

Gravity and the Returning Sky: A Scientific Exegesis of Qur'an 86:11*

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Abstract

Verse 11 of Sūrat al-Ṭāriq (*wa al-samā' i dhāti al-raj' i*) has long been a subject of exegetical debate regarding its scientific implications, owing to the broad semantic scope of the terms *samā'* (heaven/sky) and *raj'* (return/causing to return). Traditional interpretations—such as rainfall, seasonal cycles, or the motion of celestial bodies—capture only partial dimensions of the verse's meaning, typically restricting themselves to a single nuance of *raj'* (either intransitive or transitive) or to one material layer of *samā'* (Earth's atmosphere or outer space). The central problem addressed by this study is to identify and propose a scientific manifestation for *samā' dhāt al-raj'* that simultaneously accommodates both the intransitive and transitive senses of *raj'* (returning and causing to return) as well as both physical strata of *samā'* (the terrestrial atmosphere and extraterrestrial space). Adopting a descriptive-analytical approach, this research first examines the lexical meanings of *samā'* and *raj'* in classical dictionaries, then analyzes and categorizes the perspectives of early and later Qur'anic exegetes. Ultimately, drawing upon the latest findings in modern cosmology and taking into account the immediate context of the surah, the study proposes the "gravitational field" as a more comprehensive manifestation of *samā' dhāt al-raj'*. This proposal is substantiated by the fact that gravity, on the atmospheric level, is instrumental in the hydrological cycle (the return of rain) and atmospheric stability; on a cosmic scale, it governs orbital returns and the orderly motion of celestial bodies. Consequently, a gravitational interpretation offers a unified, coherent framework for the diverse semantic dimensions of the verse and aligns more closely with the opening context of Sūrat al-Ṭāriq.

Keywords: Qur'an and Science; Scientific Exegesis; Cosmology; Gravity; Returning Sky

* Received: 2026/01/10

Accepted: 2026/2/29

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Introduction

The Qur'an is a book of guidance, and the principal purpose of its revelation is to guide human beings toward perfection. God Almighty has used various methods to show human beings the path of perfection and the straight way, and He has expressed, in different forms, whatever can assist them on this path. Sometimes this is done in the form of stories and narratives, sometimes through rational argument, sometimes by awakening human nature and conscience, and sometimes by posing a scientific question. The astronomical topics raised in the Qur'an are also among these examples, through which God has particular aims in order to lead human beings to the intended perfection¹. With this explanation, the question of understanding this category of verses becomes increasingly important.

In this regard, a scientific exegesis of the verse must be offered. By scientific exegesis is meant the scientific explanation of Qur'anic verses through empirical sciences.² In this method of scientific exegesis, the exegete, while possessing the necessary qualifications and observing the valid principles of exegesis, undertakes the scientific interpretation of the Qur'an. The exegete seeks, by using certain scientific data supported by rational evidence and consistent with the apparent meaning of Qur'anic verses according to their lexical and conventional meanings to engage in scientific exegesis³ and to uncover the unknown meanings of the Qur'an.

One of these scientific verses of the Noble Qur'an is verse 11 of Sūrat Al-Ṭāriq: وَالسَّمَاءِ ذَاتِ الرَّجْعِ. The particular selection of words by God in this verse has led exegetes to propose various manifestations for the returning property of Samā. Sometimes these interpretations are oriented toward the scientific miraculousness of the verse, and sometimes they are merely explanatory accounts derived from the meanings of the words without using certain scientific data. In this article, we first discuss the usages of the words Samā and Raja' and then, by employing modern cosmology, present a new manifestation of the returning property of Samā that is more closely related to the apparent meaning of the wording of the verse.

1. Background and Literature Review

The manifestations and the returning property of Samā in previous studies may be classified into two main approaches:

¹ Isa Mostarhami, *The Qur'an and Cosmology*, vol. 1 (Qom, Iran: Center for Qur'anic Exegesis and Sciences, 2008), 1:42.

Mohammad Ali Rezaei Esfahani, Mohsen Mollakazemi, and Al-Mahdi Center for Qur'anic Studies, *Scientific Miracles and Wonders of the Qur'an*, vol. 1 (Qom, Iran: Center for Qur'anic Exegesis and Sciences, 2008), 1:17

³ Isa Mostarhami, *The Qur'an and Cosmology*, 1.35.

1.1. The Return-Causing Samā

In this view, Samā is a factor that returns objects or phenomena to the Earth or to the space beyond the atmosphere. This approach includes the following cases:

- The cycle of life and precipitation: the return of vapors that have ascended to the Earth in the form of rain, which indicates the importance of the continuity of life.¹
- The role of atmospheric layers: atmospheric layers function as reflectors. For example, the troposphere and stratosphere play a role in returning moisture, while the ionosphere and mesosphere play a role in reflecting radio waves.²
- Other functions: the reflection of ultraviolet radiation by the ozone layer, the return of radio waves by the ionospheric layer, and the repulsion of cosmic rays by the magnetic field and radiation belts.³

1.2. The Returning Samā

In this approach, cosmic phenomena return to their previous state:

- The motion of celestial bodies: the returning motion of stars and planets.⁴
- Cosmic and biological cycles: the cycle of birth and death of stars, the return of celestial spheres to their initial state in each period, and the return of atmospheric gases to nature—for example, the conversion of carbon dioxide into oxygen by plants⁵

As noted above, most previous studies have focused on only one semantic aspect of Raja'—either returning or causing to return—and have generally been limited to one manifestation of Samā, whether the Earth's atmosphere, cosmic space, or celestial bodies. Therefore, the present article seeks to address this research gap by offering a single manifestation that encompasses all semantic aspects of the verse.

2. Lexical Analysis

In order to understand the intended meaning of the verse correctly, it is first necessary to reach a proper understanding of the meanings of the key words of the verse Samā and Raja' in ancient and modern lexicons and to classify their manifestations.

¹ Rouhollah Sayyadi-Nejad and Sedigheh Jafar-Nejad, "Aspects of Linguistic Economy in the Qur'an (A Case Study of Juz' 26–30)," *Qur'anic Linguistic Studies* 5, no. 1 (2016)

² Sayyid Isa Mostarhami, "Astronomical Miracles of the Qur'an," *Qur'an and Science Journal*, no. 7 (2010):

³ Zaghoul Ragheb Najjar et al., *The Scientific Miracles of the Holy Qur'an*, vol. 1 (Qom, Iran: Office of the Supreme Leader's Representation in Universities, Daftar Nashr-e Ma'aref, 2009)

⁴ M. H. Baroomand, A. Joudavi, and B. Alavi, "A Comparative Exegesis of Verses 11–13 of the al-Tariq Chapter," *Comparative Interpretation Research* 11, no. 1 (2025): ۳۳۵.

⁵ Najjar et al., *The Scientific Miracles of the Holy Qur'an*, vol. 1.

2.1. The Word Samā

In lexicons, Samā derives from the root s-m-w and means height, elevation, and loftiness.¹ This word is used in numerous manifestations, such as:

- the atmosphere.²
- cloud³ in verse 164 of Sūrat Al-Baqarah;
- rain⁴ in verse 11 of Sūrat Nūḥ;
- sometimes celestial bodies⁵ in verse 11 of Sūrat Fuṣṣilat, or the space containing them⁶ in verse 61 of Sūrat Al-Furqān;
- and sometimes the spiritual heaven in verse 40 of Sūrat Al-A‘rāf.

Thus, in order to determine the appropriate manifestation for the word Samā in this verse, attention must be paid to the intended meaning of the word Raja‘.

2.2. The Word Raja‘

Raja‘ generally means return: returning to a previous place, state, or condition.⁷ In fact, this word inherently contains the meaning of return, while external factors may play a role in bringing about that return⁸. Therefore, some lexicographers have mentioned both the intransitive and transitive meanings returning and causing to return for Raja‘.⁹

Rāghib al-Iṣfahānī defines Raja‘ as returning to a point from which one began, or returning a decree that has begun to its place, or returning an act that occurred in the past, or returning to a statement that has been made. This return may be complete and essential, or it may involve a part of it or an act associated with it¹⁰. Abū Hilāl al-‘Askarī, in explaining the difference between radd and Raja‘, defines Raja‘ as returning something or someone without that thing or person being displeased.

¹ Muhammad ibn Mukarram Ibn Manzur, *Lisan al-‘Arab*, 15 vols. (Beirut, Lebanon: Dar al-Fikr, n.d.), 14:397

² Naser Makarem Shirazi, *Tafsir Nemouneh* (Tehran, Iran: Dar al-Kutub al-Islamiyya, 1995), 1: 121

³ Fadl ibn Hasan Tabarsi, *Majma‘ al-Bayan fi Tafsir al-Qur‘an*, 10 vols. (Beirut, Lebanon: Dar al-‘Ulum, 2005), 1:451

⁴ Tabarsi, *Majma‘ al-Bayan fi Tafsir al-Qur‘an*, 10 vols, 10:102

⁵ Makarem Shirazi, *Tafsir Nemouneh*, 1:166

⁶ Mohammad Saqqafi Tehrani, *Rawan-e Javid dar Tafsir Qur‘an Majid*, 5 vols. (Tehran, Iran: Taban, 1951), 20:167

⁷ Muhammad ibn Ya‘qub Firuzabadi et al., eds., *Al-Qamus al-Muhit*, vol. 1 (Cairo, Egypt: Dar al-Hadith, 2008), 621

⁸ Isma‘il ibn Hammad Jawhari and Ahmad ‘Abd al-Ghafour ‘Attar, *Al-Sihah*, 7 vols. (Beirut, Lebanon: Dar al-‘Ilm li al-Malayin, 1983), 3:1216

⁹ Ali Akbar Qureshi Bonabi, *Tafsir Ahsan al-Hadith*, 12 vols. (Tehran, Iran: Bonyad Ba‘thah, 1996), 3:56

¹⁰ Hossein ibn Mohammad Raghīb Isfahani and Safwan ‘Adnan Dawudi, *Mufradat Alfaz al-Qur‘an*, vol. 1 (Beirut, Lebanon: Dar al-Shamiyya, 1991), 342

Manifestation of "Raja'"	Rationale for applying the term Raja'	Source "Raja'"
manifestations for the word Raja' in verse 11 of Surah At-Tariq.	Because it returns the rainy air and what it holds of water, returning it to the earth.	Jawahiri, Ibn Manzur, Turayhī, al-Rāghib al-Isfahānī;
The one with benefit (Dhat al-Naf')		Jawhari
The pond (Al-Ghadir).	This name is either for the rain water it contains or for the motion of its waves and water being confined to the same pool, with back-and-forth movement.	Jawhari
The steps of animals when walking	The return of the animal's limbs when walking.	Faraheedi; Jawhari; Ibn Faris
The returning of the shoulder (Raja' al-Katf).	“When the shoulder moves forward or backward, it returns to its initial position, i.e., the terminal end of the shoulder (acromion).”	Jawhari
The movement of celestial bodies like the Moon, sun, and stars.		Al-Tarihi
The water cycle		Same as above
Water		Ibn Manzur; Zubeidi.
Thunder		Same as above
The sky		Ibn Manzur
Spring plants		Faraheedi; Zubeidi.; Fayrouzabadi
The holding and storing of water. One of the manifestations presented for the word Raja' in verse 11 of Surah At-Tariq.		Zubeidi
Dung and fece (Al-Raja' al-Rawth wa al-Najw).	The return of waste products to the body through natural cycles.	Zubeidi
“Raja' al-rashq fi al-ramy refers to the object that is struck back; in archery, it denotes the target upon which the arrow rebounds.”		Zubeidi
Raja' al-Dhafra: its bend and curvature		Al-Kafi Al-Kufah

3. Views of Exegetes

After identifying the meanings and manifestations of the words Samā and Raja', it is necessary, for a precise understanding of the verse, to examine the views of early and later exegetes concerning *وَالسَّمَاءِ ذَاتِ الرَّجْعِ*. Therefore, in this article an attempt has been made to categorize the perspectives of exegetes in order to achieve this aim.

3.1. The Spreading and Covering of Clouds

Some have interpreted the returning property of Samā as the spreading and covering of clouds¹.

¹ Mohammad ibn Yusuf Abū Ḥayyān, *Al-Bahr al-Muhit fī al-Tafsīr*, 11 vols. (Beirut, Lebanon: Dar al-Fikr, 1999), 10:452

3.2. Precipitation

Precipitation, including rain and snow, has been mentioned as a manifestation¹ Some have interpreted the word Raja' as rain because it involves repetition and back-and-forth movement.

²Others refer to rain that falls year after year.³

3.3. Motion

Some interpret the Samāthat possesses the returning property as the motion of countless celestial spheres that move and travel in their specific orbits in the atmosphere, without the slightest friction or deviation occurring in their path.⁴

3.4. Angels

Some regard Raja' as referring to angels who return to Samāwhile carrying the deeds of servants with them.⁵

3.5. Causing to Return

Some understand Raja' in the sense of causing to return, whether this refers to the return of vapors rising from oceans and seas in the form of snow and rain, the reflection of radio waves when they collide with the Earth's atmosphere, or the return of cosmic rays except to the extent needed by terrestrial beings.⁶

3.6. Rain

Some believe that the verse refers to rain.⁷

3.7. The Sun, Moon, and Stars

Some interpret the verse as referring to the Sun, Moon, and stars of Samāthat rise and set.⁸

¹ Mohammad Sabzevari, *Irshad al-Adhhan ila Tafsir al-Qur'an*, vol. 1 (Beirut, Lebanon: Dar al-Ta'aruf, 1998), 596 & Mohammad Mahmoud Hijazi, *Al-Tafsir al-Wadih*, 3 vols. (Beirut, Lebanon: Dar al-Jil, 1992), 3:852.

² Naser Makarem Shirazi, *Tafsir Nemounah*, 26: 372

³ Yahya ibn Ziyad Fara', *Ma'ani al-Qur'an*, 3 vols. (Cairo, Egypt: General Egyptian Book Organization, 1980), 3: 255

⁴ Mohammad Husaynī Hamadānī, *Anwar-e Derakhshan dar Tafsir Qur'an*, 18 vols. (Tehran, Iran: Lotfi, 1983), 18:86

⁵ Muḥammad Sayyid Ṭanṭāwī, *Tafsīr al-Wasīṭ li al-Qur'ān al-Karīm*, 15 vols. (Cairo, Egypt: Dār al-Nahḍah, 1997), 15: 3356

⁶ Mostafa Khorramdel, *Tafsir Noor*, vol. 1 (Tehran, Iran: Ehsan, 2005), 1 : 1286

⁷ Mohammad ibn Ahmad Ibn Idris, *Al-Muntakhab min Tafsir al-Qur'an*, 2 vols. (Qom, Iran: Mar'ashi Najafi Public Library, 1988), 2:376

⁸ Ahmad ibn Mohammad Nahhas, *I'rab al-Qur'an*, 5 vols. (Beirut, Lebanon: Dar al-Kutub al-'Ilmiyya, 2000), 5:125

3.8. Natural Cycles

Some exegetes regard this verse as a metaphor for the property of Samā whereby it continuously sends down rain and different seasons follow one another.¹ Others interpret the returning property of Samā as the existence of natural cycles such as night and day, the seasons of the year, and the growth and decline of plants.²

3.9. The Rotation of Stars

Some interpret it as the rotation of stars and the formation of water and climatic cycles on the basis of their rotation.³

3.10. Return

3.10.1. The Return of Samā to Its Gaseous State

Some have interpreted this return as the return of Samā to the gaseous state in which it existed at the beginning of creation.⁴

3.10.2. The Return of Celestial Spheres to Their Orbits

Some have referred to the return of celestial spheres to their orbits with complete order and harmony, without any change in their paths.⁵

Some have interpreted it as the Samā that possesses rotation and returns to its origin in each period.⁶

Some regard it as the Samā that returns to its initial description, because there is no state except that it returns to that first description.⁷

Some interpret it as the return of water.⁸

Some have interpreted it as the repetition of rainfall, namely the return of rain from Samā to the Earth over and over again.⁹

¹ Mohammad ibn Hossein Sharif Razi, *Talkhis al-Bayan fi Majazat al-Qur'an*, vol. 1 (Beirut, Lebanon: Dar al-Adwa', 1985), 364

² Ibrahim ibn 'Umar Baqa'i, *Nazm al-Durar fi Tanassub al-Ayat wa al-Suwar*, 8 vols. (Beirut, Lebanon: Dar al-Kutub al-'Ilmiyya, 2006), 8: 390

³ Ṭaṭāwī ibn Jawharī Ṭaṭāwī Jawharī, *Al-Jawāhir fi Tafsīr al-Qur'ān al-Karīm*, 5 vols. (Cairo, Egypt: Dār al-Kutub al-'Ilmiyya, 2004), 5:125.

⁴ Saqqafi Tehrani, *Rawan-e Javid dar Tafsir Qur'an Majid*, 5 vols, 30:257

⁵ Mohammad Taqi Modarresi, *Min Huda al-Qur'an*, 18 vols. (Tehran, Iran: Dar Muhibbi al-Husayn, 1998), 18: 21

⁶ Hossein Shah-Abdolazimi, *Tafsir Ithna-'Ashari*, 14 vols. (Tehran, Iran: Miqat, 1984), 14:149

⁷ Mohammad ibn Heydar Soltan 'Ali Shah, *Bayan al-Sa'ada fi Maqamat al-'Ibadah*, 4 vols. (Beirut, Lebanon: Mu'assasat al-A'lami, 1987), 4: 247

⁸ Mohammad ibn Ahmad Mahalli, *Tafsir al-Jalalayn* (Beirut, Lebanon: Mu'assasat al-Nur, 1995), 594

⁹ Tabarsi, *Majma' al-Bayan fi Tafsir al-Qur'an*, 10 vols, 10: 250

Some exegetes interpret Raja' as the return of rain on the grounds that Arabs believed that clouds carry water from the seas to the Earth and then return it to the Earth.¹

Some consider the verse to refer to the natural return of the form of Samā, that is, celestial bodies, after reaching a complete cycle and becoming a star and a piercing star, returning to its former form and state until it eventually explodes and becomes gaseous matter, returning and inclining toward the boundless ocean of matter, unity, and power.²

Raja' has also been interpreted as the return of sustenance every year.³

Some believe that the meaning of the verse is the return of clouds to rain.⁴

Some have regarded the verse as referring to the return of celestial bodies from below the Earth to above it.⁵

By examining the exegetes' views on the manifestations of the returning property of Samā, it becomes clear that the word Samā has been understood by exegetes as the Earth's atmosphere, where rain, natural cycles, and the place of the rising and setting of celestial bodies are mentioned as interpretations of the verse; as the spiritual heaven, when the verse is interpreted as referring to angels or the place of the descent of goodness and blessing; and as the space beyond the atmosphere—where the motion and return of celestial bodies in orbits, or their return to their initial state, is discussed.

4. Scientific Discussion

In this section, the gravitational force and its related effects are examined. This force, which exists as attraction among different bodies, is also explained through the formulations introduced by physicists, along with their differences and similarities.

4.1. Gravitational Force in Newtonian Terms

Newton's law of universal gravitation is one of the most fundamental principles of physics, introduced by Isaac Newton in 1687. This law states that the gravitational force between two bodies with masses m_1 and m_2 is defined as follows:

¹ Ali Haeri Tehrani, *Moqtaniyat al-Durar*, 12 vols. (Tehran, Iran: Dar al-Kutub al-Islamiyya, 1959), 12: 120

² Sayyid Maḥmūd Tāleqānī, *Pertuvī az Qur'ān*, 6 vols. (Tehran, Iran: Intishārāt-i Daftar-i Nashr-i Farhang-i Islāmī, 1983), 6:335

³ Mahmoud ibn Abdullah Al-Alusi, *Ruh al-Ma'ani fi Tafsir al-Qur'an al-'Azim wa al-Sab' al-Mathani*, 16 vols. (Beirut, Lebanon: Dar al-Kutub al-'Ilmiyya, 1994), 15:311

⁴ 'Abd al-Aziz Ibn 'Abd al-Salam, *Tafsir al-'Izz ibn 'Abd al-Salam*, 2 vols. (Beirut, Lebanon: Dar al-Kutub al-'Ilmiyya, 2008), 2: 350

⁵ Abd al-Qahir ibn 'Abd al-Rahman Jurjani, *Daraj al-Durar fi Tafsir al-Qur'an al-'Azim*, 2 vols. (Amman, Jordan: Dar al-Fikr, 2009), 2:703.

$$F = G \frac{m_1 m_2}{r^2}$$

In this equation, m_1 and m_2 are the masses of the two bodies in kilograms, r is the distance between the two bodies in meters, and: $G=6.67 \times 10^{-11}$

The gravitational force that the first body exerts on the second is equal to, and opposite in direction to, the force that the second body exerts on the first. Moreover, gravitational force is a vector quantity, and its direction is along the line connecting the two bodies and toward each other. This force is inversely proportional to the square of the distance between the two bodies.

Gravitational force can be used to describe the motions of planets, the Moon, and other simple astrophysical phenomena, such as the equations of orbital motion and Kepler's elliptical orbits. However, this law is inadequate at high velocities or in strong gravitational fields, such as near black holes.

4.2. Gravitational Force in General Relativity

In the theory of General Relativity, gravity is understood as the curvature of spacetime created by masses and energies, rather than as a force acting between bodies. This theory states that the presence of mass and energy curves spacetime, and this curvature determines the motion of bodies. In this framework, bodies move along geodesic lines, that is, the shortest paths, which are curved in curved spacetime. Experiments have been conducted to verify the curvature of spacetime, such as the deflection of light, whereby light bends when passing near a large mass such as the Sun.

The second step in the formulation of General Relativity concerning gravity is that geometry and gravity have common properties. To explain the similarity between geometrical curvature and gravity, imagine a large elastic sheet that has been stretched and is initially flat. The curvature of this sheet is zero everywhere, like spacetime that exists at a great distance from a star, where gravity is practically zero. If we roll a small sphere, such as a metal ball, on the surface of this sheet, the ball will also move at constant speed, ignoring friction. The metal ball follows a straight line at constant speed, exactly like a laboratory freely moving at a great distance from a star.

Now we place a heavy sphere at the center of the sheet, which creates a large depression (see Figure 1). Far from the central body, the surface of the sheet is almost flat, and the metal ball follows an almost straight path. This situation resembles spacetime at a great distance from a star. But near the central body, the curvature of the surface is large, and the metal ball moving on the surface accelerates in a manner similar to a body accelerating near a star. By changing the speed of the metal ball, we can make it follow paths resembling elliptical, parabolic, or hyperbolic orbits around the central body. The motion of the metal ball resembles a freely falling

laboratory, and the curvature of the surface simulates the properties of gravity. Where the curvature of the surface is zero and gravity is practically zero at a great distance from a star, the metal ball and the laboratory move at constant speed. But where the curvature is non-zero and gravity exists, the metal ball and the laboratory follow similar curved paths.¹

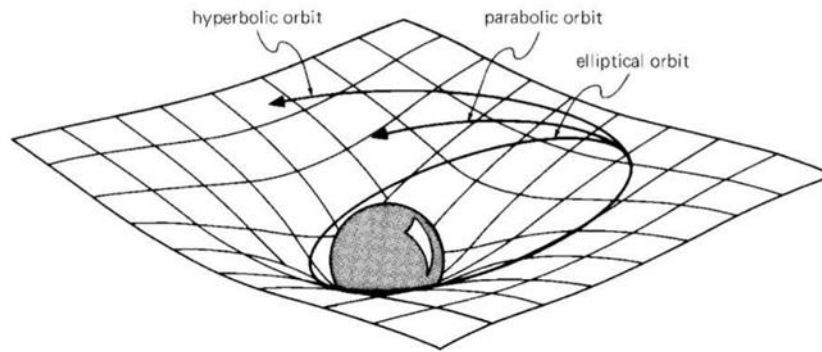


Figure 1 .An elastic horizontal sheet is depressed by a heavy spherical object. The curvature of this sheet simulates the effect of gravity, and a steel ball follows a path that is either elliptical, parabolic, or hyperbolic).

4.3. Effects of Gravitational Force

4.3.1. The Motion of the Sun and the Earth

The motion of the Earth and the Sun can be explained by examining the effects of gravitational force. According to Newton's law of universal gravitation, gravitational force acts as a central force that causes the orbital motion of the Earth and other planets around the Sun. In addition to determining the path of the Earth's motion around the Sun, Newtonian gravity also affects the stability and minor variations of the orbit.

For a body moving in an orbit, such as the Earth around the Sun, the gravitational force is in equilibrium with the centripetal force provided by the body's orbital motion, so that the Earth continues its orbital motion around the Sun²

¹ E. Harrison, *Cosmology: The Science of the Universe* (Cambridge: Cambridge University Press, 2000),

² B. W. Carroll and D. A. Ostlie, *An Introduction to Modern Astrophysics* (Cambridge: Cambridge University Press, 2017)

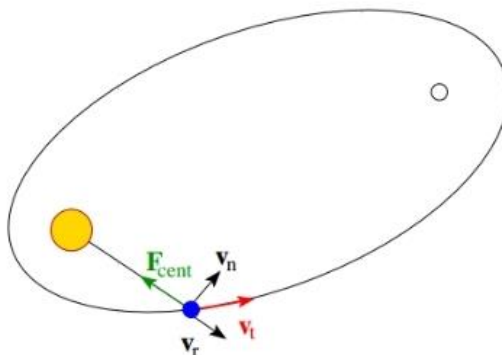


Figure 2. The Sun maintains a planet in its orbit by exerting a gravitational force that serves as the centripetal force . In the absence of this gravity-induced centripetal force, the planet would leave its orbit and continue moving at a constant velocity along the tangent to the orbital path.

4.3.2. The Preservation of the Earth's Atmosphere

The Earth's atmosphere consists of five layers troposphere, stratosphere, mesosphere, thermosphere, and exosphere based on temperature changes and other essential characteristics. The troposphere is the layer nearest to the Earth's surface, where most atmospheric phenomena occur.

Gravitational force is exerted by the Earth on all the gas molecules present in the atmosphere, causing the atmosphere to be pulled downward toward the center of the Earth. This force creates pressure toward the interior of the atmosphere. The pressure of atmospheric gases tends to drive the atmosphere upward, whereas the Earth's gravitational force tends to pull the gases downward. When these two forces pressure and gravity reach equilibrium, the atmosphere remains in a stable state.

Near the Earth's surface, the pressure of gases is high because the molecules are compressed at high density. This compression is due to the strength of gravitational force in this region, and the internal pressure of the gases must be higher in order to counter this force. As altitude above the Earth's surface increases, the number of gas molecules decreases and gravitational force becomes weaker. The density of gases decreases, and consequently pressure also decreases.

Hydrostatic equilibrium exists continuously in the Earth's atmosphere. Without this equilibrium, the atmosphere would either collapse and fall onto the Earth or disperse into space.¹

¹ John M. Wallace and Peter V. Hobbs, *Atmospheric Science: An Introductory Survey*, 2nd ed. (Amsterdam: Elsevier Academic Press, 2006), 13-20

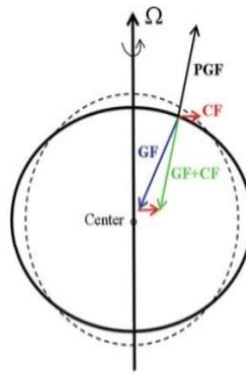


Figure 3. Balance of forces in the Earth's atmosphere: the gravitational force of the Earth (GF), the centrifugal force due to Earth's rotation (CF), and the pressure gradient force (PGF), which together maintain the atmosphere in place.¹

4.3.3. Rainfall

Water droplets in clouds are formed through the condensation of water vapor in cold air. Smaller droplets attach to larger droplets until the droplet becomes large through the process of collision and coalescence, and gravitational force is able to act upon it. At this stage, the droplet separates from the cloud and, under the influence of gravitational force, reaches the Earth's surface.

Gravitational force also plays an essential role in creating air currents that lead to rainfall. Gravity even affects the size and behavior of raindrops in different planetary atmospheres. One of the key findings is that, as surface gravity increases, the minimum and maximum stable sizes of raindrops decrease in inverse proportion to the square root of gravity. This means that on planets with stronger gravity, raindrops are generally smaller.²

¹ J. Kaempf, *Ocean Modelling for Beginners: Using Open-Source Software* (Berlin: Springer, 2009).

² K. Loftus and R. D. Wordsworth, "The Physics of Falling Raindrops in Diverse Planetary Atmospheres," *Journal of Geophysical Research: Planets* 126, no. 4 (2021).

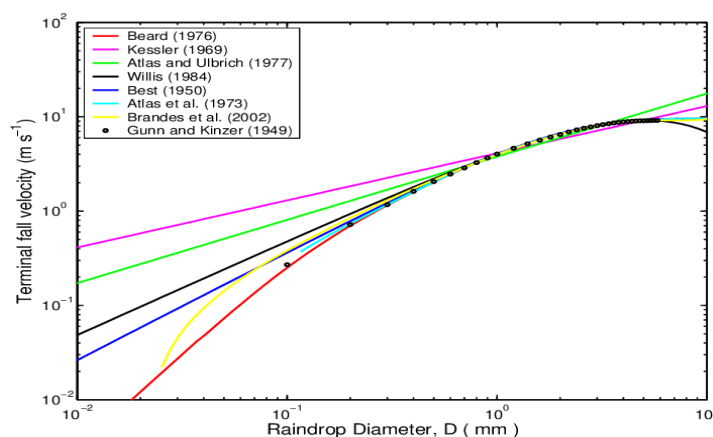


Figure 4. Terminal velocity of a raindrop as a function of drop diameter, illustrating the balance between gravitational force and air resistance (Wang et al., 2010, p. 5693).

5. A New Interpretive Proposal

One of the philosophies behind the oaths of the Lord in the Qur'an is to express the degree of importance of the thing by which an oath is taken; it is an expression of the importance and value of the beings by which God swears. In fact, from this perspective, Qur'anic oaths are keys to sciences and knowledge, because they mobilize the thought of reflective and intellectual human beings concerning the beings by which God has sworn; and through this, important secrets, new issues, and new forms of knowledge are discovered for humanity.¹

One of these oaths occurs in verse 11 of Sūrat Al-Ṭāriq, and the manifestations proposed by early and later exegetes for the returning property of Samā were discussed in the previous sections of this article. In this verse, God swears by the Samā that possesses the property of causing to return and/or returning. What manifestation of the verse can include all possible semantic meanings for it?

As examined in the previous sections, the manifestations so far proposed for the returning property of Samā do not encompass all the meanings of the words Samā and Raja'. Rather, the interpretations have been presented merely with attention to one semantic aspect of the word Raja', intransitive or transitive, returning or causing to return, and one of the three categories of the manifestations of the word Samā: the Earth's atmosphere, the space beyond the Earth's atmosphere, and the spiritual heaven.

In this study, a manifestation is proposed to explain this verse that is compatible with the semantic aspects of material Samā and Raja'. The manifestations of material Samā can be divided into two parts: the Earth's atmosphere and the space beyond the Earth's atmosphere.

¹ Naser Makarem Shirazi and Abolqasem Alian-Nezhadi, *The Oaths of the Qur'an*, vol. 1 (Qom, Iran: Madrasat al-Imam Ali ibn Abi Talib (a.s.), 2007). 51

These two include all manifestations of material Samā. Likewise, two meanings can be considered for Raja': one is the intransitive meaning "returning" and the other is the transitive meaning "causing to return." On this basis, four possible cases can be imagined for the meaning of the verse:

1. the Earth's atmosphere with the property of causing to return;
2. the Earth's atmosphere with the property of returning;
3. the space beyond the atmosphere, such as the Solar System, with the property of causing to return;
4. the space beyond the atmosphere, such as the Solar System, with the property of returning.

Gravity is the manifestation presented in this study as a new interpretive proposal. With this explanation, if what is meant by Samā is the Earth's atmosphere and the meaning of Raja' is causing to return, the role of gravitational force in rainfall becomes clear as that which causes to return the vapors that exist in the atmosphere in the form of clouds after having risen from the surface waters of the Earth. Or, if it is understood in the sense of returning, it points to the essential role of gravitational force and its equilibrium with the centripetal force in maintaining the stability of the atmosphere around the Earth and preventing the atmosphere from being thrown into space.

Likewise, if the meaning of Samā is the space beyond the Earth's atmosphere, such as celestial bodies or interstellar spaces, and Raja' means causing to return, then gravitational force becomes evident through the existence of massive stars and the creation of curvature in spacetime, which leads planets to revolve around that star. One of these stars is the star of the Solar System, the Sun, which, by virtue of its very large mass, produces a tremendous gravitational force that causes the Earth and the other planets of the Solar System to revolve in specified orbits around the Sun and prevents them from moving in a straight path, that is, from being thrown into space.

Or, if Raja' is understood in the sense of returning, it refers to the motion of celestial bodies in specified orbits due to the curvature of spacetime created by massive bodies and the effect of gravitational force on the motion of celestial bodies around that massive body. It should be noted that Sūrat Al-Ṭāriq begins by speaking of an oath by a shining star, which has a close correspondence with the manifestation proposed in this study.

Conclusion

In this study, after a precise examination of the words related to verse 11 of Sūrat Al-Ṭāriq, as well as the views of exegetes concerning the property of Samā as causing to return/returning, the manifestations mentioned were criticized and examined through a categorization of

exegetical views. The essential point concerning this verse is its multifaceted character. That is, Raja' has both an intransitive meaning, returning, and a transitive meaning, causing to return; likewise, Samā can have multiple manifestations.

It was shown that the manifestations mentioned in exegetical works are compatible with some of these semantic aspects, and where different manifestations of Samā have been considered, a separate returning property has been mentioned for each manifestation of Samā. Subsequently, by using the latest findings of cosmology, a new proposal for scientific exegesis was offered, one that identifies a single manifestation for the different semantic states of the verse. In the final section, gravitational force which exists intrinsically in celestial bodies and whose attractive nature evokes the property of return was examined in the different semantic states of the verse. It was shown that this proposal, in addition to corresponding to the apparent meaning of the verse and the latest scientific findings, also has a close correspondence with the context of Sūrat Al-Ṭāriq.

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