

**THE CIRCULATION OF THE MOON IN THE PERSPECTIVE OF THE
HOLY QUR'AN AND SCIENCE**



THESIS

**Submitted to Faculty of Ushuluddin and Humanities in Patrial
Fulfillment of the Thesis Requiriments for the Degree of S-1 of the Sciences of
Qur'an and Tafseer**

Submitted By:

EKATUL HILWATIS SAKINAH

1804026034

**USHULUDDIN AND HUMANITIES FACULTY
FOR SPECIAL PROGRAM
WALISONGO STATE ISLAMIC UNIVERSITY SEMARANG**

2022

DECLARATION

I declare that this thesis is definitely my own work, I am responsible for the whole content of this thesis. Other writer's arguments or findings include within it are quoted or cited in accordance with ethical standards.

Semarang, May 30th, 2022

The writer

Ekatul Hilwatis Sakinah

NIM 1804026034

THE CIRCULATION OF THE MOON IN THE PERSPECTIVE OF THE
HOLY QUR'AN AND SCIENCE

THESIS

Submitted to Ushuludin and Humanities Faculty in Partial Fulfillment of the Thesis
Requirements for the Degree of S-I of the Sciences of Qur'an and Tafseer

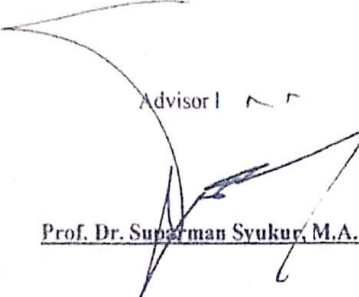
Submitted by:

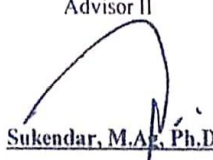
EKATUL HILWATIS SAKINAH

NIM : 1804026034

Semarang, 30th May, 2022

Aproved by:

Advisor I 
Prof. Dr. Superman Syukur, M.A.

Advisor II 
Sukendar, M.A., Ph.D

PENGESAHAN SKRIPSI

Skripsi di bawah ini:

Nama : Ekatul Hilwatis Sakinah

NIM : 1804026034


Judul : **The Circulation of the Moon in the Perspective of the Holy Qur'an and Science**

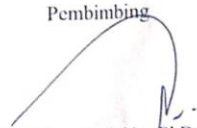
Telah dimunaqasyahkan oleh Dewan Penguji Skripsi Fakultas Ushuluddin dan Humaniora UIN Walisongo Semarang pada tanggal: 23 Juni 2022 dan telah diterima sebagai salah satu syarat guna memperoleh gelar Sarjana Agama dalam Ilmu Ushuluddin dan Humaniora.

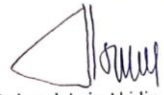
Semarang, 4 Juli 2022

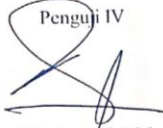
Ketua Sidang/Penguji I

H. Sukendar, MA., PhD.
NIP. 19740809 199803 1004

Penguji III

Dr. Ahmad Tajuddin Arafat, M.S.I
NIP. 19860707 201903 1012

Pembimbing

H. Sukendar, MA., PhD.
NIP. 19740809 199803 1004

Sekretaris Sidang/Penguji II

Achmad Azis Abidin, M.Ag.
NIP. 19930711 1201903 1007

Penguji IV

Dr. Zainul Adzfar, M.Ag.
NIP. 19730826 200212 1002

MOTTO

سَنُرِيهِمْ آيَاتِنَا فِي الْأَفَاقِ وَفِي أَنفُسِهِمْ حَتَّىٰ يَتَّبِعِنَ لَهُمْ أَنَّهُ الْحَقُّ أَوَلَمْ يَكْفِ بِرَبِّكَ أَنَّهُ عَلَىٰ كُلِّ شَيْءٍ شَهِيدٌ ﴿٥٣﴾

We will show them Our signs in all the regions of the earth and in their own souls, until they clearly see that this is the truth. Does it not suffice that your Lord is watching over all things?

(Fuṣṣilat/41: 53)

DEDICATION

I dedicate this thesis to:

My dear parents,

Jamaludin, Lc. and Siti Fasikha, thank you for all the prayers that are always said, the efforts that are never absent, the love that always flows, and the support that cannot be counted, so that I can feel the beauty of life as it is today

*

My beloved sister, Muna Esya Halala (Almhi), thank you for the short time, hopefully we can meet in the hereafter

*

All my teachers who have inspired me and gave me knowledge

*

The family of FUPK 14, Ma'had Ulil Albab lil Banat, and my beloved almamater, UIN Walisongo Semarang

*

Everyone who has accompanied during this writing process

TRANSLITERATION¹

A. Single Consonant

Arabic	Written	Arabic	Written
ب	B	ط	ṭ
ت	T	ظ	ẓ
ث	ṯ	ع	'
ج	J	غ	g
ح	ḥ	ف	F
خ	Kh	ق	q
د	D	ك	k
ذ	Ẓ	ل	L
ر	R	م	m
ز	Z	ن	n
س	S	و	w
ش	Sy	هـ	h
ص	ṣ	ء	`
ض	ḍ	ي	y

¹The Team of Compiling the Thesis, Pedoman Penulisan Skripsi Fakultas Ushuluddin dan Humaniora (Fakultas Ushuluddin dan Humaniora UIN Walisongo Semarang 2020), p. 98- 103

B. Double Consonant

Double consonant, including syaddah is written double.

For example: رَبَّكَ is written rabbaka

C. At-Tā' al-Marbūtāh (ة) in the End of Word

1. At-tā' al-marbūtāh (ة) in the end of word with sukūn is written by *h*, except Arabic word that is used as Indonesian word, such as salat, zakat, etc.

For example: فَاطِمَةٌ is written as *Fātimah*.

2. At-tā' al-marbūtāh (ة) followed by ال, but read as sukūn must be written as *h*.

For example: الْمَدْرَسَةُ الْعَالِيَةُ is written as *al-madrasah al-'āliyah*.

3. At-tā' al-marbūtāh (ة) followed by ال, but read as unite must be written as *t*.

For example: الْمَدْرَسَةُ الْعَالِيَةُ is written as *al-madrasatul 'āliyah*.

D. Vowel

1. Short Vowel

اَ	A
اِ	I
اُ	U

كَلِمَ	<i>Kalama</i>
شَرِبَ	<i>Syariba</i>

كُتُبٌ	<i>Kutubun</i>
--------	----------------

2. Long Vowel

Long vowel (*al-madd*) written as *hurūf* and stripe (-) above it

نَامٌ	<i>Nāma</i>
كَرِيمٌ	<i>Karīm</i>
مَحْمُودٌ	<i>Mahmūd</i>

3. Double Vowel

<i>Fathah + ya' sukūn</i> = بَيْنٌ	<i>Baina</i>
<i>Fathah + waw sukūn</i> = قَوْلٌ	<i>Qaula</i>

4. Consecutive Short Vowels in the One Word separated with the Apostrophe

أَنْتُمْ	<i>A'antum</i>
----------	----------------

E. Article *Alif + Lam* (ال)

a) Followed by *hurūf qamariyyah* is written as *al* and separated by stripe (-)

الْقُرْآنُ	<i>Al-Qur'ān</i>
------------	------------------

- b) Followed by *hurūf syamsiyyah* is written as real formula (according to the first *hurūf syamsiyyah*) and separated with stripe (-)

الشَّمْسُ	<i>Asy-Syams</i>
-----------	------------------

F. Word As Part of Phrase or Sentence

It is written as real formula

أَهْلُ السُّنَّةِ	<i>Ahl as-Sunnah</i>
-------------------	----------------------

ACKNOWLEDGEMENT

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Praise be to Allah, the Most Gracious, the Most Merciful, because of His blessings, mercy, taufiq, guidance, and inayah, the writer was able to complete this thesis. Shalawat and greetings are always poured out to the greatest human being, the noblest human being, the coolest human being of all time, namely the prophet Muhammad SAW, and not forgetting to his family and friends who have always faithfully accompanied his struggle in upholding the banner of Islam, so that now we can feel the peace. The prophet Muhammad as the bearer, transmitter, practitioner, and the main interpreter of the Qur'an.

This thesis entitled "The Circulation of the Moon in the Perspective of the Holy Qur'an and Science", was prepared to fulfill one of the requirements to obtain a bachelor's degree Faculty of Ushuludin and Humanities, UIN Walisongo Semarang.

In the preparation of this thesis, the authors get a lot of guidance, support, and suggestions from various parties so that the preparation of this thesis can be completed. For that, the author expresses many thanks to:

1. Prof. Imam Taufiq, M.Ag, as the Rector of state Islamic University (UIN) Walisongo Semarang.
2. Dr. Hasyim Muhammad as the Dean of the Faculty of Ushuludin and Humanities.
3. Mundhir, M.Ag, as the Chief of the Sciences Qur'an and Tafseer Department, and M. Sihabudin, M.Ag. as the Secretary who both facilitated me with the full service to finish my work.
4. Prof. Dr. Suparman Syukur, M.A and Sukendar, M.A., PhD., as my advisors. Thanks for being willing to take the time, energy, and thoughts to provide guidance and direction in the preparation of this thesis.

5. All Lecturers of the Ushuludin and Humanities Faculty of UIN Walisongo Semarang who have provided useful knowledge for the author so that i can complete this thesis.
6. Dr. Abdul Muhayya, M.A. as the director of Ma'had Ulil Albab Ngaliyan Semarang who always provides knowledge and advice, who has cared for, guided, and provided a place to live for me during the lecture process. May Allah reward all his kindness.
7. My beloved parents, Jamaludin and Siti Fasikha who always give love, prayers, support, and motivation. May Allah always pour out His *maghfirah*, mercy, and guidance in this world and in the hereafter.
8. My family FUPK-14 who always support me to increase my skill to study for being exist among you.
9. All students of Ma'had Ulil Albab lil Banat Ngaliyan Semarang, especially those who have become my close friends, who have always provided support during the process of making this thesis. You guys are amazing.
10. Various parties who have participated in the preparation of this thesis either directly or indirectly in providing support.

Hopefully the good deeds of those who have helped in the process of completing this thesis will receive a rewards from Allah. In the end, I realize that the writing of this thesis has not yet reached perfection in the true sense, but i hope that this thesis can be useful for myself and the readers in general.

TABLE OF CONTENTS

PAGE OF TITLE	i
DECLARATION	ii
ADVISOR APPROVAL	iii
RATIFICATION	iv
MOTTO	v
DEDICATION	vi
TRANSLITERATION	vii
ACKNOWLEDGEMENT	xi
TABLE OF CONTENT	xiii
ABSTRACT	xvi
CHAPTER I: PRELIMINARY	1
A. Background of Research	1
B. Problem Formulation	13
C. Purpose and Benefits	14
D. Theoretical Framework	14
E. Literature Review	17
F. Research Methods	19
G. Writing Systematic	21
CHAPTER II: AN OVERVIEW OF THE MOON	24
1. Understanding the Moon	24
2. The Process of the Formation of the Moon	25
3. Characteristics of the Moon	26
4. The Moon as Earth's Satellite	29
CHAPTER III: THE CIRCULATION OF THE MOON IN THE QUR'AN	35
A. Verses About the Circulation of the Moon	35

B. Interpretation of the Verses of the Circulation of the Moon	38
C. The Benefits of the Circulation of the Moon in the Qur'an	54
CHAPTER IV: THE RELEVANCE OF THE MOON'S CIRCULATION VERSES TO SCIENCE	61
A. The Concept of the Circulation of the Moon According to the Qur'an and Science	61
B. The Benefits of the Circulation of the Moon in the Qur'an According to Science	74
CHAPTER V: CLOSING	101
A. Conclusion	101
B. Suggestion	103
REFERENCES	104
CURRICULUM VITAE	114

ABSTRACT

The understanding of the Qur'an which is a holy book that contains instructions is sometimes still worrying even among Muslims themselves, especially for people who do not study the contents of the Qur'an. Not a few Muslims think that the Qur'an only contains things that are theological in nature, such as Islamic religious sciences, even though in reality, the Qur'an also discusses science, especially about the universe. The Qur'an provides instructions about the state and order of the universe, both in the heavens and on earth. The heavenly bodies have been arranged by Allah in such a way, including the moon which is a satellite of the earth. The moon in its cycle has been explained by Allah in the Qur'an 15 centuries ago, but the scientific explanation can only be understood after entering the modern era, where the methodology and approach of science have begun to be applied.

This study seeks to examine the circulation of the moon described by the Qur'an and science. This research is a qualitative research with the type of library research. The method used in this research is descriptive analysis. Specifically, this study tries to uncover questions about how the concept of the circulation of the moon according to the Qur'an and science and the benefits of the circulation of the moon in the Qur'an according to science.

The concept of the circulation of the moon has been explained in the Qur'an 15 centuries ago, it is explained that the moon circulates according to its orbital line, Allah reveals it with lafadz *yasbahūn*, many of the commentators such as Quraish Shihab and Zaghoul En-Naggar interpret the word *yasbahūn*, with the meaning of swimming, which is analogous to the movement of celestial bodies on its orbit. The movement of the moon revealed by the Qur'an has been proven by findings in the form of scientific facts in this modern age. The moon in its revolution experiences a unique movement that has a *manzilah* (plural is *manāzil*). Mufassir defines *manzilah* as the places of its orbit, because in its journey the moon is not like the sun, the moon has orbital places so that we are seen from the earth the moon is always seen with different shapes. Science states that the meandering path of the moon does not rotate, so the moon has its own *manzilah* which became known in science as the phases of the moon or changes in the shape of the moon.

Allah does not create anything without benefits. The circulation of the moon has benefits. The circulation of the moon is used as a guide in calculating the time where humans use it in the *Qamariyyah* calendar to find out important days in Islam. With the circulation of the moon, the earth will also get light at night, especially during the full moon. The benefits of the circulation of the moon which is very influential on the earth is that have a positive impact on some humans. The circulation of the moon does not happen forever because one day it will stop, this has been explained by Allah in the Qur'an and has been supported by modern science, thus scientific miracles are true, a Muslim will further increase his faith because

everything revealed by the Qur'an is in accordance with the findings of modern science.

Keywords: *Moon, Qur'an, Science.*

CHAPTER I

PRELIMINARY

A. Background of Research

The Qur'an is a holy book in which there are various Islamic sciences, this holy book encourages observations and research. The Qur'an is also believed to be a guide that should be understood by Muslims. From this context, Muslims began to try to understand the contents of the Qur'an. From the effort to understand it, new disciplines and knowledge were born that had never been revealed before.¹

Basically, The Qur'an is a holy book that stipulates all problems in faith and guidance as well as sharia law and morals. Not only that, the Qur'an also contains verses that contain various scientific properties that can provide encouragement to humans to study, discuss, and explore what scientific cues are revealed by the Qur'an.²

The understanding of the Qur'an as a holy book that contains instructions is still quite concerning for Muslims themselves, especially those who do not study the sciences contained in the Qur'an. Not a few Muslims think that the Qur'an only contains theological matters, such as the Islamic religious sciences, whereas in reality, the Qur'an also discusses matters relating to the economic sciences, politic, scientific, society, and more.

Like a text in Arabic, the Qur'an can be interpreted using interpretations between verses, *as-sunnah*, the words of the companion of prophet and the words of the *tabi'īn*. The commentators of the Qur'an with the process of interpretation that they do are finally able to reveal the meaning of the verses, stories, and the reasons for the revelation of the verses they interpret.³ The interpretations of the Qur'an that

¹Quraish Shihab, *Kaidah Tafsīr*, (Tangerang: Lentera Hati 2015), p. 2.

²Muhammad Nor Ichwan, *Memasuki Dunia Al-Qur'ān* (Semarang: Lubuk Raya 2001), p. 253.

³Suparman Syukur, *Studi Islam Transformatif: Pendekatan di Era Kelahiran, Perkembangan, dan Pemahaman Kontekstual* (Yogyakarta: Pustaka Pelajar, 2015), p. 163.

occurred in the classical period actually used to a *bayyānīy*⁴ (textual) normative approach, but as the times progressed, because the Qur'an was intended for the world of life, it was impossible for the *bayyānīy* normative approach to produce products, therefore humans must move from the *bayyānīy* approach to *burhānīy*⁵ abstraction approach in order to study the products of science in life.

The interpretation of the Qur'an by using *burhānīy* can be strengthened by the integration-interconnection theory developed by Amin Abdullah.⁶ This theory explains that the integration between the Qur'an and hadith with other sciences such as social, science, and others can give birth to a study of social interpretation, modern science interpretation, and other interpretations.

The interpretation of the Qur'an has grown and developed along with the growth and development of Islam itself. This is due to the fact that there are certain verses whose meaning and content cannot be understood by the companions themselves, except they must refer to Rasulullah.⁷

In line with the needs of Muslims to know all aspects of the content of the Qur'an and the intensity of the attention of the scholars on the interpretation of the Qur'an, various methods and styles of interpretation emerged, both during the time of

⁴The word *bayyānīy* comes from Arabic language which literally means something for away or something open. *Bayyānīy* is a typical Arabic thought method that emphasizes the authority of the text (nash), directly or indirectly justified by linguistic reasoning that is explored through and inference. See Suparman Syukur, *Studi Islam Transformatif...*, p. 126.

⁵In general, *burhānīy* is proof to justify something. The burhani approach prioritizes reason/reason. Thus, it can be said that this approach uses the sensory power and the power of reason together to achieve knowledge, but also cannot be separated from naql/text. See Suparman Syukur, *Studi Islam Transformatif...*, p. 283 and 292.

⁶This Integration-interconnection theory explains the integration and interconnection between scientific disciplines, both from secular sciences and religious sciences, will make both of them related to each other, both in terms of weakness or strengths. With this paradigm as well, the three main areas of science, namely social sciences, natural sciences, and humanities will no longer be independent, but will be interrelated with each other. See M. Amin Abdullah, et al, *Tafsīr Baru Studi Islam dalam Era Multikultural* (Yogyakarta: Panitia Dies IAIN Sunan Kalijaga Yogyakarta ke-50 dan Kurnia Alam Semesta, 2002), p. 370. See also Siswanto, "Perspektif Amin Abdullah Tentang Integrasi Interkoneksi Dalam Kajian Islam", in *Teosofi: Jurnal Tasawuf dan Pemikiran Islam*, UIN Sunan Ampel Surabaya, Vol. 3 No. 2 (Desember, 2013), p. 390.

⁷Mohammad Nor Ichwan, *Tafsir Ilmi: Memahami Al-Qur'an Melalui Pendekatan Sains Modern* (Jogjakarta: Menara Kudus Jogja, 2004), p. 72.

the Salaf and Khalaf scholars, until today. In general, there are four methodological classifications in interpretation, namely the *tahliliy*, *ijmaliy*, *muqaran*, and *maudhu'iy* interpretation methods.⁸ A *mufassir* when interpreting the Qur'an using certain methods cannot be separated freely from his background in interpreting the Qur'an, some of them have their own tendencies that differ from one interpreter to another, so that various types of interpretation emerge according to the tendency of each *mufassir*.⁹ For those who are legal experts, the understanding in their interpretation will be legal (*fiqh*), as well as for those whose understanding is more using the findings of modern science and established technology as a means of understanding the Qur'an, the interpretation will also be patterned scientific. This scientific interpretation is currently being discussed widely because it is related to science in life in this modern age.

Scientific interpretation is interpreting the verses of the Qur'an based on a scientific approach or exploring the content of the Qur'an based on scientific theories. The reason that gave birth to scientific interpretation is because of the call of the Qur'an which is basically a scientific call that invites many people to contemplate the phenomena of the universe.¹⁰ The most fundamental sciences in the Qur'an which is studied in the interpretation of scientific verses is the universe, which is revealed by the Qur'an with the aim of increasing faith in Allah who created the heavens and earth.

The universe is a place where there is biotic or abiotic life, as well as all natural phenomena and events that cannot be explained by humans.¹¹ The universe which is very wide to the limit of human vision of it has always been a difficult question to answer, even problems like this have occurred since time immemorial,

⁸This classification is based on what was stated by Abdul Hayy Al-Farmawi. See Abd Al-Hayy Al-Farmawi, *Al-Bidayah fi Tafsir Al-Maudhu'i* (Mesir: Maktabah Jumhuriyah, 1977), p. 23.

⁹Abdul Syukur, "Mengenal Corak Tafsir Al-Qur'an" in *El-Furqonia* Vo. 01 No 01 (Agustus, 2015), p. 84.

¹⁰*Ibid.*, p. 91.

¹¹Lajnah Pentashihan Mushaf Al-Qur'an, et al., *Penciptaan Bumi dalam Perspektif Al-Qur'an dan Sains* (Jakarta: Lajnah Pentashihan Mushaf Al-Qur'an, 2010), p. 29.

there are a lot of opinions that arise about the process of the occurrence of the universe both from Muslims themselves and from non-Islamic.

The process of creating the universe has continued to reap debate among Muslim philosophers since ancient times, in addition, atheists claim that the matter of the universe was *azalī*, that the universe had no beginning, and that there was no need for a creator.¹² The claims of these atheists are countered by a fact which shows that there is a phenomenon of radiation or the emission of sunlight, because as long as the heavenly bodies such as the sun and all the stars shine and emit their rays, then everything must have a beginning, if everything in the universe is *azalī* (not a start), then of course the fuel ran out billions of years ago. This fact is the first blow to atheists against the theory of the origin of matter.¹³

The universe is Allah's creation which Allah manages with His will and care. Allah commands mankind to observe and contemplate the truth of the universe, whether the sky, earth, plants, mountains, the alternation of day and night, as well as other phenomena and creations of Allah.¹⁴ The purpose of Allah commanding humans to observe is to increase faith, as stated in the letter Yūnus/10: 101.

قُلْ انظُرُوا مَاذَا فِي السَّمَوَاتِ وَالْأَرْضِ ۚ وَمَا تُعْنِي الْآيَاتُ وَالنُّذُرُ عَنْ قَوْمٍ لَا يُؤْمِنُونَ ﴿١٠١﴾

Say: "Behold the heavens and the earth contain! But neither signs nor warnings will avail the unbelievers."¹⁵ (Yūnus/10: 101)

This verse explains the command to use reason and pay attention to natural conditions in order to increase faith in the greatness of Allah. Observation of the universe is not limited to the eyes of the head, but also with the eyes of the heart in seeing day, night, clouds, rain, water, air, sun, moon, planets that are constantly

¹²Ahmad Atabik, "Konsep Penciptaan Alam: Studi Komparatif-Normatif antar Agama-agama", in *Fikrah: Ilmu Aqidah dan Studi Keagamaan*, IAIN Kudus, Vol. 3 No. 1 (Juli, 2015), p. 104.

¹³See Yusuf Ahmad, *Mawsū'ah, Al-I'jāz Al-Ilmī fī Al-Qur'ān Al-Karīm wa As-Sunnah Muthahharah*, Trans. Kamran Arsyad Irsyadi (Jakarta: Grafindo Khazanah Ilmu, 2006), p. 62.

¹⁴Harun Yahya, *Al-Qur'ān dan Sains* (Bandung: Dzikra, 2004), p. 1.

¹⁵The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Translition of the Meaning of the Qur'an* (Beirut: Darl Al-Choura, 1980), p. 155.

circulating, shining stars, and others. all of which are very firm in order and very beautiful in arrangement. If humans pay close attention to all of this, then humans will have more faith in Allah and believe that after Allah created this universe with a very beautiful appearance, then surely Allah will not allow His creations to be in vain.¹⁶

Humans should take advantage of all the signs of Allah's greatness contained in this universe. Usually, people who do not believe will try to deny and deny the Qur'an even though their minds and minds know the truth of the holy book of the Qur'an which discusses the phenomena that occur in the heavens and the earth. Therefore, as Muslims who believe in Allah, findings in science about this phenomenon must be used to reveal the truth contained in the Qur'an and increase faith in Allah.¹⁷

The Qur'an talks about the universe and all its contents and phenomena in it, there are more than a thousand verses that talk about the universe. Agus Purwanto stated that there are around 1,108 verses that talk about nature and the classifications contained in it, although not all of them immediately show scientific signs, but there are many terms that reveal direct nature in various languages from the Qur'an.¹⁸

All processes of order and balance in the universe are never separated from the process of Allah's creation of the universe. Allah created the universe through a process, it did not happen by chance. The creation has been completed with the completion of the events of the heavens and the earth, while the mastery and care of Allah is still continuing, everything is always in line with wisdom and wisdom that benefits all of Allah's creatures. The process of occurrence and order of the universe is explained by Allah in the Qur'an, one of which is in Surah Al-A'rāf/7: 54.

¹⁶Muhamad Hasbi Ash-Shiddieqy, *Tafsīr Al-Qurān Al-Madjīd: An-Nūr*, Juz 2 (Jakarta: Cakrawala Publishing, 2011), p. 37.

¹⁷See Ridwan Abdullah Sani, *Sains Berbasis Al-Qur'ān* (Jakarta: Bumi Aksara, 2014), p. 18.

¹⁸Agus Purwanto, *Ayat-ayat Semesta Sisi-sisi Al-Qur'ān yang Terlupakan*, 3rd Press (Bandung: Mizan Pustaka, 2009), p. 25.

إِنَّ رَبَّكُمُ اللَّهُ الَّذِي خَلَقَ السَّمَوَاتِ وَالْأَرْضَ فِي سِتَّةِ أَيَّامٍ ثُمَّ اسْتَوَى عَلَى الْعَرْشِ يُغْشَى اللَّيْلَ النَّهَارَ يَطْلُبُهُ حَثِيثًا وَالشَّمْسَ وَالْقَمَرَ وَالنُّجُومَ مُسْحَرَاتٍ بَأَمْرِ آلِهِ الْخَلْقُ وَالْأَمْرُ تَبَارَكَ اللَّهُ رَبُّ الْعَالَمِينَ ﴿٥٤﴾

Your Lord is Allah, who in six days created the heavens and the earth and the esestablished Himself on the Throne. He throws the veil of night over the day. Swiftly they follow one another.¹⁹ (Al-A'rāf/7: 54)

The verse above describes the process of the creation of the universe for six day. Allah confirms that Allah created this universe in six days. There are various kinds of understanding from the commentators regarding the *سِتَّةِ أَيَّامٍ* or six days referred to in this verse.²⁰ Quraish Shihab explained that in addition to explaining the process of creating the universe for six days, this verse also directs the eyes of our heads and the eyes of our hearts to the hidden secrets of nature as well as phenomena that have been seen, such as the night that always chases the day, objects celestial bodies, namely the sun, stars, moon that are subject to Allah's will, clouds that are always moving from place to place so that they can benefit, the wind that blows in the air, and so on. All of this is to invite humans to submit and obey Allah who has arranged the universe and established its laws.²¹

Humans should obey Allah who has arranged all phenomena that exist in this universe, both natural phenomena that are still hidden and those that have been seen. Specifically, in Surah Al-A'rāf/7: 54 it mentions the phenomenon of night which quickly turns into day. Allah made the night with its darkness to cover the light

¹⁹The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Translition of the Meaning of the Qur'an*...., p. 111.

²⁰The word *yaum* which is the singular form of *ayyām* is aligned with the English word age or aeon. The 16th century commentator Abdus Su'ud said that the word *yaum* was equated with the meaning of events or prophecies. With these various opinions, the word *yaum* is more appropriate if translated as stage, period or period. So the sentence that reads *sittati ayyām* in Surah Al-A'rāf is more accurately interpreted as 'in six periods'. See Abdullah Yusuf Ali, *The Holy Qur'an, Text, Translation and Commentar* (Beirut: Dar Al-Arabia, 1968), p. 416. See also Lajnah Pentashihan Mushaf Al-Qur'ān, et al., *Penciptaan Jagad Raya dalam Perspektif Al-Qurān dan Sains* (Jakarta: Lajnah Pentashihan Mushaf Al-Qurān, 2010), p. 12.

²¹Quraish Shihab, *Tafsīr Al-Misbāh, Pesan, Kesan dan Keserasian Al-Qurān* (Tangerang: PT Lentera Hati, 2016), p. 138.

of day. The night continues to wait for the day so that man can do his work in the light of day. The night waits for the day to occur continuously and never experience a delay.²²

Allah has arranged all events in this universe, both in the heavens and on earth. Allah said in Surah Ar-Ra'd/13: 2.

اللَّهُ الَّذِي رَفَعَ السَّمَاوَاتِ بِغَيْرِ عَمَدٍ تَرَوْنَهَا ۖ ثُمَّ اسْتَوَىٰ عَلَى الْعَرْشِ ۗ وَسَحَّرَ الشَّمْسَ وَالْقَمَرَ ۗ كُلٌّ يَجْرِي لِأَجَلٍ مُّسَمًّى ۗ يُدَبِّرُ الْأَمْرَ يُفَصِّلُ الْآيَاتِ لَعَلَّكُمْ بِلِقَاءِ رَبِّكُمْ تُوقِنُونَ ﴿٢﴾

It was Allah who raised the heavens without visible pillars. He then ascended His throne and forced the sun and the moon into His service, each pursuing an appointed course. He ordains all thing. He makes plain His revelations so that you may firmly believe in meeting your Lord²³ (Ar-Ra'd/13: 2)

The information contained in this verse are the totality and the majesty of Allah's power. Allah has created the sky without pillars. The existence of the sky without pillars is a proof and manifestation of Allah's power. The sky can stand tall because of Allah's care, providence, arrangement, although some say it's because of the balance of gravity between the planets and the stars, but still everything is Allah's creation.²⁴

The sun and the moon have been subdued by Allah. Allah made the sun and moon obedient to do what Allah wants for the benefit of his creatures. The celestial body rotates and shines, appears, and sinks. Allah has arranged the affairs of the universe and carried it out according to Allah's will and according to the wisdom contained in it.²⁵

²²See Muhamad Hasbi Ash-Shiddieqy, *Tafsīr Al-Qurān*..., p. 603.

²³The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Transliteration of the Meaning of the Qur'an*..., p. 176.

²⁴Wahbah Zuhaili, *Tafsīr Al-Munīr*, Juz 7, trans. Abdul Hayyi Al-Kattani (Jakarta: Gema Insani, 2016), p. 107.

²⁵*Ibid.*, p. 108.

Proof of Allah's existence and power include raising the sky without a pillar and regulating the passage of the sun and moon that circulate according to their respective orbits and times. Allah governs the universe wisely, the planets and stars which are very numerous will not be able to collide with each other. In the Qur'an Surah Fātir verse 41 also explains about the related phenomena of the universe, namely that Allah regulates and maintains the heavens and the earth so that they do not disappear. The providence that Allah does is also with his laws. One of them is the law of gravity which governs the orbits of all objects in space. The celestial bodies remain solid and circulate according to their respective orbits, this is due to the gravity that binds these celestial bodies.²⁶

The celestial bodies in the study of science are included in the science of astronomy. Astronomy is the study of celestial bodies, namely the sun, moon, stars, and other planets.²⁷ There are many celestial bodies in the perspective of astronomy, but when viewed in the Qur'an, the specifically mentioned are the sun, moon, and stars.²⁸ These three celestial bodies have their respective important functions for life on earth, including the moon which is the earth's satellite.

The moon is the only natural satellite of the earth with a diameter of about a quarter of the earth. The moon is also the fifth largest satellite in the solar system.²⁹ This earth satellite has no light in it. The light that humans usually see on the moon is actually not the original light of the moon, the light is light from the sun which is then reflected by the moon.

²⁶See Lajnah Pentashihan Mushaf Al-Qurān, et al., *Manfaat Benda-benda Langit dalam Perspektif Al-Qurān dan Sains* (Jakarta: Lajnah Pentashihan Mushaf Al-Qurān, 2010), p. 12.

²⁷Darwis Hude, et al., *Cakrawala Ilmu Dalam Al-Qurān* (Jakarta: Pustaka Firdaus, Bale Kajian Tafsir Al-Qurān Pase dan Institut Perguruan Tinggi Ilmu Al-Qurān, 2022) p. 69.

²⁸Muhammad Hasan, "Benda Astronomi dalam Al-Qurān dari Perspektif Sains", in *Teologia: Islam dan Sains*, Vol. 26, No. 1 (Januari, 2015), p. 93.

²⁹The term moon under the geophysical definitions is a planetary-mass object that formed a differentiated rocky body, making it a satellite planet. It lacks any significant atmosphere, hydrosphere, or magnetic field. Its surface gravity is about one-sixth of earth (0.1654 g). Further description can be seen in Wikipedia, Moon, access on 13 January 2022, from <https://id.wikipedia.org/wiki/Moon>

The word moon used in the Qur'an is *qamar* which is explained as *munīr* which means the body that gives light, this is in accordance with the description of the moon whose body is a reflecting material from the sun's light, and cannot emit its own light. In talking about the moon, the Qur'an always characterizes it as *munīr* (objects that glow or objects that reflect light), so *al-inārah* which means lighting is a trait that is always attached to the moon. Meanwhile, when revealing about the sun, the Qur'an always mentions *as-sirāj al-munīr* (a lamp that illuminates). *As-sirāj* (incandescent) and *al-inārah* (illumination) are two inherent properties of the sun. This means that the Qur'an has given knowledge that the sun and the moon have different properties in their respective rays and light.³⁰

In addition to using the word *qamar*, there is one more word used by the Qur'an in mentioning the word moon in its essential meaning, namely by using the word *hilāl*. The word *hilāl* in the Qur'an is mentioned in the plural, namely *ahillah*. From this plural word, it gives an understanding that the *hilāl* is always repeated, not only happening once, this means that the journey of the moon from the very thin to the perfect moon, from the perfect moon back to the very thin moon, this is what is called as the *hilāl*.³¹

The moon is the only natural satellite of the earth. Scientists believe that the moon was formed from a very large and violent impact that occurred about 4.6 billion years ago. The collision involved ancient earth and a smaller ancient planet. The collision delivered debris of material that evaporated in the form of discs which then rotated around the earth. The vapor from the flakes of this material then hardens and shrinks into grains which then freeze and fall and stick to the moon.³²

Science has stated that the moon rotates on its axis, and at the same time the moon also revolves around the earth. Scientists have discovered that the moon

³⁰Compare Mahmudz Mas'ud and Farah Faida, *Al-Qurān dan Sains Modern, Mengenal Kemukjizatan Ayat-Ayat Astronomi Dalam Al-Qurān* (Wonosobo: Media Kreasi, 2016) p. 227 with Zakir Naik, *Miracles of Al-Qurān & As-Sunnah* (Solo: PT Aqwam Media Profetika, 2015), p. 17.

³¹Muhammad Hasan, "Benda Astronomi...", p. 96-97.

³²Mahmudz Mas'ud and Farah Faida, *Al-Qurān dan Sains Modern...*, p. 229.

revolves in a curved line. The moon goes in a circle, not in a straight line. This is why humans can only see one side of the moon's surface. The time it takes for the moon to circle the earth and rotate on its axis is 29 days and 8 hours.³³

The circulation of the moon in the Qur'an can be found in Surah Al-Baqarah/2: 189, Al-An'am/6: 96, Yūnus/10: 5, Ibrāhim/14: 33, Al-Anbiyā'/21: 33, Al-Ra'd: 2, Luqmān: 29, Az-Zumār/39: 5, Fāṭir/35: 13, Yāsīn/36: 38-40, Ar-Rahmān/55: 5, Al-Insyiqāq/84: 18, and As-Syams/91: 1-2.

Humans can see the moon every day, some of them don't really think about what actually happens to the moon in the sky, why in its circulation, the shape of the moon looks different when viewed from the earth, unlike the sun which always looks like a circle. Everything that happens on the moon is a form of God's arrangement and power.

Signs of Allah's power include Allah making night and day, the sun and the moon circulating in their respective orbits, and Allah has determined the circulation of the moon to has its own characteristics by establishing the *manzilah* or positions of their orbits. Allah said in Surah Yāsīn/36: 37-40.

وَأَيُّهُمُ اللَّيْلُ يَسْلَخُ مِنْهُ النَّهَارَ فَإِذَا هُمُ مُظْلِمُونَ ﴿٣٧﴾ وَالشَّمْسُ تَجْرِي لِمُسْتَقَرٍّ هَآءِذَا لَمَّ عَلَيْكَ تَقْدِيرُ الْعَزِيزِ الْعَلِيمِ ﴿٣٨﴾ وَالْقَمَرَ قَدَرْنَاهُ مَنَازِلَ حَتَّىٰ عَادَ كَالْعُرْجُونِ الْقَدِيمِ ﴿٣٩﴾ لَا الشَّمْسُ يَنْبَغِي لَهَا أَنْ تُدْرِكَ الْقَمَرَ وَلَا اللَّيْلُ سَابِقُ النَّهَارِ يَوْمَئِذٍ فِي فَلَكٍ يَسْبَحُونَ ﴿٤٠﴾

And a sign for them is the night. From it We draw out the day-and they are plunged in darkness. The sun hastens to its resting-place: that is the decree of the Mighty One, the-All Knowing. And for the moon, We have ordained mansions till it bocems again as an old dry palm-branch. The sun is not allowed to overtake the moon, nor does the night outpace the day. Each in its own orbit runs.³⁴ (Yāsīn/36: 37-40)

³³Nadhiyah Thaharah, *Buku Pintar Sains...*, p. 430.

³⁴The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Translition of the Meaning of the Qur'an...*, p. 325.

Allah explains that among the proofs of Allah's great power is the creation of night and day and alternating between them continuously Allah draws day from night so that darkness disappears, and vice versa, Allah draws night from day so that the situation becomes dark and light disappears. The sign of the night in the form of the moon will not be able to precede the sign of the day which is the sun. Another proof of Allah's power is the circulation of the sun and moon in their respective orbits, and for the moon, Allah has determined *manzilah* (plural is *manāzil*), namely by determining the places that become the path of the moon in its movement.³⁵

The signs of the *manzilah* of the moon in its journey are further strengthened by the results of scientific research which states that the journey of the moon from the dead moon to the full moon, and the full moon to the dead moon again has phases, namely the new moon phase, the first quarter phase, and the moon phase. full moon, and the third quarter phase, which is when the moon is moving toward the third quarter.³⁶

An in-depth study of natural phenomena will conclude that everything that exists is not created without benefits. All materialized with benefits for humans.³⁷ Allah has created the moon and regulates all phenomena that occur in it, including its rotation. Thanks to the moon's cycle, mankind can use it as a timer. Allah said in Surah Yunus/10: 5.

هُوَ الَّذِي جَعَلَ الشَّمْسَ ضِيَاءً وَالْقَمَرَ نُورًا وَقَدَرَهُ مَنَازِلَ لِتَعْلَمُوا عَدَدَ السِّنِينَ وَالْحِسَابَ ۗ مَا خَلَقَ اللَّهُ ذَلِكَ

إِلَّا بِالْحَقِّ ۗ يُفَصِّلُ الْآيَاتِ لِقَوْمٍ يَعْلَمُونَ ﴿٥﴾

It was He that made the sun brightness and the moon light, ordaining the latter's phases that you may learn the number of years and the reckoning. He created them

³⁵Wahbah Zuhaili, *Tasfīr Al-Munīr*..., p. 40.

³⁶See Muhammad Hasan, "Benda Astronomi...", p. 17.

³⁷Lajnah Pentashihan Mushaf Al-Qurān, et al., *Manfaat Benda-benda Langit*..., p. 7.

only to manifest the truth. He makes plain His revelations to mean of understanding³⁸ (Yunus/10: 5)

This verse informs us that Allah uses the word *dhiyā* (ray) when describing the sun, while in describing the moon, Allah uses the word *nūr* (light). Therefore, it can be understood that Allah created the sun to have light from its own substance, and the moon to have light that comes from the reflection of the sun's rays. Allah has made the sun that illuminates the universe during the day and made the moon shine at night to remove the darkness of the night, Allah has set the cycle of the moon in the solar system for its *manzilah*, so with that, people can know the number of *manzilah* that descended every night, and finally also know the number of times.³⁹

The fact states that the sun is also the standard of calculating time. Allah has made the sun and the moon as a means of calculating time for days, months, and years. Thus, humans can know their whereabouts, namely where and when. The astronomical miracles contained in the verse above are in accordance with what has been revealed by studies in astronomical terms.⁴⁰

The existence of the moon can be used as a means of determining time in the calendar. The circulation of the moon when it revolves around the earth and at the same time as the earth revolves around the sun takes a certain amount of time with a relatively fixed period, cause this phenomenon, the circulation of the moon can be used as a human guide in determining the time, especially times related to the worship of Muslims. The status of the moon as a satellite of the earth also has a myriad of benefits for the regularity of the earth, such as tides, light of the earth at night, and so on. Thus Allah's creation of the heavenly bodies including the moon and all its phenomena has benefits for all humans. However, among humans there are still

³⁸The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Translition of the Meaning of the Qur'an...*, p. 147.

³⁹Wahbah Zuhaili, *Tafsīr Al-Munīr...*, p. 109-120.

⁴⁰See Nadiyah Thayyarah, *Buku Pintar Sains...*, p. 430.

people who are not aware of the usefulness of the moon, this results in them not being able to take advantage of the benefits that are clearly in front of them.⁴¹

The results of research by astronomers have found common ground with the *kauniyah* verse in the Qur'an. After a long observation, the signs contained in the Qur'an can finally be understood as scientific facts that are *i'jāz* after being interpreted using science. The problem of the circulation of the moon in the Qur'an which was explained 14 centuries ago can only be understood after a scientific study using modern scientific methodologies and approaches, therefore, it is necessary to conduct an in-depth study of the circulation of the moon in the perspective of the Qur'an. and science.

The Qur'an provides instructions about the state and order of the universe, with the existence of science, it can be explained theoretically and scientifically. The concept of the cycle of the moon that Allah has explained in the Qur'an has been proven to be in accordance with scientific explanations. Likewise with the benefits, Allah created the moon and all the phenomena that occur in it with a benefit and benefit, because nothing is in vain for Allah's creation. The rotation of the moon is realized with benefits that can be felt by all creatures on this earth.

Based on all of the above background, the authors are encouraged to conduct research with the title "The Circulation of the Moon in the Perspective of the Holy Qur'an and Science".

B. Problem Formulation

1. What is the Concept of the Circulation of the Moon According to the Qur'an and Science?
2. What are the Benefits of the Circulation of the Moon in the Qur'an According to Science?

⁴¹Lajnah Pentashihan Mushaf Al-Qurān, et al., *Manfat Benda-benda Langit...*, p. 101-118.

C. Purpose and Benefits

The aim of this research is:

1. To understand the concept of the circulation of the moon according to the Qur'an and science.
2. To understand the benefits of the circulation of the moon in the Qur'an according to science.

This research has various benefits including:

1. Theoretical Benefits

Theoretically, this research is expected to be able to make a scientific, applicable, or implicative contribution that also enriches scientific treasures, especially in the fields of Qur'anic science and interpretation.

2. Practical Benefits

Practically, the results of this research are expected to provide insight and knowledge of a person about the concepts and benefits of the circulation of the moon described by the Qur'an and science. In addition, this research is also expected to be used as a science that provides valid information so that it can be used as a reference and information material for observers of commentary studies, as well as reading and library materials in various scientific institutions.

D. Theoretical Framework

Within the framework of this theory, the author will describe the flow in writing this thesis, so that in making it can be understood clearly. This study uses the style of scientific interpretation.

Scientific interpretation can simply be defined as an attempt to understand the verses of the Qur'an by making the discoveries of modern science as a tool. The verse of the Qur'an in question is the verse of the Qur'an which is more

oriented to the text that specifically talks about natural phenomena or commonly known as the Kauniyah verse.⁴²

Scientific interpretation is the *ijtihad* of a *mufassir* in finding the relationship of the verses of the Qur'an (kosmos) with the discovery of experimental sciences that aim to reveal the miracles of the Qur'an as a source of knowledge that is appropriate and in line at every time and place.⁴³ The views of scholars on scientific interpretation vary, among them there are those who reject and accept. Scholars who refuse are of the opinion that associating the Qur'an with scientific theories is a wrong action, because Allah sent down the Qur'an not to explain scientific theories, scientific disciplinary terminology, and various kinds of knowledge. The association of the Qur'an with scientific theories only encourages its supporters to interpret the Qur'an in accordance with scientific theories.⁴⁴ Among the groups of scholars who reject scientific interpretation are Shaykh Shaltut, Amin Al-Khulli, Abu Ishaq Al-Syatibi, and M. Husein Ad-Dahabi. While the group of scholars who received them were Imam Abu Hamid Al-Ghazali, Imam Fakhruddin Al-Razi, Jalaluddin As-Suyuti, and Allamah Al-Majlisi. As for one of the reasons for scholars who accept scientific interpretations because the verses of the Qur'an always open themselves to the mind and provide the correct understanding of anything. The fact proves that the more advanced the human mind, the more fields of knowledge are mastered and in addition to the urgency of the need to find new things and the more perfect the equipment needed to conduct research on all the signs of the Qur'an, the truth becomes more apparent.⁴⁵

⁴²Mohammad Nor Ichwan, *Tafsir Ilmi: Memahami Al-Qur'an Melalui Pendekatan Sains Modern...*, p. 127.

⁴³This scientific interpretation definiton reveal by Fahd Al-Rumi, See Fahd Al-Rumi ibn Abd Al-Rahman, *Ittijāhāt Al-Tafsīr fī Al-Qarn Al-Rābi' 'Asyar* (Mamlakat Al-'Arabiyyat Al-Sa'ūdiyyah: w.y), p. 549.

⁴⁴Abdul Hayy Al-Farmawi, *Metode Tafsir Maudhu'i*, Trans. Rosihon Anwar (Bandung: CV Pustaka Setia, 2002), p. 34.

⁴⁵Rosihan Anwar, *Pengantar Ulumul Qur'an*, (Bandung: Pustaka Setia, 2009), p. 284.

When there was a debate on scientific interpretation, contemporary scholars also expressed their views on scientific interpretation. They can understand the existence of scientific interpretation. Their attitude is moderate in responding to the development of science related to the verses of the Qur'an. Among the moderates are Muhammad Mustafa Al-Maraghi, Ahmad Umar Abu Hajar, Ayatullah Makarim, and Ayatollah Ja'far Subhan. Those who are supportive and moderate in responding to scientific interpretation are also *mufassir* of the Qur'an, and among them interpret the Qur'an using scientific interpretations.

The main reason that encourages commentators to write scientific interpretations is the many verses of the Qur'an which explicitly or implicitly instruct humans to explore science and know the dimensions of the miracles of the Qur'an in the field of modern science.⁴⁶

Scientific interpretation has invited many pros and cons between scholars, thus raising caution in using the applied methodology in obtaining the meaning prescribed by the verses of the Qur'an.

The method that must be used by the *mufassir* in interpreting the verses of the Kauniyah is first, using experimental sciences or sciences that are proven through research. If the interpretation uses scientific theories that are fixed and have been recognized by scientists, then these theories should not be based on the verses of the Qur'an as a definite theory that does not change. Second, the verses that are interpreted in a scientific manner are those that clearly hint at science.⁴⁷

One of the scholars who formulate the rules that must be considered in interpreting the verses of the Kauniyah is Yusuf Al-Qardhawi, an Egyptian

⁴⁶Moh Nur Ichwan, *Tafsir Ilmi: Memahami Al-Qur'an Melalui Pendekatan Sains Modern...*, p. 127.

⁴⁷See Udi Yulianto, "Al-Tafsīr Al-Ilmī Antara Pengakuan dan Penolakan" in *Jurnal Katulistiwa: Journal of Islamic Studies*, Vol. 1, No. 1 (Maret, 2011), p. 42

scholar who is very famous in this century, and many Muslims take his views as a reference. Yusuf Al-Qardhawi formulates it as follows.⁴⁸

1. The science that is used as a reference to explain the scientific side of the Qur'an is a scientific theory that has been considered valid by scientists and has been proven true. As for the scientific theory which is only limited to discourse or its veracity is doubted by some scientists, it is not feasible to be used as a reference in explaining the scientific side of the Qur'an.
2. Scientific interpretation should not be separated from the linguistic rules of the verse which will be explained from the scientific side, both from the siyaq side and the original meaning of the vocabulary in Arabic.
3. The nature of the scientific interpretation of which is to add or develop the interpretation of the Qur'an that has been pioneered by previous scholars, and not to annul it. Therefore, the scientific interpreter must not claim that his study of interpretation is the most correct and that no one from the previous generation of Muslims until his time understood its meaning at all.

E. Literature Review

Research in the form of a journal by Muhammad Hasan entitled *Benda Astronomi dalam Al-Qur'ān dari Perspektif Sains*. This study describes the circulation of astronomical objects mentioned in the Qur'an, namely the sun, stars, and moon. From the results of his research, the author suggests that the Qur'an has given instructions about the movement of the celestial bodies. In the perspective of the Qur'an, none of the celestial bodies are stationary, they all experience the circulation of the sun, moon, and stars.⁴⁹

Basuni Rahman in his journal entitled *Bulan Sebagai Satelit Bumi*. This research focuses on the study of the function of the moon as a satellite of the

⁴⁸Yusuf Al-Qardhāwi, *Kayfa Nata'amal ma'a Al-Qur'ān Al-Azīm* (Kairo: Dār Al-Shurūq, 2000), p. 385.

⁴⁹Muhammad Hasan, "Benda Astronomi dalam Al-Qurān dari Perspektif Sains", in *Teologia: Islam dan Sains*, Vol 26, No. 1 (Januari, 2015).

earth. The perspective used is based on facts and scientific theory. At the end of his research, researchers said that knowledge about the moon had advanced after humans went to the moon. The moon is quieter and darker, and prone to earthquakes, therefore, the moon cannot be occupied by humans.⁵⁰

Thesis with the title *Kontektualisasi Makna Bulan dalam Al-Qur'ān* by Diki Ilham. This study discusses the verses about the moon and the contextualization of the meaning of the moon in the Qur'an. As for interpreting the verse about the moon, researcher uses *Tafsīr Al-Marāghi* and *Tafsīr Ibn Katsīr*. In the limitation of the problem, researcher said that he only discusses the verses that talk about the process of the occurrence of the moon and the role of the moon as determining time. The result of this research is about the role of the moon and interpretation the term *al-qamar* which is a noun (*isim*) relates to the meaning of the moon, calculations based on the moon, and calendar based on the moon.⁵¹

Agus Minaur Rohman in his thesis entitled *Visualisasi Gerak Semu Bulan dan Matahari Serta Pengaruhnya terhadap Pasang Surut Air Laut Menggunakan Algoritma Jean Meeus*. This study uses the Jean Meeus method in determining the position of celestial bodies for the process of predicting sea level. The results of this study indicate that the method of Jaen Meeus is very precise and accurate for calculating the coordinate positions of celestial bodies.⁵²

Istikomah in her thesis entitled *Pemahaman Mufasir dan Astronom Tentang Bulan Terbelah pada QS. Al-Qamar Ayat 1-2*. This thesis discusses the phenomenon of the split moon described in the Qur'an. This study uses a type of qualitative research that is literature, while the analytical method used in this

⁵⁰Basuni Rahman, "Bulan Sebagai Satelit Bumi", in *Jurnal BBM*, Universitas Pendidikan Indonesia, (February 2012).

⁵¹Diki Ilham, *Kontekstualisasi Makna Bulan Dalam Al-Qurān (Kajian Tafsīr Tematik)*, Skripsi Fakultas Ushuludin UIN Sultan Syarif Kasim Riau, 2020.

⁵²Agus Minaur Rohman, *Visualisasi Gerak Semu Bulan Dan Matahari Serta Pengaruhnya terhadap Pasang Surut Air Laut Menggunakan Algoritma Jean Meeus*, Skripsi Fakultas Sains dan Teknologi UIN Maulana Malik Ibrahim Malang, 2016.

research is content analysis. The results of this study are that most of the commentators argue that the moon was split twice in Mecca, before the Prophet moved to Medina. The occurrence of the split moon was motivated by the request of the Quraysh who wanted the Prophet Muhammad to show his apostolate. Quraysh actually witnessed when the moon was split, but they still did not believe it and then said that the prophet Muhammad had performed magic. Meanwhile, according to astronomy, the splitting of the moon has never happened, because it is not clear that there has been a split under the moon.⁵³

Based on the literature review that the author described above, the author admits that there are many studies that discuss the moon, although with the limitations of the author in tracking it, but even so, the author tries to find a discussion that is different from before. Therefore, the author intends to discuss the circulation of the moon in the perspective of the Qur'an and science.

F. Research Methods

Research method is a very fundamental way to obtain knowledge and data in research. Therefore, the author uses the following research methods:

1. Research Types

This research uses qualitative research methods with the type of library research. Library research is research conducted by studying, exploring, and citing concepts or theories from various kinds of literature, both books and journals.⁵⁴ In this research, researchers will study and explore theories from various kinds of literature related to the circulation of the moon in the perspective of the Qur'an and science.

⁵³Istikomah, *Pemahaman Mufasir dan Astronom Tentang Bulan Terbelah Pada QS. Al-Qamar Ayat 1-2*, Skripsi Fakultas Ushuludin dan Humaniora UIN Walisongo Semarang, 2018.

⁵⁴M. Amin Amrullah, *Panduan Menyusun Proposal Skripsi, Tesis & Disertasi*, 1st Press, (Yogyakarta: Smart Pustaka, 2014), p. 25.

2. Data Source

This research is included in library research, so the source of the data is library, that is, it comes from various kinds of literature, such as books, journals, personal documents, newspapers, and so on. For more details, the data sources in this study are divided into two, namely primary data sources and secondary data sources.

a.) Primary Source

Primary data source is the original source that contains the information or data.⁵⁵ The primary data sources used are tafseers and science books that discuss the relationship with the circulation of the moon.

b.) Secondary Source

Secondary data sources are data sources that are generated from non-original sources that contain the information or data.⁵⁶ The secondary data sources in this study were books, journals, and articles related to the circulation of the moon in the perspective of the Qur'an and science.

3. Data Collecting Method

Data collection techniques are methods used to collect information and facts contained in the field.⁵⁷ The data collection technique used in this research is documentation, which is a method that is done by looking for data about a thing or variable in the form of notes, books, transcripts, magazines, agendas, and so on.⁵⁸ Data collection techniques with documentation were

⁵⁵Tatang Amin, *Menyusun Rencana Penelitian*, 3rd Press, (Jakarta: PT. Raja Grafindo Persada, 1995), p. 133.

⁵⁶*Ibid*, p. 133.

⁵⁷Andi Prastowo, *Metode Penelitian Kualitatif Dalam Perspektif Rancangan Penelitian*, (Yogyakarta: Ar-Ruz Media, 2014), p. 208.

⁵⁸Suharsimi Arikunto, *Prosedur Penelitian: Suatu Pendekatan Praktis*, (Jakarta: Rineka Cipta, 1993), p. 202.

used to explore and collect data from reading sources related to the circulation of the moon in the perspective of the Qur'an and science.

4. Data Analysis Method

The data analysis method used in this research is descriptive analysis. Descriptive analysis is a method by describing as well as analyzing. By using this method simultaneously, it is hoped that the object can be given maximum meaning. The researcher will provide an explanation and analyze in depth regarding the data that has been collected about the circulation of the moon according to the Qur'an and science.

G. Writing Systematic

In facilitating the preparation of the thesis and providing a detailed description of the subject matter, the author arranges this thesis in several chapters with the following systematic.

The first chapter contains an introduction which is the philosophical foundation of this thesis and will lead to the following chapters, divided into six sub-chapters. The first sub-chapter contains background thoughts on the topic that the author is studying, in this sub-chapter there are also reasons why the author chose the title of the study, from the background it is necessary to inform about the main problems to be studied which are described in the second sub-chapter. The third sub-chapter contains the objectives and benefits of the research. The research objectives are described to find out what aspects will be studied, known, discussed, and the targets to be achieved in this research. The benefits of research are described so that it is known the importance of a research, the impact that will be obtained, and the clarity of the problem itself. The fourth sub-chapter contains a literature review which is used to prove the originality of this thesis and as a reference for analysis. The fifth sub-chapter is research methods which are approaches, methods, and techniques that will be used in the process of

conducting research. Then the last sub-chapter is systematic writing which describes the stages of discussion in this thesis.

The second chapter is information about the theoretical basis, namely an overview of the universe and the moon. As for the universe, the definition of the universe, the process of the universe, and the contents of the universe will be discussed. The explanation of the universe needs to be explained before explaining the theory about the moon, because the moon is part of the universe. After explaining the universe, the author will explain about the moon which contains the understanding of the moon, the process of forming the moon, the characteristics of the moon, and the moon as a satellite of the earth. The explanation of the moon in this study will play an important role because it serves as a theoretical basis in delivering the following chapters.

The third chapter contains the presentation of data that discusses the circulation of the moon in the Qur'an and science. In this chapter are verses about the circulation of the moon, the interpretation of the verses about the circulation of the moon in the Qur'an, and the benefits of the circulation of the moon in the Qur'an according to science. In this chapter, the exposure to the data described is the result of research on certain objects which will be the focus of discussion in the next chapter.

The fourth chapter is data analysis which contains the relevance of the moon's circulation verses to science. This chapter is a discussion of the data that has been collected from the previous chapter. Aspects of the problem in this chapter especially those that are at the core of the discussion will be discussed and analyzed based on the theory that has been described in the second chapter and the third chapter with due regard to the purpose of the discussion in this study. From the discussion in this chapter, it will be followed by conclusions that will be presented in the next chapter.

The fifth chapter is the end of the writing process, namely the closing which is the conclusion of all the descriptions that have been described and is the

answer to the problem formulation, and there are suggestions that can be contributed as recommendations for further studies.

CHAPTER II

AN OVERVIEW ABOUT THE MOON

A. Understanding of the Moon

The moon is the only natural satellite of the earth, as well as the fifth largest natural satellite in the solar system.¹ Its position as a satellite causes it to revolve around the earth, and the longer the moon orbits the earth, the more the moon's surface is exposed to sunlight.

Like the stars, the moon also appears at night. When the sun appears, the moon and stars cannot be seen. The moon has similarities with the sun, because when viewed both appear round, and the size also looks the same,² although in reality they are different, both in shape and size. One of the very basic differences is the light it produces, although at night the moon looks luminous, but actually the moon does not have light, the light that humans usually see from the moon is the light reflected by the moon against the sun's rays.

The surface of the moon is different from the surface of the earth. The earth's surface is formed by a series of phenomena such as water, tectonic forces, volcanism, erosion by wind, and so on. While the surface of the moon is formed by the fall of meteorites to form craters on the surface of the moon.³

The moon rotates on its axis, and at the same time the moon also rotates around the earth. Earth too, it rotates on its axis and at the same time the earth is also rotating around the sun. Both the moon and the earth both

¹The five largest satellite sequences in the solar system are Ganimede from the Planet Jupiter with a diameter of 5.262 km, Titan from the planet Saturn with a diameter of 5.152 km, Kalisto from the planet Jupiter with a diameter of 4.800 km, IO from the planet Jupiter with a diameter of 3.643 km, and the Moon from the planet Earth with a diameter 3.475 km. See Dahli Anggara (2021), *Wajib Tahu 5 Satelit Alam dengan Ukuran Terbesar di Tata Surya*. Accessed on February, 2 2022 from <https://www.idntimes.com/science/discovery/dahli-anggara/satelit-terbesar-di-tata-surya-c1c2>.

²Agus Purwanto, *Nalar Ayat-ayat Semesta...*, p. 316.

³Gunawan Admiranto, *Eksplorasi Tata Surya...*, p. 112.

rotate on their axis and revolve around the sun. The sun also rotates on its axis, and at the same time, all members of the solar system revolve around the center of the galaxy which is also rotating on its axis.⁴

B. The Process of the Formation of the Moon

Scientists believe that the moon was formed about 4.6 billion years ago, when the earth had not yet solidified, a celestial body the size of the planet Mars hit the earth, from this large collision some of the earth's material with the material that made up celestial bodies was thrown into space and then merged into one form the moon.⁵ The process of the formation of the moon is called the Collision theory. Actually, until now there is still no certainty about how the moon was formed which later became a satellite of the earth, but the collision hypothesis is a popular hypothesis and is believed by many people.

Astronauts named Jay Melosh, George Wetherill, and David Stevenson also support the collision hypothesis. They made a computer simulation of the collision process that had occurred. The simulation finally yielded the result that this collision succeeded in eroding part of the earth and releasing some material into space, which then formed the condensation of the moon.⁶

In summary, the origin of the moon can be sorted into four processes. First, the occurrence of a powerful collision process between the earth and a very large asteroid. Second, as a result of the collision, a number of fragments of material from the asteroid and the earth were scattered and scattered into space. Third, because of the earth's gravity, a number of these fragments of

⁴See Nadiah Thayyarah, *Buku Pintar Sains Dalam Al-Qur'ān, Mengerti Mukjizat Ilmiah Firman Allah* (Jakarta: Zaman, 2014), p. 427.

⁵Gunawan Admiranto, *Eksplorasi Tata Surya...*, p. 114.

⁶Gunawan Admiranto, *Menjelajahi Tata Surya* (Yogyakarta: Kansius, 2009), p. 212.

matter began to circle the earth, and the fourth fragments around the earth then clumped together to form the moon.⁷

The Collision theory can provide an explanation of various problems regarding the chemical structure of the moon. Metal is found only slightly on the surface of the moon, this is because the moon comes from the earth's crust. This discovery is then said to be in accordance with the collision hypothesis. In addition, this very large collision also produces very high temperatures, from the high temperature it causes the loss of volatile elements such as those found on the surface of the moon that can be observed at this time.⁸

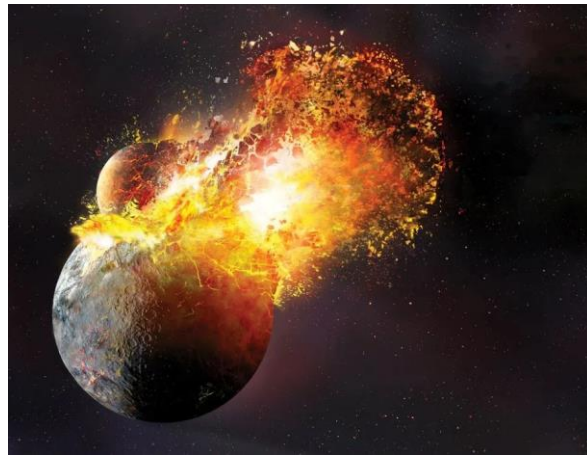


Image 1.2 Illustration about the Formation of the Moon⁹

C. Characteristic of the Moon

The moon has the criteria of a planet, its size is approximately a quarter of the size of the earth. The diameter of the moon is 3.475 km, this means that the volume of the moon is only about 2% of the volume of the earth and the gravitational force on the moon's surface is about 17% of the gravitational force on the earth. Meanwhile, the mass of the moon is only

⁷See Nathalie Fradette and Claude Lafleur, *Visual Ilmu Pengetahuan...*, p. 33.

⁸Gunawan Admiranto, *Menjelajahi Tata Surya...*, p. 212.

⁹Leonard Kelley (2020), *The Formation of the Moon, or How Did That Get There?*, Accessed on March 1, 2022 from <https://owlcation.com/stem/The-Formation-of-the-Moon-or-How-Did-That-Get-There>.

0.012 of the mass of the earth, and the moon has a mass (3.4 g/cm^3) lighter than the density of the planet earth (5.5 g/cm^3).¹⁰

The moon has no atmosphere, so the temperature of the moon has quite extreme differences, the temperature can be high or very low. At noon, the temperature on the moon can reach 127° Celsius, this indicates that the temperature is hotter than boiling water. Meanwhile, at night, the cold temperature on the moon can reach -173° Celsius,¹¹ because of this extreme temperature difference, no living thing can inhabit the moon.

The moon does not have a layer of air and water, but it is estimated that there is ice mixed with fine sand at the bottom of the polar craters whose temperature is always below 200° Celsius. In general, the surface of the moon is uneven, the moon has craters with a diameter of hundreds of kilometers, the mountains in it are up to 9 km high, and the ravines on the moon have a depth of up to 6 km. Craters and mountains on the moon are in the highest plains with uneven areas, the area being the brightest and most visible zone.¹²

The craters on the surface of the moon appear as a result of the bombardment of meteorites that fall to the moon's surface at any time. The formation of craters through the fall of meteorites to the lunar surface is a geological process that is used as the reason for the formation of the lunar surface. Its status, which has no atmosphere, makes any small meteorites that fall to the moon will certainly enter and form craters. That is why on the moon there are so many craters and the shape of the moon is pockmarked.¹³

¹⁰Abdul Syukur, *Buku Pintar Serba Tahu Segala yang di Langit dan Bumi* (Yogyakarta: Diva Press, 2011), p. 27.

¹¹Budi Prawoto, *Serba-Serbi Tata Surya* (Yogyakarta: CV. Empat Pilar Pendidikan, 2007) p. 15.

¹²Nathalie Fradette and Claude Lafleur, *Visual Ilmu dan Pengetahuan...*, p. 32-33.

¹³The fact states that not only the moon, meteorite bombardments also enter the earth, but because the earth has an atmosphere in it, then the meteorites that enter the earth will burn out due to the friction of the meteorite with the atmosphere, in the end the meteorites that enters the earth will not have time to reach the earth's surface. See Gunawan Admiranto, *Menjelajahi Tata Surya...*, p. 202-203.

The craters found on the moon are not all full to fill the moon, because on the moon there are also valleys, mountains, and crusts. The crust on the moon is the result of the collision of various small meteors or particles of the solar wind. The particles are covered by a layer of rock and fine sand up to several meters thick which is then coated by very fine dust.¹⁴

The various meteorite processes that affect the formation of craters, mountains, valleys, and crust on the moon do not imply that the moon is full of them, because in reality, on the moon there are clean areas that are not subject to too much meteorite bombardment. This clean area is called maria (mare) which means sea.¹⁵

The moon has no light in it. The light that humans usually see on the moon is actually not the original light of the moon, the light is light from the sun which is then reflected by the moon.

The shape of the appearance of the bright moon is always changing, this indicates a change in the part of the moon that reflects light which can then be seen from the earth. The surface of the moon that receives sunlight or sunlight is always the same, i.e. half or only part of the moon, therefore, the shape of the part of the moon that is exposed to sunlight does not appear entirely as a full circle, but forms a phase which is then known to humans as the moon phase.¹⁶

The shape of the moon when viewed as a whole looks perfectly round, but it is not actually round. The moon looks distended when it is lined up with the earth. Astronauts have proven the shape of the distended moon by using quite sophisticated equipment, and the results are indeed true that the moon is

¹⁴Nathalie Fradette and Claude Lafleur, *Visual Ilmu Pengetahuan...*, p. 33.

¹⁵Gunawan Admiranto, *Menjalajahi Tata Surya...*, p. 202.

¹⁶See Mahmudz Mas'ud and Farah Faida, *Al-Qur'ān dan Sains Modern, Mengenal Kemukjizatan Ayat-Ayat Astronomi Dalam Al-Qur'ān* (Wonosobo: Media Kreasi, 2016), p. 239.

distended.¹⁷ The bulge on the moon is caused by the earth's gravity. Earth's gravity not only causes a bulge in the shape of the moon, but also causes earthquake activity that often occurs on the moon. The earthquake that occurred took place at a depth of 1.000 km from the lunar surface. Specifically, earthquakes on the moon occur due to tidal forces on the earth due to the earth's gravity. The ups and downs take place regularly every month.¹⁸



Image 2.2 Far and Near Side of the Moon¹⁹

D. Moon As Earth's Satellite

Satellites are celestial bodies that are members of the solar system that always accompany the planets. The satellite will rotate and revolve around the planet it is accompanied by. The satellite will also revolve around the sun along with its planet.²⁰

There are two types of satellites namely natural satellites and artificial satellites. Natural satellites are celestial bodies that move by orbiting other objects, while artificial satellites are spacecraft that surround celestial bodies and are made by humans with the aim of facilitating human life.

¹⁷Jajak MD, *Astronomi Ilmu Pengetahuan Luar Angkasa* (Jakarta: Harapan Baru Raya, 2006), p. 65.

¹⁸See Gunawan Admiranto, *Menjelajahi Tata Surya...*, p. 206.

¹⁹The image of the moon on the left is the side of the moon when viewed near from the earth, photographed by the Galileo spacecraft on its way to Jupiter. The image of the moon on the right is the side of the moon when viewed far from earth, photographed by the Apollo 16 spacecraft. See James D. Burke (2002), *Moon Earth's Satellite*, Accessed on March 1, 2022 from <https://www.britannica.com/place/moon>.

²⁰Yenny Pahmawati, *Apa yang Terjadi Pada Tata Surya...*, p. 31.

The only natural satellite that the earth has is the moon. The moon is called the earth's natural satellite because it moves around the earth. The moon is a faithful natural satellite, it always follows the earth and never leaves it, either when the earth rotates around its axis or when the earth revolves around the sun.²¹ The moon rotates around its axis at the same speed as the moon around the earth, therefore, the moon is always visible from the earth with one side.²²

The results of research by scientists stated that the moon revolves in a curved line, not in a straight line, so the moon can always be in the same stopover places. The moon revolves around the earth in an elliptical path, but its path is not shaped like a true circle. The average distance between the earth and the moon is 384.400 km, of which the closest distance is 363.000 km and the farthest distance is 406.000 km.²³

The moon in its circulation to the earth has two kinds of circulation, namely the sidereal cycle and the synodic cycle. In relation to the earth, the moon takes 27.3 days to rotate on its axis and also revolves around the earth. This period is called the sidereal period. In relation to the moon and other planets, there is another period which relates to the object's relative position with the earth and the sun. This period is called the synodic period. In a synodic period the moon takes time to reach two successive equal phases, such as one full moon to the next. One synodic period lasts 29.3 days. This synodic period has always had a great influence on human life on earth.²⁴

²¹Zaghloul Ragheb Mohamed En-Naggar, *Haqqāiq Ilmiyyah fī Al-Qur'ān Al-Karūm: Namādzij min Al-Isyarat Al-Qur'āniyyah ilā 'Ulūm Al-Ardh*, (Beirut: Dārul Ma'rifah, 2006), p. 167.

²²Humans always see the same side of the moon because the moon's satellite rotates on its axis at the same time as it rotates around the earth, which is 27 days and 8 hours. This then makes the moon visible from one side only when viewed from the earth. See Nathalie Fradette and Claude Lafleur, *Visualisasi Ilmu Pengetahuan...*, p. 35. See also A. Kadir, *Formula Baru Ilmu Falak* (Jakarta: Bumi Aksara, 2012), p. 33.

²³Nadiyah Thayyarah, *Buku Pintar Sains...*, p. 427.

²⁴Gunawan Admiranto, *Eksplorasi Tata Surya...*, p. 105.

Another source states that in general the circulation of the moon is divided into two, namely the circulation of the true moon and the circulation of the moon in the daily pseudo-moon.

First, the circulation of the true moon. The true moon cycle consists of three movements, namely the rotation of the moon, the revolution of the moon, and the moon and earth together around the sun. The moon's rotation is the rotation of the moon on its axis with a period of 27.3 days from west to east. The moon's rotation is the same as the moon's revolution around the earth. As a result of this rotation is what makes the moon visible only one side of the earth's surface. Next is the lunar revolution. Lunar revolution is the movement of the moon accompanied by the phases of the moon's surface that emit light due to reflection from sunlight. The revolution of the moon in reaching the following phases reaches a period of 29.5305882 (29 days 12 hours 44 minutes 2.8 seconds). Another division of the true moon's cycle is that the earth and the moon both revolve around the sun. The path of the moon in its orbit is elliptical, the moon has its own stopover. There are times when the position of the moon is at the closest distance to the earth, there are times when the position of the moon is very far from the earth. The moon circulates in its path around the earth by intersecting the ecliptic plane by $05^{\circ} 08'52''$, so that the orbital plane of the moon does not coincide with the plane of the earth's orbit, because if the two coincide it will result in a lunar eclipse and a solar eclipse. In fact, every month does not necessarily experience a lunar or solar eclipse, this is due to the small angle of intersection between the orbital plane and the ecliptic.²⁵

Second, the circulation of the moon in the daily pseudo-motion of the moon. The rotation of the moon from east to west results in the apparent daily motion of the moon which then makes the moon make its revolution to circle

²⁵Slamet Hambali, *Pengantar Ilmu Falak* (Banyuwangi: Bismillah Publisher), p. 219-223.

the earth in a direction from west to east. As a result of this movement, when viewed from the earth, the moon will rise late by about 50 minutes or 13 degrees of arc. From this, the moon will rise late compared to where certain stars are behind it. While the delay of the moon to the sun is about 12 degrees arc, this indicates that in every hour, the moon will always be left behind by the movement of the sun by $\frac{1}{2}$ degrees arc or like a disk width from the moon or the sun.²⁶

The moon's orbit around the earth is a synchronous orbit, because when viewed from the earth, the moon always shows the same surface, this is also because the moon's rotation period is the same as its revolution about the earth. The interaction of the moon and the earth has resulted in the existence of tides on the earth which causes the moon to move away from the earth at a rate of 3.74 cm/year.²⁷

The moon undergoes a transformation expanding from a crescent to a semicircle, then turning into a full circle and shrinking again. This happens because when viewed from the earth, the change in the position of the moon relative to the sun.²⁸ The position of the earth and moon with respect to the sun is always changing during the cycle. These changes are scientifically termed the phases of the moon.

The phases of the moon occur according to the light reflected by the moon to the earth. When the moon is between the sun and the earth, the part of the moon that does not get sunlight will face the earth so that at that time the moon will not be visible on the earth. This phase is called the new moon phase. Furthermore, according to its movement, gradually the moon will appear as a crescent moon, so that at that time humans named it as a crescent moon. When viewed from the earth, the moon will continue to grow until it

²⁶*Ibid.*, p. 224.

²⁷Slamet Hambali, *Pengantar Ilmu Falak...*, p. 105.

²⁸Nathalie Fradette and Claude Lafleur, *Visual Ilmu dan Pengetahuan Populer untuk Pelajar dan Umum: Memahami Alam Semesta* (Jakarta: PT Bhuana Ilmu Populer, 2006), p. 34.

forms not half. The moon will continue to expand by showing a larger part until the moon is shaped like a full circle and at that time on earth all parts of the moon will be visible, so the moon at that time is called not a full moon. The position of the moon at full moon is exactly opposite to the new moon. After going through the full moon, the moon will shrink back then pass through the half moon, crescent moon, until it returns to the new moon. These phases will always run continuously during the moon's revolution about the earth and sun.²⁹

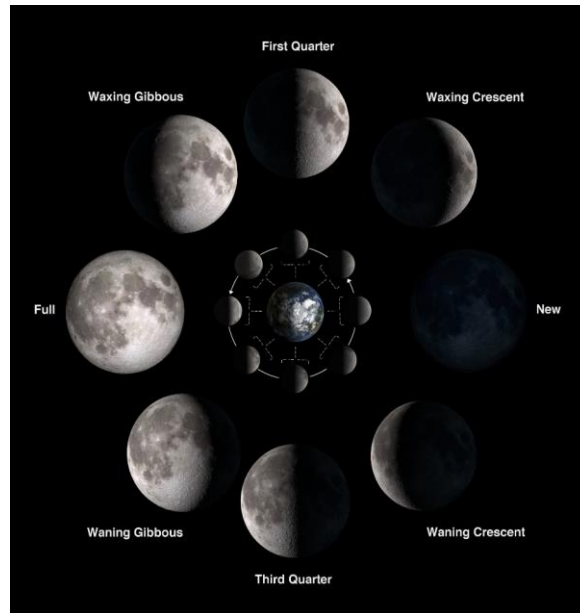


Image 3.2 Phases of the Moon³⁰

In summary, the phases of the moon can be categorized into major, important phases, namely: 1) new moon, 2) waxing crescent, 3) first quarter, 4) waxing gibbous, 5) full moon, 6) waning gibbous, 7) third quarter, 8) waning crescent. The phases of the moon that take place regularly every month have made it easy for humans to create time systems, such as the lunar

²⁹Yenny Pahmawati, *Apa yang Terjadi Pada Sistem Tata Surya ...*, p. 47.

³⁰NASA Solar System Exploration (2018), *Phases of the Moon*, Accessed on March 1, 2022 from <https://solarsystem.nasa.gov/resources/676/phases-of-the-moon/>.

calendar system, the Qamariyyah calendar system, and as a marker of worship times for Muslims.

CHAPTER III

THE CIRCULATION OF THE MOON IN THE QUR'AN

A. Verses About the Circulation of the Moon

The moon in the Qur'an are mentioned in three terms, namely *qamar*, *hilāl*, and *syahr*. *Qamar* and *hilāl* mean the true moon while *syahr* means the non-essential moon, namely the month as the time of calculation.

1. *Qamar*

The word *Qamar* in the Qur'an is mentioned in 27 times. *Qamar* means the moon in the sky, and can be referred to *qamar* when it has been seen full, that is after the third day of every month.¹

2. *Hilāl*

The Qur'an mentions the word *hilāl* only once in the plural (*ahillah*). There is a one-time mention in Surah Al-Baqarah/2: 189. The word *hilāl* contained in the verse is understood that the *hilāl* is not only once but repeatedly. This interpretation means that the new moon is the journey of the moon from a very thin moon to a perfect moon and from a perfect moon to a thin moon again.²

3. *Syahr*

The word *syahr* means a period of time that has become one part of the twelve parts in the sun's cycle that departs from one point until it returns to that point. The Qur'an mentions the word *syahr* in 21 times.³

¹Al-Raghib Al-Asfihani, *Al-Mufradāt fī Gharīb Al-Qurān* (Mesir: Dar Ibnu Al-Jauzi, 1438), p. 228.

²Muhammad Hasan, "Benda Astronomi dalam Al-Qurān dari Perspektif Sains", in *Teologia*, Vol. 26, No. 1 (Januari, 2015), p. 97.

³Al-Raghib Al-Asfihani, *Al-Mufradāt fī Gharīb Al-Qurān*..., p. 876.

The moon that revolves around the earth and at the same time along with the earth the moon also revolves around the sun has resulted in the calculation of the time amounting to twelve months. The month in this sense of time is referred to as *syahr*. The calendar that uses pure lunar circulation is the *Qamariyyah* calendar. The *Qamariyyah* calendar system is calculated based on the synodic month period in which the moon travels around the earth in twelve cycles. One month in the synodic month period is 29 days 12 hours 44 minutes 2.8 seconds and one year in the synodic period is 365.5 days.

The mention of the term *syahr* is often found in the Qur'an as an expression of time, but even so, the disclosure of time is still related to the effects of the circulation of the moon. One of the verses that reveal the term *syahr* is surah al-Baqarah/2: 185.

شَهْرُ رَمَضَانَ الَّذِي أُنزِلَ فِيهِ الْقُرْآنُ هُدًى لِّلنَّاسِ وَبَيِّنَاتٍ مِّنَ الْهُدَىٰ وَالْفُرْقَانِ ۚ فَمَن شَهِدَ مِنْكُمُ الشَّهْرَ فَلْيَصُمْهُ ۖ وَمَن كَانَ مَرِيضًا أَوْ عَلَىٰ سَفَرٍ فَعِدَّةٌ مِّنْ أَيَّامٍ أُخَرَ ۗ يُرِيدُ اللَّهُ بِكُمُ الْيُسْرَ وَلَا يُرِيدُ بِكُمُ الْعُسْرَ وَلِتُكْمِلُوا الْعِدَّةَ وَلِتُكَبِّرُوا اللَّهَ عَلَىٰ مَا هَدَاكُمْ وَلَعَلَّكُمْ تَشْكُرُونَ ﴿١٨٥﴾

The month of Ramadan is the month in which the Quran was revealed, a book of Guidance with proofs of guidance distinguishing right from wrong. Therefore, whoever of you is well in that month, let him fast. But he who is ill or on a journey shall fast a similar number of days later on. Allah desires your well-being, not your discomfort. He desires you to fast the whole month so that you may magnify Him for giving you His guidance, and that you may give thanks.⁴ (Al-Baqarah/2:185)

This verse is information about when the Qur'an was revealed which is a guide for humans, namely during the month of *Ramadan*. Quraish Shihab explained that after it was clear that certain days must be filled with fasting, the continuation of this verse stipulates who is obliged to fast, namely because

⁴The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Translition of the Meaning of the Qur'an* (Beirut: Darl Al-Choura, 1980), p. 19.

fasting is obligatory in the month of *Ramaḍan*, then whoever of you is present that month is in the country where he lives or knows the appearance of the beginning of the month of *Ramaḍan*, while he is not hindered by obstacles that are justified by religion, then he should fast in that month. This fragment of the verse can also mean, so whoever among you knows the presence of the moon, by seeing it for himself or through information from someone who can be trusted, then let him fast. Knowing his presence by seeing through his eyes, or by knowing through calculation, that he can be seen with the eyes, even though in fact it is not visible for one reason or another, for example it is cloudy, then he should fast. Those who do not see it in the above sense must also fast if he knows of his presence through a trusted person.⁵

Seeing or knowing the presence of the crescent of *Ramaḍan* is a sign of the obligation to fast, just as seeing or knowing the presence of the crescent of Shawwal is a sign of the end of the fast of *Ramaḍan*. The ninth day of the presence of the month of *Zulhijjah* is the day of *wuquf* at Arafah. And many religious obligations or recommendations are associated with the moon. The vision that needs to be done is to see the moon, not the sun. Humans cannot know the number of days just by looking at the sun, because the center of the solar system which is a ball and emits light does not give any signs of the days that have passed or are being and will be experienced by humans. Every day, the sun appears and is seen in the same form and state. The sun only points to the course of a day; if it rises, then it is a sign that it is morning, if it has risen half way, then it is near noon, and if it sets, then the day has passed, or night has come.⁶

Humans cannot see the moon during the day, because this natural satellite of the earth will only be visible at night. The journey of the moon will

⁵Quraish Shihab, *Tafsīr Al-Misbāh, Pesan, Kesan dan Keserasian Al-Qurān*, Juz 6 (Tangerang: PT Lentera Hati, 2016), p. 488.

⁶*Ibid.*, p. 488.

begin with a crescent shape then enlarge to become a full moon and run until it looks like a crescent again. Such circulation has resulted in the calculation of the 12 months of Qamariyyah, one of which is the month of *Ramaḍan*, in which Muslims are required to fast when they see the new moon at the beginning of the month in *Ramaḍan*.

The circulation of the moon means that moon in its essential form in circulation. The moon in its essential form in the Qur'an is discussed in 28 times, while those that explain the circulation of the moon are 13 verses. The circulation of the moon in the Qur'an can be found in Surah Al-Baqarah/2: 189, Al-An'am/6: 96, Yūnus/10: 5, Ibrāhim/14: 33, Al-Anbiyā'/21: 33, Al-Ra'd: 2, Luqmān: 29, Az-Zumār/39: 5, Fāṭir/35: 13, Yāsīn/36: 38-40, Ar-Rahmān/55: 5, Al-Insyiqāq/84: 18, and Asy-Syams/91: 1-2.

B. Interpretation of the Verses of the Circulation of the Moon

1. Al-Baqarah/2: 189

يَسْأَلُونَكَ عَنِ الْأَهْلِ ۗ قُلْ هِيَ مَوَاقِيتُ لِلنَّاسِ وَالْحَجِّ ۗ وَلَيْسَ الْبِرُّ بِأَنْ تَأْتُوا الْبُيُوتَ مِنْ ظُهُورِهَا

وَلَكِنَّ الْبِرَّ مَنِ اتَّقَىٰ وَأَتُوا الْبُيُوتَ مِنْ أَبْوَابِهَا ۗ وَاتَّقُوا اللَّهَ لَعَلَّكُمْ تُفْلِحُونَ ﴿١٨٩﴾

They question you about the new moons. Say: 'They are time fixed for mankind and for the pilgrimage.' Righteousness does not consist in entering your dwellings from the back. The righteous man is he that fears Allah. Enter your dwellings by their doors and fear Allah, so that you may prosper.⁷ (Al-Baqarah/2: 189)

Asbāb an-nuzūl explained from this verse that Abu Naim and Ibn Asakir narrated from Abu Salih and Ibn Abbas, at that time Mu'az ibn Jabal and Tha'labah ibn Kharimah asked the Messenger of Allah "O Messenger of Allah, why does the moon look smooth and thin? like a thread and then

⁷The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Translition of the Meaning of the Qur'an...*, p. 20.

increase until it is round. After the circle then shrinks or decreases again and is getting smaller day by day, then it returns to the way it was originally, which means it is not fixed in its state (always changing), then after this question was asked, Surah al-Baqarah/2: 189 came down.⁸

Another narration explains that this verse was revealed when the companions asked the Messenger of Allah about the crescent moon, so this Surah Al-Baqarah/2: 189 was revealed, and this explanation was also narrated by Ibn Hatim, besides that, there is another explanation which is also narrated by Ibn Hatim namely the form of the friend's question is why the moon was created with this shape,⁹ i.e. a small form, getting bigger, then getting smaller again, then after that question, this verse came down

Experts differ in discussing the two *asbāb an-nuzūl* above. They explain that the first narration is a question about the nature of the crescent moon, why the crescent was initially small and then enlarged until it was full, but then it became smaller again. Allah's answer in this verse is not in accordance with the questions of the friends, but the answer that comes from Allah is regarding the wisdom and usefulness of the crescent moon. Thus, this answer implies that asking about the wisdom and usefulness of changing the shape of the moon is better than asking about the nature of the change itself. Furthermore, the second narration explains the question of the relationship or wisdom of the condition of the crescent moon, then Allah answers that its wisdom is as a guide for humans in calculating time. Therefore, Allah's answer is in accordance with the questions of the friends.¹⁰

Analysis from experts believes that the reason for the revelation of this verse is the second, namely asking about the wisdom of the changing

⁸Muhamad Hasbi Ash-Shiddieqy, *Tafsīr Al-Qurān Al-Madīd: An-Nūr*, Juz 2, (Jakarta: Cakrawala Publishing, 2011), p. 200-201.

⁹Farida Arianti, "Penetapan Awal Bulan Qamariah Menurut Perspektif Al-Qur'an dan Tafsīr", in *Juris*, Vol, 13, No. 1 (Juni, 2014), p. 65.

¹⁰Lajnah Pentashihan Mushaf Al-Qur'ān et al., *Manfaat Benda-benda Langit dalam Perspektif Al-Qurān dan Sains* (Jakarta: Lajnah Pentashihan Mushaf Al-Qurān, 2010), p. 113.

conditions of the moon, this is in accordance with the message carried by the Prophet in providing enlightenment that can increase the belief and piety of the people, not to explain astrology, geography, mathematics, and so on.¹¹

Several verses before Surah Al-Baqarah/2: 189 describe the problem of fasting and its rules in the month of Ramadan, then in this verse Allah reveals the time needed for humans to carry out worship, such as fasting, pilgrimage, and others. This verse describes the calculation of time that humans make as a guide in their lives.¹²

Hasbi As-Shidiqi explained in his commentary, that the moon which in this case is referred to as *hilāl* is a phenomenon and a sign for humans, with *hilāl*, humans can determine the time to carry out worship and use it as a guide, for example celebrating holidays and pilgrimages. The timing of the pilgrimage is very important, both in its implementation and its making up. *Hilāl* is also useful for worldly affairs, such as knowing the time to grow crops, trade, and human time that is determined for social interaction according to the Shari'a.¹³

The movement of the moon and sun in terms of time can be used as a guide to determine the day, month, and year. The international term states that the calculation of time using the moon is called Lunar¹⁴ calendar then in Islamic terms is called the *Qamariyyah* calendar. The time calculation that uses the benchmark of the earth's motion around the sun is called Solar¹⁵

¹¹*Ibid.*, p. 113-114.

¹²Lajnah Pentashihan Mushaf Al-Qur'an et al., *Manfaat Benda-benda Langit...*, p. 114.

¹³Muhamad Hasbi Ash-Shiddieqy, *Tafsīr Al-Qurān Al-Madjīd...*, p. 198.

¹⁴It is called the lunar calendar because another name for the month in English is lunar. Lunar itself comes from the Latin word Luna 'moon'. See John Simpson and Edmund Weiner, *Little Oxford English Dictionary* (California: Oxford University Press. 2006), p. 263.

¹⁵The word solar from latin Solaris, from sol means the sun. So the solar calendar is a calendar based on the revolution of the earth around the sun. See also *Little Oxford English Dictionary...*, p. 422.

calendar or the *Syamsiyah* calendar. The sun and the moon can be used as a guide for human time in their lives.¹⁶

2. Al-An'ām/6: 96

فَالِقُ الْإِصْبَاحِ وَجَعَلَ اللَّيْلَ سَكَنًا وَالشَّمْسَ وَالْقَمَرَ حُسْبَانًا يَذُكُّكَ تَقْدِيرُ الْعَزِيزِ الْعَلِيمِ ﴿٩٦﴾

He kindles the light of dawn. He has ordained the night for rest and the sun and the moon for reckoning.¹⁷ (Al-An'ām/6: 96)

Allah explained His power over things that are material and are on earth in the previous verse, now in Surah Al-An'ām/6: 96 Allah explains His power over the heavenly bodies, namely that Allah made the night for rest and relaxation. the dawning of the morning so that creatures may move freely.¹⁸

Allah has created light and darkness and Allah has replaced the darkness of the night with the rising of the sun in the morning that illuminates all that exists. Allah with His power has created everything that is different and contradictory, which shows the perfection of His majesty and power.¹⁹

Quraish Shihab explained in his interpretation that the mention of the sun and the moon in this verse is the cause of darkness and light. Both the sun and the moon, Allah has made them circulate based on very careful calculations, emitting ray and light, and making night and day alternately. The moon reflects sunlight towards the earth's surface so it looks bright and you can see the crescent moon. In the first half the position of the moon is between the sun and the earth, then the moon shrinks which indicates a new crescent moon appears for the entire surface of the earth. When the moon is in front of the sun, and the position of the earth is in the middle, the full moon will be

¹⁶Lajnah Pentashihan Mushaf Al-Qurān. *Manfaat Benda-benda Langit...*, p. 115.

¹⁷The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Translition of the Meaning of the Qur'an...*, p. 97.

¹⁸Quraish Shihab, *Tafsir Al-Misbah, Pesan, Kesan dan Keserasian Al-Qurān...*, p. 368.

¹⁹Abdullah bin Muhammad, *Lubab At-Tafsir min Ibni Katsir*, Juz 3, Trans. Abdul Ghoffar (Jakarta: Pustaka Imam Syafi'I, 2017), p. 326.

seen, then the full moon will shrink again until the second half. From the movement of this month, one month of Qamariyyah is complete, which is 29.5309 days.²⁰

Allah has measured the movement of the sun at a certain amount of speed and slowness, so the cycle is completed in the amount of a year, and Allah has also measured the movement of the moon so that the cycle is completed in a month. Allah determines the amount of time in the movement of the sun, so the creatures on the earth experience four seasons, as a result of the four seasons, creatures on earth can get what they need from the ripening of fruit and produce.²¹ The four seasons are winter, summer, spring and fall.

The circulation of the moon has taught humans how to calculate the moon, such as the month for hajj, fasting, Eid al-Fitr, Eid al-Adha, *tasyrik*'s day, and so on. The circulation of the moon is used as a calculation of the month for those who use it in their lives, while the circulation of the sun is used as a calendar of days and years. Both of these celestial bodies are equally used as a time guide for humans in living their lives on this earth.

3. Yūnus/10: 5

هُوَ الَّذِي جَعَلَ الشَّمْسُ ضِيَاءً وَالْقَمَرَ نُورًا وَقَدَرَهُ مَنَازِلَ لِتَعْلَمُوا عَدَدَ السِّنِينَ وَالْحِسَابَ ۗ مَا خَلَقَ
اللَّهُ ذَٰلِكَ إِلَّا بِالْحَقِّ ۗ يُفَصِّلُ الْآيَاتِ لِقَوْمٍ يَعْلَمُونَ ﴿٥﴾

It was He that made the sun brightness and the moon light, ordaining the latter's phases that you may learn the number of years and the reckoning. He created them only to manifest the truth. He makes plain His revelations to mean of understanding.²² (Yūnus/10: 5)

²⁰Quraish Shihab, *Tafsīr Al-Misbāh*..., p. 568.

²¹Fakhruddin Al-Razi, *Tafsīr Al-Kabīr*, Juz 13-14 (Beirut: Dar Al-Kutub Al-Ilmiyah, 1999), p. 81.

²²The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Translition of the Meaning of the Qur'an*..., p. 147.

Allah mentions the arguments for the affirmation of *ulūhiyah*, *tauhīd*, and *ba'ts* (resurrection after death) through the creation of the heavens and the earth in the verse before Surah Yūnus/10: 5, then in this verse Allah mentions the condition of the sun and moon as a proof for the oneness of Allah in terms of creation and the argument for the confirmation of the resurrection day. These two reasons are because the sun and the moon are tools for measuring time, including the year. It is thus a watch for time which must come to an end with the death of all beings in the universe. Allah also describes the benefits of Allah's creation of the earth and the benefits of the exchange of night and day. Therefore, there are four evidences for *ulūhiyah* and *tauhīd*, namely the creation of the heavens and the earth, the creation of the sun and the moon, the benefits derived from the dawning of the night and day, and what Allah created in the heavens and the earth in the form of rain, shine, lightning, waves. in the oceans, earthquakes, volcanoes, and what happens to animals, plants, and minerals.²³

Surah Yūnus/10: 5 explains the nature of the sun and the moon. The sun is called *ḍiyā'* which means radiant source, this is because the sun has its own light, while the moon is called *nūr* because it does not have its own light and only reflects light from the sun.²⁴ The sun is source light (ضياء = *ḍiyā'*) and the moon is light (نور = *nūr*), this translation seems to be better than the translation of people who confuse the two words. In fact, the difference in meaning between the two words is very small. *ḍiyā'* comes from the root word (*dw'*) which according to Kazimirski's Arabic-French dictionary means flaming, shiny, but the author also interprets it with the meaning of light in addition to the meaning of light. In the Qur'an the moon is described as a shining object (منير = *munīr*), from the same root as the word *nur* (the word

²³Wahbah Zuhaili, *Tafsīr Al-Munīr*, Juz 4, Trans. Abdul Hayyi Al-Kattani, (Jakarta: Gema Insani, 2016), p. 120.

²⁴Lajnah Pentashihan Mushaf Al-Qur'ān et al., *Manfaat Benda-benda Langit...*, p. 115.

bright is used for the moon). The sun is compared to a lamp (سراج = *sirāj*) or a very strong lamp (وهاج = *wahhāj*).²⁵

Ali Ash-Shabuni also explained that Allah made the sun a lamp because the sun emits its own light, while the mention of the moon as light is because the moon gets light from the celestial object that Allah calls a lamp, namely the sun.²⁶ Allah did not create a luminous moon but its light is reflected from the sun, so that the light of the moon can be used by travelers on their journey, according to Al-Maraghi when describing the verse about the moon.²⁷

Zaghloul En-Naggar in his Tafseer said The Qur'an has distinguished between the sun is radiant source called (*diyā'*) and the moon is reflected light called (*nūr*). Starting from this scientific fact that distinguishes between light that arises from objects that are ignited, turbulent, and self-luminous at very high temperatures (up to millions of degrees celsius as occurs in the sun's nucleus), and light reflected from cold objects that receive light, then reflects it into light. The Noble Qur'an focuses on the detailed differences between sunlight (*diyā'*) and moonlight (*nūr*) and between the sun as a lamp and the moon as light.²⁸

Allah has made the sun to illuminate this universe during the day and Allah has made the moon shining during the night, Allah has set the circulation of the moon in the composition of this solar system in its *manzilah*.

²⁵Maurice Bucaille, *Bible, Qur'an dan Sains Modern*, Trans. Rasjidi, (Jakarta: Bulan Bintang, 2010), p. 141.

²⁶Muhammad Ali Ash-Shabuni, *Shafwāt Al-Tafāsir*, Juz 5 (Jakarta: Pustaka Al-Kautsar, 2011), p. 499.

²⁷Ahmad Mustafa Al-Maraghi, *Tafsīr Al-Marāghī*, Juz 11 (Semarang; CV. Toha Putra, 1993), p. 127.

²⁸Zaghloul Ragheb Mohamed En-Naggar, *Selekta dari Tafsir Ayat-ayat Kosmos dalam Al-Qur'an Al-Karim*, Juz 1, Trans. Masri El-Mahsyar Bidin (Jakarta: Shourok International Bookshop, 2010), p. 66

In one night, one *manzilah* descends in the month which there are 28 *manzilah*.²⁹

Allah has decreed the *manzilah* on the moon and made them straight, so that they will not pass through their orbits. This verse mentions *qoddarnāhu* by only mentioning one dhamir, but the previous verse mentions the sun and the moon. At-Tabari explained that there are two answers to this problem. First, the Surah dhamir *ha'* in the word *qoddarnāhu* only returns to the meaning of the moon, does not return to the sun, the reason is because with the new moon it will be known the turn of the month and year (*hijriah*), not by using the sun. Second, the mention of *dhamir* in the word *qaddarnāhu* already includes the sun and the moon, this is as Allah says ...”but it is more just that they should please Allah and His Apostle”... (At-Taubah/9: 62) and as the poet said “He accused me of of one thing that my father and I were not involved in.” Furthermore, the disclosure ...”so that you may know the number of years and the calculation of time”... is also intended for the sun and the moon. Allah has set *manzilah* on the moon and the sun so the believers may know the number of the beginning of the year and the end of the year. The calculation of time referred to in this paragraph is the calculation of hours, days, and so on.³⁰

Contrast to Ath-Thabari, Wahbah Zuhaili argues that the mention of *manzilah* in the moon because the *dhamir* in the word *qaddarnāhu* is understood as *dhamir* which returns to the word *qamar*. The mention of the *manzilah* in this moon is due to the fast circulation of the moon, the knowledge of the positions of the moon which is easy to understand and the dependence of Allah's Shari'ah laws on the month, therefore Allah confirms that the circulation is used to know the number of years and the calculation of

²⁹Wahbah Zuhaili, *Tafsīr Al-Munīr...*, p. 119-120.

³⁰Abu Ja'far Muhammad bin Jarir Ath-Thabari, *Jāmi' Al-Bayān An Ta'wīl Ayat Al-Qurān*, Juz 5, (Jakarta: Pustaka Azzam, 2011), p. 448-499.

time, namely that with the true month in circulation, it will be known the count of months, days, nights, four seasons, as well as calculations related to worship such as prayer times, fasting, zakat, agreements, buying and selling, and others.³¹

Humans will be difficult if living without the moon, because without the moon humans do not know about the calculation of time, months, to weeks. The moon can also be used as a time reference to know and measure the seasons on earth, such as winter, summer, spring, and autumn.³²

4. Ibrāhīm/14: 32-34

اللَّهُ الَّذِي خَلَقَ السَّمَاوَاتِ وَالْأَرْضَ وَأَنْزَلَ مِنَ السَّمَاءِ مَاءً فَأَخْرَجَ بِهِ مِنَ الثَّمَرَاتِ رِزْقًا لَكُمْ
وَسَخَّرَ لَكُمْ الْفُلْكَ لِتَجْرِيَ فِي الْبَحْرِ بِأَمْرِهِ وَسَخَّرَ لَكُمْ الْيَوْمَ وَاللَّيْلَ وَالنَّهَارَ ﴿٣٢﴾ وَسَخَّرَ لَكُمْ الشَّمْسَ
وَالْقَمَرَ دَائِبَيْنِ وَسَخَّرَ لَكُمْ اللَّيْلَ وَالنَّهَارَ ﴿٣٣﴾ وَأَتَاكُمْ مِنْ كُلِّ مَا سَأَلْتُمُوهُ وَإِنْ تَعُدُّوا نِعْمَةَ
اللَّهِ لَا تُحْصُوهَا إِنَّ الْإِنْسَانَ لَظَلُومٌ كَفَّارٌ ﴿٣٤﴾

It is Allah who made the heavens and the Earth. And sends down water from the sky with which he brings forth fruits for your sustenance. He drives the ships which, by His leave, sail the ocean in your service. He has created rivers for your benefit, and the sun and moon, which steadfastly pursue their courses. And He has subdued to you the night and the day. He grants you all that you ask Him. If you reckoned up Allah's favours, you could not count them. Truly, man is wicked and thankless.³³ (Ibrāhīm/14: 32-34)

Allah has explained the description of the condition of the happy group and the unfortunate group in the previous verse, then in verse 33, Allah explains a number of evidences regarding the existence of Allah, perfection,

³¹Ibid., p. 120.

³²See Tanthawi Jawhari, *Al-Jawhir fī Tafṣīr Al-Qurʾān*, Juz 7 (Kairo: Mathbah Al-Bāb Al-Halabi, 1929), p. 16.

³³The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Translition of the Meaning of the Qur'an...*, p. 184.

the totality of Allah's knowledge, the oneness of Allah and the power of Allah.³⁴

Tanthawi Jawhari explained in Surah Ibrāhīm/14: 33 it contains about the state of the sun and moon which always remain in their circulation. These two celestial bodies have illuminated and dispelled the darkness. The sun and moon have also improved the order of the earth, humans, animals, and plants. The earth with the sun will know the seasons in it, with the moon, humans will know the months.³⁵ Imam Al-Qurtubi explained Surah Ibrāhīm/14: 33 is an explanation of the sun and moon that appear alternately. If one leaves, the other will come with benefits and life-supporting factors for humans. The sun provides a supporting factor for humans to work for a living, and the moon is used by humans to rest, as well as Allah's grace for all of us.³⁶

The benefits of the sun and the moon are enormous. Allah has also mentioned it in Surah Nūh/71:16, Ar-Rahmān/55:5, Al-Furqān/25:61, Yūnus/10:5, and Yūsuf/12:47. These two celestial bodies both illuminate the earth, equally influential in dispelling darkness, and can give life to animals and plants.³⁷

The sun has been considered the king of the day, while the moon is considered the king of the night. If there was no sun, there would be no improvement in this world and there would be no four seasons.³⁸ Allah has subdued the night and the day and made these two heavenly bodies come one after another and contradict each other. Afternoon is a time to carry out activities, such as working, carrying out worldly affairs, as well as for efforts to find life. While the night is a time for calm and rest³⁹ Everything that

³⁴Wahbah Zuhaili, *Tafsīr Al-Munīr...*, p. 244.

³⁵Tanthawi Jawhari, *Al-Jawhīr fī Tafsīr Al-Qurān...*, p. 192.

³⁶Syaikh Imam Al-Qurthubi, *Al-Jamī lī Ahkām Al-Qurān*, Juz 14, Trans. Studi Rosadi, et al. (Jakarta: Pustaka Azzam, 2008), p. 583.

³⁷See Fakhruddin Al-Razi, *Tafsīr Al-Kabīr...*, p. 101.

³⁸*Ibid.*, p. 101.

³⁹See Wahbah Zuhaili, *Tafsīr Al-Munīr...*, p. 247.

happens in the universe is in order according to Allah's arrangement. This order is also emphasized by Allah in Surah Fāṭir/35:13.

يُولِجُ اللَّيْلَ فِي النَّهَارِ وَيُؤَلِّجُ النَّهَارَ فِي اللَّيْلِ وَسَخَّرَ الشَّمْسَ وَالْقَمَرَ كُلًّا يَجْرِي لِأَجَلٍ مُّسَمًّى ؕ
 دَلِكُمْ اللَّهُ رَبُّكُمْ لَهُ الْمُلْكُ ؕ وَالَّذِينَ تَدْعُونَ مِنْ دُونِهِ مَا يَمْلِكُونَ مِنْ قِطْمِيرٍ ﴿١٣﴾

He causes the night to pass into the day and the day into the night. He has forced the sun and the moon into His service, each running for an appointed term. Such is Allah your Lord. He is the sovereignty. Those whom you invoke besides Him have power over nothing.⁴⁰ (Fāṭir/35: 13)

The previous verse explains the evidence of the power and abundance of God's gifts related to creatures, river water, sea water, and objects contained in both, then in this verse Allah reveals evidence and other non-material/immaterial blessings.⁴¹

The proofs and favors of Allah include that it is Allah who turns the day into the night and subdues the sun and the moon. Allah made the night one day longer than the day and Allah also made the day longer than the night, this is done by Allah through the laws of nature that He has set. The difference in the time of day and night as Allah has explained is very clear in a number of areas far from the equator.⁴²

The use of *fil mādhī* in the word *sakhkhorō* (subject) implies that the subjugation of the sun and moon has been completed from the past and has not experienced the slightest change or change. The sun and the moon have been subdued by Allah and have walked towards the appointed time. As seen everyday, the cycle of the sun and the moon will continue to run until the time determined by Allah, and the end of that time is nearing the end of the world.

⁴⁰The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Transliteration of the Meaning of the Qur'an...*, p. 320.

⁴¹Quraish Shihab, *Tafsīr Al-Misbāh...*, p. 37.

⁴²*Ibid.*, p. 37.

Astronomers explain that the sun will later be able to burn its atomic fuel (hydrogen) and then turn into helium, and that major natural disasters will occur when these events occur.⁴³

Changes in the position of the earth with respect to the sun have caused changes in the time of day and night as well as changes in seasons and climate. The location is a bit far between the southern and northern hemispheres, causing the area to have summer, cold, autumn, and spring. Spring in the Southern Hemisphere takes place around March, April, and May. The air temperature in spring is very cool, because spring is a transition from winter to summer. At the spring, the plant began to bud and then grow leaves after being bare. Next, comes summer which lasts from June to August. The situation at that time was very comfortable, because the sun was shining brightly, therefore, in this season, many people in the area relax by enjoying the natural beauty of the scenery with various kinds of blooming plants. Summer is over, autumn comes from September to November. In these months, the leaves on the plants begin to fall, until in winter almost all plants are no longer leaves, winter lasts during December and January.⁴⁴

Everything has been arranged by Allah. The Southern Hemisphere has seasons that are opposite to those of the Northern Hemisphere. If the northern hemisphere experiences summer, the southern hemisphere experiences winter, and if the northern hemisphere experiences spring, the southern hemisphere experiences autumn. All of these statutes are Allah's arrangements for the balance of the universe. With this arrangement, humans will increase their faith, because all phenomena that always occur are the will of the almighty Allah.

⁴³*Ibid.*, p. 37.

⁴⁴Lajnah Pentashihan Mushaf Al-Qur'ān et al., *Manfaat Benda-benda Langit...*, p. 91-92.

5. Yāsin/36: 37-40

وَأَيَّةٌ لَهُمُ اللَّيْلُ نَسْلَخُ مِنْهُ النَّهَارَ فَإِذَا هُمْ مُظْلِمُونَ ﴿٣٧﴾ وَالشَّمْسُ تَجْرِي لِمُسْتَقَرٍّ لَهَا ذَلِكَ تَقْدِيرُ الْعَزِيزِ الْعَلِيمِ ﴿٣٨﴾ وَالْقَمَرَ قَدَرْنَا مَنَازِلَ حَتَّىٰ عَادَ كَالْعُرْجُونِ الْقَدِيمِ ﴿٣٩﴾ لَا الشَّمْسُ يَنْبَغِي لَهَا أَنْ تُدْرِكَ الْقَمَرَ وَلَا اللَّيْلُ سَابِقُ النَّهَارِ وَكُلٌّ فِي فَلَكٍ يَسْبَحُونَ ﴿٤٠﴾

And a sign for them is the night. From it We draw out the day-and they are plunged in darkness. The sun hastents to its resting-place: that is the decree of the Mighty One, the-All Knowing. And for the moon, We have ordained mansions till it bocomes again as an old dry palm-branch. The sun is not allowed to overtake the moon, nor does the night outpace the day. Each in its own orbit runs.⁴⁵ (Yāsin/36: 37-40)

The previous verse describes some of the signs of Allah's greatness on earth through His creations, Allah also gives examples of His power in bringing life to life and explaining His creation in pairs. Furthermore, verses 37 to 40 talk about His creation that is in the sky and the impact and benefits of Allah's creation.⁴⁶

Allah explains the phenomena that occur every day, namely the alternation of day and night. In a day, humans witness events starting from the rising of the sun when the morning is filled with light until noon, until finally it gradually turns into evening and returns to the darkness of the night. Furthermore, Allah explains that the sun always moves in its orbit according to the provisions set by Allah. Allah is very meticulous in determining the sun's orbit, so that not even a second the sun will deviate. This decree of Allah also applies to other celestial bodies, such as the moon, stars, and planets in outer space, although they are very numerous, all of them rotate in an orderly manner and circulate in their respective paths.⁴⁷

⁴⁵The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Translition of the Meaning of the Qur'an...*, p. 324.

⁴⁶Quraish Shihab, *Tafsīr Al-Misbāh...*, p. 536.

⁴⁷Lajnah Pentashihan Mushaf Al-Qur'ān et al., *Manfaat Benda-benda Langit...*, p. 50.

The word of Allah " We have ordained mansions" (*manzilah*), means that Allah makes the moon circulate in another place of circulation (different from the circulation of the sun), which can be used as a sign for the moon to change, this kind of thing as the sun can be known between day and night time. An explanation like this is as the word of God found in Surah Al-Baqarah/2: 189 and Surah Yūnus/10: 5.⁴⁸

The moon will always move from the starting point according to its position and continue to rotate until it returns to the point where the moon departed. When viewed from the earth, the moon at the beginning of its appearance is shaped like a crescent with two sharp ends, then it will move in a predetermined position. Changes in the position of the moon when seen from the earth, will appear from a small crescent to a large one and at its peak looks full circle or commonly known as full moon. Furthermore, the moon will continue to run and be seen again from the earth the moon looks smaller, until it finally returns to the shape of a septum, resembling a crescent or curved palm frond.⁴⁹

The sun in essence will never precede the moon, because these two celestial bodies circulate in a linear motion that is impossible to meet. This is like night which cannot precede day, unless the earth rotates on its axis from east to west, unlike what happens, namely moving from west to east. The moon when it revolves around the earth and the earth when it goes around the sun must pass through a collection of stars which then gives rise to *manzilah* on the moon. So people can see the moon like an old bunch in the first and second quarters.⁵⁰

⁴⁸Abdullah bin Muhammad, *Lubāb At-Tafsīr...*, p. 28.

⁴⁹Lajnah Pentashihan Mushaf Al-Qur'ān et al., *Manfaat Benda-benda Langit...*, p. 84.

⁵⁰See Lajnah Al-Qurān dan As-Sunnah Majelis Tinggi Islam Kairo, *Tafsīr Al-Muntakhab fii Tafsīr Al-Qurān Al-Karīm* (Al-Azhar: Kairo, 2001). See also Quraish Shihab, *Tafsīr Al-Misbāh...*, p. 135.

Furthermore, the above verse only mentions the sun and night which cannot precede the moon and cannot precede the day. Not mentioning otherwise. This is to shorten the description, especially if the big and great one, namely the sun, cannot precede the small one, namely the moon, then of course even more so the opposite. The word يَسْبَحُونَ (*yasbahūn*) originally meant they were swimming. Space is likened by the Qur'an to a large ocean. The celestial bodies are likened to the fish swimming in the open ocean. Allah describes the objects with words that are used for intelligent people (they swim). This seems to indicate the submission of the celestial bodies to the provisions and destiny that Allah has ordained for them.⁵¹

The verses above have been proven by scientific facts that were just discovered by astronomers around the 17th century AD that the sun, moon, earth, and other celestial bodies in the universe move regularly with certain speeds and directions. All celestial bodies in the universe circulate in their respective orbits.

6. Asy-Syams/91: 1-2

وَالشَّمْسُ وَضُحَاهَا ﴿١﴾ وَالْقَمَرِ إِذَا تَلَّهَا ﴿٢﴾

By the sun and his rising brightness; by the moon, which rises after him.⁵²
(Asy-Syams/91: 1-2)

Surah Asy-Syams has similarities with the previous Surah, it is explained that the previous Surah, namely Surah Al-Balad ends with an explanation of *ashhābul maimanah* which means right people, this explanation is repeated again in Surah Al-Syams, namely by stating the person who cleanse and pollute his soul. Surah Al-Balad is then closed with

⁵¹Quraish Shihab, *Tafsīr Al-Misbāh...*, p. 543.

⁵²The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Translition of the Meaning of the Qur'an...*, p. 454.

the condition of the disbelievers in the hereafter, while Surah Asy-Syams is closed with the condition of the disbelievers in the world.⁵³

Quraish Shihab quoted from Al-Biq'a'i, namely in the last Surah Al-Balad it was explained that humans live in difficulties while emphasizing that whoever deviates from the way of Allah, then he will live in hell with eternal difficulties. Therefore, at the beginning of sura As-Syams, Allah swore that it was Allah who did this, because Allah is the one who is powerful, who limits man to his heart, as stated in Surah Al-Anfāl/8: 24, where Allah swore by showing the breadth of knowledge and His perfection.⁵⁴

Ad-Dhahak narrated from Ibn Abbas, the word *wa duhāha* means Allah has created light in the sun and made it scorching hot. Al-Yazidi said that the expanse of light, so that the oath in this verse shows the sun and all creatures on this earth.⁵⁵ Furthermore, in the second verse, namely “and the moon when it accompanies it”, it means the night the crescent moon appears, namely when the sun sets at the beginning of the month. If the sun begins to set at the beginning of the middle of the month, then the moon will accompany the sunrise on the eastern horizon, and if at the end of the month, the moon will accompany the sun on the western horizon. The word *talāha* means to take from him, that is, the moon can shine because of the reflection of the sun's rays. Some people say the phenomena implied in this verse occur when rotating and residing, therefore, the parable is like light and light.⁵⁶

The sun and moon have their own orbits. The orbit of the moon's revolution with respect to the earth is slightly tilted from the orbit of the earth's revolution with respect to the sun, therefore, humans can see the appearance of the circulation of the sun and moon in the sky from east to west

⁵³Muhamad Hasbi Ash-Shiddieqy, *Tafsīr Al-Qurān Al-Madjīd...*, p. 329.

⁵⁴Quraish Shihab, *Tafsīr Al-Misbāh...*, p. 296.

⁵⁵See Abu Al-Hasan bin Muhammad Al-Mawardhi, *An-Nukat wa Al-Uyūn*, (Beirut: Dar Al-Kutub Al-Ilmiyyah, 1992), See also Syaikh Imam Al-Qurthubi, *Al-Jamī lī Ahkām Al-Qurān*, p. 432.

⁵⁶Syaikh Imam Al-Qurthubi, *Al-Jamī lī Ahkām Al-Qurān...*, p. 434.

which appear close together, so that the sun and the moon always compete quickly.

The moon meets the sun once a month. It begins with the appearance of the new moon from the west after sunset, then the moon will gradually lag behind the sun, then the moon will also rise at the same time as the sun when it enters the full moon, shortly after that, the moon will rise late about 50 minutes every year, days, and this delay continues until the new moon can be seen at midday. Maybe this is what Allah meant in Surah Asy-Syams/40:2, where the moon follows or accompanies the sun.⁵⁷

C. The Benefits of the Circulation of the Moon in the Qur'an

1. The Circulation of the Moon As a Guide in Calculation of Time

The moon is used by humans as a timepiece. This is in accordance with the word of Allah in the Surah Yūnus/10:5.

هُوَ الَّذِي جَعَلَ الشَّمْسَ ضِيَاءً وَالْقَمَرَ نُورًا وَقَدَرَهُ مَنَازِلَ لِتَعْلَمُوا عَدَدَ السِّنِينَ وَالْحِسَابَ ۗ مَا خَلَقَ

اللَّهُ ذَٰلِكَ إِلَّا بِالْحَقِّ ۗ يُفَصِّلُ الْآيَاتِ لِقَوْمٍ يَعْلَمُونَ ﴿٥﴾

It was He that made the sun brightness and the moon light, ordaining the latter's phases that you may learn the number of years and the reckoning. He created them only to manifest the truth. He makes plain His revelations to mean of understanding.⁵⁸ (Yunus/10: 5)

Another explanation regarding the moon as a time indicator is also revealed in Surah Al-Baqarah/2: 189, Al-An'ām/6: 96, Yunus/10: 5, Yāsin/36:38-40, Ar-Rahmān/55: 5 The verses that have been mentioned show that Allah has made the sun and the moon the standard for calculating time for humans on this earth.

⁵⁷See Nadiyah Thayyarah, *Buku Pintar Sains dalam Al-Qur'an*, (Jakarta: Zaman, 2014), p. 429.

⁵⁸The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Translition of the Meaning of the Qur'an...*, p. 147.

The month provides benefits in the calculation of time including the number of years. The calculation of time in the Qamariyyah calendar system is based on when the moon begins to rise, and at that time the day begins at sunset, because when the sun sets, the moon appears. The calculation of time such as the Qamariyyah calendar is of course different from the calculation of time using the *Syamsiyah* calendar. In the *Syamsiyah* calendar system, the calculation of the day begins at midnight, namely at 00.00, therefore the determination of the day at the beginning of the year always starts at midnight. The determination of the day on the *Qamariyyah* calendar system and the Lunar Calendar is set when the new moon has begun to be seen or not based on observations and astronomical calculations. If the new moon has not been seen, the beginning of the month has not started and that day is part of the ongoing month, and vice versa, if the new moon has been seen, then the calculation of the beginning of the month begins at that time.⁵⁹ Observation of the new moon at the beginning of this month is called *ru'yah*⁶⁰ which is an activity or effort to see the new moon or crescent on the western horizon shortly after sunset before the start of the new month.⁶¹

Some other Muslims only use *hisāb*⁶² (reckoning) in determining the time of the beginning of the month. Those who use reckoning as a guide for calculating time do not need to do rukyat at the beginning of the month. Determination of the beginning of the month using *hisāb* is based on the

⁵⁹Lajnah Pentashihan Mushaf Al-Qur'ān et al., *Manfaat Benda-benda Langit...*, p. 114.

⁶⁰The word *ru'yah* comes from the Arabic language رؤية - يرى - رأى which means seeing with the eyes or being carried out directly. Usually *ru'yah* is done using the eyes of the head. See Atabik Ali and Ahmad Zuhdi Muhlor, *Kamus Kontemporer Arab-Indonesia* (Yogyakarta: Multi Karya Grafika, w.y), p. 939. See also Susiknan Azhari, *Ensiklopedia Hisab Rukyat* (Yogyakarta: Pustaka Pelajar), p. 128.

⁶¹Mukyidin Khazim, *Ilmu Falak dalam Teori dan Praktik* (Yogyakarta: Buana Pustaka, 2009), p. 173.

⁶²Etymologically, the word reckoning comes from the Arabic Al-Hisab (الحساب) which means Al-Adad wa Al-Ihsa (numbers or counts), while in terminology, reckoning is a science that discusses the ins and outs of calculation, therefore, the term reckoning is often used. associated with arithmetic. See Muhammad Hadi Bashori, *Pengantar Ilmu Falak* (Jakarta: Pustaka Al-Kautsar, 2015), p. 197.

calculation of the earth, moon, and sun. In other word, *hisāb* method is the calculation when the moon revolves around the earth. The *hisāb* method can predict and determine the day at the beginning of the month far in advance and does not depend on observing the new moon when the sun sets at the beginning of the month.⁶³

2. The Circulation of the Moon As a Light for the Earth at Night

The moon in the Qur'an is always mentioned with the word *munīr* (objects that glow or objects that reflect light). Meanwhile, in revealing the sun, the Qur'an always mentions *as-siraj al-munīr* (a lamp that illuminates).⁶⁴ This means that the Qur'an has given knowledge that the sun and the moon have different properties in their respective rays and light. As in the word of Allah in Surah Nūh/71: 15-16

أَلَمْ تَرَوْا كَيْفَ خَلَقَ اللَّهُ سَبْعَ سَمَاوَاتٍ طِبَاقًا ﴿١٥﴾ وَجَعَلَ الْقَمَرَ فِيهِنَّ نُورًا وَجَعَلَ الشَّمْسَ سِرَاجًا
﴿١٦﴾

Can you not see how He created the seven heavens one above the other, placing in them the moon as a light and the sun as a lantern?⁶⁵ (Nūh/71:15-16)

The verse above explains that the sun is the radiant lamp, namely the source of light that illuminates the universe, including planet earth. While the moon has light because it gets reflected from the sun's light. Only a small part of the sun's light is reflected to the earth, because most of it has been absorbed by the moon. Therefore, the moonlight is not hot, but dim.⁶⁶

The word of Allah وَجَعَلَ الْقَمَرَ فِيهِنَّ نُورًا وَجَعَلَ الشَّمْسَ سِرَاجًا implies that between the sun and the moon have different light, the sun is made a rays of

⁶³*Ibid.*, p. 198.

⁶⁴Mahmudz Mas'ud and Farah Faida, *Al-Qurān dan Sains Modern...*, p. 227.

⁶⁵The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Transliteration of the Meaning of the Qur'an...*, p. 431.

⁶⁶Lajnah Pentashihan Mushaf Al-Qurān, et al., *Cahaya dalam Perspekti Al-Qurān dan Sains* (Jakarta: DIPA Lajnah Pentashihan Mushaf Al-Qurān, 2016), p. 7.

light because it has its own light, while the moon is made a light because of the nature of the moon which does not have its own light, the light it produces is a reflection of sunlight. Allah always expresses in different words when talking about the light of the sun and the moon. These two celestial bodies have differences in the light they produce. In surah Nūh/71: 16 Allah reveals the sunlight with the word *sirāj*, while in surah Yūnus/10: 5, Allah reveals the the sunlight with the word *diyā'*.

The moon does not emit light from him. In fact, moonlight is the light from seeing the entire side of the moon reflected through its face. Humans sometimes can only see from the side of the moon that is being lit by the sun. Human vision of the moon will be clearer and brighter at night, because at night, the earth experiences darkness so that the moon which only receives light from the reflection of sunlight will look bright on earth, especially when the moon is full, the earth looks like it is completely illuminated by the moon. Therefore, the moon can provide benefits as a light for the earth at night.

The illumination of the full moon on the earth is also explained by Hamka when interpreting Surah Asy-Syams/51: 1-2, "by the moon when it accompanies it". In the first verse it is revealed about Allah's oath to the sun "by the sun and its rays in the morning", thus, in the second verse it means that the moon follows the sun when the moon enters its full period, namely from the 13th to the 16th. At that time the moon will be seen as a full moon from the earth, so that the night will be fully lit from the moon from sunset to sunrise.⁶⁷

3. The Stopping of the Circulation of the Moon As a Sign of the End of the Day (*Yaum Al-Qiyāmah*)

The sun and the moon have been subdued by Allah and have walked towards the appointed time. As seen everyday, the cycle of the sun and the

⁶⁷See Hamka, *Tafsīr Al-Azhar*, Juz 7 (Jakarta: Pustaka Panjimas, 1982), p. 172.

moon will continue to run until the time determined by Allah, and the end of that time is nearing the end of the world.⁶⁸ Allah said in Surah Luqmān/31: 29

أَلَمْ تَرَ أَنَّ اللَّهَ يُؤَلِّجُ اللَّيْلَ فِي النَّهَارِ وَيُؤَلِّجُ النَّهَارَ فِي اللَّيْلِ وَسَخَّرَ الشَّمْسَ وَالْقَمَرَ كُلًّا يَجْرِي إِلَىٰ
 أَجَلٍ مُّسَمًّى وَأَنَّ اللَّهَ بِمَا تَعْمَلُونَ خَبِيرٌ ﴿٢٩﴾

Do you not see how Allah causes the night to pass into the day and the day into the night and has forced the sun and the moon (into His service), each running for an appointed term? Allah is cognizant of all your actions.⁶⁹ (Luqmān/31:29)

According to Quraish Shihab, the sentence *ilā ajalīn musamma* means the provision of time for the passage of the sun and moon in this universe or mean the journey of the sun and moon continues for a specified time. Towards the apocalypse, the sun will rise from the west, its speed will also decrease and at that time there will be collisions with other celestial bodies until the time that Allah has determined for the destruction of the universe.⁷⁰

The force at the center of the two celestial bodies, namely the earth and the moon, has produced a rotational force on the earth's surface and has resulted in an acceleration of the moon. This event resulted in the transfer of rotational energy from the earth to the moon, so that the earth's rotation slowed down in the range of 1.5 miles per century, and the moon's orbit would move away by 3.8 cm/year.⁷¹

In the past, the moon was only 23.000 km from the earth, but now the distance from the moon to the earth is 385.000 km. This indicates that in the future the moon will move away and will look very small from the earth. Even someday, when the lunar eclipse can no longer cover the sun.⁷²

⁶⁸Quraish Shihab, *Tafsīr Al-Misbāh...*, p. 118.

⁶⁹The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Transliteration of the Meaning of the Qur'an...*, p. 302-303.

⁷⁰*Ibid.*, p. 154.

⁷¹Mahmudz Mas'ud and Farah Faida, *Al-Qurān dan Sains Modern...*, p. 239-240.

⁷²*Ibid.*, p. 240.

The moonlight will later disappear, this is in accordance with the explanation of scientists who say that when the moon moves away from the earth, the reflection of sunlight that reaches the moon will slowly weaken until it completely disappears. This phenomenon is in line with what is revealed by the Qur'an in Surah Al-Qiyāmah/75: 8-9

وَحَسَفَ الْقَمْرُ ﴿٨﴾ وَجُمِعَ الشَّمْسُ وَالْقَمَرُ ﴿٩﴾

And when the moon is dimmed, and the sun and the moon are brought together.⁷³ (Al-Qiyāmah/75: 8-9)

The sentence *wa khasaf al-qamar* above means that the moon loses its light, then after that Allah says 'and the sun and moon are gathered', this means that the moonlight will disappear before the sun and moon are gathered.⁷⁴ Tanthawi Jawhari also explains this verse that later the moonlight will go away. The sun and the moon will come together as one, and the light from them will disappear. This is a picture on the end of the world, where the light from the sun and moon will disappear from human sight.⁷⁵

The verse above is actually a series of verses before and after which describe the atmosphere of the apocalypse, therefore the word *khasaf al-Qamar* in Surah Al-Qiyāmah/75: 8 means that the moon has lost its light or the moon itself has disappeared due to the apocalypse, namely the universe will be lost. experience great destruction, the celestial bodies including the moon will also disappear.⁷⁶

The dimming of the moon is one illustration of the state of the celestial bodies when the apocalypse occurs. The celestial bodies such as the moon and the sun will be collected and then form a phenomenon that cannot be

⁷³The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Transliteration of the Meaning of the Qur'an...*, p. 437.

⁷⁴Nadhiyah Thayyarah, *Buku Pintar Sains...*, p. 445.

⁷⁵Tanthawi Jawhari, *Al-Jawhir fī Tafsīr Al-Qurān...*, p. 301.

⁷⁶Nadhiyah Thayyarah, *Buku Pintar Sains...*, p. 445.

imagined by the human mind, because at that time something terrible happened.

Allah has explained the various benefits of the moon in His word, as well as the gaze of the moon's circulation. The circulation of the moon and all phenomena in the universe run according to Allah's arrangements, and Allah has explained this in various verses of the Qur'an. Nothing escapes the discussion of the Qur'an, both from the past, present, and future. Humans are required to use reason in analyzing data obtained from the word of Allah, with human studies, humans will receive guidance from the Qur'an to know Allah.

CHAPTER IV

THE RELEVANCE OF THE MOON'S CIRCULATION VERSES TO SCIENCE

A. The Concept of the Circulation of the Moon According to the Qur'an and Science

Allah has created the celestial bodies in this universe, each celestial body runs in an orderly manner according to Allah's arrangement. The celestial bodies run according to their respective orbits, between each other will never collide, as well as the sun and the moon. The word of Allah in Surah Al-Anbiyā' /21: 33.

﴿۳۳﴾ وَهُوَ الَّذِي خَلَقَ اللَّيْلَ وَالنَّهَارَ وَالشَّمْسَ وَالْقَمَرَ كُلٌّ فِي فَلَكٍ يَسْبَحُونَ

Dan Dialah yang telah menciptakan malam dan siang, matahari dan bulan. Masing-masing dari keduanya itu beredar di dalam garis edarnya.¹ (Al-Anbiyā' /21: 33)

Everything that exists is God's creation and is under His care and control. His Word in explaining the creation of day and night, sun and moon can be understood and contemplated for us. Allah has created the night so that from the creation of the night man can rest because of its darkness. Allah also created the day with the rising of the sun. The celestial bodies, namely the sun and the moon, circulate in their respective orbits. The word of Allah *كُلٌّ فِي فَلَكٍ يَسْبَحُونَ* (each circulating in its orbit) means that the sun and the moon have their own axis and orbit, both of which circulate continuously and tirelessly.² God has arranged the sun and moon in such a way, so that the time span of the change of day and night in various regions will always be like what happened without changing.

¹The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Transliteration of the Meaning of the Qur'an* (Beirut: Darl Al-Choura, 1980), p. 234.

²Quraish Shihab, *Tafsīr Al-Misbāh, Pesan, Kesan dan Keserasian Al-Qurān*, Juz 6 (Tangerang: PT Lentera Hati, 2016), p. 447-448.

The movement of the sun and the moon are very harmonious, Maurice Bucaille said the harmony of the two celestial bodies is expressed by the word *sabaḥa* which refers to the movement of an object due to its own movement. When the movement takes place in water, the movement will lead to an expanding action, so if the displacement is on the ground, it will occur due to the movement of the object's feet. If displacement occurs in outer space, then the movement in question can be explained only by the etymological sense of the word itself, therefore, the word *sabaḥa* must be understood as self-inflicted movement.³

Likewise, what was expressed by Zaghoul El-Naggar, the word السبح (*as-sabḥ*) is fast motion in water or air. *Sabaḥa yasbaḥu sabḥan* (سبح - يسبح - سبح) and *sibāḥah* (سباحة) means swimming, then analogous to the movement of stars in their orbits. According to him lafadz كُلُّ فِي فَلَكٍ يَسْبَحُونَ (everything circulates in its orbit), not only is the circulation of the sun and the moon but also the circulation of day and night, when referring to the sun and the moon, the expression must use a double form (*tasniyah*) namely *yasbaḥāni*. Therefore, lafadz *as-sabḥu* is used for objects and materials that have a minimum thickness. Linguistically, *as-sabḥu* means the rapid movement of an object with its movement coming from itself, such as the movement of the sun, moon, and earth in their respective orbits, and the circulation of night and day which is mentioned in Surah Al-Anbiya/21: 33 this is a subtle signal of the earth's rotation on its axis around the sun.⁴

Scientific facts explain that the celestial bodies, including the sun and the moon, revolve in their respective orbits. There are nuances of verbs in the Qur'an that indicate the self-moving power of the sun and the moon. The motion of these

³See Maurice Bucaille, *Bible, Qur'an dan Sains Modern*, Trans. Rasjidi, (Jakarta: Bulan Bintang, 2010), p. 146-147. See also Mahmudz Mas'ud dan Farah Faida, *Al-Qur'an dan Sains Modern, Mengenal Kemukjizatan Ayat-Ayat Astronomi Dalam Al-Qur'an*, (Wonosobo: Media Kreasi, 2016), h. 133.

⁴Zaghoul Ragheb Mohamed En-Naggar, *Selekta dari Tafsir Ayat-ayat Kosmos dalam Al-Qur'an Al-Karim*, Juz 1, Trans. Masri El-Mahsyar Bidin (Jakarta: Shourok International Bookshop, 2010), p. 234.

two celestial bodies has been proven by the results of modern science,⁵ and such explanations have been revealed by the Qur'an since the 7th century AD, even though at that time humans did not have sophisticated equipment to observe the universe.

The sun and the moon always circulate according to their respective calculations. Allah says in Surah Ar-Rahman/55:5.

الشَّمْسُ وَالْقَمَرُ بِحُسْبَانٍ ﴿٥﴾

The sun and the moon pursue their ordered course.⁶ (Ar-Rahmān/55: 5)

Qurasuh Shihab in his Tafseer said that the word *husban* is taken from the word reckoning, which is calculation. The addition of the letters *alif* and *nun* to the word implies accuracy and perfection.⁷ With a very thorough circulation, humans can know the number of times such as days and months, even humans can also know when certain phenomena such as eclipses will occur. Basically, the moon has three kinds of circulation at once, namely the journey of the moon along with the earth in its orbit around the sun, the rotation of the moon and the revolution of the moon.

1. The Moon's Journey with the Earth around the Sun

The moon does not revolve in a full circle when it goes around the earth, the circle of the moon's journey is more like a twist, that is, the starting point when the moon goes around the sun does not meet the end point. A twisted circle takes 29.5 days, while a fully twisted circle takes 365.5 days, so the moon is said to have done 12 times in a twisted circle.⁸

When crossing its orbit, the moon has its own stopover. There are times when the position of the moon is at its closest distance to the earth, there

⁵See Maurice Bucaille, *Bible, Qur'an dan Sains Modern...*, p. 147.

⁶The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Translition of the Meaning of the Qur'an...*, p. 397.

⁷Quraish Shihab, *Tafsir Al-Misbah*, p. 498.

⁸Slamet Hambali, *Pengantar ilmu Falak (Menyimak Proses Pembentukan Alam)*, (Yogyakarta: Elos Digital Publishiung, 2012), p. 223.

are times when the position of the moon is very far from the earth. The moon circulates in its path around the earth by intersecting the ecliptic plane by $05^{\circ} 08'52$, so that the orbital plane of the moon does not coincide with the plane of the earth's orbit, because if the two coincide it will result in a lunar eclipse and a solar eclipse.⁹ The solar eclipse is a phenomenon where the position of the sun-moon-earth is in a straight line, so that the moon covers the sun's disk which results in some areas of the earth not getting sunlight, while a lunar eclipse is a phenomenon that occurs when the moon enters the earth's shadow cone, namely when the sun-earth-moon are in a straight line. A lunar eclipse occurs when the earth enters the full moon phase,¹⁰ However, not every full moon, the earth will experience a lunar eclipse. A lunar eclipse can be felt by all parts of the earth that are experiencing night.

2. Moon Rotation

The moon rotation is the rotation of the moon about its axis from west to east. The time it takes the moon to rotate is equal to one cycle around the earth,¹¹ the time is around 27 days 8 hours, thus, it explains why humans only see one side of the moon on earth.¹²

The rotation of the moon causes the surface of the moon to face the earth is always fixed. Actually there is a nodding motion of the moon that makes a slight change in the surface of the moon, but the motion of the moon's nod is so small that it can be ignored.¹³

⁹*Ibid.*, p. 223.

¹⁰See UPT Observatorium Bosscha Institut Teknologi Bandung, *Perjalanan Mengenal Astronomi* (Bandung: ITB, 1995), p. 41-42.

¹¹Mukyidin Khazim, *Ilmu Falak dalam Teori dan Praktik* (Yogyakarta: Buana Pustaka, 20), p. 131.

¹²Nathalie Fradette & Claude Lafleur, *Visual Ilmu dan Pengetahuan Populer untuk Pelajar dan Umum: Memahami Alam Semesta*, Trans. Hedro Setyanto (Jakarta: PT Bhuana Ilmu Populer, 2006), p. 35.

¹³Mukyidin Khazim, *Ilmu Falak dalam Teori dan Praktik...*, p. 32.

The surface of the moon that can be observed from the earth can reach more than 50%, this is caused by the libration phenomenon¹⁴. The eccentricity of the moon's orbit around the earth is 0.054,¹⁵ so the moon's speed in orbiting the earth is not constant. Thus, due to this unstable speed, it causes the rotation of the moon to move ahead of or lag behind its revolution.¹⁶

3. Moon Revolution

The lunar revolution is the rotation of the moon around the earth from west to east. The moon's orbit is elliptical, so the moon's distance from the earth changes as the moon evolves. Based on the reference of the moon's revolution, the moon has two distinct periods, namely the sidereal period and the synodic period. The sidereal period is the length of time the moon orbits the earth in one rotation in relation to the background position of a fixed star. The length of time required in this period is 27 days 7 hours 43 minutes 11.6 seconds. In this period, the time interval that the moon takes exactly in one rotation is 360° , this is one exact rotation. While the synodic period is the time it takes the moon to circle the earth about the earth. This synodic period lasts 29 days 12 hours 44 minutes 2.8 seconds. In the synodic period, the moon evolves more than 360° or more than one revolution. The synodic period requires an interval of time to reach two successive equal phases,¹⁷ such as

¹⁴The phenomenon of Librasi or the nodding motion of the moon is the transverse and longitudinal motion of the moon's axis. Libration occurs due to the tilt of the moon's axis to the axis of its orbital plane which is around 6.5° , while the tilt of the moon's orbital plane to the elliptical is 5.2° . With this libration phenomenon, the earth changes slightly due to the nodding motion that occurs. See Taufiqurrahman Kurniawan, *Ilmu Falak dan Tinjauan Matlak Global* (Yogyakarta: MPKSDI, 2009), p. 78.

¹⁵The orbital eccentricity is the sum when the orbit deviates from a perfect circle, 0 is a perfect circle, 1.0 is a parabola and its not a closed orbit. See Ensiklopedia Dunia, *Eksentrisitas Orbit*, Accessed on April 4, 2022 from https://p2k.stekom.ac.id/ensiklopedia/Eksentrisitas_orbit.

¹⁶Gunawan Admiranto, *Eksplorasi Tata Surya* (Bandung: Mizan Pustaka, 2017), p. 111.

¹⁷See Agus Fani Chandra Wijaya, *Gerak Bumi dan Bulan* (Jayapura: Digital Learning Lesson Study, 2010), p. 9. See also Syeikh Muhammad Rasyid Ridha, et.al, *Hisab Bulan Kamariah: Tinjauan Syar'i tentang Penetapan Awal Ramadhan, Syawal, dan Zulhijah*, (Yogyakarta: Suara Muhammadiyah, 2012), p. 65-67.

one full moon to the next full moon, thus the synodic moon period is often referred to as the lunar period based on the phases of the moon. Between the synodic months and the sidereal months, the period that has the most influence on life on earth is the synodic period. The synodic period is also used by Muslims as the basis for calculating the month of *Qamariyyah*.

During its circulation, the moon undergoes changes in appearance when viewed from the earth, this is because Allah has set places or *manzilah* on the moon's circulate. In science, this order is referred to as the phases of the moon. The phases of the moon are different shapes of the moon when viewed from the earth, the calculation of the phases of the moon is based on the sidereal month period, which is 29 days 12 hours 44 minutes 2.8 seconds. The moon will shine because it reflects the sun's light. The part of the moon that faces the sun will look bright, and vice versa, the part of the moon that faces the sun will be dark. The phases of the moon as seen from the earth depend on the nature of the relative positions of the sun, moon, and earth. Regarding this, Allah explains in Surah Yāsin/36: 38-40.

وَأَيَّةٌ لَهُمُ اللَّيْلُ نَسْلَخُ مِنْهُ النَّهَارَ فَإِذَا هُمْ مُظْلِمُونَ ﴿٣٧﴾ وَالشَّمْسُ تَجْرِي لِمُسْتَقَرٍّ لَهَا ذَلِكَ تَقْدِيرُ الْعَزِيزِ الْعَلِيمِ ﴿٣٨﴾ وَالْقَمَرَ قَدَرْنَاهُ مَنَازِلَ حَتَّىٰ عَادَ كَالْعُرْجُونِ الْقَدِيمِ ﴿٣٩﴾ لَا الشَّمْسُ يَنْبَغِي لَهَا أَنْ تُدْرِكَ الْقَمَرَ وَلَا اللَّيْلُ سَابِقُ النَّهَارِ يَوْمَئِذٍ فِي فَلَكَ يُسَبِّحُونَ ﴿٤٠﴾

And a sign for them is the night. From it We draw out the day-and they are plunged in darkness. The sun hastens to its resting-place: that is the decree of the Mighty One, the-All Knowing. And for the moon, We have ordained mansions till it bocems again as an old dry palm-branch. The sun is not allowed to overtake the moon, nor does the night outpace the day. Each in its own orbit runs.¹⁸ (Yāsin/36:38-40)

¹⁸The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Translition of the Meaning of the Qur'an*...., p. 325.

According to *Tafsīr Al-Azhar*, the verses above explain the phenomena that occur every day, namely the alternation of day and night, light disappears and darkness will cover. During a 24 hour day, humans witness events from the time the sun rises in the morning and then it is filled with light until noon, until it is time for it to begin to gradually turn into evening, dusk, and finally be in darkness. The sun always rotates or runs according to its orbit. The moon is the same, this celestial body has set its *manzilah*. Humans can see the moon from where it was. In the first days the moon is very small like a crescent, then it is only slightly above the western horizon after sunset. The next day, at night just where it passed the other way, and slightly up, the moon was bigger than yesterday and could be seen from a distance. This will continue until the third, fourth, fifth, sixth, and seventh days. Every day, the moon is getting bigger and higher than our heads, until the following nights, the moon is increasing towards the east. On the 14th night the moon rises as a full moon in the east as the sun rises. Then came the following nights, the moon was getting late and rising. On the 15th night, the moon rises at seven o'clock in the evening and on the 16th night the moon has risen at nine o'clock in the evening, and so on. Then the moon gets smaller and becomes visible in the east when it is noon, signaling the return of the crescent moon.¹⁹

An explanation of the positions of the moons was given by the Ministry of Religion of the Republic of Indonesia's Scientific Interpretation. It is explained that the moon will always move from the starting point according to its position and continue to rotate until it returns to the point where the moon departed. When viewed from the earth, the moon at the beginning of its appearance is shaped like a crescent with two sharp ends, then it will move in a predetermined position. Changes in the position of the moon when seen from the earth, will appear from a small crescent to a large one and at its peak looks full

¹⁹Hamka, *Tafsīr Al-Azhar*, Juz 7 (Jakarta: Pustaka Panjimas, 1982), p. 424.

circle or commonly known as full moon. Furthermore, the moon will continue to run and be seen again from the earth the moon appears to be shrinking, until it finally returns to the shape of a septum, resembling a crescent or curved date palm.²⁰

Allah has made the moon in its places. According to Wahbah Zuhaili, the meaning of the word *manāzil* in Surah Yāsin/36: 39 above is the distance traveled by the moon in a day and night. The moon has 28 places during its circulate, and every night, the moon has one. The moon looks small and curved when it is in its last orbit and will return to its first orbit. If the number of days in a month is 30 days, then the moon will not be visible for two nights, so if the number of days in a month is 29 days, the moon will not be visible for one night.²¹

The changes in the shape of the moon in scientific terms are called the phases of the moon. The phases of the moon are determined by the configuration of the positions of the earth, moon, and sun. Calendars that use the moon as their benchmark will find that on the 1st of the month it enters a new moon phase or the moon is dead. At that time, the moon is closest to the sun and the part of the moon that faces the earth is dark, not visible. Specifically, the moon at that time was between the earth and the sun, so that no sunlight could be reflected by the moon to reach the earth. After the new moon, the moon will continue to move around the earth, and the longer the cycle of the moon, the more the moon's surface is illuminated by the sun. At that time, the moon was seen as a crescent moon and lasted until the 7th, the moon was only half full at that time. Furthermore, around the 7th to the 13th, the surface of the moon that gets more

²⁰Lajnah Pentashihan Mushaf Al-Qur'ān et al., *Manfaat Benda-benda Langit dalam Perspektif Al-Qurān dan Sains* (Jakarta: Lajnah Pentashihan Mushaf Al-Qurān), 2010, p. 84.

²¹Wahbah Zuhaili, *Tafsīr Al-Munīr*, Juz 12, Trans. Abdul Hayyi Al-Kattani, (Jakarta: Gema Insani, 2016), p. 37.

sunlight. This phase is known as the hunchback moon.²² The period from the new moon to the bow moon is often referred to as the young moon. After the curvature of the moon, the face of the moon will look like a bright and brilliant round plate, this is known as the full moon. The full moon occurs around the 14th, when the earth is between the moon and the sun. At this position, the moonlight shines fully because when viewed from the sun, the position of the moon is directly behind the earth. Finally, after the full moon takes place, the reverse process will occur from the young moon, namely the old moon. Entering the old moon, the moon will become narrower, and the situation becomes stooped again, half full, then crescent-shaped, until it reaches the next phase of the new moon.²³ The image about the phases of the moon has been viewed in preceding page (page 20). In summary, the phases of the moon can be categorized into major, important phases, namely: 1) new moon, 2) waxing crescent, 3) first quarter, 4) waxing gibbous, 5) full moon, 6) waning gibbous, 7) third quarter, 8) waning crescent.

Allah has arranged the phases in the moon's cycle very accurately, so that humans can benefit from it in the form of calculating time. Another explanation in the Qur'an that relates to scientific explanations is about the moon that accompanies the sun when it enters the full moon. Allah said in Surah Asy-Syams/91: 1-4.

وَالشَّمْسُ وَضُحَاهَا ﴿١﴾ وَالْقَمَرَ إِذَا تَلَّهَا ﴿٢﴾ وَالنَّهَارَ إِذَا جَلَّاهَا ﴿٣﴾ وَاللَّيْلَ إِذَا
يَعُشَاهَا ﴿٤﴾

²²The mention of the hunchback moon because more than half of the moon's surface is visible from the earth, so the moon's position appears to be bent. See Ellyvon Pranita (2021), *Istilah Bulan, dari Bunguk hingga Baru*. Accessed on April 1, 2022 from <https://www.kompas.com/sains/read/2021/09/22/093000923/-glosarium-astronomi-istilah-bulan-dari-bungkuk-hingga-biru>.

²³Compare Gunawan Admiranto, *Eksplorasi Tata Surya* (Bandung: Mizan Pustaka, 2016), p. 105-106 with A. Kadir, *Formula Baru Ilmu Falak*, (Jakarta: Bumi Aksara, 2012), p. 33.

By the sun and his rising brightness; by the moon, which rises after him; by the day, which reveals his splendor; by the night, which veils him!²⁴ (Asy-Syams/91: 1-4)

Allah swears by the sun that always shines, both when it rises and sets, this is because the sun is a great creation of Allah. Allah also swears by the moon that shines when the sun sets, especially on nights at full moon, i.e. the 13th night until the fourteenth night, which lasts from sunset to sunrise. I swear by such light it is night time. Furthermore, in verses 3-4, Allah swears by the time of day when the sun shines, perfection in the afternoon is the perfection of sunlight. Allah swears by the time of night when darkness covers the light of the sun, the light of the sun disappears with the setting of the sun, then half of the earth experiences darkness, then the sun rises again in another part of the earth.²⁵

Ibn Kathir explained in his commentary that the second verse "by the month when he accompanies him" means that the moon follows the sun, that is, when the moon reaches its full moon, if the sun goes down, the moon will appear. Ibn Kathir quoted from Qatadah, then he also gave an explanation according to Ibn Zahid. The following is the interpretation of Ibn Kathir in his *Tafsīr* entitled *Tafsīr Al-Qur'ān Al-'Azīm*.

« والقمر إذا تلاها » قال يتلو النهار وقال قتادة إذا تلاها ليلة الهلال إذا سقطت الشمس رؤي

الهلال وقال ابن زيد هو يتلوها في النصف الأول من الشهر ثم هي تتلوه وهو يتقدمها في النصف

الأخير من الشهر وقال مالك عن زيد بن أسلم إذا تلاها ليلة القدر²⁶

By the moon when he accompanies him, it means that the moon follows the sun when the moon is at its full moon, at that time, the moon will appear

²⁴The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Transliteration of the Meaning of the Qur'an...*, p. 454.

²⁵Wahbah Zuhaili, *Tafsīr Al-Munīr...*, p. 547.

²⁶Abi Al-Fida Ibn Katsir, *Tafsīr Al-Qur'ān Al-'Azīm*, Juz 30 (Kairo: Dar Al-Taufiqiyah li Al-Turāts, 2009), p. 516.

when the sun goes down. According to Ibn Zahid, the moon follows the sun in the first half of each moon, then the sun follows it where the moon precedes it in the last half of each moon.²⁷ Hamka in his commentary also explains this verse that the word of God in the second verse of Surah Asy-Syams/51: 2 contains about the moon following the sun when the moon enters its full period, namely from the 13th to the 16th. At that time the moon will be seen as the moon full of the earth, so that the night will get full light from the moon from sunset to sunrise. The oath in this verse is not directed to the moon alone, but to the comparison of the light of the moon with the light of the sun. Then Hamka said at the end of his interpretation that this verse does not contain the moon itself following the sun, because actually what happens is that the moon travels faster than the sun, so it is inappropriate to say that the sun changes the moon, because the sun travels slower, i.e. 365 days a year. while the moon is faster that is 354 days in a year.²⁸

Nadhiyah Thayarah explains the meaning of the second verse, namely that Allah swore on behalf of the moon that accompanies the sun in illuminating the earth, namely when the sun sets. This is a sign of Allah that the moon accompanies the sun in the rising and setting of the sun.²⁹

The moon's orbit of revolution is slightly more tilted than the orbit of the sun's revolution with respect to the earth, thus, the inhabitants of the earth can see the circulation of the sun and moon in the sky looking close to each other from east to west, so that the sun and moon seem to be competing quickly. The sun and the moon are celestial bodies that can always be seen from the earth. The moon meets the sun once a month, the sign that appears when the meeting is the appearance of the new moon from the west after sunset, then the moon will gradually lag behind the sun, then the moon will also rise at the same time as the

²⁷Abdullah bin Muhammad, *Lubāb At-Tafsīr min Ibni Katsīr*, Juz 30, Trans. Abdul Ghoffar (Jakarta: Pustaka Imam Syafi'I, 2017), p. 91.

²⁸Hamka, *Tafsīr Al-Azhar...*, p. 172-173.

²⁹See Nadiah Thayarah, *Buku Pintar Sains dalam Al-Qurān* (Jakarta: Zaman, 2014), p. 429.

sun when it enters the full moon, shortly after , the moon will rise about 50 minutes late every day, and this delay continues until the new moon can be seen at noon. Perhaps this is what Allah meant in Surah Asy-Syams/40: 2, where the moon follows or accompanies the sun.³⁰

The moon circulates in its orbit with definite laws in accordance with the arrangements and provisions of Allah. Humans can use the moon's cycle as a time calculation. As for Muslims, take advantage of the calculation of time with the lunar cycle system in the *Qamariyyah* calendar. The *Qamariyyah* calendar is calculated using the synodic month period, which is 29.5 days. The rotation of the moon is a sure thing that is based on the laws of Allah. As Muslims, we must always follow the unity of knowledge against the laws of Allah that He has set.

The Qur'an has revealed that all the planets and other celestial bodies revolve in their respective orbits. They move and rotate in a predetermined orbit. The orbits of the celestial bodies in their respective orbits have been proven by modern science, including the circulation of the moon in its orbit, its circulation according to calculation, the determination of the places of its orbit which then gives rise to the phases of the moon. All such phenomena were explained by the Qur'an in the 7th century AD, even though at that time humans did not have advanced technology or telescopes that could observe space that was thousands to millions of kilometers away. As for the shape of the moon, it has been used by humans since the time of the Prophet Muhammad as a determinant of the time of worship, even though at that time the tools were still very limited and improvised. The shape of the moon can indeed be seen from the earth, even humans can see the shape of the moon with the naked eye, although more details must use a telescope.

Its status as a satellite of the earth, makes the moon a celestial body that always faithfully accompanies the earth. Earthlings can see the moon shining at

³⁰*Ibid.*, p. 429.

night. The moon will continue to circulate in its orbital line, even though one night humans cannot see the light of the moon because it is covered by clouds. The moon and other celestial bodies have been arranged by Allah very accurately, each circulating in a certain linear line, so that it is impossible for these celestial bodies to collide with each other.

Allah has established its laws since the creation of this universe, so that whatever happens in this universe is in accordance with the laws established by Allah, including the cycle of the moon which Allah has determined its journey. The moon and everything in the universe is submissive and obedient to the laws that Allah has set. Allah said in Surah Fāṭir/35: 43.

...فَلَنْ يَجِدَ لِسُنَّتِ اللَّهِ تَبْدِيلًا ۖ وَلَنْ يَجِدَ لِسُنَّتِ اللَّهِ تَحْوِيلًا ﴿٤٣﴾

.....No changes will you find in Allah's way; nor will it be altered.³¹ (Fāṭir/35: 43)

Sunnatullah is a natural law that runs continuously, automatically.³² The law set by Allah is natural (fixed, automatic, objective, and definite) to regulate the mechanism of the universe so that it becomes a guide for humans in worshiping Allah and in managing the universe which is *khalifatullah*, in order to avoid mafsadat and realize benefits for human life.

Sunnatullah will never deviate. Allah has made it clear that the general nature of Allah's order is irreplaceable and will not change.³³ No one will be able to change the way that Allah has ordained in treating humans, nor will anyone be able to divert Allah's law from the direction Allah has determined. When compared with the laws of nature, for example, humans cannot freeze water that

³¹The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Translation of the Meaning of the Qur'an...*, p. 322.

³²Tim Penyusun Kamus Besar Bahasa Indonesia and Departemen Pendidikan dan Kebudayaan, *Kamus Besar Bahasa Indonesia* (Jakarta: Balai Pustaka, 1988), p. 868.

³³Sayyid Qutbh, *Tafsīr fī Zilāl Al-Qurān*, Juz 12, Trans. As'ad Yasin (Jakarta: Gema Insani, 2000), p. 397.

is being boiled to reach 100° Celsius, and it is also impossible to thaw it when the water has reached 0° Celsius. In order for water to freeze and thaw, humans must be able to change its temperature according to the provisions of Allah's law on water. Likewise with the laws of society, humans will not be able to change the way that Allah has set.³⁴

All movements in this universe are regulated by *Sunatullah*, as well as the heavenly bodies and the creatures in them. Humans will never be able to change the course of the sun from west to east, as well as the circulation of the moon, humans will never be able to change the course of the moon's revolution from east to west, because everything has gone according to fixed and definite natural laws.

B. The Benefits of the Circulation of the Moon in the Qur'an According to Science

1. The Circulation of the Moon As a Guide in Calculation of Time

The moon is used by humans as a calculation of time. This is in accordance with the word of Allah in Surah Yūnus/10: 5.

هُوَ الَّذِي جَعَلَ الشَّمْسَ ضِيَاءً وَالْقَمَرَ نُورًا وَقَدَرَهُ مَنَازِلَ لِتَعْلَمُوا عَدَدَ السِّنِينَ وَالْحِسَابَ ۗ مَا خَلَقَ
 اللَّهُ ذَلِكَ إِلَّا بِالْحَقِّ ۗ يُفَصِّلُ الْآيَاتِ لِقَوْمٍ يَعْلَمُونَ ﴿٥﴾

It was He that made the sun brightness and the moon light, ordaining the latter's phases that you may learn the number of years and the reckoning. He created them only to manifest the truth. He makes plain His revelations to mean of understanding.³⁵ (Yūnus/10: 5)

Scientific facts have proven that the sun and moon are used as timepieces. According to science, the moon revolves around the earth once a

³⁴Quraish Shihab, *Tafsīr Al-Misbāh...*, p. 494.

³⁵The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Translition of the Meaning of the Qur'an...*, p. 147.

month. The moon rotates on its axis with the same period as the moon's revolution about the earth, therefore humans can only see one side of the moon's surface from the earth.

The moon is crossing the earth and at the same time, the earth and the moon are revolving around the sun. The earth rotates in a complete circle for 365 days so that in a day, the earth travels an average angle of 0.98563 (360/365 ¼) degrees.³⁶

The moon is always seen only on one side because the moon rotates on its axis at the same time as it revolves around the earth, which is 27 days and 8 hours,³⁷ or about 27 days 7 hours 43.2 minutes. In its journey from the sun-moon-earth parallel to the next parallel position, the moon takes an average of 29 days 12 hours 44 minutes 2.8 seconds or equal to 29.53058796 (29.53) days.³⁸

The moon has a regular circulation so that it can be used by human as a guide for calculating time. Those who use the calculation of time with a pure lunar system is the *Hijriyah* calendar or it can also be called the *Qamariyyah* calendar. This calendar is used by Muslims as a time guide in matters relating to worship and important days in Islam. The preparation of the pure *Qamariyyah* calendar uses a synodic month period based on the phases of the moon, where the phases of the moon also depend on the relative positions of the sun, moon, and earth.

The month of *Qamariyyah* is determined by the rotation of the moon around the sun. The moon revolves around the earth in a semi-circular orbit estimated to be 2.4 million km long, with an average speed of 1 km/s to

³⁶See Agus Purwanto, *Ayat-ayat Semesta: Sisi Al-Qur'an yang Terlupakan* (Bandung: Mizan, 2008), p. 260.

³⁷Nathalie Fradette & Claude Lafleur, *Visual Ilmu dan Pengetahuan...*, p. 35.

³⁸Departemen Agama RI, *Al-Qur'an dan Tafsirnya* (Jakarta: Departemen Agama RI, 1981), p. 48.

complete a conjunction orbit around the earth in about 29.5 earth days. that's what is called the moon Qomariyyah conjunction of the earth.³⁹

The number of days in a year is 354 days in the *Qamariyyah* calendar, because the time taken in a synodic month is 29.5 days. In each month in the *Qamariyyah* year, the number of alternate days is 29 days and 30 days.⁴⁰

There are 12 months in the *Qamariyyah* calendar. The terms for naming the months on the *Qamariyyah* calendar are *Muḥarram*, *ṣafar*, *Rabi' al-Awwal*, *Rabi' al-Akhir*, *Jumad al-Awwal*, *Jumad al-Akhir*, *Rajab*, *Sya'ban*, *Ramaḍān*, *Syawāl*, *Ẓulqo'dah*, and *Ẓulhijah*. The *Qamariyyah* calendar or better known as the Islamic calendar is something that is urgently needed for Muslims, especially in determining the schedule of important Muslim days, such as the day to start and end the fast of Ramadan, set the feast of Eid al-Fitr and Eid al-Adha, and determine the time of Hajj. As for the other days, *Isra' Mi'raj* which falls on 27 *Rajab*, the birthday of the prophet Muhammad which falls on 12 *Rabi' al-Awwal*, 11, 12, 13 *Dzulhijah* which is the day of *Tasyrik*, the day it is forbidden to fast, and so on.

There are differences among Muslims in determining the beginning of the month of *Qamariyyah*, Some Muslims argue that the way to determine the beginning of the month of *Qamariyyah* is based on *ru'yah* (observation), this is because it is in accordance with the understanding of the hadiths of the prophet and the practice of the prophet in determining the beginning of the month of *Qamariyyah*.⁴¹ The hadith of the prophet that explains the determination of the beginning of the month of *Qamariyyah* using *ru'yah* is as follows.

³⁹Zaghloul Ragheb Mohamed En-Naggar, *Selekta dari Tafsir Ayat-ayat Kosmos dalam Al-Qur'an Al-Karim...*, p. 88.

⁴⁰Yenny Pahmawati, *Apa yang Terjadi Pada Sistem Tata Surya* (Bandung: CV. HBSA Jaya, 2011), p. 47-48.

⁴¹Muhammad Hadi Bashori, *Pengantar Ilmu Falak* (Jakarta: Pustaka Al-Kautsar, 2015), p. 191.

حَدَّثَنَا آدَمُ حَدَّثَنَا شُعْبَةُ حَدَّثَنَا مُحَمَّدُ بْنُ زِيَادٍ قَالَ سَمِعْتُ أَبَا هُرَيْرَةَ رَضِيَ اللَّهُ عَنْهُ يَقُولُ: قَالَ النَّبِيُّ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ أَوْ قَالَ قَالَ أَبُو الْقَاسِمِ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ صُومُوا لِرُؤُوسِهِ وَأَفْطِرُوا لِرُؤُوسِهِ فَإِنْ غُيِّبَ عَلَيْكُمْ فَأَكْمِلُوهُ شَعْبَانَ ثَلَاثِينَ ﴿رواه بخارى ومسلم﴾

Has told us Adam, has told us Shu'bah, has told us Muhammad bin Ziyad, i heard Abu Hurairah say that the Prophet SAW said: Fast when you have seen it (the moon), and break your fast when you have seen it. see it (the moon of Shawwal) And when it is cloudy for you, the month of Sha'ban will be made up to 30 days. (Hadith Riwayah Bukhari 1776 and Imam Muslim 5/354)

حَدَّثَنِي الْقَاسِمُ بْنُ زَكَرِيَّاءَ حَدَّثَنَا حُسَيْنُ بْنُ عَلِيٍّ عَنِ زَائِدَةَ عَنِ إِسْمَاعِيلَ عَنِ مُحَمَّدِ بْنِ سَعْدٍ عَنِ أَبِيهِ رَضِيَ اللَّهُ عَنْهُ عَنِ النَّبِيِّ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ قَالَ الشَّهْرُ هَكَذَا وَهَكَذَا وَهَكَذَا عَشْرًا وَعَشْرًا وَتِسْعًا مَرَّةً ﴿رواه مسلم﴾

Has told me Al-Qasim bin Zakariya has told us Husayn bin Ali from Za'idah from Ismail from Muhammad bin Sa'd from his father r, a, from the Prophet SAW said One month is like this, this and this (ie. ten, ten and nine). (Hadith Riwayah Muslim: 1818)

Based on the hadith above, we can understand that the number of days in a *Qamariyyah* month is 29 days. This is because the number of 29 days shows the full moon, according to what prophet said, "the month there are 29 and the moon is like this, like this and then bend the thumb the third time". Furthermore, in determining the beginning of the month, the sight of the moon when it appears, or in this case is called the new moon. The sighting of the new moon is done when the sun sets on the 29th of every *Qamariyyah* month. This is because one month has 29 days. If the new moon has entered and appears, then the beginning of the month falls on the first day of the new month, but if the new moon has not been seen or has not appeared, then it will

be fulfilled in one month to be 30 days. The accuracy of the observer in seeing the new moon must be done on the 29th of a *Qamariyyah* month.⁴²

An atsar narrated by Imam Muslim from Kuraib explained that Umm Fadhal bint Harith sent Kuraib to meet Mu'awiyah in the Sham region, while in Sham, Kuraib received news that the new moon of Ramadan had arrived with *ru'yah*, and Kuraib saw the new moon at night Friday. Then when it fell at the end of the month he returned to Medina and met Ibn Abbas. Ibn Abbas asked Kuraib that when Kuraib saw the new moon, Kuraib also said that he saw the new moon on Friday night, but Ibn Abbas said that he saw the new moon on Saturday night, Ibn Abbas continued to fast for 30 days. Then Kuraib asked, did we not have enough with Mu'awiyah's *ru'yah*. Ibn Abbas replied, no, because that's how the Messenger of Allah told us.⁴³

Ru'yah is done by observing the visibility of the new moon, which is the appearance of the crescent moon which is first seen after the *ijtima* takes place. *Ru'yah* activities can be carried out before sunset for the first time after *ijtima*, seeing the new moon can be done with the naked eye or using optical devices such as telescopes. When the sun sets for the first time after *ijtima*, the position of the moon is to the west and the moon sets just after the sun has set. If you see the new moon, then at *maghrib* local time it has entered the beginning of the month, the 1st of the month of *Qamariyyah*.⁴⁴

Another difference of opinion in determining the beginning of the month of *Qamariyyah* is to use *hisāb* (reckoning). This opinion is due to taking from the messages conveyed by the Qur'an regarding the calendar, time, and circulation of celestial bodies. The *hisāb* method is a method of determining the beginning of the month based on the calculation of the earth,

⁴²Farida Arianti, "Penetapan Awal Bulan Qamariah Menurut Perspektif Al-Qurān dan Tafsīr", in *Juris*, Vol, 13, No. 1, (Juni, 2014), p. 69-70.

⁴³See Ibnu Rusyd, *Bidāyatul Mujtahid*, Trans. Ghazali Said and Achmad Zaidun (Jakarta: Pustaka Amani, 2007), p. 646.

⁴⁴Mukhyidin Khazim, *99 Tanya Jawab Masalah Hisāb dan Rukyah* (Yogyakarta: Ramadhan Press), p. 143.

moon, and sun. In other words, reckoning is the calculation when the moon revolves around the earth. The *hisāb* method can predict and determine the beginning of the month far in advance and does not depend on observing the new moon when the sun sets just before the beginning of the month. The use of the *hisāb* method has been used as a problem solver in solving urgent human needs in this life. The *hisāb* system has also been able to provide the accuracy of current astronomical calculations and can also help in knowing when geocentric conjunctions occur and when the existence of the new moon itself.⁴⁵ The arguments used by them in using *hisāb* as the basis for calculating the beginning of the month are Surah Yūnus/10: 5, Ar-Rahmān/55: 5, and hadith of the prophet.

هُوَ الَّذِي جَعَلَ الشَّمْسَ ضِيَاءً وَالْقَمَرَ نُورًا وَقَدَرَهُ مَنَازِلَ لِتَعْلَمُوا عَدَدَ السِّنِينَ وَالْحِسَابَ ۗ مَا خَلَقَ

اللَّهُ ذَٰلِكَ إِلَّا بِالْحَقِّ ۗ يُفَصِّلُ الْآيَاتِ لِقَوْمٍ يَعْلَمُونَ ﴿٥﴾

It was He that made the sun brightness and the moon light, ordaining the latter's phases that you may learn the number of years and the reckoning. He created them only to manifest the truth. He makes plain His revelations to mean of understanding.⁴⁶ (Yūnus/10: 5)

الشَّمْسُ وَالْقَمَرُ بِحُسْبَانٍ ﴿٥﴾

The sun and the moon pursue their ordered course.⁴⁷ (Ar-Rahman/55: 5)

The understanding in Surah Yūnus/10: 5 and Surah Al-Rahmān/55: 5 is that Allah has confirmed the celestial bodies in the form of the sun and the moon that circulate in their orbits or orbits with definite laws in accordance with Allah's provisions and decrees. Therefore, the circulation of the celestial

⁴⁵Muhammad Hadi Bashori, *Pengantar Ilmu Falak...*, p. 198.

⁴⁶The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Translition of the Meaning of the Qur'an...*, p. 147.

⁴⁷*Ibid.*, p. 397.

bodies can be calculated correctly. The orbits of the sun and moon can be calculated, predicted, and known by humans even without celestial information. The affirmation in these verses is an order to pay attention to and study the motion and circulation of the celestial bodies which will bring many benefits in order to understand the greatness of their Creator, as well as practical benefits for humans in compiling a good timing system.⁴⁸

At the time of the prophet Muhammad, he and his companions did not use *hisab* as a method to determine the beginning of the month of *Qamariyyah*, but used *ru'yat al-hilal*. The practice and command of the prophet in doing *ru'yah* is something that is accompanied by *illat* (legal power). *Illat* meant the condition of the ummah at that time was still *ummi*.⁴⁹

إِنَّا أُمَّةٌ أُمِّيَّةٌ لَا نَكْتُبُ وَلَا نَحْسِبُ الشَّهْرَ هَكَذَا وَهَكَذَا يَعْنِي مَرَّةً تِسْعَةً وَعِشْرِينَ وَمَرَّةً ثَلَاثِينَ
﴿رواه البخاري ومسلم﴾

Verily, we are an umm people; we can not write and can not do the reckoning. The moon is so-so. The meaning is sometimes twenty-nine days, and sometimes thirty days. (Bukhari and Muslim).

The condition of *ummi* referred to by the people at the prophet era had not mastered literacy and the science of *hisāb* (astronomy), so it was not possible to use reckoning in determining the beginning of the month. As stated in Surah Ar-Rahmān/55: 5 and Surah Yūnus/10: 5, the method used at that time was to see the new moon directly, and if the new moon was seen then the beginning of the month fell at that time, but when the new moon was not seen, then the day is fulfilled to be 30 days.⁵⁰

⁴⁸Tim Majelis Tarjih dan Tajdid Pimpinan Pusat Muhammadiyah, *Pedoman Hisab Muhammadiyah* (Yogyakarta: Majelis Tarjih dan Tajdid Pimpinan Pusat Muhammadiyah, 2009), p. 75.

⁴⁹Rasyid Ridla, *Tafsīr Al-Manār* (Beirut: Dar Al-Kutub Al-Ilmiyah, 2005), p. 152.

⁵⁰Tim Majelis Tarjih dan Tajdid Pimpinan Pusat Muhammadiyah, *Pedoman Hisab Muhammadiyah...*, p. 75-76.

The existence of the moon has been used as the basis for determining the time of the calendar, although there are differences of opinion in determining the beginning of the month. The movement of the moon always requires certain times with a relatively fixed period, both when the moon revolves around the earth and when the moon orbits the sun with the earth.⁵¹ Thus, the movement of the moon can be used as a human guide in calculating time.

2. The Circulation of the Moon As a Light for the Earth at Night

The Qur'an has given knowledge that between the sun and the moon have different properties in their respective rays and light. The moon does not have its own light, the light obtained from the moon is a reflection of sunlight, so it is clear that these two celestial bodies are different. The Word of Allah in Surah Nūh/71: 16

وَجَعَلَ الْقَمَرَ فِيهِنَّ نُورًا وَجَعَلَ الشَّمْسَ سِرَاجًا ﴿١٦﴾

Can you not see how He created the seven heavens one above the other, placing in them the moon as a light and the sun as a lantern?⁵² (Nūh/71:16)

Surah Nūh/71:16 implies between the sun and the moon have different light, the sun is radiant lamp because it has its own light, while the moon is made a light because of the nature of the moon which does not have its own light, the light it produces is a reflection of sunlight. Allah reveals the sunlight with the word *sirāj* in surah Nūh/71: 16, while in Surah Yūnus/10: 5, Allah reveals the sunlight with the word *diyā'*.

Moonlight is the light from seeing the entire side of the moon reflected through its face. Humans sometimes can only see the entire illuminated side,

⁵¹See Lajnah Pentashihan Mushaf Al-Qur'ān et al., *Manfaat Benda-benda Langit...*, p. 111-112.

⁵²The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Translition of the Meaning of the Qur'an...*, p. 431.

with a large luminous plate, but other times, humans can see only part of the reflecting side of the light.⁵³

Ancient people thought that the moon is a planet that gives off its own light. Moonlight is not as strong as sunlight. This is an incorrect thought, because the Qur'an itself has explained that the sun is a source of heat, light and bright light, while the moon is not like the sun. The moon in its position relies on its light from the sun's rays.

Moonlight comes from sunlight. The surface of the moon that gets sunlight is always the same, that is half. The half of the moon facing the sun will be bright and vice versa, the part of the moon facing the sun will be dark. However, the phase of the moon that can be seen from the earth depends on the relative positions of the sun, moon and earth.⁵⁴ The visible part of the moon on earth will always be the same, because the moon's rotation takes the same time as the moon orbits the earth. Therefore, humans always see the side of the moon that is fixed, only the phases are different, repeating from the new moon to the full moon.⁵⁵

The phases of the moon affect the intensity of moonlight. As we known, the moon looks round when it enters the full moon and at that time the condition of the region on earth looks bright, but even though it is in the full moon phase, the light intensity it has is only about 0.05-0.1 lux. When the condition of the moon is at its closest point to the earth and appears above the climax of the tropics, the illumination from the moon only reaches 0.32 lux. This indicates that the moonlight at full moon is only one millionth of the brightness of the sun.⁵⁶

⁵³See Jajak MD, *Astronomi Ilmu Pengetahuan Luar Angkasa* (Jakarta: Harapan Baru Raya, 2006), p. 67.

⁵⁴UPT Observatorium Bosscha Institut Teknologi Bandung, *Perjalanan Mengenal Astronomi* (Bandung: ITB, 1995), p. 32.

⁵⁵*Ibid.*, p. 33.

⁵⁶See John Tuzo Wilson, *Geophysics* (Technical Assistant to Chief of Naval Operations for Polar Projects, 1956), p. 16.

The color of the moonlight when viewed using the eye without the help of other artificial light sources looks bluish, especially during a full moon. Moonlight is not actually blue, this is due to the Purkinje effect,⁵⁷ The moonlight also doesn't actually have a silvery quality that sticks, although what is well-known among us is the moonlight like silver, but that's not the case. The moon has an albedo⁵⁸ of 0.136, Therefore, only 13.6% of the sun's rays of light is reflected to the moon.⁵⁹ The moon when viewed at night is very beautiful, not only that, this celestial object is often used as words or poetry. Humans can see the moon and other constellations of stars at night, and during the day humans can also see the sun, the lamp of life.

The earth gets light at night because of the moon. During its circulate around the earth, the moon appears in different forms, starting from a crescent moon, then increasing little by little, then turning into a full moon. From such a circulation process, the moon will illuminate the earth, especially during the full moon. Humans can see the moon at night when the moon looks bright in the sky, but sometimes humans also experience periods of dark nights because there is no moonlight.

The full moon will illuminate the earth at night, the earth will get full moon light from sunset to sunrise. This happens on the 13th to the 16th of every *Qamariyyah* month. Such an explanation relates to Surah Asy-

⁵⁷The Purkinje effect or often referred to as the Purkinje shift occurs because of the tendency in the peak luminance sensitivity of the human eye to shift towards the blue end of the color spectrum at low illumination levels, this occurs as part of the adaptation to darkness. See Mimir Ensiklopedia Bahasa Indonesia (2004), *Fenomena Purkinje*. Accessed on March 11, 2022 from <https://mimirbook.com/id/eb6061403e3>.

⁵⁸Albedo is the ratio of the amount of short-wave solar radiation received by a surface with short-wave solar radiation reflected on the surface, or it can be interpreted that albedo is the ratio of reflected solar radiation to radiation coming from a surface. See Oxford English Dictionary, *Little Oxford English Dictionary* (California: Oxford University Press. 2006), p. 10. See also Rushayati et al., "Pengembangan Ruang Terbuka Hijau Berdasarkan Distribusi Suhu Permukaan di Kabupaten Bandung" in *Forum Geografi*, Vol. 25, No. 1 (Juli, 2015), p. 17.

⁵⁹Wikipedia (2002), *Cahaya Bulan: Cahaya dari Bulan yang Mencapai Bumi*. Accessed on March 11, 2022 from https://id.m.wikipedia.org/eiki/Cahaya_bulan.

Syams/41: 2, namely 'and when the moon accompanies it' which means that the moon accompanies the sun during its full moon.⁶⁰



Image 2.4. Moon Illuminates Bunch of Ships in Holma, Swedia⁶¹



Image 3.4 Moonlight Shining in the Sky is Near the Very Large Telescope⁶²

3. The Circulation of the Moon As a Mover of the Ocean Tides

The moon is a satellite of the earth that has a very large effect on planet earth, among these effects are its positions which will cause tides.

⁶⁰See Hamka, *Tafsīr Al-Azhar*..., p. 424.

⁶¹*Ibid.*, https://id.m.wikipedia.org/eiki/Cahaya_bulan.

⁶²*Ibid.*, https://id.m.wikipedia.org/eiki/Cahaya_bulan.

Tides are a vertical movement, namely the rise and fall of sea water repeatedly and regularly. This vertical movement of sea water takes place from all particles of sea water mass from the surface to the deepest part of the sea floor. Tidal phenomena are caused by the gravitational force between the earth and the moon, the earth and the sun, and the earth and the sun and moon.⁶³ Apart from the force of gravity, tides are also the result of the centrifugal effect.⁶⁴ The required period of low tide varies widely, most areas have low tides with a time of 12 hours 25 minutes to 24 hours 50 minutes. If judging again, the tide consists of two words, namely ups and downs. High tide is a condition where the sea level is higher than the average, while low tide is a condition where the sea level is lower than the average.⁶⁵

The circulation of the moon with a predetermined time makes the moon have certain positions in its circulation. The existence of these positions which ultimately makes a big influence on the earth, including the phenomenon of tides. Regarding the circulation of the moon in its orbit with a certain time, Allah has explained in the Qur'an. Allah said in Surah Yāsin/36: 39.

وَالْقَمَرَ قَدَرْتَهُ مَنَازِلَ حَتَّىٰ عَادَ كَالْعُرْجُونِ الْقَدِيمِ ﴿٣٩﴾

And for the moon, We have ordained mansions till it bocems again as an old dry palm-branch.⁶⁶ (Yāsin/36:39)

Allah explains about the positions of the moon in this verse. Allah mentions by the name of *manāzil*, the singular is *manzilah* as the position of

⁶³Dewi Surinati, “Pasang Surut dan Energinya”, in *Oseana*, Vol. 32, No. 1, (2017), p. 16.

⁶⁴The centrifugal effect is a push outward from the center of the earth's rotation. See Ellen Tjandra, *Mengenal Pantai* (Bogor: Cita Insan Madani, 2016), p. 45.

⁶⁵See Lukman Adrianto, *Karakteristik Pasang Surut Air Laut di Pelabuhan Benoa dengan Menggunakan data Automatic Weather Station (AWS) BMKG* (Universitas Maritim Amni: Nautika, 2020), p. 8.

⁶⁶The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Translition of the Meaning of the Qur'an...*, p. 324.

the moon. As in *Tafsīr fī Zilāl Al-Qurān* by Sayyid Quthb, the *manzilah* of the moon start from the crescent moon, then develop from one night to another until they become a complete full moon. After the full moon, little by little the moon will shrink back to a crescent moon resembling an old bunch.⁶⁷ The moon has a position that changes all the time, it's because of its movement around the earth. Changes in the position of the moon are not only related to its appearance when viewed from the earth, but also related to the position of the moon as a whole to its parent planet.⁶⁸

The positions of the moon which are always changing make the earth suffer the consequences. The moon has a gravitational force like the other planets. The moon's gravitational force has a very strong influence on the earth because the moon's position is close to the earth. The gravitational force or attraction that is owned by the moon makes the elements of the earth are attracted and lean towards the moon. The most volatile part of the earth is the sea, therefore, the sea level will always change according to the position of the moon. When the moon is in a position, the sea water which is in a straight line with the moon will be attracted and its surface will rise, as well as the sea which reaches 180 degrees. As for the sea which is 90 degrees towards the moon, it will recede because the sea level is attracted to a location in the direction of the moon. Tides occur in different places, and will always occur at any time.⁶⁹

In fact, the distance between objects in space has a very large influence on the force of gravity. If the distance between the moon and the earth is too close, it is certain that the moon will be attracted by the earth's gravity. The attraction of the moon because of the gravitational force it will cause the moon to hit the earth and then destroy all life on earth, but if the

⁶⁷Sayyid Quthb, *Tafsīr fī Zilāl Al-Qurān...*, p. 394.

⁶⁸See Lajnah Pentashihan Mushaf Al-Qurān, et al., *Manfaat Benda-benda Langit...*, p. 111.

⁶⁹*Ibid.*, p. 111.

moon is further away from the earth and the distance between the two is getting wider, then on earth there will be no tidal phenomenon. The moon will also be attracted by the gravitational force of other planets if the moon moves away from the earth. In addition, the earth will also have a significant effect, namely it rotates in only 4 hours, the night lasts only 2 hours and the day lasts only 2 hours.⁷⁰

The moon's gravitational force has had a major impact on the earth's surface. Newton's law explains that all masses of objects attract each other and the force depends on the magnitude of the masses, as well as the distance between them. In reality, gravity varies directly with mass, but inversely with distance. Therefore, it can be understood that although the mass of the moon is smaller than the mass of the sun, the distance of the moon is much smaller (in the sense that it is closer to the earth), so that it has a big effect on the moon's attraction to the earth, than the sun's attraction to the earth.⁷¹

The sun's mass is 227 million times larger than the moon, but the sun's distance from the earth is very far, reaching 149.6 million km. Meanwhile, the average distance from the moon to the earth is 381.160 km. because the distance of the moon is closer to the earth, the influence of the moon on the tides of sea water on earth is greater than that of the sun. The strong attraction of the moon will cause the part of the earth closest to the moon to be attracted so that the sea water in that place will rise and there will be tides. At the same time, there will be receding in the area of the earth that is perpendicular to the axis of the earth and the moon. Tidal phenomena occur regularly and constant, because the circulation of the earth around the sun, the circulation of the moon around the earth, and the rotation of the earth on its axis is fixed.⁷²

⁷⁰Nadhiyah Thayyarah, *Buku Pintar Sains dalam Al-Qurān...*, p. 436.

⁷¹Wardiyatmoko and H.R Bintaro, *Geografi untuk SMA Kelas 1* (Jakarta: Erlangga, 1994), p. 25.

⁷²Susilo Soekardi and Tauhid Nur Azhar, *Air dan Samudera: Mengurai Tanda-tanda Kebesaran Allah di Lautan* (Solo: Tinta Medina, 2012), p. 67.

The tides are very complicated, because the movement of tides depends on the rotation of the earth, ocean currents, winds, and other conditions that exist in that place. The force of gravity pulls seawater toward the moon and sun and creates two gravitational tidal bulges in the ocean. Declination plays an important role in determining the latitude of the tidal bulge. The declination is the angle between the axis of rotation of the earth and the orbital planes of the sun and moon.⁷³

In general, there are two types of tides, namely full tides and neap tides. A spring tide occurs when the earth, moon and sun are in a straight line. When this phenomenon takes place, it will produce very high high tides and very low low tides. The tides of the full moon occur when the new moon and full moon or can be called opposition conjunctions.⁷⁴

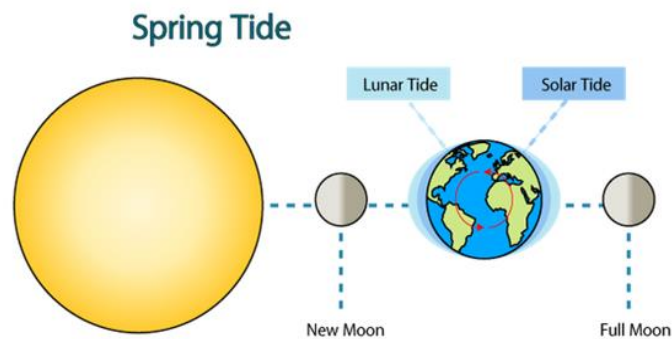


Image 4.4 Ilustration Spring Tide⁷⁵

Another tidal division is neap tide. Neap tides occur when the earth, moon, and sun form at right angles to each other and when it produces high low tides and high low tides. Neap tides occur when the moon is and in size.⁷⁶

⁷³See Bambang Triatmojo, *Pelabuhan* (Jakarta: Beta Offset, 2003), p. 29.

⁷⁴Joenil Kahar, *Geodesi* (Bandung: ITB, 2008), p. 144.

⁷⁵Karina Dwi Adistiana (2018), *Pasang Surut Air Laut Akibat Gravitasi Bulan*, Accessed on March, 20 2022 from <https://www.ruangguru.com/blog/pasang-surut-air-laut-akibat-gravitasi-bulan>

⁷⁶Joenil Kahar, *Geodesi...*, p. 144.

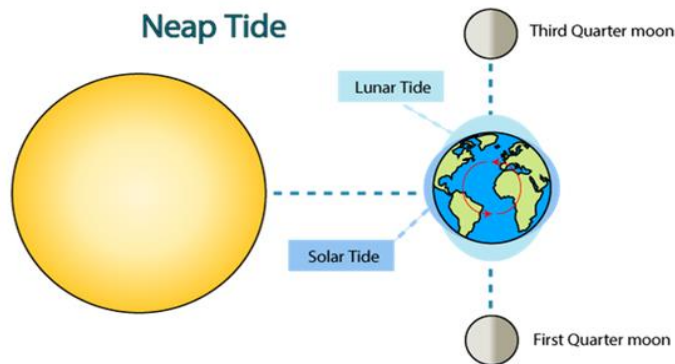


Image 5.4 Ilustration Spring Tide⁷⁷

The tidal zone is called the littoral zone. The area in the tidal zone is between the highest high tide and the lowest low tide. The boundary where the sea and land meet at the time of the highest tide is on the coastline. At certain times, the beach experiences ups and downs. High tides occur when sea levels rise and inundate land that was originally dry, while low tides occur when sea levels fall and leave dry land.⁷⁸ The high tide and the low tide have a significant influence on life on earth. The effects resulting from the phenomenon of the high tides and the low tides are as follows.

A. Tides As a Source of Electricity

The tidal phenomenon produces energy that is taken by utilizing the difference in sea level height during high and low tides. When the sea experiences highs and lows, the flow of water is able to drive turbines to generate electricity, in addition to currents that occur when sea water moves down at high tide and currents that occur when sea water rises at low tide. The difference in height at sea level can be exploited by making

⁷⁷Karina Dwi Adistiana (2018), <https://www.ruangguru.com/blog/pasang-surut-air-laut-akibat-gravitasi-bulan>.

⁷⁸Ellen Tjandra, *Mengenal Pantai...*, p. 3 & 44.

a dam at the mouth of the estari or terul, while the currents that occur during high and low tide can be used to move the propellers.⁷⁹

The factors that influence the mechanism of the tidal energy power center are the direction, wind, speed, length of time the wind blows, and the area affected by the tides. Thus, the utilization of tidal energy power centers needs to be carried out in a large area so that it can accommodate sea water.⁸⁰

Tidal power is renewable energy, which is the result of converting tidal energy into electricity. The energy contained in electricity is obtained from energy in the tides. Utilization of electric power from tidal power has become an endless source of electricity, this is due to the earth-moon interaction that always occurs. Actually, electricity in tidal power has very good potential, but the fact is that many of the tidal power industry are still limited to pilot projects and have not been noticed by the whole world, even though tidal energy is capable of producing electricity for 10 hours during tidal wave. Thus, tidal energy is intermittent energy, which is the same energy as solar and wind.⁸¹ Utilization of tidal energy power centers has been realized in the La Ranche region of France, followed by Russia in Murmannsh, Lumboy, Tae Menzo Boy, and The Thite Sea, in addition to Kimberly, Australia has also utilized tidal energy power centers. It is noted that currently in the world's oceans, the potential for tidal energy reaches 3.106 MW.⁸²

⁷⁹Arintika Widhayanti, *Pasang Surut Pemanfaatan Data Pasang Surut* (Semarang: Universitas Diponegoro, 2013), p. 4.

⁸⁰Soepardjo, *Potensi dan Teknologi Energi Samudera dalam Eksplorasi Sumber daya Budaya Maritim* (Jakarta: Departemen Kelautan dan Perikanan, Pusat Penelitian Kemasyarakatan dan Budaya, Universitas Indoneisa, 2005), p. 125-132.

⁸¹Mikael Adrisno Lusi, "Studi Pemanfaatan Pasang Surut Air Laut untuk Pembangkit Daya", in *MJEME*, Vol. 2, No. 2 (April, 2020), p. 45.

⁸²See Tridoyo Kusumastanto, *Analisis Ekonomi Kelautan dan Arah Kebijakan Pengembangan Jasa Kelautan* (Institut Pertanian Bogor: Pusat Kajian Sumber Daya Pesisir dan Lautan, 2001) p. 9.

B. Tides As Livelihoods for Fishermen

Fishermen are people who do fishing and cultivation in the sea and in places where there are tides.⁸³ Thus, if there is work to catch fish in fish farming areas, such as fish ponds, ponds, rivers, lakes, and so on, they are not called fishermen.⁸⁴

The livelihoods of fishermen depend on marine products. Usually the fishermen live in coastal areas of the sea or the outskirts of the coast.⁸⁵ The activities of fishermen are never separated from catching fish, selling it and processing marine products. In essence, the fishermen will depend on the state of the sea to survive, because their main job is in the sea.

If the tide rises, there will be big waves in the sea. With these big waves, the fishermen will not be able to go to sea to catch fish.⁸⁶ This indicates that the tidal phenomenon can harm fishermen, while the tidal phenomenon can provide benefits for fishermen because they can catch fish as their livelihood.

⁸³Tarigan, *Nelayan: Strategis Adaptasi dan Jaringan Sosial* (Bandung Humaniora Press, 2000), p. 31.

⁸⁴See Sofyan R Indara, et al., “Faktor-Faktor yang Mempengaruhi Pendapatan Nelayan Tangkap di Desa Bongo Kecamatan Batudaa Pantai Kabupaten Gorontalo”, in *Agrinesia*, Vo. 2, No. 1 9November, 2017), p. 92.

⁸⁵Sastrawidjaya, et al., *Nelayan Nusantara* (Jakarta: Pusat Pengolahan Riset Produk Sosial Ekonomi Kelautan dan Perikanan & Badan Riset Kelautan dan Perikanan, 2002), p. 1.

⁸⁶Ellen Tjandra, *Mengenal Pantai...*, p. 44.



Image 6.4 The Phenomenon of High Tides and Low Tides that Occurs Continuously causes Fishermen to Stop Going to Sea⁸⁷

C. High Tides As a Determinant of Water Transportation

Understanding the tides plays an important role in port planning. Port planning based on the results of tidal observations is the observation of formed sedimentation, not the determination of vertical datums. Tides will be regulated using a measuring device called a gauge, and this measurement is carried out on an hourly or daily basis using manual observations.⁸⁸

At high tide, large ships can dock to the edge of the pier. Thus, the captains of large ships are very lucky if this tidal phenomenon occurs. The profits of the captains of these large ships are inversely proportional to the profits of the fishermen. If the captains are lucky with the high tide, the fishermen are lucky with the low tide because they will catch fish easily.

⁸⁷Radar LamSel (2018), *Air Laut Pasang Surut, Ratusan Nelayan Libur Melaut*. Accessed on April 3, 2022 from <https://www.radarlamsel.com/air-laut-pasang-surut-ratusan-nelayan-libur-melaut/>.

⁸⁸Lailatul Qhomariyah, *Analisa Hubungan Antara Pasang Surut Air laut dengan Sedimentasi yang Terbentuk: Studi Kasus Dermaga Pelabuhan Petikemas Surabaya* (Institut Teknologi Sepuluh Nopember Surabaya: Fakultas Teknik Sipil dan Perencanaan, 2015), p. 5.

D. High Tides Produce Salt

Seawater contains a mixture of 96.5% pure water and 3.5% others such as salts, dissolved gases, insoluble particles, and organic materials. The salt content of around 3.5% causes seawater to taste salty. Each sea has a different salt content. The earth that humans live on is filled with mineral salts found in soil and rocks, so it's not surprising that sea water also has salt levels. Ocean waves on the beach also produce salt which is found in rocks, as well as river water that flows into the ocean carrying salt.⁸⁹

During high tide conditions, deep waters will experience a salinity⁹⁰ that is always stable, while in shallow waters will experience salinity movement towards the mainland. Furthermore, the mass of water that stores salt will be on the bottom surface. Thus, at low tide there will be dissolution of salt in the sediment and bottom substrate and at high tide, salinity will decrease due to the melting of salt content into deep waters.⁹¹ The distribution of salinity is always influenced by the tides of sea water, not only the tides, the distribution of salinity is also influenced by surface flow, depth, evaporation, and waste discharged into sea water.⁹²

The salt content in seawater which is around 3.5% indicates that in 1 liter of water there are 35 grams of salt, especially table salt/NaCl. Salt

⁸⁹See Yuningsih and Masduki, "Potensi Energi Arus Laut untuk Pembangkit Tenaga Listrik di Kawasan Pesisir flores Timur", in *Jurnal Ilmu Teknologi dan Kelautan Tropis*, Vol. 3 (2011), p. 13-15. See also Okky Putri Prastuti, "Pengaruh Komposisi Air Laut dan Pasir Laut Sebagai Sumber Energi Listrik", in *Jurnal Teknik Kimia dan Lingkungan*, Vol 1, No. 1 (2017), p. 36.

⁹⁰Salinity is the amount of salt dissolved in water. Salinity is part of the physical and chemical properties of water. Water salinity describes the salt content in a waters. The salt is an ion dissolved in water, including table salt (NaCl). See Effendi, *Pengantar Akuakultur* (Jakarta, Penebar Swadaya, 2004), p. 4.

⁹¹Mahendrajit Yudhantoko, et al., "Karakteristik dan Peramalan Pasang Surut di Pulau Kepala Dua", Kabupaten Kepulauan Seribu, in *Oceanografi*, Vol. 5, No. 3 (2016), p. 373.

⁹²See Furqon Aziz, "Tipe Eatuari Binuangeun (Banten) Berdasarkan Distribusi Suhu dan Salinitas Perairan" in *Oceanologi & Limnologi*, Vol. 01, No. 25 (Maret, 2007), p. 108.

farmers can turn salt-containing seawater into solid salt,⁹³ so what reaches us is sometimes solid salt.

Salt farmers will make ponds on the beach and when the tide rises, sea water will fill the ponds. The sun's rays will evaporate the sea water then the evaporated sea water will produce salt crystals in the pools. The salt will be harvested and then sold in the market.⁹⁴



Image 7.4 Due to the High Tides, Salt Farmers are Starting to Rise.⁹⁵

Tidal phenomena that occur on earth not only have an effect on the state of the earth itself, because in reality, tidal phenomena also affect the moon. The moon experienced an earthquake that took place at a depth of 1.000 km from its surface. The earthquake on that month was related to the tidal force due to the earth's gravity because it took place every month on a regular basis.⁹⁶

Allah has subdued the moon as one of the ways in which the tidal process occurs. Tides are one of the earth's forces that play a role in breaking coastal rocks and forming types of sediment and rock deposits along the coast.

⁹³ Bambang Joko Susilo, *Yuk Lebih Dekat Mengenal Laut* (Jakarta: Bee Media, 2018), p. 12.

⁹⁴ See Ellen Tjandra, *Mengenal Pantai...*, p. 39.

⁹⁵ Mohammad Rifa'I (2018), *Pasang Surut Petani Garam Madura, Kini Mulai Bangkit Dari Serbuan Garam Impor Bermodal Geo Membran*. Accessed on April 3, 2022 from <https://madura.tribunnews.com/2018/12/21/pasang-surut-petani-garam-madura-kini-mulai-bangkit-dari-serbuan-garam-impor-bermodal-geo-membran>.

⁹⁶ Gunawan Admiranto, *Menjelajahi Tata Surya* (Yogyakarta: Kansius, 2009), p. 206.

So also serves to make the concentration of a number of mineral wealth in the sand. These are just a few of a number of forms of submission that Allah has determined by His will, along with the extraordinary wisdom that the moon and sun can provide benefits in regulating the motion of life on earth and can provide benefits in the structure of the universe.⁹⁷ Submission to what is on earth and in the sea has been explained by Allah in His word Surah Al-Hajj/22: 65.

أَلَمْ تَرَ أَنَّ اللَّهَ سَخَّرَ لَكُمْ مَّا فِي الْأَرْضِ وَالْفُلْكَ تَجْرِي فِي الْبَحْرِ بِأَمْرِهِ وَيُمْسِكُ السَّمَاءَ أَنْ تَقَعَ
عَلَى الْأَرْضِ إِلَّا بِإِذْنِهِ ۗ إِنَّ اللَّهَ بِالنَّاسِ لَرُءُوفٌ رَحِيمٌ ﴿٦٥﴾

Do you not see that he Has subdued to you all that is on the earth? He has also given you ships which sail the sea at His bidding. He holds the sky from falling down. (This it shall not do) except by His own will. Compassionate is Allah, and Merciful to men.⁹⁸ (Al-Hajj/22:65)

Allah made the planets have special orbits which they never violated, therefore Allah holds the planets like the sun, moon, and other stars with a system of attraction. The planets will always exist in this life until the end of the world. Had it not been for such a system of attraction, some of the large planets would have collided with each other, and the earth would have been destroyed and not a single creature would have been able to survive on earth.⁹⁹

Allah has set laws in this universe, so that the sea water will not be able to beat the water in the river, nor can it beat the land even though the sea is in a tidal or ebb phenomenon due to the influence of the moon's

⁹⁷Zaghloul Ragheb Mohamed En-Naggar, *Selekta dari Tafsir Ayat-ayat Kosmos dalam Al-Qur'an Al-Karim...*, p. 89.

⁹⁸The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Translition of the Meaning of the Qur'an...*, p. 246

⁹⁹Ahmad Mushtafa Al-Maraghi, *Tafsir Al-Maraghī*, Juz 17 (Mesir: Mustafa Al-Bab Al-Halab, 1934), p. 24.

gravitational force on the water on the earth's surface and when the water is high.¹⁰⁰

The circulation of the moon has given rise to the phenomenon of tides. Everything that happens as a result of changes and the position of the moon is a natural law decree that has been determined by Allah. All of this is Allah's rule that will always happen at any time according to what He has created.¹⁰¹

4. The Stopping of the Circulation of the Moon As a Sign of the End of the Day (*Yaum Al-Qiyāmah*)

Allah has determined when the circulation of celestial bodies such as the moon will stop. Allah said in Surah Luqmān/31: 29.

أَلَمْ تَرَ أَنَّ اللَّهَ يُوَلِّجُ اللَّيْلَ فِي النَّهَارِ وَيُوَلِّجُ النَّهَارَ فِي اللَّيْلِ وَسَخَّرَ الشَّمْسَ وَالْقَمَرَ كُلًّا يَجْرِي إِلَىٰ أَجَلٍ مُّسَمًّى وَأَنَّ اللَّهَ بِمَا تَعْمَلُونَ خَبِيرٌ ﴿٢٩﴾

Do you not see how Allah causes the night to pass into the day and the day into the night and has forced the sun and the moon (into His service), each running for an appointed term? Allah is cognizant of all your actions.¹⁰² (Luqman/31:29)

Al-Razi in the interpretation of *Maḥātib Al-Ghaib* interprets the verse above that each has its own territory. The orbit of the sun is different from the orbit of the moon, the day is shorter than the night, and the morning is shorter than the day, but by the grace of Allah, these celestial bodies are submissive and obedient to Allah.¹⁰³

Furthermore, in the lafadz كُلُّ يَجْرِي إِلَىٰ أَجَلٍ مُّسَمًّى (each running for an appointed term) there are two different opinions. The first opinion says that

¹⁰⁰Quraish Shihab, *Tafsīr Al-Misbāh...*, p. 500.

¹⁰¹Lajnah Pentashihan Mushaf Al-Qurān, et.al, *Manfaat Benda-benda Langit...*, p. 110.

¹⁰²The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Transliteration of the Meaning of the Qur'an...*, p. 302-303.

¹⁰³Fakhruddin Al-Razi, *Tafsīr Al-Kabīr*, Juz 21-22 (Beirut: Dar Al-Kutub Al-Ilmiyah, 1999), p. 107.

what is meant by time here is the time of sunrise and sunset, while the second opinion that is meant by time here is the time of the end of the day (*yaum al-qiyyāmah*).

According to Quraish Shihab, the sentence *ilā ajalin musammā* above means the provision of time for the passage of the sun and moon in this universe. The sentence *ilā ajalin musammā* can also mean that the journey of the sun and moon continues for a specified time. Towards the apocalypse, the sun will rise from the west, its speed will also decrease and at that time there will be collisions with other celestial bodies until the time that Allah has determined for the destruction of the universe.¹⁰⁴

The duration of the circulation of the sun and moon in their respective orbits cannot be determined, because only Allah has the power to stop the circulation. It is Allah who has the right to determine the cessation of the circulation of the sun and moon, and if that happens, then the universe will end or in other words there will be the end of the world.¹⁰⁵

Science explains when the sun continues to lose mass, the earth will also lose mass because the distance between the earth and the sun remains constant. Earth loses mass in the form of dust and gas which amounts to about millions of tons. Loss of mass on the earth occurs because the earth maintains the distance between the sun and the earth. When the earth loses its mass, the moon should also be affected, considering that the moon is a satellite that faithfully accompanies the earth, but that is not what happened. The moon will not lose mass, so the distance between the moon and the earth is not constant. Statements like this are actually in accordance with scientific facts which state that the moon is constantly moving away from the earth. The distance of the moon from the earth is explained by the speed of the moon on

¹⁰⁴Quraish Shihab, *Tafsīr Al-Misbāh...*, p. 154.

¹⁰⁵Fahma Fatwa Rosyadi, *Ilmu Falak: Menyelami Makna Hilal dalam Al-Qur'ān* (Bandung: P2U-LPPM UNISBA, 2017), p. 88-89.

its axis which begins to decrease little by little due to wind and tidal phenomena on earth. Events like this cause an increase in the average speed of the moon's rotation on its axis, pushing the moon away from earth.¹⁰⁶

Earth slows down about 0.1 second every century. At the same time, the moon accelerates its rotation by the same average. This resulted in a gradual change in the state of equilibrium between the earth and the moon, which in turn resulted in the moon being released from the earth's gravitational bonds, and sucked into the sun.¹⁰⁷ It is true that Allah has sent down the Qur'an in the 7th century AD. Allah said in Surah Al-Qiyāmah/75: 8-9.

When the moon moves away from the earth during its orbit around the earth, the speed of the circle decreases, then the repulsion force of the center decreases, otherwise the moon will be separated from the earth's gravitational bonds and then disappear into the universe or be swallowed by the sun. Therefore, the moon's orbital speed in its orbit around the earth is approximately between 3483 and 3888 km/hour with an average of 3675 km/hour, or more or less at the limit of 1 km/second, which is the same as the rotational speed of the moon. Therefore we can only see the moon from the other side. However, due to the presence of a layer of water that covers approximately 3/4 of the earth's surface, and the presence of an atmosphere that extends thousands of km around the earth, as well as estimates of no atmosphere around the moon and its surface, it is evident that the earth loses speed of 1/1000 of a second every year. century as a result of ocean waves, especially tidal processes and wind movements.¹⁰⁸

The reduction in the Earth's rotational speed even though it is very small causes a regular increase in the moon's rotational speed that moves it

¹⁰⁶Nadhiyah Thayyarah, *Buku Pintar Sains...*, p. 445.

¹⁰⁷Zaghloul Ragheb Mohamed En-Naggar, *Selekta dari Tafṣīr Ayat-ayat Kosmos dalam Al-Qurān Al-Karīm...*, p. 241.

¹⁰⁸*Ibid.*, p. 91-92.

away from Earth by 3 cm every year. Scientists predict that the moon's regular departure from Earth will expel the moon at some point from the Earth's resistance zone into the sun's gravitational zone, where it will engulf it. This means the destruction of the moon. The Qur'an has stated since 14 centuries ago that in essence the sun will swallow the moon. The clue to this fact is found in Surah Al-Qiyāmah/75: 8-9.¹⁰⁹

وَحَسَفَ الْقَمَرُ ﴿٨﴾ وَجُمِعَ الشَّمْسُ وَالْقَمَرُ ﴿٩﴾

And when the moon is dimmed, and the sun and the moon are brought together.¹¹⁰ (Al-Qiyāmah/75: 8-9)

The moonlight will go away. The sun and the moon will come together as one, and the light from them will disappear. This is a picture on the end of the day (*yaum al-qiyāmah*), where the light from the sun and moon will disappear from human sight.¹¹¹ The disappearance of the moonlight is probably caused by the presence of extraordinarily thick dust, but it is also possible because the dimming of sunlight which is the source of the moonlight itself.¹¹²

The universe will experience great destruction when the end of the world arrives. Apart from the disappearance of light, all the celestial bodies will collide with each other. It is explained that the coming of the end (*yaum al-qiyāmah*) begins with the blowing of the angel Israfil's trumpet. There are two blasts, the first blast will destroy the entire universe and the second blast will raise humans from their graves. The first blast will destroy the very order of the universe. Galaxies, stars, planets, satellites and

¹⁰⁹Zaghloul Ragheb Mohamed En-Naggar, *Selekta dari Tafsīr Ayat-ayat Kosmos dalam Al-Qurān Al-Karīm...*, p. 92.

¹¹⁰The Supreme Sunni and Shiin Councils of the Republic of Lebanon, *The Qur'an: An English Translation of the Meaning of the Qur'an...*, p. 437.

¹¹¹Tanthawi Jawhari, *Al-Jawhir fī Tafsīr Al-Qurān...*, p. 301.

¹¹²Lajnah Pentashihan Mushaf Al-Qurān, et al., *Kiamat dalam Perspektif Al-Qurān dan Sains* (Jakarta: Lajnah Pentashihan Mushaf Al-Qurān, 2011), p. 90.

all celestial bodies that revolve around their center of mass will collide. All will be confused even though the number is billions. The celestial bodies that have been circulating for billions of years will stop circulating because of Allah's decree, namely the time of the end of the world has arrived. Events colliding celestial bodies will cause a very powerful explosion.¹¹³

The universe will experience complete destruction and will end up being replaced by a new form. The destruction of the universe is agreed upon by almost all cosmologists. They say that according to the latest scientific developments, the universe is ephemeral, it is possible that in the past it appeared and then later it will disappear and be replaced with something new.¹¹⁴

The creation of the moon and other celestial bodies has benefits for all creatures. Allah has subjected the moon to benefit humans. The moon revolves in its orbit with the time that Allah has set. With the journey that He has set, humans can benefit from it, however, there are still among humans who have not realized the benefits of these celestial bodies, including the moon. As a result, many of them are not able to take full advantage of the circulation of the moon which is clearly displayed in front of them.

¹¹³*Ibid.*, p. 77.

¹¹⁴See Hariwijaya Soewadi, et al., *Ilmu Alamiah Dasar* (Jakarta: Ghaila Indonesia, 1999), p.

CHAPTER V

CLOSING

A. Conclusion

The results of the research entitled *The Circulation of the Moon in the Perspective of the Holy Qur'an and Science* found that the circulation of the moon which has been explained by the Qur'an is in line with the findings of science in this modern age. The orbit of the moon is a scientific fact that is clear and definite, not a theory that can often change. The revelation of the Qur'an about the cycle of the moon is intended as an effort to know Allah and also to increase faith in Allah. The Qur'an mentions more than 14 verses about the cycle of the moon. This shows humans about the scientific miracles of the Qur'an, when the Qur'an was revealed, humans did not have sophisticated equipment like in this modern age.

The concept of the circulation of the moon revealed by the Qur'an is that the moon circulates according to its orbit and according to perfect calculations. The Qur'an reveals the circulation of the moon according to its orbital line by using the word *yasbahūn*, many of the *mufassir* such as Zaghoul En-Naggar and Quraish Shihab, and figure Maurice Bucaille interpret the word *yasbahūn* with the meaning of swimming, namely the movement of celestial bodies in their orbits, this indicates that every celestial bodies including the moon revolve in their own orbital lines. The movements of celestial bodies in their orbits have been proven by scientific facts in the modern age. While the moon circulates according to this perfect calculation, scientific facts have also been revealed which states that in its circulation the moon has three kinds of circulation according to their respective calculations, namely the rotation of the moon, the revolution of the moon, and the journey of the moon along with the earth in revolving around the sun. There is an important thing in the revolution of the moon, which is also revealed by the Qur'an, namely the moon in its circulation has a *manzilah* (plural is *manāzil*). The

commentators interpret *manzilah* as orbital places for the moon. *Manzilah* only exists on the moon because of its winding path when it goes around the earth. The term *manzilah* on the moon is closely related to what is revealed by science as the phases of the moon, namely changes in the shape of the moon when viewed from the earth.

The circulation of the moon is Sunatullah (a permanent law of nature) and it is impossible for Allah to create it and regulate it without benefit. It can be concluded that the cycle of the moon has several benefits. The circulation of the moon is used by humans as a guide for calculating time in the calendar. The calendar that uses a pure moon circulation is the *Qamariyyah* calendar which uses a synodic moon revolution. In addition to the calendar, the light obtained from the circulation of the moon is also used to illuminate the earth at night, especially during the full moon. The moon is not a source of light, because the light that the moon has is a reflection of sunlight. The Qur'an calls the moonlight with lafadz *munīr*, while when it mentions sunlight the Qur'an uses the words *siraāj* and *ḍiya'*. This is a very clear difference in truth and detail between light (*ḍiya'*) that emerges from an object that is lit and shines independently, then drops its light on a dark, silent, and atmosphereless moon and then looks light (*nūr*) from the moon's surface. Another benefit that greatly influences the moon's circulation is the phenomenon of the ocean tides. Tides have brought great effects to humans, many of whom take advantage of this phenomenon, both to earn a living and for other purposes, but the tidal effects also have a negative impact on the earth, because with the tides, the moon will be farther away from the earth, as a result the earth will lose its mass and will cause destruction to the earth and the moon. With this fact, humans will know that life in the universe will not last forever, there will come a time when the universe will experience destruction. The moon will stop circulating in accordance with the time set by Allah, namely the end of the day (*yaum al-qiyāmah*). Regarding the cessation of the circulation of the moon, Allah has revealed in the Qur'an, so that in this way, a Muslim will

increase his faith in Allah and will believe that the end of the day (*yaum al-qiyyāmah*) will one day come.

B. Suggestion

I hope the discussion about something revealed by the Qur'an and proven by science continues. There are many scientific miracles that the Qur'an has revealed from 15 centuries ago, but they can only be proven by scientific facts in the modern age. Furthermore, I also hope the study of the moon can be reviewed in more detail by using theories related to the Qur'an and science or with other different points of view and analysis, such as the circulation of the moon based on the point of view of certain *mufasssir*, the revelation of the Qur'an about the difference in the mention between the light of the sun and the moon, the mention of the sun and the moon in the verses of the Qur'an that are always at the same time, differences in views on the role and function of the moon when the times of the Qur'an were revealed with the present, and so on.

Finally the great expectations of the writer, I hope this writing can be benefit all of us and contribute to the treasures of Islamic knowledge. I really hope for criticisms and suggestions for the sake of perfection of this writing.

REFERENCES

Book

- Abdullah, M. Amin dkk., *Tafsīr Baru Studi Islam dalam Era Multikultural*, (Yogyakarta: Panitia Dies IAIN Sunan Kalijaga Yogyakarta ke-50 dan Kurnia Alam Semesta, 2002)
- Abdullah Sani, Ridwan, *Sains Berbasis Al-Qur'ān*, (Jakarta: Bumi Aksara, 2014)
- Abdullah bin Muhammad, *Lubab At-Tafsīr min Ibni Katsīr*, Juz 3, Trans. Abdul Ghoffar (Jakarta: Pustaka Imam Syafi'i, 2017)
- Abu Al-Hasan bin Muhammad Al-Mawardhi, *An-Nukat wa Al-Uyūn*, (Beirut: Dar Al-Kutub Al-Ilmiyyah, 1992)
- Abu Ja'far Muhammad bin Jarir Ath-Thabari, *Jāmi' Al-Bayān An Ta'wīl Ayat Al-Qurān*, (Jakarta: Pustaka Azzam, 2011)
- Abi Al-Fida Ibn Katsir, *Tafsīr Al-Qur'ān Al-'Aẓīm*, (Kairo: Dar Al-Taufiqiyyah li Al-Turāts, 2009)
- Admiranto, Gunawan, *Eksplorasi Tata Surya* (Bandung: Mizan Media Utama, 2017)
- Admiranto, Gunawan, *Menjelajahi Tata Surya* (Yogyakarta: Kansius, 2009)
- Adrianto, Lukman, *Karakteristik Pasang Surut Air Laut di Pelabuhan Benoa dengan Menggunakan data Automatic Weather Station (AWS) BMKG* (Universitas Maritim Amni: Nautika, 2020)
- Ahmadi, Habibullah, *Ahsan Al-Hadits Analisis Tekstual Ulumul Qur'an*, (Jakarta: Sadra Press, 2011)
- Al-Asfihani, Al-Raghib, *Al-Mufradāt fī Gharīb Al-Qurān* (Mesir: Dar Ibnu Al-Jauzi, 1438)
- Al-Farmawi, Abdul Hayy, *Al-Bidayah fī Tafsir Al-Maudhu'i* (Mesir: Maktabah Jumhuriyah, 1977)
- Al-Farmawi, Abdul Hayy, *Metode Tafsir Maudhu'i*, Trans. Rosihon Anwar (Bandung: CV Pustaka Setia, 2002)

- Al-Maraghi, Ahmad Musthafa, *Tafsīr Al-Marāghī*, Juz 11 (Semarang; CV. Toha Putra, 1993)
- Al-Razi, Fakhrudin, *Tafsīr Al-Kabīr*, Juz 13-14 (Beirut: Dar Al-Kutub Al-Ilmiyah, 1999)
- Al-Rumi, Fahd, *Ittijāhāt Al-Tafsīr fī Al-Qarn Al-Rābi’ ‘Asyar* (Mamlakat Al-‘Arabiyyat Al-Sa’ūdiyyah: w.y)
- Al-Qardhāwi, Yusuf, *Kayfa Nata’amal ma’a Al-Qur’ān Al-Azīm* (Kairo: Dār Al-Shurūq, 2000)
- Ali, Atabik, and Zuhdi Muhlor, Ahmad, *Kamus Kontemporer Arab-Indonesia* (Yogyakarta: Multi Karya Grafika, w.y)
- Ali Ash-Shabuni, *Shafwāt Al-Tafāsir*, (Jakarta: Pustaka Al-Kautsar, 2011)
- Amin, Tatang, *Menyusun Rencana Penelitian*, Cet. 3, (Jakarta: PT. Raja Grafindo Persada, 1995)
- Amrullah, Amin, *Panduan Menyusun Proposal Skripsi, Tesis & Disertasi*, Cet. 1, (Yogyakarta: Smart Pustaka, 2014)
- Anwar, Rosihan, *Pengantar Ulumul Qur’an*, (Bandung: Pustaka Setia, 2009)
- Arikunto, Suharsimi, *Prosedur Penelitian: Suatu Pendekatan Praktis*, (Jakarta: Rineka Cipta, 1993)
- Ash-Shiddieqy, Muhammad Hasbi, *Tafsīr Al-Qurān Al-Madjīd An-Nūr*, Jilid 2, (Jakarta: Cakrawala Publishing, 2011)
- Azhari, Susiknan, *Ensiklopedia Hisab Rukyat* (Yogyakarta: Pustaka Pelajar)
- Bucaille, Maurice, *La Bible, La Coran Et La Science: Bibel, Al-Qur’ān, dan Sains* (Jakarta: Bulan Bintang, 1994)
- Chandra Wijaya, Agus Fani, *Gerak Bumi dan Bulan* (Jayapura: Digital Learning Lesson Study, 2010)
- Departemen Agama RI, *Al-Qur’ān dan Tafsirnya* (Jakarta: Departemen Agama RI, 1981)
- Effendi, *Pengantar Akuakultur* (Jakarta, Penebar Swadaya, 2004)

- En-Naggar, Zaghoul, *Selekta dari Tafsir Ayat-ayat Kosmos dalam Al-Qur'an Al-Karim*, Juz 1, Trans. Masri El-Mahsyar Bidin (Jakarta: Shourok International Bookshop, 2010)
- En-Naggar, Zaghoul, *Haqqāiq Ilmiyyah fī Al-Qur'ān Al-Karūm: Namādzij min Al-Isyarat Al-Qur'āniyyah ilā 'Ulūm Al-Ardh*, (Beirut: Dārul Ma'rifah, 2006)
- Fatwa Rosyadi, Fahma, *Ilmu Falak: Menyelami Makna Hilal dalam Al-Qur'ān* (Bandung: P2U-LPPM UNISBA, 2017)
- Fradette, Nathalie, et al., *Visual Ilmu dan Pengetahuan Populer untuk Pelajar dan Umum: Memahami Alam Semesta*, Trans. Hedro Setyanto (Jakarta: PT Bhuna Ilmu Populer, 2006)
- Gulo, W, *Metode Penelitian*, (Jakarta: Grasindo, 2000)
- Hadi Bashori, Muhammad, *Pengantar Ilmu Falak* (Jakarta: Pustaka Al-Kautsar, 2015)
- Hambali, Slamet, *Almanak Sepanjang Masa*, (Semarang: Program Pasca Sarjana IAIN Walisongo Semarang, 2011)
- Hambali, Slamet, *Pengantar Ilmu Falak* (Banyuwangi: Bismillah Publisher)
- Hamka, *Tafsīr Al-Azhar*, (Jakarta: Pustaka Panjimas, 1982)
- Harun, Yahya, *Al-Qur'ān dan Sains*, (Bandung: Dzikra, 2004)
- Hariwijaya Soewadi, et al., *Ilmu Alamiah Dasar* (Jakarta: Ghalia Indonesia, 1999)
- Hude, Darwis dkk., *Cakrawala Ilmu Dalam Al-Qur'ān*, (Jakarta: Pustaka Firdaus, Bale Kajian Tafsīr Al-Qur'ān Pase dan Institut Perguruan Tinggi Ilmu Al-Qur'ān, 2022)
- Hossein Nasr, Sayyed, *An Introduction to Islamic Cosmological Doctrines*, (Boulder: Shambala, 1978)
- Ichwan, Mohammad Nor, *Tafsir Ilmi: Memahami Al-Qur'an Melalui Pendekatan Sains Modern* (Jogjakarta: Menara Kudus Jogja, 2004)
- Ichwan, Mohammad Nor, *Memasuki Dunia Al-Qur'ān* (Semarang: Lubuk Raya 2001)

- Ilham, Diki, *Kontekstualisasi Makna Bulan Dalam Al-Qur'ān: (Kajian Tafṣīr Tematik)*, Skripsi UIN Sultan Syarif Kasim Riau, 2020
- Istikomah, *Pemahaman Mufasir dan Astronom Tentang Bulan Terbelah Pada QS. Al-Qamar Ayat 1-2*, Skripsi, UIN Walisongo Semarang, 2018
- Jawhari, Tanthawi, *Al-Jawhir fī Tafṣīr Al-Qurān*, Juz 7 (Kairo: Mathbah Al-Bāb Al-Halabi, 1929)
- Joko Susilo, Bambang, *Yuk Lebih Dekat Mengenal Laut* (Jakarta: Bee Media, 2018)
- Kadir, Ahmad, *Formula Baru Ilmu Falak*, (Jakarta: Bumi Aksara, 2012)
- Kahar, Joenil, *Geodesi* (Bandung: ITB, 2008)
- Khazim, Mukhyidin, *Ilmu Falak dalam Teori dan Praktik* (Yogyakarta: Buana Pustaka, 2009)
- Khazim, Mukhyidin, *99 Tanya Jawab Masalah Hisāb dan Rukyah* (Yogyakarta: Ramadhan Press, 2009)
- Kurniawan, Taufiqurrhman, *Ilmu Falak dan Tinjauan Matlak Global* (Yogyakarta: MPKSDI, 2009)
- Lajnah Al-Qurān dan As-Sunnah Majelis Tinggi Islam Kairo, *Tafṣīr Al-Muntakhab fī Tafṣīr Al-Qurān Al-Karīm* (Al-Azhar: Kairo, 2001)
- Lajnah Pentashihan Mushaf Al-Qur'ān Badan Litbang, dkk., *Penciptaan Bumi dalam Perspektif Al-Qur'ān dan Sains*, (Jakarta: Lajnah Pentashihan Mushaf Al-Qur'ān, 2010)
- Lajnah Pentashihan Mushaf Al-Qur'ān Badan Litbang, dkk., *Penciptaan Jagad Raya dalam Perspektif Al-Qur'ān dan Sains*, (Jakarta: Lajnah Pentashihan Mushaf Al-Qur'ān, 2010)
- Lajnah Pentashihan Mushaf Al-Qurān, et al., *Kiamat dalam Perspektif Al-Qurān dan Sains* (Jakarta: Lajnah Pentashihan Mushaf Al-Qurān, 2011)
- Mahmudz Mas'ud dan Farah Faida, *Al-Qur'ān dan Sains Modern: Mengenal Kemukjizatan Ayat-Ayat Astronomi Dalam Al-Qur'ān*, (Wonosobo: Media Kreasi, 2016)

- Mayall, *Edwin Powell Hubble 1889-1953* (Washington D.C: National Academy of Sciences, 1970)
- Minaur Rohman, Agus, *Visualisasi Gerak Semu Bulan Dan Matahari Serta Pengaruhnya terhadap Pasang Surut Air Laut Menggunakan Algoritma Jean Meeus*, UIN Maulana Malik Ibrahim Malang, 2016
- MD, Jajak, *Astronomi Ilmu Pengetahuan Luar Angkasa* (Jakarta: Harapan Baru Raya, 2006),
- Mohamed El-Nagger, Zaghoul Ragheb, *Selekta dari Tafsir Ayat-ayat Kosmos dalam Al-Qurān Al-Karīm*, Juz 1 (Jakarta: Shorouk International Bookshop, 2010)
- Munawir, A. W, *Kamus Al-Munawir Arab-Indonesia Terlengkap* (Surabaya: Pustaka Progresif, 1997)
- Musthafa Al-Maraghi, Ahmad, *Tafsir Al-Maraghi*, Terj. Anshori Umar Sitanggal, dkk., Cet. ke-2, Juz X, (Semarang: Karya Toha Putra, 1993)
- Mutawali Al-Sya'rawi, Muhammad, *Tafsir Al-Sya'rawi: Khawatir Al-Sya'rawi Haul Al-Qurān* (Kairo: Akhbar Al-Yaum, 1991)
- Naik, Zakir, *Miracles of Al-Qur'ān & As-Sunnah*, (Solo: PT Aqwam Media Profetika, 2015)
- Nurjanah, "Kosmologi dan Sains dalam Islam", in *Akademika: Jurnal Pemikiran Islam*, Vol. 18, No. 1, Institut Agama Islam Negeri Metro, (Maret 2013)
- Pahmawati, Yenni, *Apa yang Terjadi Pada Sistem Tata Surya* (Bandung: CV. HBSA Jaya, 2011)
- Pangestiwi, Dianning, *Lebih Tahu: Tata Surya dan Alam Semesta* (Yogyakarta: Istana Media, 2017)
- Prawoto, Budi, *Serba-Serbi Tata Surya* (Yogyakarta: CV. Empat Pilar Pendidikan, 2007)
- Prastowo, Andi, *Metode Penelitian Kualitatif Dalam Perspektif Rancangan Penelitian*, (Yogyakarta: Ar-Ruz Media, 2014)
- Purwanto, Agus, *Nalar Ayat-ayat Semesta* (Jakarta: Mizan Media Utama, 2008)

- Purwanto, Agus *Ayat-ayat Semesta: Sisi Al-Qurān yang Terlupakan* (Bandung: Mizan, 2008)
- Qutbh, Sayyed, *Tafsīr fī Zilāl Al-Qurān*, Juz 12, Trans. As'ad Yasin (Jakarta: Gema Insani, 2000)
- Rahman, Basuni, "Bulan Sebagai Satelit Bumi", dalam *Jurnal BBM*, Universitas Pendidikan Indonesia, (February 2012)
- Ridla, Rasyid, *Tafsīr Al-Manār* (Beirut: Dar Al-Kutub Al-Ilmiyah, 2005)
- Rusyd, Ibnu, *Bidāyatul Mujtahid*, Trans. Ghazali Said and Achmad Zaidun (Jakarta: Pustaka Amani, 2007)
- Sastrawidjaya, et al., *Nelayan Nusantara* (Jakarta: Pusat Pengolahan Riset Produk Sosial Ekonomi Kelautan dan Perikanan & Badan Riset Kelautan dan Perikanan, 2002)
- Shihab, Quraish *Tafsīr Al-Misbāh*, Pesan, Kesan dan Keserasian Al-Qur'ān, (Tanggerang: PT Lentera Hati, 2016)
- Shihab, Quraish, *Kaidah Tafsīr*, (Tanggerang: Lentera Hati, 2015)
- Soepardjo, *Potensi dan Teknologi Energi Samudera dalam Eksplorasi Sumber daya Budaya Maritim* (Jakarta: Departemen Kelautan dan Perikanan, Pusat Penelitian Kemasyarakatan dan Budaya, Universitas Indonesia, 2005)
- Soewadi, Hariwijaya, et al., *Ilmu Alamiah Dasar* (Jakarta: Ghaila Indonesia, 1999)
- Susilo Soekardi and Tauhid Nur Azhar, *Air dan Samudera: Mengurai Tanda-tanda Kebesaran Allah di Lautan* (Solo: Tinta Medina, 2012)
- Syafi'i, Imam, *Konsep Ilmu Pengetahuan Dalam Al-Qur'ān*, (Yogyakarta: UIII Press, 2000)
- Syeikh Imam Al-Qurthubi, *Al-Jamī lī Ahkām Al-Qurān*, Trans. Studi Rosadi, et al. (Jakarta: Pustaka Azzam, 2008)
- Syeikh Muhammad Rasyid Ridha, et.al, *Hisab Bulan Kamariah: Tinjauan Syar'i tentang Penetapan Awal Ramaḍan, Syawal, dan Żulhijah*, (Yogyakarta: Suara Muhammadiyah, 2012)

- Syukur, Abdul, *Buku Pintar Serba Tahu Segala yang di Langit dan Bumi* (Yogyakarta: Diva Press, 2011)
- Syukur, Suparman, *Studi Islam Transformatif: Pendekatan di Era Kelahiran, Perkembangan, dan Pemahaman Kontekstual* (Yogyakarta: Pustaka Pelajar, 2015)
- Tarigan, *Nelayan: Strategis Adaptasi dan Jaringan Sosial* (Bandung Humaniora Press, 2000)
- Tjandra, Ellen, *Mengenal Pantai* (Bogor: Cita Insan Madani, 2016)
- Thayyarah, Nadiyah, *Buku Pintar Sains Dalam Al-Qur'ān, Mengerti Mukjizat Ilmiah Firman Allah*, (Jakarta: Zaman, 2014)
- Tim Majelis Tarjih dan Tajdid Pimpinan Pusat Muhammadiyah, *Pedoman Hisab Muhammadiyah* (Yogyakarta: Majelis Tarjih dan Tajdid Pimpinan Pusat Muhammadiyah, 2009)
- Tim Penyusun Kamus Besar Bahasa Indoneisa and Departemen Pendidikan dan Kebudayaan, *Kamus Besar Bahasa Indonesia* (Jakarta: Balai Pustaka, 1988)
- Triatmojo, Bambang, *Pelabuhan* (Jakarta: Beta Offset, 2003)
- Kusumastanto, Tridoyo, *Analisis Ekonomi Kelautan dan Arah Kebijakan Pengembangan Jasa Kelautan* (Institut Pertanian Bogor: Pusat Kajian Sumber Daya Pesisir dan Lautan, 2001)
- Tuzo Wilson, John, *Geophysics* (Thecnical Assistant to Chief of Naval Operations for Polar Projects, 1956)
- UPT Observatorium Bosscha Institut Teknologi Bandung, *Perjalanan Mengenal Astronomi* (Bandung: ITB, 1995)
- Wahbah Zuhaili, *Tafsīr Al-Munir*, Jilid 7, Trans. Abdul Hayyi Al-Kattani, (Jakarta: Gema Insani, 2016)
- Wardiyatmoko and H.R Bintaro, *Geografi untuk SMA Kelas I* (Jakarta: Erlangga, 1994)
- Weiner, Edmund, et al., *Little Oxford English Dictionary* (California: Oxford Unversity Press. 2006)

Yusuf, Abdullah Ali, *The Holy Qur'an, Text, Translation and Commentary*, (Beirut: Dar Al-Arabia, 1968)

Journal

Adrisno Lusi, Mikael, “Studi Pemanfaatan Pasang Surut Air Laut untuk Pembangkit Daya”, in *MJEME*, Vol. 2, No. 2 (April, 2020)

Arianti, Farida “Penetapan Awal Bulan Qamariah Menurut Perspektif Al-Qur'an dan Tafsir”, in *Juris*, Vol, 13, No. 1 (Juni, 2014)

Atabik, Ahmad, “Konsep Penciptaan Alam: Studi Komparatif-Normatif antar Agama-agama”, dalam *Fikrah: Jurnal Ilmu Aqidah dan Sains*, IAIN Kudus, Vol. 3 No. 1 (Juli, 2015)

Aziz, Furqan, “Tipe Eatuari Binuangeun (Banten) Berdasarkan Distribusi Suhu dan Salinitas Perairan” in *Oseanologi & Limnologi*, Vol. 01, No. 25 (Maret, 2007)

Hasan, Muhammad, “Benda Astronomi Dalam Al-Qur'an dari Perspektif Sains”, in *Teologia*, UIN Walisongo Semarang, Vol. 26, No. 1 (Januari, 2015)

Indara, Sofyan R., et al., “Faktor-Faktor yang Mempengaruhi Pendapatan Nelayan Tangkap di Desa Bongo Kecamatan Batudaa Pantai Kabupaten Gorontalo”, in *Agrinesia*, Vo. 2, No. 1 (November, 2017)

Putri Prastuti, Okky, “Pengaruh Komposisi Air Laut dan Pasir Laut Sebagai Sumber Energi Listrik”, in *Jurnal Teknik Kimia dan Lingkungan*, Vol 1, No. 1 (2017)

Rushayati et al., “Pengembangan Ruang Terbuka Hijau Berdasarkan Distribusi Suhu Permukaan di Kabupaten Bandung” in *Forum Geografi*, Vol. 25, No. 1 (Juli, 2015)

Siswanto, “Perspektif Amin Abdullah Tentang Integrasi Interkoneksi Dalam Kajian Islam”, dalam *Teosofi: Jurnal Tasawuf dan Pemikiran Islam*, Vol. 3 No. 2, (Desember, 2013)

Surinati, Dewi “Pasang Surut dan Energinya”, in *Oseana*, Vol. 32, No. 1, (2017)

Syukur, Abdul, “Mengenal Corak Tafsir Al-Qur’an” in *El-Furqonia*, Vol. 01, No 01 (Agustus, 2015)

Yudhantoko, Mahendrajit, et al., “Karakteristik dan Peramalan Pasang Surut di Pulau Kepala Dua”, Kabupaten Kepulauan Seribu, in *Oceanografi*, Vol. 5, No. 3 (2016)

Yulianto, Udi “Al-Tafsīr Al-Ilmī Antara Pengakuan dan Penolakan” in *Jurnal Katulistiwa: Journal of Islamic Studies*, Vol. 1, No. 1 (Maret, 2011)

Yuningsih and Masduki, “Potensi Energi Arus Laut untuk Pembangkit Tenaga Listrik di Kawasan Pesisir flores Timur”, in *Jurnal Ilmu Teknologi dan Kelautan Tropis*, Vol. 3 (2011)

Online Web

Dahli Anggara (2021), *Wajib Tahu 5 Satelit Alam dengan Ukuran Terbesar di Tata Surya*. Accessed on February, 2 2022 from <https://www.idntimes.com/science/discovery/dahli-anggara/satelit-terbesar-di-tata-surya-c1c2>

Ellyvon Pranita (2021), *Istilah Bulan, dari Bungkuk hingga Baru*. Accessed on April 1, 2022 from <https://www.kompas.com/sains/read/2021/09/22/093000923/-glosarium-astronomi-istilah-bulan-dari-bungkuk-hingga-biru>

Ensiklopedia Dunia, *Eksentrisitas Orbit*, Accessed on April 4, 2022 from https://p2k.stekom.ac.id/ensiklopedia/Eksentrisitas_orbit

James D. Burke (2002), *Moon Earth’s Satellite*, Accessed on March 1, 2022 from <https://www.britannica.com/place/moon>

Joshua Filmer (2014), *From Geocentric to Heliocentric*, Accessed on February 28, 2022 from <https://futurism.com/from-geocentrism-to-heliocentrism>

Karina Dwi Adistiana (2018), *Pasang Surut Air Laut Akibat Gravitasi Bulan*, Accessed on March, 20 2022 from <https://www.ruangguru.com/blog/pasang-surut-air-laut-akibat-gravitasi-bulan>

- Leonard Kelley (2020), *The Formation of the Moon, or How Did That Get There?*, Accessed on March 1, 2022 from <https://owlcation.com/stem/The-Formation-of-the-Moon-or-How-Did-That-Get-There>
- Mimir Ensiklopedia Bahasa Indonesia (2004), *Fenomena Purkinje*. Accessed on March 11, 2022 from <https://mimirbook.com/id/eb6061403e3>
- Mohammad Rifa'I (2018), *Pasang Surut Petani Garam Madura, Kini Mulai Bangkit Dari Serbuan Garam Impor Bermodal Geo Membran*. Accessed on April 3, 2022 from <https://madura.tribunnews.com/2018/12/21/pasang-surut-petani-garam-madura-kini-mulai-bangkit-dari-serbuan-garam-impor-bermodal-geo-membran>
- NASA Solar System Exploration (2018), *Phases of the Moon*, Accessed on March 1, 2022 from <https://solarsystem.nasa.gov/resources/676/phases-of-the-moon/>
- Radar LamSel (2018), *Air Laut Pasang Surut, Ratusan Nelayan Libur Melaut*. Accessed on April 3, 2022 from <https://www.radarlamsel.com/air-laut-pasang-surut-ratusan-nelayan-libur-melaut/>
- Wikipedia (2002), *Cahaya Bulan: Cahaya dari Bulan yang Mencapai Bumi*. Accessed on March 11, 2022 from https://id.m.wikipedia.org/eiki/Cahaya_bulan

CURRICULUM VITAE

BIOGRAPHY:

Name : Ekatul Hilwatis Sakinah
NIM : 1804026034
Department : Qur'an and Tafseer Sciences
Place and Date of Birth : Tegal, March 29th, 2001
Adress : Tembok Kidul Village, Adiwerna Regency,
Tegal City
Contact Person : +62 882-2763-5919
Email : aykahilwatiss@gmail.com
Name of Parents : 1. Father: Jamaludin, Lc.
2. Mother: Siti Fasikha

EDUCATION:

A. Formal Education

- | | |
|---|------------------|
| 1. SD/MI : MI Miftakhul Athfal Tembok Kidul | Graduate on 2012 |
| 2. SMP/MTs: MTs Darussalam Balapulang Tegal | Graduate on 2015 |
| 3. SMA/MA/SMK: MAN 1 Kota Pekalongan | Graduate on 2018 |

B. Informal Education

- | | |
|---|--------------|
| 1. Pondok Pesantren Darussalam Kalibakung Tegal | on 2012-2015 |
| 2. Pondok Pesantren Sirojutholibin Kradenan
Pekalongan | on 2012-2015 |
| 3. Ma'had Ulil Albab lil Banat Ngaliyan Semarang | on 2018-2022 |