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Analyzing Meteor Phenomena in The Perspective of Science and Al-Quran

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Abstract: Meteors are meteoroid fragments that enter the Earth's atmosphere and are commonly called "shooting stars". Apart from a scientific perspective, meteors can also be seen from the perspective of the Quran. This article aims to discuss meteors from the perspective of science and the Quran. This analysis uses qualitative research and is carried out using the method of literature study to draw conclusions about the relationship between meteors and science and verses in the Koran. Meteors have existed since ancient times and have been mentioned in verses of the Quran. In the Al-Quran, one of the benefits of meteors is as the beginning of the existence of water on earth. It is hoped that this study can add insight into the meteor phenomenon or what is commonly called the shooting star and its relation to the verses of the Quran so that it can increase knowledge and faith.

Keywords: Al-Quran, Meteors, Science.

Introduction

Curiosity is a basis of human knowledge (Ningrum, Fajriyah, & Budiman, 2019). People always want to find out about everything in the universe, one of which is the meteor phenomena (Imron, Sodikin, & Romlah, 2019). Meteors are meteoroids that interact with the Earth's atmosphere (Wannberg, Wannberg, Kero, Szasz, & Westman, 2008). Meteors and asteroids rain down on Earth every year (Deded, Nasir, & Zawirman, 2016). Most of our knowledge on meteoroids comes from a short interval of their atmospheric penetration (Zdeněk, et al., 1998). Penetration through the atmosphere can give rise, to a certain size and speed, to become lucent a phenomenon known as a meteor, or as a meteoric fireball if it's lighter, ultimately also called bolide (originally used only to burst out fireballs).

When meteors or asteroids that enter the Earth's atmosphere are relatively small, they will adorn the sky and look amazing when seen by human. However, not all meteors or asteroids are small, some celestial bodies are relatively large with masses of up to tens of tons (Thayyarah, 2013). When a celestial body with a size of up to tens of tons rains down on the earth, what will happen is a big and terrible disaster that will befall humans, like the global disaster 65 million years ago which ended 100 million years of earth creatures commonly called dinosaurs (Matthews, 2008). Shooting stars, or meteor, have long triggered people's curiosity about what is really happening with the tiny pieces of extraterrestrial matter entering and interacting with the Earth's atmosphere (Wannberg, Wannberg, Kero, Szasz, & Westman, 2008). Meteors can be seen from many directions with apparently different velocities, their paths can appear as straight lines or curved lines and have different shades of color. Meteor light consists mostly of radiation of discrete emission spectral line belonging for the most part to metals and mainly to iron (Zdeněk, et al., 1998).

Therefore, meteors are an interesting object to study both from the point of view of science and the Quran. Everything that happens certainly has implied wisdom to prove the majesty and oneness

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of Allah SWT. In fact, all natural phenomena occur in accordance with God's law that apply in this earth (Atmojo & Muhandis, 2019). In science, meteors occur because of celestial bodies that fall and rub against the Earth's atmosphere. In addition, Al-Quran explains that meteors are guardians of the sky and water carriers to earth. This article will explain the meteors phenomena from the perspective of science and the Quran.

Materials and Methods

This article uses qualitative research which is research that produces descriptive data in the form of both writing and speech, as well as the behaviour of the people being observed (Bogdan & Biklen, 1992). The data analysis method used literature study. Study literature method is a series of activities related to the method off collecting library data, reading and taking notes, and processing research materials (Zed, 2008). As a support, researchers conducted literature study using correlational research methods. Correlational research method is a research method that aims to determine the relationship between two or more variables without any attempt to influence it, so that the data is valid because the is no variable manipulation (Fraenkel, Wallen, & Hyun, 2012). The first variable is an explanation related to meteors according to science and the second variable is according to the Al-Quran. Therefore, this study uses a correlational research method that examines the relationship between meteors according to science and the Quran.

In analysing the data, researcher uses the literature study method, namely the data obtained will be arranged so as to facilitate the discussion of existing problems. Because the focus of this research is library-based research, the data collected is in the form of qualitative data. The process of data analysis carried out consists of:

1. Data collection
2. Data reduction
3. Data presentation
4. Presentation and confirmation of conclusions

Results and Discussion

1. Meteor Phenomena according to Science

Meteors are streaks of bright light in the sky that occur due to meteoroid fragments that enter the Earth's atmosphere. Meteoroid fragments move quickly from space through the Earth's atmosphere. When entering the Earth's atmosphere, meteoroids experience pressure which produces heat. Very high heat produces a very bright, sparkling glow. When viewed from the earth, the glow looks like a shooting star. The speed of a celestial body that falls and rubs against the earth's atmosphere is around 11 to 72 km/s so that it burns and produces an incandescence (Imron, Sodikin, & Romlah, 2019). If the objects in the form of meteoroids reach the earth, they will become meteorites.

Meteors that don't burn completely in the Earth's atmosphere will fall to the earth's surface as meteorites. The largest meteorite was found in Hoba, Namibia, weighing around 60 tonnes. Almost all meteors, except for very large ones, experience a reduction in speed due to friction with the atmosphere so that they reach the earth's surface without causing shocks. These objects will experience a slowdown after entering the Earth's atmosphere and experience friction that makes these objects melt. If these objects break into pieces, a meteor shower is formed. A meteor shower in a dark sky will look beautiful because it looks like a sparkling glow in the sky.

Meteors that reach the earth and are called meteorites are divided into two groups, namely falls and finds. The falls group is a meteorite that appears to fall and is found shortly after the meteorite reaches the earth's surface. Meanwhile, the finds group are objects found as meteorites and have fallen for tens, hundreds, even thousands of years ago.

2. Meteor Phenomena according to Al-Quran

a) Meteor as Guardian of the Sky

Meteor is a term for a celestial body that burns when it penetrates the Earth's atmosphere, and if the object doesn't burn completely until it reaches the earth, it is called a meteorite. The burning of the celestial body is caused by friction with the earth's atmosphere at a speed of 25 km/second, causing glow. The glow of the fire can be seen from the earth when the meteor is at an altitude of 150 kilometers above the Earth's surface (Thayyarah, 2013).

This expression is similar to that described in the Al-Quran letter Ash-Saffat verse 10

إِلَّا مَنْ خَطِفَ ٱلْخَطْفَةَ فَأَتْبَعَهُۥ شِهَابٌ ثَاقِبٌ

"But whoever (among them) steals (talk); so he was chased by a brilliant torch of fire"

In the verse above, the term meteor is referred to as *syihab*, which is a bright torch or arrow of fire, just as it is explained in science that a meteor will cause a glow of fire when it rubs against the earth's atmosphere.

This explanation is also reinforced by other verses in the Koran, including Q.S. Al-Jinn verses 8-9 and Q.S. Al-Hijr verse 18

وَأَنَّا لَمَسْنَا ٱلسَّمَآءَ فَوَجَدْنَٰهَا مُلِئَتْ حَرَسًا شَدِيدًا وَشُهُبًا وَأَنَّا كُنَّا نَقْعُدُ مِنْهَا مَقَٰعِدَ لِلسَّمْعِ ۖ فَمَن يَسْتَمِعِ ٱلْءَانَ يَجِدْ لَهُۥ شِهَابًا رَّصَدًا

"And indeed we (Jinn) have tried to know (the secrets of the sky), so we found it full of strong guards and arrows of fire. And indeed we used to be able to occupy several places in the sky to listen to (the news). But now whoever (trying to) listen (like that), will certainly find fiery arrows lurking (to burn him)." (Al-Jinn verses 8-9)

إِلَّا مَنِ اسْتَرَقَ السَّمْعَ فَأَتْبَعَهُ شِهَابٌ مُّبِيْنٌ

"except (Satan) who steals (news) that can be heard (from angels) then is chased by bright bursts of fire." (Al-Hijr verse 18)

Meteors are made of crushed rocks and iron, then the two become a unit and meteors are formed. This confirms that there is magnetism in the meteor. Magnetic iron flakes from the destruction of a meteor will cool down and fall from clouds with very hot temperatures of more than 5000 degrees celcius. The cloud is above the area where the meteor fell. This proves that the meteor is attracted to something that contains the element of fire which further strengthens the statement of the Quran in the verse above, that the meteors that occur are as a means of throwing jinn. Because basically jinn are God's creatures created from fire (Thayyarah, 2013).

b) Meteor as a Water Conduit to Earth

Scientists estimate that around 150 million meteors fall to Earth every day (Thayyarah, 2013). Some meteors can be seen on any given night. In fact, the number has increased drastically and is commonly called a meteor shower. The Leonid meteor shower is one of the most famous meteor showers and occurred around November 16-17, 1833. In November 1833, the Leonid meteor shower was very heavy for 1 hour.

This meteor shower phenomenon is related to comets. Some scientists say that the meteor shower phenomenon occurs when the earth crosses the comet's orbit and passes through its trajectory. Far since approximately 35 billion years ago, the planet earth has experienced repeated collisions with thousands of meteors originating from comets containing ice crystals. This event took place billions of years ago and continues to this day (Sudarmojo,

2013). In addition, this event is also explained in the letter At-Taariq which came down when Abu Thalib came to the Prophet with bread and milk. After Abu Thalib sat down, a shooting star was seen so that the area around it seemed to be filled with fire because of the very bright light of the star. Abu Thalib also asked the Prophet, "What is this?" Then the Prophet replied, "This is a star that was thrown and is one of the many signs of Allah's power."

ٱلنَّجْمُ ٱلثَّاقِبُ

"(namely) a star whose light penetrates,"

This third verse of Surah At-Taariq, the sentence *an-najmu thaaqib* if interpreted literally means heavenly bodies that make holes. This further strengthens the interpretation that what At-taariq means is a comet. As has been studied in astronomy, comets are celestial bodies with a diameter of up to tens of kilometers and are composed of dirty ice content. In the process of the formation of the solar system, comets bombarded the ground planets causing holes in the planets. One of them is the planet Earth. The comet came to provide water which is an absolute requirement for life. And from the process of comet invasion, oceans were formed on earth.

The formation of the oceans on earth is still a mystery, until in 1986 a physicist from the United States, Dr. Louis A. Frank and J.B. Sigwart risked his academic career by saying through his research data from Viking Spaceraft that this spacecraft had photographed planet Earth using ultraviolet film. And the photo shows that Earth's atmosphere appears to be hollow everywhere. This suggests that the holes are traces of thousands of comets carrying water. Although this research was denied by other researchers, 13 years later this research has been recognized through a fairly rigorous scientific debate forum (Sudarmojo, 2013).

Conclusions

Based on the discussion above, it can be concluded that meteors are bright streaks of light in the sky that occur due to meteoroid fragments that enter the earth's atmosphere. In the perspective of Al-Quran, meteors are soldiers of Allah who serve as guardians of the sky who steal news from the sky, as He says in Q.S. Ash-Saffat verse 10, Al-Hijr verse 18, and Al-Jinn verses 8-9. This is also proven in science through the statement that magnetic iron fragments from the destruction of a meteor will cool down and fall from clouds where the temperature is very hot to more than 5000 degrees Celsius and is above the area where the meteor fell. In addition, meteors are water carriers to the earth, as it is said in science that during the formation of the solar system, the earth was bombarded by thousands of meteors originating from comets containing water. This is as explained in the Al-Quran letter At-taariq verse 3.

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