JUSPI (JURNAL SEJARAH PERADABAN ISLAM)
Published by Study Programme of History of Islamic Civilization, Faculty of Social Science, Universitas Islam Negeri Sumatera Utara, Medan, Indonesia
Website: http://jurnal.uinsu.ac.id/index.php/juspi/index | Email: jurnal.juspi@uinsu.ac.id
ISSN: 2580-8311 (Online)
VOLUME 9
NUMBER 1
JULY 2025

RADEN RANGGAWARSITA'S CORRECTION OF THE JAVANESE ISLAMIC CALENDAR IN SERAT WIDYAPRADHANA

Kurnia Sofi Mufidah

Universitas Islam Negeri Walisongo Semarang, Indonesia

Abstract

The Javanese Islamic calendar is a cultural heritage passed down from our ancestors that continues to be preserved today. Some communities still use it in their daily lives. However, not everyone pays close attention to the correction system required for its proper use. Ranggawarsita, a prominent figure of the royal court, wrote a manuscript titled Serat Widyapradhana, which offers a detailed explanation of the application of the Javanese Islamic calendar, including how corrections should be made. This study uses a descriptive qualitative approach to explain how Raden Ranggawarsita addressed the correction system within the Javanese Islamic calendar. Data was collected through library research, using the Serat Widyapradhana manuscript as the main source. A philological approach was applied to help the researcher better understand the text. The study found, first, that the Javanese Islamic calendar was already in use before the reign of Sultan Agung, particularly by Sunan Giri. Second, Ranggawarsita explained in his writings how corrections should be made to the calendar, especially regarding the 2400-year *kurup* cycle, to prevent the calendar from falling out of sync. These corrections are essential to maintain harmony between the Islamic *Hijri* calendar and the Javanese calendar. This research highlights the need for greater awareness and understanding among users of the Javanese Islamic calendar, encouraging deeper engagement with the system and contributing to the broader field of Islamic astronomy, particularly in the study of calendar variations.

Keywords: Manuscripst; Javanese calender; Ranggawarsita; Serat Widyapradhana.

INTRODUCTION

Ranggawarsita was a poet of the Surakarta Palace whose works were widely copied because of the phenomenal content. He was a figure who not only mastered one field of science, but also several other sciences, including astronomy (phalac science) or astrology, because as a poet it is possible to master it. The works he has written such as law, economics, philosophy, history, mysticism, society, prophecy, fairy tales, etc. There are even some about astronomy or astrology (Musonnif, 2017). Ranggawarsita's popularity attracted the attention of Europeans to study Javanese literature. Ranggawarsita's thought in the field of astrology is *Serat Widyapradhana*. *Serat Widyapradhana* contains discussions about several types of calendar, namely solar (*shamsiyah*) and lunar (*qomariyah*). There is uniqueness in the explanation of the Islamic Javanese calendar, where the beginning of the calculation of the Islamic Javanese calendar system is in the Javanese Candra Sengkala year 1443 (Saka) based on the 8-year cycle (Musonnif, 2017) . In contrast to the version of Sultan Agung who enacted the Islamic Javanese calendar in 1555 Saka. The *khurup* system also has additional corrections to the count of 2400 runs.

Islamic Javanese calendar is included in the lunar calendar. The Javanese Islamic calendar calculation system is also called Candrasengkala (Apsari et al., 2021) is an acculturation of the Saka calendar and the Hijriyah calendar. Islamic Javanese calendar combines Islamic culture with Hindu-Buddhist culture (Nisa', 2021). The process of Islamization of Java was followed by the implementation of the Javanese Islamic calendar by the ruling royal figures. The Islamic Javanese calendar system began to be used in the 17th century during the reign of the Demak, Banten and Mataram Sultanates. According to some literature, the Islamic Javanese calendar was introduced

*Correspondance Author: kurniasofimufidah3@gmail.com
Article History | Submited: 12 December 2024 | Revised: 13 July 2025 | Accepted: 19 July 2025 | Publish: 25 Juli 2025
HOW TO CITE (APA 6th Edition):
Mufidah, Kurnia Sofi. (2025). Raden Ranggawarsita's Correction of the Javanese Islamic Calender in Serat Widyapradhana. *Juspi: Jurnal Sejarah Peradaban Islam*. 9(1), page.161-171
DOI: https://dx.doi.org/10.30829/juspi.v9i1.22484

by Sultan Agung of Mataram. He changed the calendar order in the community from the Saka calendar to the Islamic Javanese calendar. Sultan Agung is an Islamic religious figure who believes in kejawen. However, from one of the literatures that the author will research, there is a difference of opinion that the beginning of the implementation of the Islamic Javanese calendar took place earlier. Where the Demak government by Sunan Giri II formulated an Arabic calendar that was applied in Java (Musonnif, 2017). The Islamic Javanese calendar is also discussed in a work written by a Javanese poet, namely Ranggawarsita. The writing is *Serat Widyapradhana* which is one of his manuscripts.

Other studies have examined the thoughts and literary works produced by Raden Ranggawarsita. Such as the study of Ranggawarsito's Ethical Thought (Junaidi, 2020) and about the work of sartra and its role in character building (Munfangati, 2017). This research has not discussed in detail how the use of correction and the Islamic Javanese calendar system, so the author wants to examine the discussion specifically on the correction system in the Islamic Javanese calendar according to Ranggawarsita.

This paper aims to complement the shortcomings of previous studies on Islamic Javanese dating. Specifically, this paper reveals the subject's perspective in correcting the calculation of the khurup system that has been in effect and that will come. The subject clearly explains the correction calculation formula in a note. Therefore, the question that can be asked is how the content of the manuscript *Serat Widyapradhana* about the Javanese calendar, and how the correction was made by Ranggawarsita. Understanding the content and formula used to correct the Javanese calendar is very possible to add new scientific treasures to the calculation of the Javanese calendar.

The Javanese calendar has long been in effect and until now the Javanese people still use it for the commemoration of Islamic holidays. But so far, some parties who use the Javanese calendar system have not made corrections to the windu and khurup systems, they ignore them on the pretext that there is no need for replacement. This paper is based on the argument of Ranggawarsita who has provided knowledge about the calculation and steps to determine the day, month and year of use, and explains what corrections are needed to equalize with the *Hijriyah* calendar because in fact the origin of the Javanese calendar is the result of the acculturation of Javanese culture and Islam in the early days of Java.

RESEARCH METHOD

The method used in this research is a library research method on the Islamic Javanese dating system sourced from the Manuscript *Serat Widyapradhana* written by Raden Ranggawarsita. With a philological approach, researchers are able to understand the Javanese text which is the language of the manuscript (Baried, 1985). The manuscript of *Serat Widyapradhana* becomes the primary data source and is supported by several secondary sources, namely interviews with historians, journals, books, and others that discuss Islamic Javanese dating and manuscript studies. Data collection techniques were carried out by means of documentation, namely reviewing the manuscript documents of Serat Widyapradhan in the historical section and the applicable Islamic Javanese calendar calculation system. Interviews were conducted as supporting data regarding the historical life of Ranggawarsita. After the data is collected, the data analysis technique used is descriptive qualitative technique, which is a research process that produces descriptive data (description, explanation, description) in the form of speech or writing and behavior of the subject observed (Sukidin & Basrowi, 2002). Thus, this research aims to explain how the corrections to the Islamic Javanese calendar presented by Raden Ranggawarsita in the manuscript.

RESULT AND DISCUSSION

Definition of Dating

Penanggalan comes from the word *tanggal* (Poerwadarminta, 1999) which means the process, method, making, series, arrangement of dates in which there are the number of dates, days, and months (Warsito, 1978). In the big Indonesian dictionary, the word dating has the same

meaning as calendar, almanac, and takwim, namely a list of days and months in a year or the process, method, act of leaving (KBBI Online, n.d.) Modern terms are more familiar with dating as a calendar. The word calendar is an absorption of modern English "calendar", which comes from the old French "*calendier*" which is absorbed again from Latin "*kalendarium*", meaning a record book for money lenders. "*Kalendarium*" itself comes from the word "calendae" which means the day of the beginning of a month (Darsono, 2010) .

In terms of dating has several definitions, among others, dating is a table or series of pages showing days, weeks, and months in a particular year (Amri, 2016). According to Susiknan Azhari, dating is a system of organizing units of time for the purpose of marking and calculating time in the long term (Azhari, 2008) . Syamsul Anwar explains the definition of dating is a marking that is done by giving names such as Sunday, Monday, and so on in Indonesian and by giving a sign in the form of numbers (Arafat, 2020). Slamet Hambali defines dating with a calculation system that aims to organize time in a certain period with the month as a unit that is part of the almanac, the day as the smallest almanac unit, then the time system, namely hours, minutes, and seconds (Hambali, 2011). So it can be concluded that dating is a system of time markers arranged in the form of tables of days, weeks, and months with certain references that apply in the long term.

There are about 40 kinds of calendar scattered in this world with their respective ways of determining according to their influence factors (Rofiuddin, 2016). In general, there are three categories of calendar calculations. First, the Gregorian or Christian calendar is a calendar system that makes the movement of the Sun as a reference for its calculations (*shamsiyah* or solar system). The age of the day or the number of days is adjusted to the period division policy, Julian and Gregory, which has a four-year cycle, with details (3 x 365 days) + (1 x 366 days) = 1461 days (Somawinata, 2020). Second, the lunar calendar is based on the moon's journey while orbiting (evolving towards the Earth). The guideline used by the lunar calendar is the synodic journey of the moon (12 x 29.5306 days) (Butar-Butar, 2016) for 354 days 48 minutes 35 seconds (A.M.G. Rashed, 2017). Third, the luni-solar calendar, which is a combination of the lunar system and the solar system. The luni-solar calendar has a sequence of months that refers to the lunar phase cycle, but at every various year an insertion is given to keep it synchronized with the seasonal calendar.

Islamic Javanese Calendar

On the island of Java itself, the diversity of calendar use has been seen since pre-Islamic times until Islam entered. Among the dates that were applied were Pranatamangsa, Saka, and Masehi. Considering the history of the Islamic Javanese calendar system is the result of a cultural fusion of the Saka (Hindu) calendar that was previously used by the Javanese people, as evidenced by historical records from the book "*Primbon* Aji Caka Almanak *Pawukon* 1000 *Taun*" (Fitriyanti, 2011). The Islamic Javanese calendar is a lunar system-based calendar that follows the circulation of the moon. This calendar is included in the arithmetic calendar base (Bashori, 2013) or mathematical calendar. The number of days in a month is known with certainty, it does not change. Because it belongs to the arithmetic calendar, the calculation is easier, but the accuracy of the calculation is less than perfect considering the circulation of the Earth and the Moon is not fixed. When compared to other calendars, the Javanese calendar has a more complete and comprehensive system, which means that the Javanese accuracy in observing a natural phenomenon for life needs is very thorough. One of them is the pranatamangsa calendar (Hartono Kristoko, 2012). There is also a division of days that does not only contain seven in a week but two to nine days(Bashori, 2013)

The beginning of the day in the Javanese calendar begins at sunset with a very diverse daily cycle, namely a seven-day, five-day and nine-day cycle. Javanese people are familiar with the terms weton and pasar. These terms also changed after the entry of Islam in Java. The ancient Javanese year that used the terms Umanis, *Pahing, Pon, Wagai, Kaliwuan*, the Islamic Javanese calendar changed to *Legi, Pahing, Pon, Kliwon* (How is the History of the Origin of the Names of Market Days in the Javanese Calendar?, n.d.) . The Javanese Islamic calendar is based on the movement of the Moon around the Earth or the revolution of the Moon, which is a synodic cycle aged 29 days 12

hours 44 minutes 2.5 seconds (Bashori, 2013) , so it takes 29 days or 30 days (rounding days) to change to the next month. Unlike the *Hijriyah* calendar, which determines the beginning of the month by observation, the Javanese calendar is based on arithmetic, the count has been determined in one year. The result of the adaptation of Javanese culture and the inclusion of Islamic traditions in the Javanese calendar is the change in the names of the months, which originally adopted from the Saka year, *namely Srawana, Badra, Aswina, Kartika, Margasira, Pusya, Mugha, Paguna, Cetrama, Jysetha*, and *Asadha*, changed to *Suro, Sapar, Mulud, Bakdo Mulud, Jumadil Awal, Jumadil Akir, Rejeb, Ruwah, Poso, Sawal, Selo* and *Besar* (Wiranti, 2021) .

The determination of the Islamic Javanese year is based on a cycle of one windu consisting of 8 years, adopted from the previous Saka calendar. Each windu has its own name, namely windu Adi, windu kuntara, windu sengara, and windu sancaya which runs twice round with the symbols *Langkir* and *Kulawu* (Hambali, 2011) . To incorporate Islamic culture into the calendar, the names of the year are made with a pattern of letters and agka jumali (**وجا هجز دب**), namely, Alip, Ehe, Jim Awal, Je, Dal, Be, Wawu, Jim Akir. Fixed year numbers start from the letters Alif, Ehe, and so on in accordance with the rules of Arabic numerals. The difficulty in calculating fractions of days is overcome by the existence of 3 wastu (long years) in each windu, so that the age = (354 x 8) + 3 = 2835 days. The *wastu* is placed in years 2, 5, and 8 (Masruhan & Program, 2017) . The *windu* system in the Javanese Islamic calendar is a simplification of the 30-year cycle found in the Hijriyah calendar. If calculated in 30 years (1 cycle) is 10631 days from the calculation of (354 x 30) + 11) (Hambali, 2011) days. Within 120 years there will be a difference of 1 day between the *Hijriyah* calendar and the Javanese Islamic calendar, hence the establishment of the *Khurup* system. The *Kurup* system itself has its own names for each year, namely *Jamngiyah, Kamsiyah, Arbangiyah, Salasiyah, Isananiyah, Akdiyah,* and *Sabtiyah*. The names of the years are adjusted to the first day of the Alip year in every 15 winds, such as those that have been running, namely *A'ahgi, Amiswon, Aboge,* and *Asapon.*

Biography of Ranggawarsita

Ranggawarsita is a nickname or title given by the king for the position of poet in a palace. In this paper, the Ronggowarsito referred to is Raden Ronggowarsito III who has been recognized by many circles for his phenomenal work. Raden Ronggowarsito III has the real name Bagus Burhan who was born on Monday, March 15, 1802 AD(Any, 1980). His father was also a poet of the Surakarta Palace named Raden Mas Pajangswara (Ronggowarsito II), the 13th descendant of Sultan Trenggono (Cipta, 2020). His mother had the nickname Mas Ajeng Ronggowarsito, the daughter of Mas Ngabehi Sudiradirja Gantang, a singer of *Macapat lagon palaran* songs (Jawa.org, n.d.) . Growing up in the palace, her character was based on the upbringing of her grandfather Raden Tumenggung Sastronagoro (Raden Ronggowarsito I) with a nanny named Ki Tanujoyo (Any, 1980).

Bagus Burhan's adolescence lived a life full of twists and turns, starting from the story of his enrollment at the Gebang Tinatar Ponorogo Islamic Boarding School, which was raised by Kyai Imam Besari II (Rahmawati, 2021) . Far from smooth, he was even scolded by his own Kyai because of his bengal behavior, like gambling and playing cockfighting. However, from this event, it became a way for him to become better and obtain the revelation of Judaism or the light of Judaism's inspiration,(Any, 1980) After doing tirakat 40 days of fasting and *kungkum* in the river, the young poet *was* immediately able to read the Koran in a beautiful tone without the slightest mistake and interpret the Koran in Javanese (Florida, 2021) . In retrospect, it is not surprising that Bagus Burhan received the inspiration for his poetry, as his maternal grandfather was a singer of the Macapat *lagon* palaran. During the reign of Kanjeng Gusti Pakubuwono IV, every Monday and Thursday he was asked to recite the song at Pendopo Ageng (Jawa.org, n.d.). After he traveled to deepen his knowledge to the island of Bali, where he studied with Kyai Tuggulwulung in Ngadiluwih, Kyai Ajar Wirakanta in Ragajambi, and Kyai Ajar Sidalaku in Tabanan Bali, Bagus Burhan was appointed as a courtier with the position of *carik* or clerk in Kadipaten Anom, Surakarta Kasunanan Palace. He was titled *Mas Ronggo Pujangga Anom* which means young writer (Yasasusastra, 2016) and married

Raden Ayu Gombak (Kamajaya, 1991) daughter of Adipati Cakraningrat (Regent of Kadiri) on November 9, 1821.

Raden Ranggawarsita's popularity began when he became a poet of the Surakarta Palace (Florida, 2021) . Foreigners outside the palace became Ranggawarsita's partners such as CF. Winter, known as the father of colonial philology, J.F.C. Gricke, Dr. Falemr Van Den Broug, Jonas Portier and many more. Together with C.F. Winter they succeeded in compiling a book of Javanese literature entitled Paramasastra Jawi (Ikram, 2014). Together with another figure, Jonas Portier, they were able to publish the Bramartani magazine which raised political issues of Dutch colonialism with its unreasonable policies, so that Ranggawarsita was known as a native informant (Norma, 2017). Many of his works have skyrocketed abroad and his works are reprinted to maintain their preservation. There are about 56 works that can be produced in various forms, prose to songs. He also made several compositions of his grandfather's works such as the ancient Kakawin Bhatarayuda manuscript (Florida, 2021).

Raden Ranggawarsita's indication of studying phalac or astronomy is that he was a court poet or clergyman who had to be *mandraguna.* The trail of his knowledge acquisition began with his studies at the Gebang Tinatar Tegalsari boarding school with Kyai Hasan Besari II. The possibility of acquiring knowledge about astrology or astronomy is very high. In the manuscript it is also written that the explanation of the solar year and lunar year is in accordance with the *Washilatul Thulab* book, which is a Falak book by Nusantara figures. In addition, by his own family, Pangeran Buminata was also taught necromancy, which is also based on astrology. In Javanese society, the science of *titen* is still closely held.

Manuscript of Serat *Widyapradhana*

Manuscript is synonymous with the term script, meaning all handwritten materials left by ancestors on paper, palm, bark, and rattan. According to the Big Indonesian Dictionary, manuscripts are handwritten manuscripts that are the study of philology *(KBBI Online*, n.d.). In Latin manuscripts are called *codex,* in English they are called manuscript, and in Dutch they are called handschrift (Suryaningsih & Hendrawanto, 2017). Manuscripts are used in science to explore the history of what is recorded in a period which is the product of the past. By studying manuscripts, the thoughts of the predecessors will be revealed. Nusantara manuscripts have attracted the attention of observers and researchers in various disciplines, both within the country and abroad.

The manuscript of *Serat Widyapradhana* is a relic of Raden Ranggawarsita that is still kept at the Radya Pustaka Museum in Surakarta. The manuscript is in Javanese Krama and written in Javanese script. *Serat Widyapradhana* is one of Raden Ranggawarsita's writings in the form of prose so that it can be read by the general public. because most of his writings are in the form of tembang or *gancaran* which are intended specifically for writers. *Serat Widyapradhana* has been copied three times with each copy written in a different style. The copies are also placed in 2 places, two are stored in the Sasana Pustaka Library of the Surakarta Palace, and one in the Pura Pakualam Library of the Yogyakarta Palace (Kusumasari, 2014). The discussion is about astrology which is about dating. Raden Ranggawarsita did not write the title, which only focuses on the calculation of the shamsiyah and kamariyah years. It explains the example of the calculation of the tiger year that runs in the land of the Javanese kingdom. Ranggawarsita's works are mostly in the form of songs which are chanted by the puppeteers in wayang performances. 60 manuscripts separately in the chapter title section, but the first paragraph clearly states that this writing is about "*Serat Widyapradhana*".

Widyapradhana consists of two words *Widya* and *Pradhana*. In the Baoesastra Djawa Poerwadarminta dictionary Widya means *kawruh* (knowledge), and *pradhana* means *panggedhe* (big). The meaning is that this fiber contains great knowledge, namely phalac science regarding the calculation of the calendar system (Kusumasari, 2014) . The hope of writing the manuscript as a basic source of great knowledge for the community and its readers. Not only the calculation, but also the history of dating from before the Prophet to the 19th century in Java, especially Surakarta. The manuscript of *Serat Widyapradhana* consists of 18 sheets along with a cover which in general

there are 4 chapters of discussion studies in it, namely first, an explanation of the solar and lunar years, second, an explanation of the use of dating throughout the world, third, an explanation of the history of the use of dating in the Arab lands, and fourth, an explanation of the Islamic Javanese year (Ranggawarsita, n.d.).

Correction of the Javanese Islamic calendar by Ranggawarsita

The discussion of the Islamic Javanese calendar is specifically explained in the manuscript of *Serat Widyapradhana* starting from page 10 to the end. The system used in the Islamic Javanese calendar is the result of cultural assimilation between the *Hijriyah* calendar and the Saka calendar which is guided by the journey of the Moon system (Darsono, 2010). History records that the Islamic Javanese calendar was first initiated by Sultan Agung who ruled during the Islamic Mataram Kingdom. It is said that Sultan Agung abolished the Saka calendar system from the corners of Islamic Mataram (Bashori, 2013) for several purposes, namely:

1. The tactic of unity of the Mataram people to face Dutch colonization,
2. Commemoration of Islamic holidays is easier to remember
3. The process of Islamization of Java (Nisa', 2021).

However, in the manuscript *Serat Widyapradhana* Ranggawarsita explains that the beginning of the Islamic Javanese count was in the year *Condrosengkala* Jawi 1443 or 1443 Islamic Java, coinciding with the year 931 Hijriyah in the Islamic calendar. This period was under the rule of Kanjeng Sunan Giri II in the Demak Sultanate (Ranggawarsita, n.d.). Due to the internal conflicts of the Demak Sultanate itself and the disapproval of Sultan Agung's policies towards his control of the entire Islamic Mataram region, Sultan Agung's seizure of the throne of the Sultanate was successfully conquered (Usamah, 2019).

The method of calculating the Islamic Javanese calendar in the manuscript continues to use urfi or conventional *hisab*. It began in 1443 Java, which continued the Saka calendar that had previously been used. At that time it coincided with the year 931 Hijriyah, the reign of Sunan Giri II in the Demak Kingdom. Based on an excerpt from the text of the *Widyapradhana* fiber, 1 Suro 1443 Java in the year Alip coinciding with 1 Muharam 931 *Hijriyah* is *khurup Sabtiyah* or *Atuhing* (Alip Saturday Pahing). Written in the year Suryasangkala 1400, the collapse of the Majapahit kingdom set the stage for the development of new Javanese literature with an Islamic flavor, so it is possible that their calendar had an impact on the assimilation of new cultures. The number of years is still in accordance with the windu cycle, namely Alip, He, Jim Awal, Ze, Dal, Be, Wawu, and Jim Akir, with the calculation of the neptu of each year to facilitate calculation (Ranggawarsita, n.d.) . In 8 years there are 3 times *wuntu* and 5 times *wastu*.

No	Windu Name	Day Neptu	Neptu Pasaran	Age of Day	System
1	*Alip*	1	1	354	*Wastu*
2	*He*	5	5	355	*Wuntu*
3	*Jim Awal*	3	5	354	*Wastu*
4	*Ze*	7	4	354	*Wastu*
5	*Dal*	4	3	355	*Wuntu*
6	*Be*	2	3	354	*Wastu*
7	*Wawu*	6	2	354	*Wastu*
8	*Jim Akir*	3	1	355	*Wuntu*

The *khurup* system is a simplification of the correction that occurs in the difference between the Hijri calendar and the Javanese Islamic calendar. If accumulated over 120 years, there will be an excess of one day faster than the Islamic Javanese calendar, so that every change of *khurup* is

backward one day to adjust it to the Hijriyah calendar. The adjustment is made because the root of the Javanese Islamic calendar is the *Hijriyah* calendar.

No	Name of *Khurup*	Islamic Javanese calendar *Widyapradhana*	*Khurup* period (year)
1.	Atuhing	1443 J-1506 J	64 years
2.	Ajumgi	1507 A-1626 A	120 years
3.	Amiswon	1627 A-1746 A	120 years
4.	Aboge	1747 J - 1866 J	120 years
5.	Asapon	1867 J - 1986 J	120 years

Naturally, the average length of the Moon's revolution is 29 days 12 hours 44 minutes 2.8 seconds (29.51223 days) (Khazin, 2008) . When multiplied into 12 months, the length of one year in the lunar calendar is 354 days 8 hours 48 minutes 33.6 seconds. One cycle of the Islamic Javanese calendar is 2835 days (Masruhan & Program, 2017), so the average time required per year is 354.375 days (354 days 9 hours). One month has an average age of 29 days 31 minutes 52.5 seconds. So, the difference between the two dates is about 12 minutes per year. If the difference is accumulated for 120 years, the result is an excess of 24 hours. Raden Ranggawarsita clarified the calculation of *khurup* 120 in detail in the *Widyapradhana* fiber (Ranggawarsita, n.d.).

\

Time Unit	Time Regression	Unit of Time	Time Decay
1 month	1 minute	50 years	10 hours
1 year	12 minutes	60 years	12 hours
5 years	1 hour	70 years	14 hours
10 years	2 hours	80 years	16 hours
15 years	3 hours	90 years	18 hours
20 years	4 hours	100 years	20 hours
25 years	5 hours	110 years	22 hours
30 years	6 hours	120 years	24 hours
40 years	8 hours		

However, it is explained in the text excerpt below that the result of the difference between the two dates for 120 years is not even 24 hours, but only 22 hours 48 minutes, which is 1 hour 12 minutes less. In one year, the Moon advances 36 seconds. The explanation in the manuscript is written:

> *"Dene patitisipun lampahing khurup punika ing dalem 120 taun among mundur 22 jam langkung 48 ureyan, jangkepipun sadinten sadalu dados kirang 1 jam langkung 12 ureyan. Etangipun ing saben 100 taun kirang sejam. Saben 1000 taun kirang 10 jam. Ing saben 1200 taun kirang 12 jam. Dados ing saben 2400 tan kirang 24 jam manjing ing dalem sadinten sadalu, mila lampahing khurup wau menawi angsal 2400 taun botem mawi kaunduraken. Upami khurup ingkang kapengker nuju Kamsiyah, boten mundur dhateng Arbangiyah, inggih punika lajeng Kamsiyah malih lampahing khurup. Mila makaten menggah dipuncakraning condra punika ing saben sanben taun majeng 36 uren-uren. Dados etangipun ing dalem 100 taun*

majeng sejam. Ing dalem 120 taun majeng 1 jam langkung 12 ureyan. Ing dalem 1200 taun majeng 12 jam. Ing dalem 2400 taun majeng 24 jam, dados manjing sadinten sadalu. Mila angsal 2400 taun boten mawit unduripun lampahing khurup wau"

Translation: "Further explanation of the journey of the khurup in 120 years is only 22 hours and 48 minutes back, even a day and night is less than 1 hour and 12 minutes. The calculation for every 100 years is one hour less. Every 1000 years less 10 hours. Every 1200 years less 12 hours. So, every 2400 years less 24 hours, enter a day and night. Because the khurup's journey has got 2400 years it is not postponed. If the last khurup was Kamsiyah, it does not go back to Arbangiyah, but goes on the Kamsiyah khurup again. Therefore, the rotation of the Moon in each year advances 36 seconds. So, the calculation in 100 years advances one hour, in 120 years advances 1 hour more 12 minutes, in 1200 years advances 12 hours, in 2400 years advances 24 hours. Then enter a day and night. If you have got 2400 years the journey of khurup does not go backwards"(Ranggawarsita, n.d.).

Serat Widyapradhana	Disadvantages
2400 years	24 hours
1200 years	12 hours
100 years	1 hour
20 years	12 minutes
1 year	36 seconds

Table. Calculation of time difference

In order to achieve an even 24-hour time deficit, the cycle must run 2400 years. Therefore, the *khurup* does not go backwards like a normal cycle, but continues to run on the same *khurup*. In other words, after every 20 *khurups*, the *khurup* name is the same as the previous *khurup*.

Order of *Khurup*	*Khurup* Name	*Khurup* Period	Number of Years
1	Sabtiyah (Atuhing)	1443 AH - 1506 AH	64
2	Jamngiyah (Ajumgi)	1507 J - 1626 J	184
3	Kamsiyah (Amiswon)	1627 J - 1746 J	304
4	Arbangiyah (Aboge)	1747 J - 1866 J	424
5	Salasiyah (Asapon)	1867 J - 1986 J	544
6	Isneniyah (Anenhing)	1987 J - 2106 J	664
7	Akadiyah (Akagi)	2107 J - 2226 J	784
8	Sabtiyah (Atuwon)	2227 J - 2346 J	904
9	Jamngiyah (Ajumge)	2347 J - 2466 J	1024
10	Kamsiyah (Amispon)	2467 J - 2586 J	1144
11	Arbangiyah (Abohing)	2587 J - 2706 J	1264
12	Salasiyah (Asagi)	2707H - 2826H	1384
13	Isneniyah (Anenwon)	2827 J - 2946 J	1504
14	Akadiyah (Akage)	2947 J - 3066 J	1624
15	Sabtiyah (Atupon)	3067 J - 3186 J	1744
16	Jamngiyah (Ajumhing)	3187 J - 3286 J	1864

17	Kamsiyah (Amisgi)	3307 J - 3406 J	1984
18	Arbangiyah (Abowon)	3427 J - 3526 J	2104
19	Salasiyah (Asage)	3547 J - 3646 J	2224
20	Isneniyah (Anenpon)	3667 J - 3766 J	2344
21	Akadiyah (Akahing)	3787 J - 3886 J	2464
22	Akadiyah (Akahing)	3907 J - 4027 J	2584

CONCLUSION

In summary, Mohammed Arkoun's ideas provide a fresh perspective on Islamic studies that captures the political, ethical, and philosophical essence of the religion. In order to integrate "Islamic authenticity" with the latest findings in social science, Arkoun advocates for Applied Islamology. His approach highlights the significance of viewing Islam in historical, sociological, and realist contexts while attempting to go beyond the confines of mediaeval epistemology. Future Islamic studies, according to Arkoun, must focus on the modern environment in addition to the text's content and be able to recognise the mental biases (logocentrism) that characterised the Middle Ages. By highlighting the need to recreate Islamic understanding through scholarly reasoning and cross-cultural communication, Arkoun's Islamic political thought offers a middle ground between secularism and fundamentalism. According to Arkoun, the significance of Islamic thought's renewal, religious tolerance, plurality, and democracy are fundamental elements. He urges Muslims to use modern epistemes and engage in cross-cultural discourse in order to meet the difficulties of the day. Finally, in order to accomplish advancement in line with global Islamic norms, Arkoun challenges Muslims to reinterpret the link between religion and politics in a way that is objective, logical, and transformative.

The Islamic Javanese calendar began in 1443 AH, which was pioneered by Sunan Giri II during the Demak Sultanate. The Islamic Javanese calendar uses a lunar-based calendar system with the *hisab* "urfi calculation method". The Javanese Islamic calendar is governed by two systems, an eight-year cycle called windu and a 120-year cycle called *khurup*. The name of the year is calculated from the *windu* cycle based on the sequence of *Abjadi* letters. While the 120-year cycle is used as a correction to equalize the Islamic Javanese calendar which is one day (24 hours) faster than the *Hijriyah* calendar. Therefore, every 120 years the *khurup* system will retreat 1 day, the mention of the term khurup system is based on the fall of the first day of the Alip year every 15 winds. The next correction made by Ranggawarsita is regarding the running of the *khurup* for 2400 years, that for 120 years it is not even 24 hours, but only 22 hours 48 minutes, which is 1 hour 12 minutes less. Calculated in one year, the Moon advances 36 seconds. If collected over 2400 years, this would result in the Moon advancing by 24 hours. Therefore, the *khurup* system which is supposed to be retrograde is not postponed to the previous *khurup* but is still the same as the current *khurup*.

This research complements several previous studies on the Javanese calendar. This research adds a study of the correction of the Javanese calendar that has been formulated by Raden Ranggawarsita in his notes entitled *Serat Widyapradhana*. The shortcomings of this research are very limited to the data obtained, so the possibility of further research to add further studies on issues that are still odd.

REFERENCES

A.M.G. Rashed, M. G. M. (2017). Suggestion Of A Conventional Islamic Calendar. *National Research Institute Of Astronomy And Geophysics Journal Of Astronomy And Geophysics*, *6*, 275.

Amri, R. (2016). Pemikiran Mohammad Ilyas Tentang Penyatuan Kalender Islam Internasional. *Profetika, Jurnal Studi Islam*, *17*(1), 1–15.

Any, A. (1980). *Raden Ngabehi Ronggowarsito, apa yang terjadi?* Semarang: CV Aneka Ilmu.

Apsari, R. A., Sariyasa, S., Junaidi, J., Tyaningsih, R. Y., & Gunawan, G. (2021). An Ethnomathematics Case Study of Candrasengkala: A Reversed Order Chronogram in Bali-Java Tradition. *Journal of Physics: Conference Series*, *1933*(1). https://doi.org/10.1088/1742-6596/1933/1/012075

Arafat, M. (2020). *Konsep Penyatuan Kalender Hijriah Global Perspektif Syamsul Anwar*.

Azhari, S. (2008). *Ensiklopedi Hisab Rukyat*. Yogyakarta: Pustaka Pelajar.

Bagaimana sejarah asal mula digunakannya nama hari pasaran dalam penanggalan Jawa (Pon, Wage, Kliwon, Legi, Pahing)? (n.d.).

Baried, D. (1985). *Pengantar Teori Filologi*.

Bashori, M. H. (2013). *Penanggalan Islam*. Jakarta: PT Elex Komputindo.

Butar-Butar, A. J. R. (2016). *Pengantar Ilmu Falak Teori dan Praktik*. Medan: LPPM UISU.

Cipta, S. E. (2020). Ranggawarsita And Javanese Sufisme: A Study On Bagus Burhan's Thought On Javanese Islam Culture (1823-1870). *ISLAH : Journal of Islamic Literature and History*, *1*(1).

Darsono, R. (2010). *Penanggalan Islam (Tinjauan Sistem, Fiqh dan Hisab)*. Yogyakarta: Labda Press.

Fitriyanti, V. (2011). *Unifikasi Kalender Hijriyah Nasional di Indonesia: Dalam Perspektif Syari'ah dan Sains Astronomi*. UIN Walisongo.

Florida, N. K. (2021). *Jawa Islam di Masa Kolonial: Suluk, Santri, dan Pujangga Jawa*. D.I. Yogyakarta: Buku Langgar.

Hambali, S. (2011). *Almanak Sepanjang Masa*. Semarang: Program Pascasarjana IAIN Walisongo.

Hartono Kristoko, D. (2012). Updated Pranata Mangsa: Recombination of Local Knowledge and Agro Meteorology using Fuzzy Logic For Determining Planting Pattern. *UCSI International Jurnal of Computer Science Issues*, *9*(2), 367.

Ikram, A. (2014). *Masyarakat dan Kesusastraan di Jawa*. Yogyakarta: Yayasan Pustaka Obor Indonesia.

Jawa.org, S. (n.d.). *Babad Rănggawarsita*.

Junaidi, M. (2020). Pemikiran Etika Ranggawarsita. *Dar El Ilmi: Jurnal Studi Keagamaan, Pendidikan Dan Humaniora*, *7*.

Kamajaya. (1991). *Lima Karya Pujangga Ranggawarsita*. Jakarta: Balai Pustaka.

KBBI Online. (n.d.).

Khazin, M. (2008). *Ilmu Falak Dalam Teori dan Praktik*.

Kusumasari, R. A. (2014). *Serat Widya Pradhana (Suatu Tinjauan Filologis)*.

Masruhan, & Program. (2017). Islamic Effect on Calender of Javanese Community. *Al-Mizan : Jurnal Pemikiran Hukum Islam*, *13*(1), 53–68.

Munfangati, T. (2017). *Raden Ngabehi Ranggawarsita: Hasil Karya Sastra dan Perannya dalam Pembangunan Karakter*. *12*.

Musonnif, A. (2017). Geneaologi Kalender Islam Jawa Menurut Ronggo Warsito: Sebuah Komentar atas Sejarah Kalender dalam Serat Widya Pradhana. *Kontemplasi: Jurnal Ilmu-Ilmu Ushuluddin*, *5*(2). https://doi.org/10.21274/kontem.2017.5.2.329-355

Nisa', I. N. F. (2021). Historitas Penanggalan Jawa Islam. *Elfalaky: Jurnal Ilmu Falak*, *5*, 6.

Norma, A. (2017). *Zaman Edan Ronggowarsito*. Yogyakarta: Narasi.

Poerwadarminta, W. J. . (1999). *Kamus Bahasa Indonesia*.

Rahmawati, A. Y. (2021). Kontribusi Kyai Ageng Muhammad Besari dalam Akulturasi Dakwah Islam

di Ponorogo, Jawa Timur. *Jurnal Dakwah*, *15*(1), 69–82.

Ranggawarsita, R. (n.d.). *Manuskrip Serat Widyapradhana*.

Rofiuddin, A. A. (2016). Penentuan Hari Dalam Sistem Kalender Hijriah. *Al-Ahkam*, *26*(1), 117. https://doi.org/10.21580/ahkam.2016.26.1.878

Somawinata, Y. (2020). *Ilmu Falak Pedoman Lengkap Waktu Salat, Arah Kiblat, Perbandingan Tarikh, Awal Bulan Kamariah, dan Hisab Rukyat*. Depok: PT Rajagrafindo Persada.

Sukidin, & Basrowi. (2002). *Metode Penelitian Kualitatif Perspektif Mikro*. Surabaya: Insan Cendekia.

Suryaningsih, I., & Hendrawanto. (2017). Ilmu Balaghah: Tasybih dalam Manuskrip Syarh Fi Bayan al-Majaz wa al-Tasybih wa al-Kinayah. *Jurnal Al-Azhar Indonesia Seri Humaniora*, *4*(1).

Usamah. (2019). Tranformasi Islam dari Demak hingga Mataram. UIN Sunan Ampel.

Warsito, L. M. (1978). *Kamus Jawa Kuno Indonesia*.

Wiranti. (2021). *Analisis Sistem Penanggalan Jawa Islam Muslim Aboge Trah Banokeling Desa Adiraja Perspektif Astronomi*. UIN Walisongo.

Yasasusastra, J. S. (2016). *Ranggawarsita Menjawab Takdir*. Pontianak: Derwati Press.