

Islamic Astronomy in Modern Aceh: Sheikh Muhammad Amin al-Tirawi and His Manuscript

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Abstract: This study examines the classic manuscript *‘Umdat al-Tullāb fī Tārīkh al-‘Arāb* by Teuku Muhammad Amin al-Tirawi, a prominent scholar from Aceh. The research focuses on analyzing the Hijri calendar calculation system utilized in this manuscript and its relevance to efforts toward unifying the Hijri calendar in Indonesia. Employing a qualitative method with a library research approach, the study involves direct documentation of the manuscript, translation, and content analysis. The findings reveal that the manuscript applies the *hisāb ‘urfī jumālī* method, which is based on Arabic alphabetical numerical calculations adopted from Indian systems in the 3rd century CE. The key finding of the research is that the calculation algorithm in this manuscript is limited to the month of Muharram, using a repetitive method based on the provided tables. This study underscores the importance of preserving classical manuscripts as a foundation for advancing modern astronomical studies.

Keywords: Hijri calendar, astrology, *hisāb ‘urfī*, manuscript, Nusantara

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Introduction

Manuscripts serve as one of the most authentic primary sources in science, bridging the gap between the past and the present.¹ Classical manuscripts often preserve the information and knowledge of past societies, passed down through generations.² These cultural legacies exist in diverse forms, are scattered across Indonesia, and are written in various languages and scripts.³ The importance of studying classical manuscripts has been reiterated by numerous scholars worldwide, including the National Library of the Republic of Indonesia (*Perpustakaan Nasional*). The institution emphasizes that younger generations in Indonesia lack awareness and familiarity with ancient manuscripts and literature, which hold significant historical and scientific value.⁴

¹ C.C. Macknight and I.A. Caldwell, "Variation in Bugis Manuscripts," *Archipel* 61, no. 1 (2001): 139–54, <https://doi.org/10.3406/arch.2001.3616>; Maisyaroh Maisyaroh and Muhammad Iqbal, "Malay Ulama in Deli Land: The Life, Manuscripts, and Intellectual Networks of Shaykh Hasan Ma'sum (d. 1936)," *Nahrasiyah: Journal of Aceh and Malay Archipelago Heritage* 1, no. 1 (2023): 39–68, <https://doi.org/10.47766/nahrasiyah.v1i1.2038>; Mulaika Hijjas, "Marks of Many Hands Annotation in the Malay Manuscript Tradition and a Sufi Compendium from West Sumatra," *Indonesia and the Malay World* 45, no. 132 (2017): 226–49; Nurdin A.R., "The Manuscript Collection of the Aceh Museum," *Indonesia and the Malay World* 40, no. 116 (2012): 94–110, <https://doi.org/10.1080/13639811.2011.649001>.

² Oman Faturrahman, "A New Light on the Sufi Network of Mindanao (Philippines): The Sheikh Muhammad Said Manuscript Collection," *Indonesia and the Malay World* 47, no. 137 (2019): 108–24, <https://doi.org/10.1080/13639811.2019.1568753>; Oman Faturrahman, "Merawat Kearifan Lokal Naskah Islam: Pelajaran Dari Marawi," in *The 2nd International Seminar on Education* (Batusangkar: IAIN Batusangkar, 2017), <https://ejournal.uinmybatusangkar.ac.id/ojs/index.php/proceedings/article/download/850/773>.

³ Azyumardi Azra, "The Transmission of Islamic Reformism to Indonesia: Networks of Middle Eastern and Malay-Indonesian 'Ulama' in the Seventeenth and Eighteenth Centuries" (Columbia University, 1992); Azyumardi Azra, "Networks of the Ulama in the Haramayn: Connections in the Indian Ocean Region," *Studia Islamika* 8, no. 2 (2001), <https://doi.org/10.15408/sdi.v8i2.689>; Azyumardi Azra, *The Origins of Islamic Reformism in Southeast Asia: Networks of Malay-Indonesian and Middle Eastern "Ulama" in the Seventeenth and Eighteenth Centuries* (Netherlands: Asian Studies Association of Australia, 2004); Azyumardi Azra, "Nusantara Untuk Kebangkitan Peradaban: Memperkuat Optimisme Dan Peran Umat Muslim Asia Tenggara," in *Persidangan Antar Bangsa: Kosmopolitan Islam, "Mengilham Kebangkitan, Meneroka Masa Depan* (Kuala Lumpur, 2022).

Studies on classical astronomical calculations (*hisāb*) from early Islamic astronomy manuscripts have been revisited in response to the proposed unification of the Hijri calendar in Indonesia.⁵ The science of Islamic astronomy scholars argues that classical *hisāb* fulfils one of the three critical elements necessary to address this issue. Achieving a unified Hijri calendar requires consensus on specific criteria to standardize the determination of the start of each lunar month.

While contemporary calculation systems have developed significantly and offer greater convenience, classical manuscripts remain the foundation of the science of Islamic astronomy (*ilm al-falak*), which continues to evolve to this day. Without the classical calculation systems derived from these manuscripts, the advancements in the science of Islamic astronomy would not have been possible.⁶

This article examines one of Indonesia's longest-surviving classical manuscript legacies in the field of Islamic astronomy, *Umdat al-Tullāb fī Tārīkh al-ʿArāb*. This manuscript, written by Teuku Muhammad Amin al-Tirawi, an Acehese Islamic astronomy scholar, is in Arabic-Malay and was composed on European paper. The manuscript is currently under the supervision and care of Pedir Museum in Banda Aceh City. It consists of five folios (ten pages) focusing on Hijri calendar calculations. However, the manuscript does not explicitly explain the origins of the numbers or include clear formulas for the calculations. Instead, it comprises tables, sequential sentences, and uniquely includes Arabic poetry. The calculation system employed in the manuscript is based on *hisāb ʿurfī jumālī*, which adopts numerical rules derived from Arabic

⁴ Perpustakaan Nasional RI, "Naskah Kuno, Dampangi Masyarakat Pahami Budaya Bangsa," September 9, 2022, <https://www.perpusnas.go.id/berita/naskah-kuno,-dampangi-masyarakat-pahami-budaya-bangsa>.

⁵ Mohammad Ilyas, "Regional Seminar And Workshop On The International Islamic Calendar," *American Journal of Islam and Society* 5, no. 2 (1988): 293–98, <https://doi.org/10.35632/ajis.v5i2.2723>; Hamdun, "Upaya Penyatuan Kalender Islam Internasional Oleh Organisasi Kerjasama Islam (OKI)," *Jurnal Bimas Islam* 10 (2017): 473–516; Abdul Halim and Abdul Aziz, "A Unified Islamic Calendar Proposal for the World" *Middle-East Journal of Scientific Research* 22, no. 1 (2014): 115–120, [https://www.idosi.org/mejsr/mejsr22\(1\)14/16.pdf](https://www.idosi.org/mejsr/mejsr22(1)14/16.pdf).

⁶ Arwin Juli Rakhmadi Butar-Butar, "Problem Penelitian Naskah-Naskah Astronomi Di Indonesia," *OIF UMSU*, January 6, 2022, <https://oif.umsu.ac.id/2022/01/problem-penelitian-naskah-naskah-astronomi-di-indonesia/>.

letters influenced by Indian traditions dating back to the 3rd century CE. This manuscript focuses on Hijri calendar calculations supplemented by tables, explanations, and Arabic poetry. Although categorized as classical *hisāb* and no longer precise for contemporary use, studying the origins of the numbers, formulas, and calculation algorithms in the manuscript allows researchers to identify and refine algorithms that remain applicable. The Hijri calendar calculations in *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb* represent a crucial aspect of ancient manuscript studies that must be preserved.

Methods

This research is a library study⁷ that applies a philological approach.⁸ It involves the analysis of a text, and the compilation of various bibliographic references related to the text. The primary data source for this study is the book *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb* by Muhammad Amin al-Tirawi, an Acehnese scholar.⁹ The research data is analyzed using the content analysis method. Content analysis is conducted by examining the content of a text or manuscript. In this study, the researcher employs Krippendorff’s data analysis model, which outlines the steps of content analysis as consisting of unitizing, sampling, recording or coding, reducing, inferring, and narrating.¹⁰

Results and Discussion

Biography of Muhammad Amin at-Tirawi

Muhammad Amin al-Tirawi, also known as Teungku Chik di Tiro Muhammad Amin Dayah Cut, was a prominent Islamic scholar

⁷ Mestika Zed, *Metode Penelitian Kepustakaan* (Jakarta: Yayasan Pustaka Obor Indonesia, 2018).

⁸ Ade Iqbal Badruzaman and Ade Kosasih, “Teori Filologi Dan Penerapannya Masalah Naskah-Teks Dalam Filologi,” *Jumantara: Jurnal Manuskrip Nusantara* 9, no. 2 (2019): 1, <https://doi.org/10.37014/jumantara.v9i2.241>; Oman Fathurahman and Muchlis, *Filologi Dan Islam Indonesia* (Jakarta: Kementerian Agama RI Badan Litbang dan Diklat Puslitbang Lektur Keagamaan, 2010).

⁹ Yusny Saby, “The Ulama in Aceh: A Brief Historical Survey,” *Studia Islamika* 8, no. 1 (2001), <https://journal.uinjkt.ac.id/index.php/studia-islamika/article/view/694>.

¹⁰ Klaus H. Krippendorff, *Content Analysis* (California: Sage Publication, Inc., 1980).

of Arab and South Yaman descent. His arrival in Aceh began with a journey along the river, ultimately leading him to settle in the Tiro region. His decision to reside in Tiro was influenced by the fact that the ship he used during his voyage could navigate only as far as the Tiro border. Consequently, he chose to make Tiro his permanent home.

Historical records indicate that Muhammad Amin al-Tirawi lived in Aceh for an extended period. He had three children: the eldest, Teungku Muhammad Tahir; the second, Teungku Njak Latifah; and the youngest, Teungku Njak Safiah.¹¹

Muhammad Amin al-Tirawi was later recognized as an Islamic scholar who led one of the Islamic educational institutions, Dayah Tiro. This institution is in Gampong Tiro, Pidie. To this day, the Pidie region is remembered as a significant center of Islamic education in Aceh during the past, preserving its intellectual and historical heritage. Moreover, one of Aceh's national heroes, Teungku Chik di Tiro Muhammad Saman, studied under Muhammad Amin al-Tirawi before embarking on the Hajj pilgrimage and pursuing religious studies in Mecca.¹²

More than a century ago, under the leadership of Muhammad Amin al-Tirawi, Dayah Tiro became a hub for prominent scholars and Acehnese fighters. In addition to teaching religious and other forms of knowledge, Dayah Tiro was also known as a place for crafting traditional Acehnese weapons such as *rencong* (traditional daggers), spears, and *pedang on jok* (areca leaf swords). He was also renowned for his exceptional skills in developing war strategies. When the Dutch began invading Aceh, Muhammad Amin al-Tirawi appointed his nephew, Teungku Chik di Tiro, also known as Teungku Chik Muhammad Saman, as a war commander while he himself assumed the role of strategist in the resistance against Dutch forces.¹³ Despite his remarkable contributions,

¹¹ Yanti Dewi, "Identifikasi Tinggalan Teuku Chik Muhammad Amin Di Gampong Meunasah Mancang Kecamatan Tiro Pidie" (Universitas Islam Negeri Ar-Raniry, 2022), <https://repository.ar-raniry.ac.id/id/eprint/24867/>, 33.

¹² Dewi, "Identifikasi Tinggalan Teuku Chik Muhammad Amin Di Gampong Meunasah Mancang Kecamatan Tiro Pidie."

¹³ Febri Setiawan, Hanafiah Hanafiah, and Reni Nuryanti, "Peranan Ulama dalam Perang Aceh Tahun 1873-1912," *Seuneubok Lada: Jurnal Ilmu-Ilmu Sejarah, Sosial, Budaya Dan Kependidikan* 10, no. 2 (2023): 68–80, <https://doi.org/10.33059/jsnbl.v11i2.8705>.

Teungku Chik Muhammad Amin al-Tirawi passed away due to declining health, primarily caused by old age and fatigue. He was laid to rest in Tiro, specifically in Gampong Meunasah Mancang, Tiro Subdistrict, Pidie Regency, Aceh Province, Republic of Indonesia.¹⁴

Regarding his relationship with or contributions to the science of Islamic astronomy (*‘ilm al-falak*), there has yet to be a reference explicitly linking Teungku Muhammad Amin al-Tirawi to the study of this discipline. However, numerous authentic pieces of evidence suggest his expertise in astronomy, including the following:

- a. The discovery of the book *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb*, a classic text on Islamic astronomy. This manuscript focuses on the Hijri calendar, Arabic poetry related to the calendar, and accompanying *jumalī* tables.¹⁵ This serves as strong evidence that Teungku Muhammad Amin al-Tirawi possessed extraordinary knowledge of Islamic astronomy.
- b. The existence of an Islamic educational institution named Zawiyah Cut in Gampong Meunasah Mancang, Pidie Jaya.¹⁶ The role of Zawiyah Cut or the learning center founded by Muhammad Amin al-Tirawi extended beyond education. It served as a pivotal hub for scholars’ networks, research, information exchange, and astronomy. Therefore, it is evident that Muhammad Amin al-Tirawi mastered various disciplines, including astronomy and Islamic astronomy (*‘ilm al-falak*).

Muhammad Amin al-Tirawi and His Manuscript on Islamic Astronomy

The manuscript of *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb* is a collection of texts consisting of five sheets (ten pages) that discuss topics related to the Hijri calendar (*‘urfī*) and its chronology.¹⁷ According to references published by the Pedir Museum, historical records indicate that the manuscript of *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb* was authored by

¹⁴ Dewi, “Identifikasi Tinggalan Teuku Chik Muhammad Amin Di Gampong Meunasah Mancang Kecamatan Tiro Pidie.”

¹⁵ Muhammad Amin al-Tirawi, *‘Umdat al-Ṭullāb Fī Tārīkh al-‘Arāb*, n.d.

¹⁶ Dewi, “Identifikasi Tinggalan Teuku Chik Muhammad Amin Di Gampong Meunasah Mancang Kecamatan Tiro Pidie.”

¹⁷ Al-Tirawi, *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb*.

Muhammad Amin al-Tirawi.¹⁸ This classical text on Islamic astronomy was written in 1261 AH.

The condition of the manuscript remains remarkably clear, with no missing or blurred text. The manuscript is a fragmentary text without a title, combined with several other textual copies. Additionally, some sentences are written in red ink and composed in a clearly legible Arabic-Malay script.¹⁹

Figure 1. The Manuscript of *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb*



The primary discussion in the manuscript *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb* revolves around the calculation of the Hijri calendar using the *hisāb ‘urfī* method. This approach relies on the average calculation of the lunar cycle, which may differ significantly from modern astronomical methods used today.

The calculation method applies the *hisāb ‘urfī jumali* system, an astronomical calculation based on Arabic letters that carry specific numerical values. Each month and year in the Hijri calendar are associated

¹⁸ Pedir Mesuem Board, interview by Dilla Sri Junidar, July 2023.

¹⁹ Arwin Juli Rakhmadi Butar-Butar, *Katalog Naskah Astronomi, Matematika, Astrologi: Koleksi PEDIR Aceh* (Medan: UMSU Press, 2021), 87–95.

with Arabic letters. These letters are then calculated or formulated to derive equations for determining the dates in the Hijri calendar.

The Algorithm for Calculating the Hijri Calendar in *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb*

The calculation algorithm for the Hijri calendar, as discussed in the book *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb* by Teungku Muhammad Amin al-Tirawi, is primarily used for determining the date of the month of Muḥarram. This is because there are several supporting tables that can be directly referenced for the determination of the beginning of days for other Hijri months. The algorithm for calculating Hijri dates according to *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb* is as follows:²⁰

1) Determining Leap or Common Years

The first step in determining the beginning of the Hijri month, according to the book *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb*, is to classify the year as either a leap year or a common year. This classification influences the initial day, which is determined using the *‘urfī jumālī* tables presented in the book. The days written with black ink represent the beginning of days in a common year, while days written with red ink represent the beginning of days in a leap year. The book *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb* explains this as follows:²¹

- a. “This is a rule for knowing the first day of the months of Muḥarram. If you wish to determine the month of Muḥarram, first, you must identify whether it falls in a leap year or a common year.”
- b. “This section describes the schedule for identifying the beginning of each month in the Arab calendar according to the rule in *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb*. The days written in black ink represent the number four (*arba‘ah*), while those written in red ink represent the number five (*khamṣīyah*). This is how the beginning is determined.” Example of Calculation:

²⁰ Al-Tirawi, *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb*.

²¹ Al-Tirawi, *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb*.

1 *Muharram* 1266 H.

$$30/1266 = 42$$

$$\begin{array}{r} 120 - \\ 66 \\ 60 - \\ 6 \end{array}$$

Based on the example year noted in the book, which is 1266 H., dividing it by 30 clearly shows that the year 1266 H falls into the *basithah* (common) year category. This is because the division of 1266 H results in a remainder of 6, which falls within the *basithah* (common) year. Refer to the table below:

Table 1. Sequence of Leap and Common Years²²

Leap Year	Common Year
The 2nd year, the 5th year, the 7th year, the 10th year, the 13th year, the 15th year, the 18th year, the 21st year, the 24th year, the 26th year, and the 29th year.	The 1st year, the 3rd year, the 4th year, the 6th year, the 8th year, the 9th year, the 11th year, the 12th year, the 14th year, the 16th year, the 17th year, the 19th year, the 20th year, the 22nd year, the 23rd year, the 25th year, the 27th year, the 28th year, the 30th year.

b) Calculating the Letters of the Year

The second step in calculating the Islamic calendar, according to the book *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb*, involves determining and counting the letters of the year. This process is explained in the book as follows:²³

- “First, subtract one thousand two hundred and thirty (1230) years from the Hijri year. The remaining years will be.”
- “Then, subtract thirty years from the year you wish to find the beginning of, until you are left with either thirty years or fewer.”
- “Next, take five from every group of thirty years that you subtracted, and the remaining amount will be either thirty or fewer.”

²² Al-Tirawi, *Kitāb ‘Umdat al-Ṭullāb Fī Tārīkh al-‘Arāb*.

²³ Al-Tirawi, *Kitāb ‘Umdat al-Ṭullāb Fī Tārīkh al-‘Arāb*.

- d. “From every leap year, take five (5) units, and from every regular year, take four (4) units. Then add these three units together.”
- e. “Finally, from the sum of these three units, subtract seven repeatedly until you are left with either seven or fewer.”

Based on the steps outlined in the text above, the process of determining the Hijri year letter, as outlined in the book *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb*, can be written as follows:

- 1) After identifying the year to be determined, the first step is to divide the year by 1230.²⁴ Observe the calculation steps below for the date 1 Muḥarram 1266 AH.:

$$\begin{array}{r} 1230 / 1226 = 1 \\ \underline{1230 } \\ 36 \end{array}$$

- 2) Next, the result from the previous step is divided again by 30, as previously stated.²⁵ The calculation steps below:

$$\begin{array}{r} 30 / 36 = 1 \\ \underline{30 } \\ 6 \end{array}$$

- 3) Following that, the result from the division is subtracted by the number 5.²⁶ The calculation is as follows:

$$6 - 5 = 1$$

- 4) Next, the three values obtained from the previous three steps are combined.

$$36 + 6 + 1 = 43$$

- 5) After combining the values from the three previous steps, the next step is to subtract the result from point (4) according to the formula:²⁷

²⁴ Al-Tirawi, *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb*.

²⁵ Al-Tirawi, *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb*.

²⁶ Al-Tirawi, *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb*.

²⁷ Al-Tirawi, *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb*.

- a. If it is a leap year, subtract 5
- b. If it is a regular year, subtract 4

Based on the calculation, the year 1266 AH is a regular year (*basīṭah*), so the formula is subtracted by 4. Observe the calculation below:

$$43 - 4 = 39$$

- 6) The final step is to divide the result from the previous step by 7.²⁸ Observe the calculation below:

$$\begin{array}{r} 7 / 39 = 5 \\ \underline{35} \\ 4 \end{array}$$

After going through all the calculations from the first step to the sixth, the result for the Hijri year letter for 1266 AH. is 4. Referring to the table of *‘urfī jumālī* calculations in the book, the value 4 corresponds to the letter *dal*.

c) Calculating the Letters of the Month

The book *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb* explains that the letters of the month consist of ج ه و ا ب د ه ز ا ج, totaling 12 letters. Therefore, this sequence represents the letters of the months, arranged from Muḥarram to Dhu al-Hijjah.

In relation to the algorithm for calculating the Hijri calendar within this book, the calculation to determine the letters of the month does not use a specific formula to find the value of the letter of the month in question. This is because it simply involves observing whether the Hijri month falls into the category of *jumālī* letters, along with their respective values. Below are the letters of the Hijri months using the method of *‘urfī jumālī* calculation, according to the book *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb*.

²⁸ Al-Tirawī, *‘Umdat al-Ṭullāb Fī Tārīkh al-‘Arāb*.

Table 2. Names of the Letters of the Month.²⁹

Names of the Months	Letter	<i>Jumali</i> Number
<i>Muḥarram</i>	<i>Zai</i>	7
<i>Ṣafar</i>	<i>Ba</i>	2
<i>Rabī' al-Awwal</i>	<i>Jim</i>	3
<i>Rabī' al-Akhir</i>	<i>Ha</i>	5
<i>Jumād al-Awal</i>	<i>Waw</i>	6
<i>Jumād al-Akhir</i>	<i>Alif</i>	1
<i>Rajab</i>	<i>Ba</i>	2
<i>Sha'bān</i>	<i>Dal</i>	4
<i>Ramaḍān</i>	<i>Ha</i>	5
<i>Shawwāl</i>	<i>Zai</i>	7
<i>Dhu al-Qa'idah</i>	<i>Alif</i>	1
<i>Dhu al-Hijjah</i>	<i>Jim</i>	3

d) Determination of the Beginning of the Day

The next step is determining the beginning of the day by compiling all known data/values. Additionally, the reference year, whether leap or non-leap, also determines the beginning of the day to be calculated. This process is explained in the book *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb* through the following steps:³⁰

- “Once you recognize the letter for the year and the letter for the month, examine the numerical value of the letter for the year and the numerical value of the letter for the month, then sum these two values.”
- “You may start counting from Wednesday if you desire a total of *arba‘atun* (four), or from Thursday if you prefer *khamsiah* (five).”
- “The rule for determining the schedule of the beginning of each month in the Arab calendar, according to *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb*, states that numbers written in black ink represent *arba‘atun*, while numbers written in red ink represent *khamsiah*. Thus, it is sufficient to know the beginning.”

²⁹ Wali Cosra, Akhmad Arif Junaidi, and Ahmad Fuad al-Ansori, “Hisab Awal Bulan Syiah Kuala (Menyunting Dari Naskah Risalah Asy-Syaikh ‘Abd Ar-Rauf Fi At-Taqwim),” *Jurnal Ilmu Falak Dan Astronomi* 4, no. 1 (2022): 120, <https://doi.org/10.20414/afaq.v4i1.5137>

³⁰ Al-Tirawi, *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb*.

In the *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb*, the starting point for calculating the beginning of the day is divided into two categories. First, Wednesday is used as the starting point for a non-leap year. Second, Thursday serves as the beginning of the day for a leap year. In the table of general arithmetic data recorded in the book, black ink indicates results for non-leap years, while red ink represents results for leap years.³¹ For example:

Based on the calculation algorithm for 1 Muḥarram 1226 H, previously computed, the known data include:

- a. The year 1266 H is a non-leap year.
- b. The letter for the year 1266 H. is *dal*, with a numerical value of 4.
- c. The letter for the month of Muḥarram is *zai*, with a numerical value of 7.³²
- d. Since it is a non-leap year, according to the data from *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb*, the beginning of the day starts on Thursday.³³
- e. By summing the numerical values of the letter for the year and the letter for the month for 1 Muḥarram 1226 H:

Letter for the year	=	4	
Letter for the month	=	7	+
Result	=	11	
- f. The beginning of the day is calculated from Wednesday (non-leap year), so 11 days after Wednesday is Saturday. Therefore, 1 Muḥarram 1266 H, according to the calculation algorithm in *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb*, falls on Saturday.

After determining that the beginning of the day for 1 Muḥarram 1266 H falls on Saturday, the next step is to determine the beginning of the day for other Hijri months within the same year. This can be done in two ways:

- a. Calculating using the letter values for the month and starting the calculation of the beginning of the day with the reference to the beginning of the day for the month of Muḥarram.

³¹ Al-Tirawī, *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb*

³² Al-Tirawī, *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb*.

³³ Al-Tirawī, *‘Umdat al-Ṭullāb fī Tārīkh al-‘Arāb*.

Table 3: Reference of Letter Values for Months
(Starting Point for the Beginning of the Day
in the Month of Muḥarram)

Month Name	Before Change	After Change
	<i>Jumali</i> Number	<i>Jumali</i> Number
<i>Muḥarram</i>	ز = 7	ز = 7
<i>Ṣafar</i>	ب = 2	ج = 3
<i>Rabī' al-Awwal</i>	ج = 3	د = 4
<i>Rabī' al-Akhir</i>	ه = 5	و = 6
<i>Jumād al-Awwal</i>	و = 6	ز = 7
<i>Jumād al-Akhir</i>	ا = 1	ب = 2
<i>Rajab</i>	ب = 2	ج = 3
<i>Sha'ban</i>	د = 4	ه = 5
<i>Ramaḍān</i>	ه = 5	و = 6
<i>Shawwāl</i>	ز = 7	ا = 1
<i>Dhu al-Qa'idah</i>	ا = 1	ب = 2
<i>Dhu al-Hijjah</i>	ج = 3	د = 4

As for the example calculation, consider determining the beginning of the day on 1 Rajab 1266 AH. Based on the table above, it is known that the month of Rajab corresponds to the letter I, with a value of 3. Therefore, 1 Rajab 1266 AH is calculated to be three days ahead (starting from Saturday as the beginning of Muḥarram). The result for 1 Rajab 1266 AH thus falls on a Monday.³⁴

Additionally, the text also includes a table that simplifies the process of determining the beginning of days in other Hijri months, provided it is still within the same year and using Muḥarram as the reference point. The method involves identifying the beginning of the month of Muḥarram and then matching it with other months. The schedule table below applies to other Hijri months. Therefore, even without performing the calculations for the letter of the month, readers can easily determine the beginning of days for other months. Please refer to the image below:

³⁴ Al-Tirawi, *Umdat al-Tullāb fī Tārīkh al-'Arāb*.

Figure 3. Table of Monthly Schedules and Days (based on Muharam)

Month	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Muharam	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين
Safar	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين
Rabi' al-Thani	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين
Rabi' al-Awwal	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين
Jumada al-Thani	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين
Jumada al-Awwal	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين
Rajab	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين
Sha'ban	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين
Ramadan	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين
Shawwal	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين
Zulhijjah	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين
Dhu al-Qa'dah	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين	الاثنين

- b. Summing the letter values for the year and the letter values for the month based on Figure 3, then calculating the first day of the month. Please refer to the following calculation.³⁵

Calculation 1: Rajab 1266 H:

$$\begin{aligned}
 \text{Letter value for the year 1266 H} &= 4 \text{ (dal)} \\
 \text{Letter value for the month Rajab} &= 2 \text{ (ba)} + \\
 \text{Sum} &= 6
 \end{aligned}$$

Therefore, the first day of Rajab 1266 H is calculated from Wednesday (in a common year) by adding 6 days. Thus, Rajab 1, 1266 H falls on a Monday.

Table 4. Determining the First Day³⁶

Determination of the First Day	
<i>Basitah</i> Year	<i>Kabisat</i> Year
<i>Arba'atun</i> = Wednesday	<i>Khamsiah</i> = Thursday

The determination of the first day generally varies among different astronomical texts. Some begin the day from Wednesday without considering whether it is a leap or common year, as seen in the writings of Shiah

³⁵ Al-Tirawi, *'Umdat al-Tullāb fī Tārīkh al-'Arāb*.

³⁶ Al-Tirawi, *'Umdat al-Tullāb fī Tārīkh al-'Arāb*.

Kuala in the *Risālah al-Sheikh ‘Abd al-Ra‘uf fī Tārīkh al-Taqwīm*.³⁷ On the other hand, there is another opinion from Syekh Abbas Kutakarang, who starts the first day from Friday, as stated in his book, *Tāj al-Mulk*.³⁸

Conclusion

After conducting research on the text *‘Umdat al-Tullāb fī Tārīkh al-‘Arāb*, two key conclusions can be drawn: First, Muhammad Amin al-Tirawi was a scholar of Arab and South Yaman descent who traveled to Aceh and resided in Aceh for an extended period. He was also a member of the renowned Tiro family in Aceh, which included figures such as Teuku Chik Ditiro, one of his nephews. Muhammad Amin al-Tirawi’s dedication to knowledge was extraordinary, as evidenced by the discovery of his manuscripts and the establishment of Dayah Zawiyah Cut, which served as an Islamic educational institution during his time. Second, the algorithm for calculating the Hijri calendar presented in the *‘Umdat al-Tullāb fī Tārīkh al-‘Arāb* is specifically designed for the month of Muḥarram. The calculation process involves four steps: determining whether the year is leap (*kabisat*) or common (*basīṭah*), calculating the numerical value of the year, determining the numerical value of the month, and identifying the first day of the month. The calculation method employs the *hisāb ‘urfī jumālī* approach, in which the data used are pre-tabulated and follow a recurring pattern throughout the years.

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³⁷ Cosra, Junaidi, and Ansori, “Hisab Awal Bulan Syiah Kuala (Menyunting Dari Naskah Risalah Asy-Syaikh ‘Abd Ar-Rauf Fi At-Taqwim).”

³⁸ Hasna Tuddar Putri, “Hisab Urfi Syekh Abbas Kutakarang: Kajian Etnoastronomi Dalam Penentuan Awal Bulan Hijriah,” *Media Syariah* Vol. 21, no. No. 1 (2019): 29, <https://jurnal.ar-raniry.ac.id/index.php/medsyar/article/view/6476>.

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