basis for *ḥisāb* use in *pesantren*, the epistemological justification for *ḥisāb*, and its implications for scientific authority and the certainty of religious law. Finally, the conclusion will emphasize the importance of preserving classical astronomical literature, strengthening the *ḥisāb* curriculum in Islamic boarding schools, and encouraging constructive scientific dialogue between traditional and modern approaches to determining the beginning of the Hijri month.

This study is a qualitative empirical-legal research that aims to understand the epistemological and sociological dimensions of Islamic legal reasoning underlying the use of *ḥisāb* in traditionalist *pesantren*. As an empirical-legal study, it examines not only the doctrinal foundations of Islamic law but also the lived practices and interpretive frameworks adopted by NU-affiliated scholars in East Java. The approach integrates perspectives from Islamic legal epistemology, the sociology of law, and the historical sociology of Islamic law to capture how legal thought interacts with social and institutional realities.[15] This research is both descriptive and analytical in nature, involving the collection of data as accurately as possible about humans, conditions, or other phenomena to confirm hypotheses, thereby helping to strengthen existing theories or develop new ones. The data sources in this research consist of primary and secondary sources. Primary sources are the results of interviews with *kiai*, *ustādh*, and students from the *pesantren* that is the object of the study. At the same time, secondary data consists of documents related to the topic of this study. Data collection techniques include interviews and documentation. The data analysis techniques employed in this study are conducted through two processes: analysis before fieldwork and analysis during fieldwork.

## *Istinbāṭ al-Aḥkām* in Determining the Month's beginning through *Ḥisāb* in NU *Pesantren Salaf*

The implementation of *ḥisāb* in determining the beginning of the Hijri month across NU-affiliated *pesantren salaf* is not uniform but shaped by each

[15] Lexy J Moelong, "Metodologi Penelitian Kualitatif," (Bandung: Remaja Rosdakarya, 2014), 6; M Atho Mudzhar, *Pendekatan Studi Islam: Dalam Teori dan Praktek* (Yogyakarta: Pustaka Pelajar, 1998), 68.

institution's scholarly lineage, epistemic orientation, and historical context. Although grounded in the same traditionalist framework, every *pesantren* exhibits unique patterns in practicing and justifying *ḥisāb*, reflecting different interpretations of Islamic legal reasoning. To understand this variation, it is essential to explore how each *pesantren* constructs its epistemological foundation, preserves its scholarly heritage, and articulates its legitimacy within both religious and scientific paradigms. The following descriptions present four *pesantrens,* Miftahul Huda Gading Malang, Al-Falah Ploso Kediri, Darul Ulum Poncol Magetan, and Roudlotul Muhsinin Kuwolu Malang, which illustrate distinct yet interconnected modalities of *istinbāṭ* in the application of *ḥisāb*.

## The Pesantren Miftahul Huda Gading Malang's Practice of *Ḥisāb*

The determination of the beginning of the Hijri month at the Pesantren Miftahul Huda Gading Malang uses the *ḥisāb* method. The reference book is *Sullam al-Nayyirayn*. The use of *Sullam al-Nayyirayn ḥisāb* at the Pesantren Miftahul Huda Gading Malang began when Kiai Yahya led the boarding school.[16]

The use of the *ḥisāb* method at Pesantren Miftahul Huda Gading Malang is based on the teachings of Kiai Yahya, who was the first person to teach and practice the science of *ḥisāb Sullam al-Nayyirayn* at Pesantren Miftahul Huda Gading Malang and holds full authority. Subsequently, the caretakers of subsequent generations up to the present day are those who preserve and safeguard the scholarly legacy established by their predecessors.[17]

The creation of a calendar based on the calculations of the book *Sullam al-Nayyirayn* is carried out by a team called the Falakiyah Committee Pesantren Miftahul Huda, which Nizar currently chairs. The first Falakiyah Committee team was formed under the leadership of Kiai Muhammad Murtadho and Kiai Syibli. From 2018 to 2023, the Falakiyah Committee was led by Muhid and Hasib. Since 2023, the Falakiyah Committee has been led by Nizar.[18]

In practice, the *ḥisāb* method used at the Pesantren Miftahul Huda Gading Malang is based on the crescent visibility criterion, or *imkān ru'ya*, which is the

[16] Interview with Nizar, Head of the Falakiyah Committee at the Pesantren Miftahul Huda in Gading, Malang, August 31, 2024.

[17] Interview with Kiai Ahmad, Head of the Pesantren Miftahul Huda in Gading Malang, August 31, 2024.

[18] Interview with Nizar, Head of the Falakiyah Committee at the Pesantren Miftahul Huda in Gading, Malang, August 31, 2024.

minimum threshold for observing the crescent. The height of the crescent (*irtifā'*) used as a guideline is between one and a half and two degrees above the horizon. Although this threshold is relatively low, it is maintained as it reflects a cautious approach to determining prayer times.

In practice, the Pesantren Miftahul Huda Gading Malang applies different criteria for determining the beginning of Ramaḍān and the beginning of Shawwāl. For the start of Ramaḍān, the minimum crescent visibility limit is set at one and a half degrees as a measure to ensure that fasting begins with strong faith. If the calculation results show that the crescent reaches one and a half degrees or more, then that night is declared to have entered Ramaḍān. However, if the crescent's altitude has not reached this limit, then the month of Sha'bān is completed with thirty days.

Meanwhile, in determining the beginning of Shawwāl, the Pesantren Miftahul Huda Gading Malang sets a higher criterion, namely two degrees as the minimum limit for crescent visibility. If the calculation results indicate the crescent's altitude has reached two degrees or more, then that night is declared the beginning of Shawwāl. Conversely, if the crescent's altitude is below two degrees, then Ramaḍān is considered complete, having lasted thirty days. [19]

According to Kiai M. Baidhowi Muslich, the beginning of Ramaḍān, Shawwāl, and Dhū al-Ḥijja is determined by *ḥisāb*. However, at certain times, the results of the government's *ithbāt* meeting, such as the determination of 'Id al-Fiṭr, may be used. It is due to the crescent being too low, i.e., below one degree. As a precautionary measure, the fast is completed. [20]

The use of *ḥisāb* as a method for determining the beginning of the Hijri month is based on several considerations. According to Kiai Yahya, every knowledge learned should be applied in real life. It aligns with the saying "*al-'ilm bilā 'amal ka al-shajar bilā waraq wa thamar"* (knowledge that is not put into practice is like a tree without leaves and fruit), offering limited or even no benefit. This perspective emphasizes that knowledge achieves its actual value only when it is translated into action.

[19] Ahmad Wahidi. *Penggunaan Metode Hisab dalam Penentuan Awal Bulan Islam di Kalangan Pesantren Nahdlatul Ulama (NU) Malang*. Surabaya: UIN Sunan Ampel Surabaya Press, 2021. 75.

[20] M. Baidowi Muslich, *Hisab dan Rukyat di Pondok Pesantren Miftahul Huda Gading Kasri Malang*, 2.

Applying knowledge in real life is crucial, as in the afterlife, humans will be held accountable for everything they possess, including the knowledge they acquire. Based on this awareness, Pesantren Miftahul Huda Gading Malang is driven to put into practice every knowledge learned within the *pesantren* environment. One concrete form of this effort is the application of astronomy or *ḥisāb* in religious practices.

In Islamic jurisprudence, it is stated that astronomers, or those skilled in astronomical calculations, are permitted, and some scholars even consider it obligatory, to practice their knowledge. This provision also applies to those who accept and believe in the accuracy of their calculations. This view is explained in the book *Sullam al-Nayyirayn*.

According to the history of Pesantren Miftahul Huda Gading Malang, Kiai Yahya had a genealogy of knowledge in ḥisāb and *falak* that originated from his teacher, Muhammad Dahlan, who was renowned as an expert in *falak* in Kediri. He was also the founder and first caretaker of the Pesantren Jampes Kediri. This transmission of knowledge is what has enabled Pesantren Miftahul Huda Gading Malang to utilize the astronomical calculation methods outlined in the book *Sullam al-Nayyirayn*. From generation to generation, starting from Yahya's time until now, this book has been studied, taught, and practised by his sons and students. The chain of transmission for astronomy knowledge at Pesantren Miftahul Huda Gading in Malang is from Sheikh Muhammad Salih Ibn Umar of Semarang, whose student was Sheikh Muhammad Dahlan of Jampes Kediri, and whose student was Kiai Yahya of Gading Malang.[21]

## The Pesantren Al-Falah Ploso Kediri's Practice of *Ḥisāb*

The determination of the beginning of the Hijri month at the Pesantren Al-Falah Ploso Kediri is carried out by its Falakiyah Committee using the *ḥisāb* method. The *ḥisāb* is based on several books of Islamic astronomy, including *Sullam al-Nayyirayn*, *Durr al-Anīq*, and *The Ephemeris Method* of the Ministry of Religious Affairs. However, *Sullam al-Nayyirayn* is the primary reference book. It is because the Falakiyah Committee of Pesantren Al-Falah in Ploso, Kediri,

[21] Interview with Kiai Ahmad, Head of the Pesantren Miftahul Huda in Gading Malang, August 31, 2024.

adheres to the principle of preserving traditional teachings and adopting new teachings that are even more beneficial.[22]

The book *Durr al-Anīq* is a book on astronomy written by Kiai Ahmad Ghozali Muhammad Fathulloh.[23] The ephemeris *ḥisāb-ru'ya* is a system containing lunar and solar data related to the calculation of the beginning of the month, published by the Ministry of Religious Affairs of the Republic of Indonesia[24] which can be viewed through an application called Winhisab.[25] The book *Sullam al-Nayyirayn*, written by Kiai Muhammad Mansur Batawi[26] and has been studied since the inception of astronomy learning at Pesantren Al-Falah, Ploso-Kediri.

The calculation of the Hijri month at Pesantren Al-Falah Ploso Kediri is carried out by an institution called the Falakiyah Committee. The administrators of this institution are Kiai Moh. Mahshush Izzi Arifin as Chairman, Ali Musthofa as Vice Chairman, Mahmud Syarifuddin Amin as Secretary, and Hanif Nidaul Khoir and M. Baidlowi as members.

The process of producing the annual calendar begins with the entire Falakiyah Committee, with the *'Ulyā* 3rd-grade students, conducting initial calculations for each new month over the course of a year. Once these calculations are completed, the results are reviewed in a meeting attended by members of the Pesantren Al-Falah management.

Following this internal discussion, the findings are presented to senior scholars. This step ensures that the results receive scholarly approval and any necessary corrections. Once approval from the scholars is secured, the calendar

[22] Interview with Ali Mustofa, Deputy Chair of the Falakiyah Committee at Pesantren Al-Falah Ploso, Kediri, August 10, 2024.

[23] Siti Tatmainul Qulub, "Integrasi Astronomi dalam Ilmu Falak di PTAI dan Pondok *Pesantren*," *Al-Qanun: Jurnal Pemikiran dan Pembaharuan Hukum Islam* 21, no. 2 (2018): 288–309.

[24] Septi Sari, Agus Purwanto, and Akhmad Aminuddin Bama, "Menentukan *Ḥisāb* Awal Bulan Hijriyah 1436 H Dengan Metode Ephemeris," *Jurnal Penelitian Sains* 19, no. 3 (2018): 107–11.

[25] Alfan Maghfuri, "Akurasi Perhitungan Gerhana Matahari dengan Data Ephemeris *Ḥisāb Ru'ya*," *Al-Afaq : Jurnal Ilmu Falak dan Astronomi* 2, no. 1 (June 30, 2020): 1–14, https://doi.org/10.20414/afaq.v2i1.2292.

[26] Khazin, *Ilmu Falak dalam Teori dan Praktik: Perhitungan Arah Kiblat, Waktu Shalat, Awal Bulan dan Gerhana*. 25.

is finalised and prepared for publication, serving as a reference for the broader community in matters of worship and daily religious practice.[27]

The determination of the beginning of the Hijri month at Pesantren Al-Falah Ploso Kediri by its Falakiyah Committee, using the *ḥisāb* method and the book *Sullam al-Nayyirayn* as its primary reference source, is due to the Falakiyah Committee's commitment to preserving the teachings conveyed by the founder of the *pesantren*.

There are several reasons why the Falakiyah Committee Al-Falah Ploso continues to preserve and use the book *Sullam al-Nayyirayn*. This book has been part of the *pesantren*'s practice since the early days of its establishment. *Ḥisāb* experts can apply their calculations in practice. This book is actively taught to the students of Pesantren Al-Falah in Ploso, Kediri—the *pesantren*'s commitment to maintaining long-standing traditions.

Falakiyah Committee Al-Falah Ploso uses *hisab* as a method for determining the beginning of the month based on the opinion of scholars who say *ḥisāb* experts and people who believe in them are allowed or even obliged to practice the results of their *ḥisāb*. Imām Subkī noted that if one or more people claim to see the crescent. At the same time, the *ḥisāb qaṭ'ī* experts say it is impossible to see the new moon; then their testimony is rejected. Imām al-Ramlī and al-Sharbīnī stated that if one or more people testify to having seen the new moon, even though according to the *ḥisāb* experts it is impossible to see it, then their testimony is accepted. Ibn Ḥajr al-Haytami believes that if, according to *ḥisāb*, the crescent is impossible to see and only one person testifies to having seen the new moon, then their testimony is rejected. But if many people do it, the testimony of *ru'ya* is accepted.[28]

The idea of using *ḥisāb* as the basis for determining the beginning of the Hijri month at the Pesantren Al-Falah Ploso Kediri stems from the scientific transmission of Kiai Ahmad Djazuli Usman, which was passed on to Kiai Zainuddin Djazuli. Kiai Zainuddin then instructed senior students who had mastered *ḥisāb* to create their own calendar. This step aimed to address the community's need for certainty about the beginning of Ramaḍān and Shawwāl,

[27] Interview with Kiai Moh. Mahshush, Head of the Falakiyah Committee at Pesantren Al-Falah Ploso, Kediri, August 10, 2024.

[28] Ibn Ḥajr Al-Haytamī, *Tuḥfa al-Muhtāj bi Sharḥ al-Minhāj,* (Mesir: Maktabah al-Tijāriya al-Kubrā, n.d.), Vol. 3, 382.

eliminating the need to consult the Islamic boarding school's supervisor and instead referring to the *pesantren* calendar.

At that time, the astronomical team involved included Kiai Suhemi Jember, Kiai Azhari Surabaya, Kiai Imam Mukhroji Blitar, Kiai Fakih Tegal, and Kiai Mustain Bojonegoro. They were members of the first generation of the calendar compilation team at the Pesantren Al-Falah Ploso in the 1980s.[29]

In the second generation, during the 1990s, the calendar compilation team at the Pesantren Al-Falah Ploso Kediri included Kiai Moh. Mahshush, Kiai Tanzih Pabelan, Kiai Idris Tegal, Kiai Romadon Kediri, Kiai Tholhah Pasuruan, Kiai Husen Banyumas, and Kiai Muhlisun Cirebon. According to the information, the senior students who formed the calendar compilation team were from Kiai Asmuni Jasem Kranding Mojo Kediri. The teaching of *ḥisāb* for the beginning of the month began around the 1970s.[30]

The science of *ḥisāb*, studied by Kiai Asmuni, was not taught to him by his teacher at Pesantren Al-Falah Ploso Kediri. However, rather than Kiai Asmuni acquiring this knowledge, he acquired it. At the same time, he was a student at Pesantren Al-Ihsan Jampes Kediri. At that time, the first teacher at the Pesantren Al-Ihsan was Kiai Dahlan, the father of Kiai Ihsan. It was from Kiai Dahlan of Jampes that Kiai Asmuni learned the science of astronomy, also known as celestial science.[31]

## The Pesantren Darul Ulum Poncol Magetan's Practice of *Ḥisāb*

Determining the beginning of the Hijri month, especially Ramaḍān, Shawwāl, and Dhū al-Ḥijja, at the Pesantren Darul Ulum Poncol Magetan using *ḥisāb*. The method used to determine the beginning of the Hijri month is carried out by the head of the *pesantren*, Kiai Ahmad Fathoni.

The *ḥisāb* method used by Kiai Ahmad Fathoni is based on the book *Sullam al-Nayyirayn*, a work by Muhammad Mansur al-Batawi that discusses astronomy. This book consists of three parts: a discussion of the conjunction, a

[29] Interview with Kiai Moh. Mahshush, Head of the Falakiyah Committee at Pesantren Al-Falah Ploso, Kediri, August 10, 2024.

[30] Interview with Kiai Asfar Tulungagung and Kiai Ma'sum Kediri, two graduates of Pesantren Al-Falah Ploso, August 10, 2024.

[31] Interview with Kiai Ali Mustofa, Deputy Chair of the Falakiyah Committee at Pesantren Al-Falah Ploso, August 10, 2024.

description of lunar eclipses, and a study of solar eclipses.[32] To facilitate the calculation process, this book's explanation is supplemented with data sourced from the Ulugh Beik table.[33]

The criteria for determining the beginning of the Hijri month applied at the *Pesantren* Darul Ulum do not refer to the *imkān ru'ya* limits as explained in the book *Sullam al-Nayyirayn*. This *pesantren* uses the *imkān ru'ya* standard previously implemented by the Indonesian Ministry of Religious Affairs before 2022, namely a crescent altitude of 2 degrees. The book *Sullam al-Nayyirayn* itself does not explicitly specify the *imkān ru'ya* limits. The 2-degree limit is mentioned by Abu Hamdan Abdul Jalil bin Abdul Hamid al-Kudusi in the book *Fatḥ al-Ra'ūf al-Mannān*.[34]

According to Munif, the 2-degree *imkān ru'ya* limit was established based on empirical experience and observations by astronomy scholars who determined that this altitude was sufficient to allow the crescent to be visible. This criterion has a strong scientific basis and scholarly tradition. In line with developments in astronomy, the Indonesian Ministry of Religious Affairs then established a new standard, namely a minimum crescent altitude of 3 degrees with an elongation of 6.4 degrees, to improve visibility accuracy. However, this change does not eliminate the 2-degree criterion; rather, it reflects the dynamics of ijtihad in determining the beginning of the Hijri month.[35]

The caretakers of the Pesantren Darul Ulum Poncol Magetan calculate the beginning of the Hijri month using the book *Sullam al-Nayyirayn* as a reference. It means that the calculation method used at the Pesantren Darul Ulum Poncol Magetan is a *ḥisāb ḥaqīqī taqrībī* method.[36]

---

[32] Interview with Munif, one of the leaders of the Pesantren Darul Ulum Poncol Magetan, September 21, 2024.

[33] Interview with Sutarji, one of the astronomy teachers at Madrasah Diniyah Pesantren Darul Ulum Magetan, September 21, 2024.

[34] Abu Hamdan Abdul Jalil bin Abdul Hamid, *Fatḥ al-Ra'ūf al-Mannān* (Kudus: Menara Kudus, 1995).

[35] Interview with Gus Munif, one of the leaders of the Pesantren Darul Ulum Poncol, Magetan, September 21, 2024.

[36] Iqnaul Umam Ashidiqi, "Irsyadul Murid *Ḥisāb* of the Beginning Islamic Lunar Month on Digital Falak Web-Based," *Syariah: Jurnal Hukum dan Pemikiran* 19, no. 2 (November 27, 2019): 141, https://doi.org/10.18592/sjhp.v19i2.3134; Sriyatin Shadiq, *Perkembangan Ḥisāb Ru'ya dan Penetapan Awal Bulan Qamariyah* (Surabaya: PT Bina Ilmu, 1995), 65.

The use of *ḥisāb* at Pesantren Darul Ulum Poncol Magetan as a method for determining the beginning of the Hijri months, particularly Ramaḍān, Shawwāl, and Dhū al-Ḥijja, is based on both scientific and practical considerations. *Ḥisāb* enables the accurate determination of the conjunction time and position of the crescent, which marks the beginning of a new month. Furthermore, *ḥisāb* is seen as compatible with determining prayer times, which do not require direct observation, thus providing convenience and efficiency without compromising the validity of determining prayer times.

The scriptural basis (*dalīl*) used to support this practice includes, among others, Quran *Sūra* Yūnus (10): 5, al-Raḥmān (55): 5, and Yāsīn (36): 39. These verses indicate that the Sun, the moon, and other celestial bodies each have specific phases (*manzila*) and orbits. Therefore, the science of *ḥisāb*, a branch of knowledge that studies these phases and orbits, especially those of the Sun and the moon, enables the prediction of astronomical phenomena such as lunar and solar eclipses and the occurrence of *ijtimā'* well in advance through precise calculation. A practical example is the Gregorian calendar, which is based on the Earth's orbit around the Sun.

According to the head of the *pesantren*, verses from the Quran about the Sun and moon demonstrate the existence of regularities in movement and natural laws that can be studied scientifically. On this basis, the science of arithmetic is considered valid and relevant for calculating various astronomical events, such as the rising and setting of the Sun and the moon, conjunctions, and eclipses, to support the accurate determination of times of worship. The use of *ḥisāb* also has a strong basis in the views of *'ulamā'*. The books *Rawḍa al-Ṭālibīn* and *Tuḥfa al-Muḥtāj* enable *ḥisāb* experts to apply their knowledge, as *Sullam al-Nayyirayn* emphasized the obligation for *ḥisāb* experts to utilize them.[37]

The scholarly transmission line (*sanad*) of the caretaker of Pesantren Darul Ulum Poncol Magetan, Kiai Haji Ahmad Fathoni, traces back to Pesantren Al-Falah Ploso Kediri. Kiai Haji Ahmad Fathoni was a student at Pesantren Al-Falah Ploso Kediri from 1979 to 1986. During his time at the *pesantren*, Kiai Ahmad Fathoni studied Islamic astronomy and, like other students from the same *pesantren*, held the conviction that preserving and continuing the *pesantren*'s body of knowledge is an obligation. It includes sustaining the use of *ḥisāb* as a

[37] Interview with Gus Munif, one of the leaders of the Pesantren Darul Ulum Poncol, Magetan, September 21, 2024.

method for determining the beginning of the Hijri months, especially Ramaḍān, Shawwāl, and Dhū al-Ḥijja.[38]

## The Pesantren Rhoudlotul Muhsinin Kuwolu Malang's Practice of *Ḥisāb*

The determination of the beginning of the Hijri months, especially Ramaḍān, Shawwāl, and Dhū al-Ḥijja at Pesantren Roudlotul Muhsinin Kuwolu Malang, is based on *ḥisāb*. The primary *ḥisāb* references used for establishing the start of the Islamic months are the books *Sullam al-Nayyirayn* and *Fatḥ al-Ra'ūf al-Mannān*.[39] The teaching of Islamic astronomy was initially delivered directly by Kiai Haji Muhsin, the caretaker of the *pesantren*, through regular study sessions. The primary text taught was the book *al-Durūs al-Falakiyah*.[40] *Al-Durūs al-Falakiyah* is one of the most prominent and influential texts in the study of Islamic astronomy. Muhammad Ma'sum bin Ali, a renowned expert in Islamic astronomy from Jombang, wrote this book.[41]

The formal introduction of *ḥisāb* to students enrolled in the Madrasah Diniyah (the *pesantren*'s religious education program) began in the new academic year of Syawal 1414 H (March 1994 CE). At that time, Kiai Muhsin instructed the senior students, who were Madrasah Diniyah teachers, to include *'Ilm Falak* (Islamic astronomy) as a subject in the Madrasah Diniyah curriculum. The leading textbook used was *Sullam al-Nayyirayn*. In addition to *Sullam al-Nayyirayn*, other *falak science* texts were gradually incorporated, such as *Al-Durūs al-Falakiya*, *Fatḥ al-Ra'ūf al-Mannān, Nūr al-Anwār, Shams al-Hilāl*, and the *Ephemeris Hisab Rukyat*. Most recently, the primary references for compiling the Hijri calendar have been *Fatḥ al-Ra'ūf al-Mannān*, together with *Nūr al-Anwār*

[38] Interview with Gus Munif, one of the leaders of the Pesantren Darul Ulum in Poncol, Magetan, September 21, 2024.

[39] Interview with Zainal Abidin, Head of the Falakiyah Committee at the Pesantren Roudlotul Muhisnin in Kuwolu Bululawang, Malang, September 29, 2024.

[40] Interview with Kiai Makhrus, Teacher at Madrasah Diniyah Pesantren Roudlotul Muhisnin Kuwolu Bululawang Malang, September 29, 2024.

[41] Watni Marpaung and Nurhayati Nurhayati, "Determination the Beginning of Qamariyah Month According to Government," *Jurnal Ilmiah Islam Futura* 19, no. 2 (December 28, 2019): 278, https://doi.org/10.22373/jiif.v19i2.4867; Alfan Maghfuri, "Ḥisāb Waktu Shalat dalam Kitab al-Durus al-Falakiyyah," *Al-Mizan* 14, no. 1 (2018): 122–34.

and the *Ephemeris*, as reflected in the 2024 Almanac of Pesantren Roudlotul Muhsinin.[42]

The team responsible for calendar calculation operates under the Falakiyah Committee of Pesantren Roudlotul Muhsinin, Kuwolu, Bululawang, Malang. The committee is composed of senior scholars (*mashāyikh*) serving as advisors, with Wahyudi Ihsan, Reza Alfianto, and Muamilul Ulum acting as supervisors. The chairpersons are Zainal Abidin and Mahmud Marzuqi, assisted by Yasin Habibulloh as treasurer. Technical adjustments are carried out by a specialized team consisting of Wahyudi Ihsan, Reza Alfianto, Zainal Abidin, Alfan Faruq, Ahmad Nur Wahid, M. Nur Izzuddin, Mahmud Marzuqi, Zainul Ulil Maʿali, Jaʿfar Shodiq, Ahmad Muis Maulana, Zainul Ulum, and Feri Tri Atmojo. Editorial, documentation, and archival tasks are handled by Iqbal Kurniawan, Zainul Ulum, and Feri Tri Atmojo, while outreach and dissemination are managed by Ahmad Buroidah.[43]

The determination of the beginning of the Hijri month at Pesantren Roudlotul Muhsinin is carried out through systematic stages involving a special team, based on the Decree of the *Pesantren's* Supervisor. The team compiles calculations over several weeks by referring to various astronomical books, especially *Sullam al-Nayyirayn* and *Fatḥ al-Raʾūf al-Mannān*. The *pesantren* head then verifies the results of these calculations by comparing them with other books such as *Badi'a al-Mithāl, al-Khulāṣa al-Wafiya, Risāla al-Qamarayn*, and *Ephemeris Data*. After verification, the results are formulated into a draft decision, approved by the *pesantren's* board of trustees, and then announced internally. The decision is subsequently socialized to students, alumni, and the congregation through the publication of the boarding school's annual calendar.[44]

In determining the start of these months, the caretakers and the Falakiyah Committee of Pesantren Roudlotul Muhsinin apply the *imkān ruʾya* criterion, requiring a minimum lunar altitude of two degrees, as stipulated in the *Sullam*

[42] Interview with Zainal Abidin, Head of the Falakiyah Committee at the Pesantren Roudlotul Muhisnin in Kuwolu Bululawang, Malang, September 29, 2024.

[43] Letter of Decree of Falakiyah Committee *Pesantren* Roudlotul Muhisnin Kuwolu Bululawang Malang 2025.

[44] Interview with Zainal Abidin, Head of the Falakiyah Committee at the Pesantren Roudlotul Muhisnin in Kuwolu Bululawang, Malang, September 29, 2024.

*al-Nayyirayn* text. The two-degree threshold is calculated using *Sullam al-Nayyirayn* and *Fatḥ al-Ra'ūf al-Mannān*, which serve as evidence of the practice of knowledge passed down by esteemed teachers of Islamic astronomy. For students, putting such knowledge into practice, including the science of *ḥisāb*, is considered an obligation.

The Head of the Pesantren Roudlotul Muhsinin has adopted *ḥisāb* as the method for determining the beginning of the Hijri month, based on Kiai Muchsin's command to his successors to continue practicing and preserving the knowledge contained in the books of Islamic scholars. The use of *ḥisāb* is also understood as part of the tradition of maintaining the integrity of Islamic knowledge, primarily through references to classical astronomical books such as *Sullam al-Nayyirayn* and *Fatḥ al-Ra'ūf al-Mannān*. Furthermore, the choice of *the ḥisāb* method represents a recognition and respect for the scholarly authority of the authors of these books and the scholars who have taught and passed down the science of *ḥisāb* from generation to generation.[45]

The transmission of *ḥisāb* thought at the Pesantren Roudlotul Muhsinin traces its roots back to the time of Kiai Muchsin, the founder of the *pesantren*, a renowned astronomy expert. Kiai Muchsin studied astronomy at the Pesantren Ketapang Kepanjen in Malang, under the guidance of Kiai Tauhid. Kiai Tauhid himself was a student of Ahmad Dahlan Jampes of Kediri, a renowned astronomer and the father of Kiai Ihsan Jampes of Kediri, thus establishing a strong and continuous chain of astronomical knowledge.[46]

The use of classical astronomical texts such as *Sullam al-Nayyirayn* by the administrators of four *pesantrens* is inseparable from the influence of their environment and the transmission of knowledge from their teachers. The knowledge of *ḥisāb* inherited from the places where the administrators studied continues to be preserved as a form of *ta'dhīm* (respect) from the students to the kiai, especially since these teachers also provide the legal basis for *ḥisāb*, derived from authoritative *fiqh* texts. From the perspective of the sociology of knowledge, this demonstrates the close relationship between knowledge, the

[45] Interview with Ghufron, Astronomy Lecturer at Madrasah Diniyah Pesantren Roudlotul Muhisnin Kuwolu Bululawang Malang, September 29, 2024.

[46] Interview with Kiai Makhrus, Teacher at Madrasah Diniyah Pesantren Roudlotul Muhisnin Kuwolu Bululawang Malang, September 29, 2024.

social environment, and the political, socio-historical, and ideological contexts that shape the development of an individual's thinking. [47]

From all the explanations above, it is evident that the use of *ḥisāb* as a method for determining the beginning of the Hijri months, especially Ramaḍān, Shawwāl, and Dhū al-Ḥijja, is primarily based on classical astronomy texts, especially *Sullam al-Nayyirayn*. Other supporting texts, such as *Fatḥ al-Ra'ūf al-Mannān, Al-Durūs al-Falakiya, Shams al-Hilāl, Nūr al-Anwār*, *Badi'a al-Mithāl*, and the *Ephemeris*, are also referenced. However, *Sullam al-Nayyirayn* remains the principal source. When viewed from the genealogy of thought, the *ḥisāb* method in *Sullam al-Nayyirayn* used by the caretakers of these four *pesantren* can be traced back to Kiai Saleh Darat of Semarang, who was the teacher of Kiai Muhammad Dahlan Jampes.

The early generation caretakers of each of these *pesantren* can be linked to Kiai Muhammad Dahlan Jampes, who was renowned as an Islamic astronomy scholar. Kiai Yahya of Pesantren Miftahul Huda Malang once studied with Kiai Muhammad Dahlan Jampes. Kiai Asmui, who taught Ilmu Falak at Pesantren Al-Falah Ploso Kediri, was also a student of Kiai Muhammad Dahlan Jampes. Kiai Ahmad Fathoni, caretaker of Pesantren Darul Ulum Magetan, was a student at Pesantren Al-Falah Ploso Kediri, where he studied astronomy under Kiai Asmui, himself a student of Kiai Muhammad Dahlan Jampes. Similarly, Kiai Muhsin Syafii, caretaker of Pesantren Roudlotul Muhsinin Bululawang Malang, was a student of Kiai Tauhid, who had also studied under Kiai Muhammad Dahlan Jampes.

Table 1
Comparison of *Ḥisāb* Methods and Epistemological Orientations in Four NU *Pesantrens*

| No | *Pesantren* | *Ḥisāb* Method Used | Epistemo-logical Basis | Main References | Initiator of the Use of *Ḥisāb* | Reasons for Using *Ḥisāb* |
|---|---|---|---|---|---|---|
| 1 | Miftahul Huda Gading Malang | *Ḥisāb Ḥaqīqī Taqrībī* with *imkān ru'ya* | A combination of *bayānī* and *burhānī* epistemology | *Sullam al-Nayyirayn* | Kiai Muhammad Yahya, the third-generation head of *the pesantren* | It is permissible for a *ḥisāb* expert to practice their knowledge. Knowledge must be put into practice. |

[47] Karl Mannheim, *Ideologi dan Utopia: Menyingkap Kaitan Pikiran dan Politik*, tans, F. Budi Hardiman (Yogyakarta: Kanisius, 1991), 287.

| No | *Pesantren* | *Ḥisāb* Method Used | Epistemo-logical Basis | Main References | Initiator of the Use of *Ḥisāb* | Reasons for Using *Ḥisāb* |
|---|---|---|---|---|---|---|
| 2 | Al-Falah Ploso Kediri | *Ḥisāb Ḥaqīqī Taqrībī and Ḥaqīqī Contemporer* with *imkān ru'ya* | A combination of *bayānī* and *burhānī* epistemology | *Sullam al-Nayyirayn*, supplemented by *Durr al-Anīq, Ephemeris Hisab Rukyat* | Kiai Zainuddin Djazuli, the second-generation head of *pesantren* | It is permissible for a *ḥisāb* expert to practice their knowledge. Maintaining and adopting better traditions |
| 3 | Darul Ulum Poncol Magetan | *Ḥisāb Ḥaqīqī Taqrībī* with *imkān ru'ya* | A combination of *bayānī* and *burhānī* epistemology | *Sullam al-Nayyirayn* | K.H. Ahmad Fathoni, the first-generation head of *pesantren* | *Ḥisāb* can be used to determine the position of the crescent, and it is the same as determining the prayer times |
| 4 | Roudlotul Muhsinin Kuwolu Malang | *Ḥisāb Ḥaqīqī Taqrībī, Haqīqī Taḥqīqī,* and *Ḥaqīqī Contemporer* with *imkān ru'ya* | A combination of *bayānī* and *burhānī* epistemology | *Sullam al-Nayyirayn*, *Durūs al-Falakiya, Fatḥ al-Ra'ūf al-Mannān, Shams al-Hilāl, Nūr al-Anwār, Ephemeris Hisab Rukyat* | Kiai Muhsin, the first-generation head of the *pesantren* | Knowledge must be put into practice. Maintaining tradition, and as an acknowledgement of the book's author |

## The Epistemology of *Ḥisāb-Ru'ya* Jurisprudence in the Traditionalist *Pesantrens*

Examining the Hijri calendar from the perspective of the philosophy of science reveals it as a reflective, radical, and fundamental thought activity. This approach enables the study of the Hijri calendar to extend beyond its technical aspects to explore the conceptual and methodological foundations underlying its formation as a system of knowledge.

From a philosophical perspective, the Hijri calendar is understood in relation to the foundations of science and its impact on various dimensions of human life, including religious, social, and scientific aspects. Thus, analysis of the Hijri calendar not only highlights the validity of the methods used but also

considers their epistemological implications for religious practices and the dynamics of Muslim life.[48]

The philosophy of science is a reflective activity that focuses on the nature of science itself. This reflection involves an examination of the structure, assumptions, and fundamental principles that underlie the structure of science as a system of knowledge.

Furthermore, the philosophy of science also examines scientific propositions and the paradigm frameworks that shape scientists' perspectives on reality. By examining prevailing paradigms, the philosophy of science seeks to uncover how a science is constructed, developed, and maintained within a specific historical and epistemological context.[49]

The philosophy of science focuses on the study and examination of various epistemological issues related to how humans acquire and validate knowledge. Within this framework, the philosophy of science addresses fundamental questions about the meaning of truth and how it can be rationally known and justified.

Furthermore, the philosophy of science also examines scientific methods, their validity, and limitations. This study encompasses discussions of theories, hypotheses, and scientific laws as a result of the scientific process, while also critiquing the extent to which these constructs consistently and responsibly explain reality.[50]

Thoughts on the Hijri calendar fall within the realm of Islamic legal thought. Therefore, discussions of the epistemology of the Hijri calendar cannot be separated from the epistemology of Islamic law, namely *uṣūl al-fiqh*. *Uṣūl al-fiqh*

[48] Saifuddin Herlambang et al., "Ḥusn al-Jawāb 'an Ithbāt al-Ahillah bi al-Ḥisāb: Basyūnī 'Imrān's Method for Standardising the Determination of the Qamariyah Month in the Sultanate of Sambas (1913-1976)," *Journal of Islamic Law* 5, no. 2 (August 21, 2024): 222–41, https://doi.org/10.24260/jil.v5i2.2775; Mohammad Muslih, *Pengantar Filsafat Ilmu, Kajian Atas Asumsi Dasar, Paradigma dan Kerangka Teori Ilmu Pengetahuan* (Yogyakarta: LESFI, 2016), 3.

[49] Mikhael Dua. *Filsafat Ilmu Pengetahuan; Telaah Analitis, Dinamis, dan Dialektis* (Maumere: Ledalero, 2007). 6.

[50] A Sonny Keraf and Mikhael Dua, *Ilmu Pengetahuan Sebuah Tinjauan Filosofis* (Yogyakarta: Kanisius, 2001). 23.

is a discipline that examines a set of rules and methods used to derive practical sharia laws from detailed evidence.[51]

The proposal of Islamic jurisprudence is positioned as the epistemology of Islamic law because its scope is not limited to the discussion of legal rules in a purely technical and applicable sense, but also examines fundamental issues, such as the concept and nature of Islamic law, the sources that gave birth to it, the mechanism of its formulation, and the level of its legal validity and force.[52] From an epistemological point of view, the concept and essence of the Hijri calendar is a calendar system formulated based on the interpretation and understanding of verses and ḥadīth.

Legal provisions relating to the Hijri calendar are based on three main foundations: the Quran, ḥadīth, and science. The Quran and ḥadīth provide the normative-theological basis for determining worship times related to the lunar cycle, while science, especially astronomy, serves as a rational-empirical instrument for understanding the astronomical phenomena that form the basis for determining the calendar. Thus, the legal construction of the Hijri calendar is not merely textual but also combines the dimensions of revelation and reason within a complementary methodological framework.

Based on these three foundations, the thinking on the Hijri calendar that has developed in Indonesia can generally be classified into two major streams. The first stream holds that the determination of the beginning of the Hijri month must be based on *ru'ya*, the direct observation of the crescent as a realization of a literal understanding of religious texts. Meanwhile, the second stream believes that determining the beginning of the Hijri month can be done through the *ḥisāb* method, an astronomical calculation based on scientific and mathematical principles. This difference highlights the diverse approaches to understanding the relationship between religious texts and empirical reality.

From the perspective of Islamic jurisprudence scholars, both the *ru'ya* and *ḥisāb* methods have empirical-historical and theoretical-historical characteristics. It means that both approaches emerged from the historical experience of the Muslim community as well as the development of

[51] Abdul Helim, "Hamka's Legal Methodology on Ḥisāb–Ru'yah in His Book 'Saya Kembali ke Ru'yah,'" *Juris (Jurnal Ilmiah Syariah)* 23, no. 2 (July 12, 2024): 215, https://doi.org/10.31958/juris.v23i2.11952; Abdul Wahab Khalaf, *Ilmu Ushul Al-Fiqh* (Kairo: Dar al-Fikr, 1978), 12.

[52] Imam Syaukani, *Rekonstruksi Epistemologi Hukum Islam Indonesia dan Relevansinya bagi Pembangunan Hukum Nasional* (Jakarta: Rajagrafindo Persada, 2006), 154.

accompanying scientific theories. Therefore, the validity of each method can be tested through two epistemological principles: correspondence and coherence. The principle of correspondence assesses truth based on its conformity with empirical data and historical facts, while the principle of coherence measures it through internal consistency with systematically established principles of astronomy.

According to Islamic jurists, the implementation of *ru'ya* in determining the beginning of the Hijri month has legal standing as a collective obligation or *farḍ kifāya*. It means that this obligation is deemed to be waived once it has been carried out by a portion of the Muslim community with authority and competence. This view emphasizes that *ru'ya* is not merely technical but has a legal dimension directly related to the implementation of worship and public order.

Some scholars further define *ru'ya* as a form of complete adherence to religious commands. From this perspective, *ru'ya* is understood as a direct implementation of Sharia texts, especially the ḥadīths of the Prophet, which explicitly command Muslims to begin and end fasting based on the sighting of the crescent. Therefore, *ru'ya* is viewed not only as a practical method but also as an expression of normative adherence to religious teachings.

Based on this, this group of scholars argues that *ru'ya* is the only valid method for determining the beginning of the Hijri month. Other methods, such as *ḥisāb*, are considered merely supporting and cannot replace *ru'ya* as the basis for establishing law. This view emphasizes the need for caution in maintaining the authenticity of religious practices to ensure they align with Sharia commands as textually understood.[53]

Some other scholars argue that determining the beginning of the month in the Hijri calendar can be done using astronomical calculations or *calculations based on ḥisāb*. The *ḥisāb* method is carried out by carefully calculating the position and movement of the moon and Sun, such as the times of sunrise and sunset, determining the time of conjunction, and calculating the position of the

[53] Muhamad Syazwan Faid et al., "Methods in Determining New Hijri Month: A Thematic Review From Islamic Jurisprudence Perspective," *Malaysian Journal of Syariah and Law* 13, no. 1 (March 26, 2025): 75–99, https://doi.org/10.33102/mjsl.vol13no1.687; Arwin Juli Rakhmadi Butar-Butar, *Esai-Esai Kalender Islam Global* (Medan: UMSU Press, 2021), 36.

crescent astronomically. This approach utilizes advances in science to provide certainty and accuracy in determining time.

From an epistemological perspective, *ḥisāb* is understood as a rational and scientific approach. This method emphasizes the use of reason and the principles of astronomy in understanding natural phenomena, so that determining the beginning of the month relies not only on direct observation but also on systematic and measurable calculations. Therefore, *ḥisāb* is seen as a legitimate alternative in determining the Hijri calendar, especially in the modern context that demands certainty and accuracy.[54]

The idea of *ḥisāb* as a method for determining the beginning of the Hijri month actually has quite deep roots in Islamic intellectual history. Since the classical period, this method has been a part of the discussions among Islamic scholars in addressing issues related to the calendar and determining prayer times. It indicates that the use of *ḥisāb* is not a new idea, but has existed as an alternative way of thinking since the early development of Islamic law.

Classical literature records several scholars known for using the *ḥisāb* approach to determining the beginning of the Hijri month, including Mutarrif Ibn ʻAbdillāh and Ibn Surayj. These two figures represent the tendency of scholars to open up space for the use of astronomical calculations to understand the phenomenon of the lunar cycle. The existence of this view confirms that the Islamic scholarly tradition, from its beginnings, was not completely closed off from rational and scientific approaches.[55]

The concept of *ḥisāb* continued and gained strength in the modern era. Several contemporary scholars, including Muḥammad Rashīd Riḍā, Muṣṭafā Aḥmad al-Zarqā, and Yūsuf al-Qarḍawī, are recognized as advocates of using *ḥisāb* in determining the beginning of the Hijri month. They view *ḥisāb* as a method relevant to the development of science and the needs of modern Muslims.

These modern scholars understand the verses of the Quran and ḥadīths concerning *ru'ya* not merely in a literal sense, but also in a contextual one. *Ru'ya* is viewed as a means suitable for the societal conditions of the time of the Prophet, with its primary goal being to determine the onset of prayer times.

---

[54] Arwin Juli Rakhmadi Butar-Butar, *Esai-Esai Kalender Islam Global* (Medan: OIF UMSU, 2021), 37..

[55] Syamsul Anwar, *Hisab Bulan Kamariah: Tinjauan Syar'i tentang Penetapan Awal Ramadan, Syawal dan Zulhijah* (Yogyakarta: Suara Muhammadiyah, 2009), 12.

With this contextual approach, *ḥisāb* is positioned as a legitimate method and in line with the *maqāṣid al-sharī'a*.[56]

Based on the previous description, there are two primary methods for determining the beginning of the month in the Hijri calendar, which simultaneously reflect two distinct epistemological models. The first method is adopted by a group of scholars who assert that determining the beginning of the month must be done through *ru'ya*. This line of thinking can be classified as *bay*ānī epistemology, as the legal determination process relies on a textual understanding of the ḥadīth as the primary source of legal reasoning.

The second method is adopted by a group of scholars who believe that determining the beginning of the Hijri month can be done through *ḥisāb*. This view stems from contextualizing the ḥadīth and verses of the Quran, taking into account the development of science. The use of astronomy or *ḥisāb* to determine the beginning of the month indicates that this group's thinking is characterized by *burhānī* epistemology, namely legal reasoning that relies on rationality and scientific arguments.

Reflecting on the division of *'ulamā'* into two groups based on *bayānī* and *burhānī* epistemologies, as explained previously, the kiai and teachers at the Pesantren Miftahul Huda Gading Malang, the Pesantren Al-Falah Ploso Kediri, the Pesantren Darul Ulum Poncol Magetan, and the Pesantren Roudhotul Muhsinin Kuwolu Malang can be categorized into *bayānī* and *burhānī* epistemologies. This classification is based on their perspectives on understanding and determining the beginning of the Hijri month, with a priority given to rational and scientific considerations.

The kiai and teachers at these *pesantrens* believe that using the *ḥisāb* method to determine the beginning of the Hijri month, especially for essential months of worship such as Ramaḍān, Shawwāl, and Dhū al-Ḥijja, is a Sharia-justified approach. In their view, *ḥisāb* provides a higher level of certainty in determining times, thereby minimizing doubt and discrepancies in the performance of worship.

[56] A.L.A.M. Nasir et al., "New Crescent Moon Detection Using Circular Hough Transform (CHT)," *Astronomy and Computing* 51 (April 2025): 100902, https://doi.org/10.1016/j.ascom.2024.100902; Syamsul Anwar, *Hisab Bulan Kamariah: Tinjauan Syar'i tentang Penetapan Awal Ramadan, Syawal dan Zulhijah.* 5-9.

Belief in the validity of this *ḥisāb* method demonstrates an orientation toward scientific certainty as the basis for legal decision-making. Within the framework of *burhānī* epistemology, rational reasoning and the use of science, such as astronomy, are positioned as crucial instruments for understanding natural signs that form the basis for establishing the Hijri calendar. Thus, religious texts are understood not merely literally, but also through argumentative and contextual approaches.

Nevertheless, it must be emphasized that the thought of *bayānī* and *burhānī* epistemology, as developed among these kiai and teachers, is inseparable from the scholarly tradition of the early *pesantren*. Their knowledge remains rooted in classical fiqh texts, which have long been the primary reference for learning in *pesantren*. It demonstrates that the use of *ḥisāb* does not mean abandoning classical traditions, but rather represents the result of a dialectic between the scholarly tradition of *pesantren* and the development of modern science.

## Conclusion

This study found that the preference of four NU *pesantrens* in East Java for the use of *ḥisāb*, even though NU as an institution prioritizes *ru'ya*, is rooted in a strong epistemological foundation, not merely a technical choice. The practice of *ḥisāb* in these *pesantrens* is built on a combination of *burhānī* (rational-scientific) and *bayānī* (textual) epistemologies, which are reflected in the use of classical astronomy books such as *Sullam al-Nayyirayn* and the continuity of the scientific *sanad* from previous astronomy experts, primarily through the lineage of Kiai Muhammad Dahlan Jampes. The four *pesantrens* view astronomy as something that must be practiced (*taṭbīq al-'ilm*) as a form of moral-scientific responsibility, so that *ḥisāb* becomes a symbol of scientific authority and legal certainty (*yaqīn*). Despite variations in technical methods and criteria for *imkān ru'ya*, all *pesantren* display a consistent epistemological pattern: combining classical scientific tradition with scientific rationality, resulting in an authoritative style in determining the beginning of the Hijri month.

In practical terms, this study recommends strengthening the astronomy curriculum in *pesantrens*, primarily through the integration of classical methods (*ḥisāb taqrībī*) and modern astronomical data, so that students can read, calculate, and verify data more accurately. *Pesantrens* are advised to strengthen the Falakiyah Committee as a center for traditional and modern astronomy studies, while also improving communication with official institutions, such as

the Ministry of Religious Affairs, to minimize information gaps when determining the beginning of the month. Academically, this research opens up space for the development of Islamic legal epistemology studies on the practice of *ḥisāb–ru'ya* in *pesantrens*, particularly through comparative research between *pesantren*s, studies of the scientific *sanad* of Indonesian Islamic astronomy, and methodological dialogue between *bayānī* and *burhānī* epistemologies. Further research is also needed to explore the dynamics of religious authority in the relationship between *pesantrens*, mass organizations, and the state, to enrich the discourse on the integration of traditional knowledge and modern science in determining the Hijri calendar.[a]

## *Author Contribution Statement*

**Marwadi Marwadi:** Conceptualization; Data Curation; Formal Analysis; Investigation; Methodology; Project Administration; Resources; Validation; Visualization; Writing Original Draft; Writing, Review & Editing.

**Eva Mir'atun Niswah:** Data Curation; Funding Acquisition; Resources; Validation; Writing, Review & Editing.

**Muhammad Fuad Zain:** Conceptualization; Funding Acquisition; Project Administration; Validation; Writing, Review & Editing.

**Ahmad Rezy Meidina:** Methodology; Resources; Writing, Review & Editing.

**Muhammad Akmal Kafi:** Resources; Writing, Review & Editing.

## BIBLIOGRAPHY

Abdul, Abd Jabar. *Buku Perjumpaan Pendidikan Islam Pesantren Persis dengan Nilai-Nilai Nasionalisme Kultur Indonesia*. Yogyakarta: Pustaka Pelajar, 2020.

Abu Hamdan Abdul Jalil bin Abdul Hamid. *Fatḥ al-Ra'ūf al-Mannān*. Kudus: Menara Kudus, 1995.

Al-Haytamī, Ibn Ḥajr. *Tuḥfa al-Muḥtāj bi Sharḥ al-Minhāj*. Mesir: Maktabah al-Tijāriya al-Kubrā, n.d.

Alimuddin, Alimuddin. "Hijriyah Months and The Construction of Religious Moderation in The Sombaopu Community of Gowa, South Sulawesi." *Al-'Adalah* 20, no. 1 (June 25, 2023): 137. https://doi.org/10.24042/adalah.v20i1.16818.

AM, Suhar, Tasnim Rahman Fitra, Abdurrohman Kasdi, Khusnul Istiqomah, Abdurrahman Abdurrahman, and Humaira Ahmad. "Collective Ijtihad Practice in Indonesia: The Role of Isbat Sessions in Addressing Legal Paradigm Differences Between Hisab-Rukyat." *Al-Risalah: Forum Kajian Hukum dan Sosial Kemasyarakatan* 24, no. 2 (December 30, 2024): 105–23. https://doi.org/10.30631/alrisalah.v24i2.1537.

Ansori, Ansori. "Position of Fatwa in Islamic Law: The Effectiveness of MUI, NU, and Muhammadiyah Fatwas." *Ijtihad : Jurnal Wacana Hukum Islam dan Kemanusiaan* 22, no. 1 (July 29, 2022): 53–72. https://doi.org/10.18326/ijtihad.v22i1.53-72.

Anwar, Syamsul. *Hari Raya & Problematika Hisab Rukyat*. Yogyakarta: Suara Muhammadiyah, 2008.

———. "Unified Islamic Calendar in the Perspective of Islamic Legal Philosophy." *Al-Jami'ah: Journal of Islamic Studies* 54, no. 1 (June 25, 2016): 203. https://doi.org/10.14421/ajis.2016.541.203-247.

Ashidiqi, Iqnaul Umam. "Irsyadul Murid Hisab of the Beginning Islamic Lunar Month on Digital Falak Web-Based." *Syariah: Jurnal Hukum dan Pemikiran* 19, no. 2 (November 27, 2019): 141. https://doi.org/10.18592/sjhp.v19i2.3134.

Azhari, Susiknan. "Karakteristik Hubungan Muhammadiyah dan NU dalam Menggunakan Hisab dan Rukyat." *Al-Jami'ah: Journal of Islamic Studies* 44, no. 2 (December 30, 2006): 453–86. https://doi.org/10.14421/ajis.2006.442.453-485.

Butar-Butar, Arwin Juli Rakhmadi. *Esai-Esai Kalender Islam Global*. Medan: UMSU Press, 2021.

———. *Kajian Astronomi Islam di Indonesia*. Yogyakarta: Suara Muhammadiyah, 2020.

Ch, Mufidah. *Gender di Pesantren Salaf, Why Not?: Menelusuri Jejak Konstruksi Sosial Pengarusutamaan Gender di Kalangan Elit Santri*. Malang: UIN-Maliki Press, 2010.

Djamaluddin, Thomas. *Menggagas Fiqih Astronomi*. Bandung: Kaki Langit, 2005.

Dua, Mikhael. *Filsafat Ilmu Pengetahuan; Telaah Analitis, Dinamis, dan Dialektis*. Maumere: Ledalero, 2007.

Faid, Muhamad Syazwan, Mohd Saiful Anwar Mohd Nawawi, Mohd Hafiz Mohd Saadon, Khairussaadah Wahid, and Paidi Norman. "Methods In Determining New Hijri Month: A Thematic Review From Islamic Jurisprudence Perspective." *Malaysian Journal of Syariah and Law* 13, no. 1 (March 26, 2025): 75–99. https://doi.org/10.33102/mjsl.vol13no1.687.

Falakiyah, Tim Lajnah. *SK Tim Lajnah Falakiyah Pondok Pesantren Roudlotul Muhisnin Kuwolu Bululawang Tahun 2025*, 2025.

Fatmawati, Andi Muhammad Akmal, Andi Muh. Akhyar, Azwar, and Achmad Nasyori. "Determination of Islamic Month Start by Moonsighting Australia (Case Study: 1 Dzulhijah 1441)." *Journal of Islamic Thought and Civilization* 12, no. 2 (December 13, 2022): 225–41. https://doi.org/10.32350/jitc.122.16.

Hasyim, Muh. Fathoni. *Dinamika Pesantren di Jawa Timur: Tipologi dan Akomodasi Pesantren terhadap Pendidikan Formal*. Surabaya: Sinar Terang, 2009.

Helim, Abdul. "Hamka's Legal Methodology on Hisab–Ru'yah in His Book 'Saya Kembali ke Ru'yah.'" *JURIS (Jurnal Ilmiah Syariah)* 23, no. 2 (July 12, 2024): 215. https://doi.org/10.31958/juris.v23i2.11952.

Herlambang, Saifuddin, Aulia Laily Rizqina, Ridwansyah Ridwansyah, Moh. Muslih, and Abdel Kadir Naffati. "Ḥusn Al-Jawāb 'an Ithbāt Al-Ahillah Bi Al-Ḥisāb: Basyūnī 'Imrān's Method for Standardising the Determination of the Qamariyah Month in the Sultanate of Sambas (1913-1976)." *Journal of Islamic Law* 5, no. 2 (August 21, 2024): 222–41. https://doi.org/10.24260/jil.v5i2.2775.

Isfihani, Isfihani. "Hisab Rukyat untuk Penentuan Awal Bulan Hijriah dalam al Qur'an dan al Hadis." *Sanaamul Quran : Jurnal Wawasan Keislaman* 4, no. 1 (February 1, 2023): 1–23. https://doi.org/10.62096/sq.v4i1.50.

Izzuddin, Ahmad. "Dinamika Hisab Rukyat di Indonesia." *Istinbath: Jurnal Hukum* 12, no. 2 (2015): 248–73.

———. *Fiqh Hisab Rukyah di Indonesia: Upaya Penyatuan Mazhab Rukyah dengan Mazhab Hisab*. Yogyakarta: Logung Pustaka, 2003.

Keraf, A Sonny, and Mikhael Dua. *Ilmu Pengetahuan sebuah Tinjauan Filosofis*. Yogyakarta: Kanisius, 2001.

Khallāf, 'Abd al-Wahhāb. *'Ilm Uṣūl al-Fiqh*, Kairo: Dār al-Fikr, 1978.

Khazin, Muhyiddin. *Ilmu Falak dalam Teori dan Praktik: Perhitungan Arah Kiblat, Waktu Shalat, Awal Bulan dan Gerhana*. Yogyakarta: Buana Pustaka, 2004.

Koto, Ismail, Lila Pelita Hati, Afwan Syahril Manurung, and Anisa Suryani Siregar. "Islamic Holy Days: The Contention of Rukyatul Hillal and Hisab Hakiki Wujudul Hilal Disputes for Muslims in Indonesia." *Pharos Journal of Theology*, no. 105(2) (March 2024). https://doi.org/10.46222/pharosjot.105.210.

Maghfuri, Alfan. "Akurasi Perhitungan Gerhana Matahari dengan Data Ephemeris Hisab Rukyat." *Al-Afaq : Jurnal Ilmu Falak dan Astronomi* 2, no. 1 (June 30, 2020): 1–14. https://doi.org/10.20414/afaq.v2i1.2292.

———. "Hisab Waktu Shalat dalam Kitab Al-Durus Al-Falakiyyah." *Al-Mizan* 14, no. 1 (2018): 122–34.

Marpaung, Watni, and Nurhayati Nurhayati. "Determination the Beginning of Qamariyah Month According to Government." *Jurnal Ilmiah Islam Futura* 19, no. 2 (December 28, 2019): 278. https://doi.org/10.22373/jiif.v19i2.4867.

Marwadi, Mughni Labib, and Muhammad Fuad Zain. "Reforming the Islamic Calendar and Religious Authority: Dynamics of Hijri Calendar Calculation in Indonesia within Persatuan Islam's Thought." *Al-Manahij: Jurnal Kajian Hukum Islam*, June 30, 2025, 149–66. https://doi.org/10.24090/mnh.v19i1.10574.

Mochtar, Affandi. *Kitab Kuning & Tradisi Akademik Pesantren*. Bekasi: Pustaka Isfahan, 2009.

Mochtar, M Masyhuri. *Dinamika Kajian Kitab Kuning di Pesantren*. Pasuruan: Pustaka Sidogiri, 2015.

Moelong, Lexy J. *Metodologi Penelitian Kualitatif*. Bandung: Remaja Rosdakarya, 2007.

Mudzhar, Atho. *Pendekatan Studi Islam: Dalam Teori dan Praktek*. Pustaka Pelajar, 1998.

Muslih, Mohammad. "Pengantar Filsafat Ilmu, Kajian Atas Asumsi Dasar, Paradigma dan Kerangka Teori Ilmu Pengetahuan" *Solo: LESFI* 2016

Musonnif, Ahmad. "Islamic Law and Science in NU-Muhammadiyah's Lunar Calendar Determination." *Al-Hilal: Journal of Islamic Astronomy*, October 31, 2024, 199–220. https://doi.org/10.21580/al-hilal.2024.6.2.23995.

Muttaqin, Zainal. "Formalization of Islamic Law in Indonesia in the Framework of Social Engineering Theory by Roscoe Pound." *El-Mashlahah* 11, no. 2 (December 23, 2021): 97–115. https://doi.org/10.23971/elma.v11i2.2825.

Nasir, A.L.A.M., R. Umar, W.N.J.W. Yussof, N. Ahmad, A.N. Zulkeflee, N.H. Sabri, W.M.Y.W. Chik, N.A. Mahiddin, A.H. Bely, and A.I.S. Izdihar. "New Crescent Moon Detection Using Circular Hough Transform (CHT)." *Astronomy and Computing* 51 (April 2025): 100902. https://doi.org/10.1016/j.ascom.2024.100902.

Qulub, Siti Tatmainul. "Integrasi Astronomi dalam Ilmu Falak di PTAI dan Pondok Pesantren." *Al-Qanun: Jurnal Pemikiran dan Pembaharuan Hukum Islam* 21, no. 2 (2018): 288–309.

Ridwan and Muhammad Fuad Zain, "Religious symbol on determining the beginning and end of Ramaḍān in Indonesia" *HTS Teologiese Studies/Theological Studies*, 77(4), 2021, 1-9. https://doi.org/ 10.4102/hts.v77i4.6397.

Rohmah, Nihayatur. "Optimizing the Wukuf-'Arafah Time Determination Model According to the Governments of Saudi Arabia and Indonesia." *Justicia Islamica* 19, no. 2 (January 2, 2023). https://doi.org/10.21154/justicia.v19i2.4839.

Saksono, Tono. *Mengkompromikan Rukyat & Hisab*. Jakarta: Amythas Publicita: Center for Islamic Studies (CIS), 2007.

Sari, Septi, Agus Purwanto, and Akhmad Aminuddin Bama. "Menentukan Hisab Awal Bulan Hijriyah 1436 H dengan Metode Ephemeris." *Jurnal Penelitian Sains* 19, no. 3 (2018): 107–11.

Shadiq, Sriyatin. *Perkembangan Hisab Rukyat dan Penetapan Awal Bulan Qamariyah*. Surabaya: PT Bina Ilmu, 1995.

Syaukani, Imam. *Rekonstruksi Epistemologi Hukum Islam Indonesia dan Relevansinya bagi Pembangunan Hukum Nasional*, Jakarta: Rajagrafindo Persada, 2006.

Taufiq, Muhammad, Muhammad Fauzinudin Faiz, and Ziyad Ravaşdeh. "Between Sharia and State: Fatwa Authority and Pandemic Responses in Indonesia, Turkey, and Morocco." *De Jure: Jurnal Hukum dan Syar'iah* 17, no. 1 (June 28, 2025): 377–94. https://doi.org/10.18860/j-fsh.v17i1.31433.

Tim Dosen Filsafat Ilmu UGM. *Filsafat Ilmu; Sebagai Dasar Pengembangan Ilmu Pengetahuan*. Klaten: Intan Pariwara, 1997.

Wahidi, Ahmad. *Penggunaan Metode Hisab dalam Penentuan Awal Bulan Islam di Kalangan Pesantren Nahdlatul Ulama (NU) Malang*. Surabaya: UIN Sunan Ampel Surabaya Press, 2021.

Zufriani, Zufriani, Asa'ari Asa'ari, Jamal Mirdad, Arzam Arzam, Ahmad Izuddin, and Anwar M. Radiamoda. "Rukyat as Determination of the Lunar Month Beginning: A Method, Obstacles, and Debate in Indonesia." *JURIS (Jurnal Ilmiah Syariah)* 22, no. 1 (June 13, 2023): 53. https://doi.org/10.31958/juris.v22i1.6570.