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# Evaluation of ground motions and adaptation the inertia law in Qur'an

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ABSTRACT

Ancient philosophers were surprised from objects that move and tried to classify the move. First, the assumptions began with Aristotle ideas and classify motion by him. Finally, by Newton's first law (law of inertia) reached to its perfection. The law is stated as follows: Every object continues in its state of rest, or of uniform motion in a straight line, unless it is compelled to change that state by forces impressed upon it. With a little attention to verse 88 of chapter ant will realize that exist special connection between this verse and Newton's first law (inertia law). So that according to what will be said later, mountains are as stationary object and the clouds movement is as the motion object in this law. In this paper, according to the Qur'an commentators and scholars so simple, scientific and transparent, Special connection between verse 88 of chapter ant and law inertial be expressed and show that the Qur'an is not only a religious book, But also has a lot of science.



## 1. Introduction

Over 2,000 years ago, ancient Greek scientists were familiar with some of the physical concepts that are studied today. First, the assumptions began with Aristotle ideas and classify motion by him. Finally, by Newton's first law (law of inertia) reached to its perfection. In the following, we will review how to complete the theoretical scientists about the motion. In this paper, by using verse 88 of Chapter ant (and you will see the mountains which you think to be firm pass by like clouds. (Such as) making of Allah, who has created everything well. he is aware of the things you do), And the opinion of the religious scholars And also the reviews motion by scientists such as Aristotle, Galileo, Newton, Copernicus and Foucault to explain Newton's first law (inertia) and the ground motion (Earth's rotation and Earth's orbit) will pay. And according to verse 88 of chapter ant and Newton's law will show the mountains are as stationary object and the clouds movement is as the motion object in this law. And thus Newton's first law, we will adopt from this verse.

## 2. Literature Survey

One of the first to study motion seriously was Aristotle, the most outstanding philosopher-scientist of his time in ancient Greece. Aristotle attempted to clarify motion by classification. Aristotle divided motion into two main classes: natural motion and violent motion (Hewitt, 2002).

Aristotle asserted that natural motion proceeds from the "nature" of an object, dependent on what combination of the four elements earth, water, air, and fire the object contains. In his view, every object in the universe has a proper place, determined by this "nature"; any object not in its proper place will "strive" to get there. Being of the earth, an unsupported lump of clay properly falls to the ground; being of the air, an unimpeded puff of smoke properly rises; being a mixture of earth and air but predominantly earth, a feather properly falls to the ground but not as rapidly as a lump of clay. He stated that heavier objects would strive harder. Hence, argued Aristotle, objects should fall at speeds proportional to their weights: the heavier the object, the faster it should fall (Hewitt, 2002).

Violent motion, Aristotle's other class of motion, resulted from pushing or pulling forces. Violent motion was imposed motion. A person pushing a cart or lifting a heavy weight imposed motion, as did someone hurling a stone or winning a tug-of-war. The wind imposed motion on ships. Floodwaters imposed it on boulders and tree trunks. The essential thing about violent motion was that it was externally caused and was imparted to objects; they moved not of themselves, not by their "nature", but because of pushes or pulls (Hewitt, 2002).

The concept of violent motion had its difficulties, for the pushes and pulls responsible for it were not evident. For example, a bowstring moved an arrow until the arrow left the bow; after that, further

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explanation of the arrow's motion seemed to require some other pushing agent (Hewitt, 2002).

Aristotle's statements about motion were a beginning in scientific thought, and although he did not consider them to be the final words on the subject, his followers for nearly 2000 years regarded his views as beyond question. Implicit in the thinking of ancient, medieval, and early Renaissance times was the notion that the normal state of objects is one of rest. Since it was evident to most thinkers until the sixteenth century that the Earth must be in its proper place and since a force capable of moving the Earth was inconceivable, it seemed quite clear that the Earth does not move (Hewitt, 2002).

It was in this climate that the Polish astronomer Nicolaus Copernicus formulated his theory of the moving Earth. Copernicus reasoned that the simplest way to account for the observed motions of the sun, moon, and planets through the sky was to assume that the Earth circles the sun (Hewitt, 2002).

## 3. Newton's First Law (Inertia)

It was Galileo, the foremost scientist of the early seventeenth century, who gave credence to the Copernican view of a moving Earth. He accomplished this by discrediting the Aristotelian ideas about motion. Galileo easily demolished Aristotle's falling-body hypothesis. Galileo is said to have dropped objects of various weights from the top of the Leaning Tower of Pisa and compared their falls. Contrary to Aristotle's assertion, Galileo found that a stone twice as heavy as another did not fall twice as fast. Except for the small effect of air resistance, he found that objects of various weights, when released at the same time, fell together and hit the ground at the same time (Hewitt, 2010).

Motion always involved a resistive medium such as air or water. He believed a vacuum to be impossible and therefore did not give serious consideration to motion in the absence of an interacting medium. That's why it was basic to Aristotle that an object requires a push or pull to keep it moving. And it was this basic principle that Galileo denied when he stated that if there is no interference with a moving object, it will keep moving in a straight line forever; no push, pull, or force of any kind is necessary (Hewitt, 2010).

Galileo tested this hypothesis by experimenting with the motion of various objects on inclined planes. He noted that balls rolling on downward-sloping planes picked up speed, while balls rolling on upward-sloping planes lost speed. From this he reasoned that balls rolling along a horizontal plane would neither speed up nor slow down. The ball would finally come to rest not because of its “nature” but because of friction. This idea was supported by Galileo's observation of motion along smoother surfaces: when there was less friction, the motion of objects persisted for a longer time; the less the friction, the more the motion approached constant speed. He reasoned that in the absence of friction or other opposing forces, a horizontally moving object would continue moving indefinitely. The property of an object tending to keep moving straight ahead he called inertia (Hewitt, 2002).

Galileo's concept of inertia discredited the Aristotelian theory of motion. Aristotle did not recognize the idea of inertia because he failed to imagine what motion would be like without friction.

In 1642, several months after Galileo died, Isaac Newton was born. By the time Newton was 23, he had developed his famous laws of motion, which completed the overthrow of the Aristotelian ideas that had dominated the thinking of the best minds for nearly two millennia (Hewitt, 2002).

Newton refined Galileo's idea and made it his first law, appropriately called the law of inertia. Be stated as follows:

Every object continues in its state of rest, or of uniform motion in a straight line, unless it is compelled to change that state by forces impressed upon it (Hewitt, 2002; Weidner and Sells, 1980; Haliday et al., 2001; Cropper, 2001).

The key word in this law is continues. In other words, an object continues to do whatever it happens to be doing unless a force is exerted upon it. If it is at rest, it continues in a state of rest (Hewitt, 2002).

Inertia due to the mass of the object, and it can be interpreted as a desire to continue previous state (if free from the influence of any external force) or resist changes the previous state. As noted above, this rule is often attributed to Galileo, but in fact, the first by René Descartes (1596-1650) was expressed as a relation (Fowles and Cassiday, 1999).

## 4. Earth moves

Ground motion at least from a complex combination of six basic moves (Degani and Hamburg, 1976):

***Earth's rotation: Earth turns on its axis once a day***

Foucault (1819-1868) one of the most famous French physicists for the first time in 1851 with the help of a 67 meters pendulum (Pendulum is a device consisting of a metal ball attached to the end of a rope-light non expansion who swing) (Fowles and Cassiday, 1999) that did double swing in 167 seconds, prove the earth's rotation. He brought the pendulum to swing in a certain direction, after a while, it was observed that the path of the pendulum on the Earth's surface has changed. While the pendulum had not strayed from its original direction and this was possible when the earth is moving and rotates around itself.

The earth for creation the day and night must do another motion and rotates around itself left to right, that this move is Earth's rotation or indigenous movement.

***Earth's revolution: Axis of the earth around the sun once a year***

Newton's law of gravitation was preceded by three important discoveries about planetary motion by the German astronomer, Johannes Kepler, who started as a junior assistant to the famed Danish astronomer, Tycho Brahe. Brahe headed the world's first great observatory in Denmark, just before the advent of the telescope. He by Using from the huge brass protractor-like instruments called Protractor measured the positions of planets over twenty years so accurately that his measurements are still valid today. Brahe entrusted his data to Kepler. After Brahe's death, Kepler converted Brahe's measurements to values that would be obtained by a stationary observer outside the solar system. Kepler's expectation that the planets would move on perfect circles around the sun was shattered after years of effort. He found the paths to be ellipses. This is Kepler's first law of planetary motion:

Each planet moves in an elliptical orbit with the sun at one focus of the ellipse (Hewitt, 2002).

Earth as a planet is traveling at a speed of 107,000 kilometers per hour to circle the sun in one year. This movement is known as the Earth's revolution (Farouki and Edalati, 1992).

***Precession of the earth axis***

Slow changes of the Earth's axis as a result of the gravitational pull of the Moon on the Earth's equator bulge (Degani and Hamburg, 1976).

***Nutation motion of the earth axis***

Earth's axis is plotted a curve that does not smooth and homogeneous circle. This curve has small fluctuations that the oscillation of the Earth's axis creates small fluctuations around the 23- 27 Position. Real axis motion is a combination of precession and the oscillation. The recent movement is known as nutation. Gravitational force of the moon is the main cause of nutation (Degani and Hamburg, 1976).

***Sun with Earth and other planets***

In collection of the local star cluster (star cluster consists of a stars group whose members are near enough and physically linked with each other and have a common origin) moves with a speed of 20 kilometers per second to the star Vega (Degani and Hamburg, 1976). Indeed, there are two types of star clusters: globular clusters and open clusters. In the globular clusters, distribution of stars are spherical and compressed and the number of stars a few thousand or more. But in the open cluster, distribution of stars are scattered and asymmetrical and the number of stars from a few tens to a few thousand.

***Local cluster of stars***

Now that we are familiar with the concepts of inertia and Earth's rotation and Earth's orbit, we explain verse 88 of chapter ant and communicate these concepts together and Of course, a number of other verses of the Quran are referring to the movement of the earth. For example, beginning in verse 27 of Chapter Al-Imran can refer to the movement of the earth (Degani and Hamburg, 1976).

## 5. Qur'an exploration of Newton's first law

When Copernicus in the sixteenth century, express the idea of a moving earth, the concept of inertia was still unknown (Hewitt, 2002); while the Qur'an 1000 years ago has stated from the discovery of Copernicus (round earth). If we pay attention to verse 88 of Chapter ant, in this verse we see that Allah has said "and you will see the mountains which you think to be firm pass by like clouds".

With a little thought, we discover Allah says: Humans thinks that the mountains and the earth, etc. are static and People do not understand this move. Because Not only Humans but also mountains and even moving clouds with Earth's movement (30 kilometers per second) are moving.

Then, to further clarify the issue, we will review some comments from scholars about this verse:

Ayatollah Makarem says: “These verses such as revelations and symptoms monotheism is the majesty of Allah in this life and notes to the "earth movement" that not apparent to us. He also says: these mountains that we assume static, moving too fast”. Certainly, move mountains without moving other lands to which they are attached do not make sense, so this verse means that the earth moves fast as moving clouds.

Shaykh al-Futuh Razi on the interpretation of this verse says: “Mohammad, you see the mountains are solid, while standing stationary, while the move, such as moving clouds”. However, he has said in the footnote of this book: “this verse implies that the earth is moving”.

According to many scientists speech above, this verse implies that Earth moves. But question that arise here is: why Allah say about mountains Motion with clouds Motion in this verse?

To explain further, let's say the example that Hewitt has stated in his book for the Inertia Law. Consider a bird sitting at rest at the top of a tall tree. On the ground below is a fat and juicy worm.

The bird sees the worm and drops vertically below and catches it. This would be impossible, it was argued, if the Earth moved as Copernicus suggested. If Copernicus were correct, the Earth would have to travel at a speed of 107,000 kilometers per hour to circle the sun in one year. Convert this speed to kilometers per second and you'll get 30 kilometers per second. Even if the bird could descend from its branch in one second, the worm would have been swept by the moving Earth a distance of 30 kilometers away.

It would be impossible for a bird to drop straight down and catch a worm. But birds in fact do catch worms from high tree branches, which seemed clear evidence that the Earth must be at rest. But how should rejected this reason?

We should answer; you can if you invoke the idea of inertia. You see, not only is the Earth moving at 30 kilometers per second, but so are the tree, the branch of the tree, the bird that sits on it, the worm below, and even the air in between (Even the mountains and clouds). In other words, all are moving at 30 kilometers per second.

All things in motion remain in motion if no unbalanced forces and rest is only one form of equilibrium. An object moving at constant speed in a straight-line path is also in equilibrium. Equilibrium is a state of no change. An object under the influence of only one force cannot be in equilibrium. Net force couldn't be zero. Only when two or more forces act on it can it be in equilibrium are acting (Hewitt, 2002).

So when the bird drops from the branch, its initial sideways motion of 30 kilometers per second remains unchanged. It catches the worm quite unaffected by the motion of its total environment (Hewitt, 2002).

So we can say when the bird moving on the Earth's surface follows from the inertia law, the clouds that moving on the Earth's surface can also follow this rule and clouds in motion remains in motion if no unbalanced forces are acting and also the tree attached to the earth plays the role of Mountain. Stillness of the mountains and the continuous movement of the clouds stems from the inertia law. However, the mountains are playing the role of the stationary object and the clouds are playing the role of a moving object. Both are trying to maintain their previous state. So perhaps the purpose of this verse in the Quran and putting together the mountains and clouds in this verse was the expression of this law. And this mean emergence of the inertia law and the ground motions in verse 88 of the chapter ant.

## 6. Conclusions

Given the above discussion and the review of movement by Aristotle and Newton finally, we know that the mountains motion in verse 88 of chapter ant as a result of ground motion. Also according to the law of inertia, the mountains are as stationary object and the clouds movement is as the motion object in this law. As a result, possibly the purpose of this parable in the Qur'an and bringing the mountains movement with clouds movement in this verse, was the Expression of Newton's first law (inertia), respectively. Because, according to the verse above, the clouds are always moving, and according to Newton's first law of motion, clouds in motion remains in motion if no unbalanced forces are acting and the mountains will continue also to the stillness. So verse 88 of chapter ant, addition to the earth motion, has pointed to the presence of other underlying scientific concept (Newton's first law (inertia)) that has proved many years later from the Qur'an.

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