

Optical Illusion and the Magnetic Hills in Koya Region (Kurdistan-Iraq)

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Abstract

A few of so-called magnetic hills that appear in some regions of Kurdistan-Iraq were studied. These kinds of hills are downhill but look like an uphill slope and have names like (Hunted Hill), (Magnetic Hill) or (Anti-gravity Hill) in literatures, reflecting attribution of the properties of the area as supernatural or magnetism. The gravity, magnetic field and the slope of the hills has been calculated. We investigated that no supernatural forces found at work in these places and the slope of these two hills are optical illusions produced by the local topography that makes a downhill to look like an uphill slope.

Introduction

An optical illusion (also called a visual illusion) is characterized by visually perceived images that are deceptive or misleading. Illusion is mistake in the perception of a sensory experience, it occurs when what the brain perceives differs substantially from the actual qualities of an object or stimulus (the eye and brain make unconscious inferences). Illusions are common in normal perception and are natural consequences of the way our sensory systems work. The information gathered by the eye is processed by the brain to give a percept that does not agree with a physical measurement of the stimulus source. Magnetic hill is a remarkably common illusion which is found in numerous locations around the world. Usually it is a stretch of road in a hilly area where the level horizon is obscured. Objects such as trees and walls that normally provide visual clues to the true vertical, may be leaning slightly. This creates an optical illusion making a slight downhill look like an uphill slope. Objects may appear to roll uphill. In many places in the world spots where the illusion is especially powerful often become tourist attractions (Magnetic Hill in Ladakh- India, Magnetic Hill in Burlington, Ontario-Canada, just a forty five minutes drive from the famous Niagara Falls, Santa Cruz, California) Tour guides may like to claim that the effect is a mystery or that it is due to magnetic or gravitational anomalies that it is a place where the laws of physics and gravity do not apply or it is a paranormal phenomenon that science cannot explain. This is

not true of course. Natural anomalies can only be detected with sensitive equipment and cannot account for these places. Physics can easily explain them as optical illusions produced by the local topography. Optical illusions in general are due to the errors of judgment or intellect. For the sake of brevity we might say that they are those due to errors of visual perception. Optical illusions are badly named, since they are not unreal perceptions, but just misjudgments or ambiguous ones. The visual sense does the best it can to interpret the scene around us, but sometimes it fails. Optical illusion does not generally exist physically but it is difficult in some cases to explain the causes. Generally speaking, a tree will appear longer when it is standing than when it is lying on the ground. Lines, areas, and sizes are not perceived in their actual physical relations. The appearance of a colored object varies considerably with its environment. The sky is not perceived as infinite space nor as a hemispherical dome, but as a flattened vault. The moon apparently diminishes in size as it rises toward the zenith. A bright object appears larger than a dark object of the same physical dimensions, flat areas may appear to have a third dimension. Certainly there are many cases of errors of judgment. A mistaken estimate of the distance of a mountain is due to an error of judgment but the perception of a piece of white paper as pink on a green background is an error of sense. There is difference between this phenomena and the case of the mirage where rays of light coming from the object to the eye are bent from their usual straight-line course and the object appears to be where it really is not.

Some kinds of optical illusions

A few of so-called optical illusions will be discussed which are due strictly to errors of the visual and are related to our subject:

A. Illusions of length

In the Müller-Lyer illusion (Fig.1), the slanted lines cause horizontal line segment AB to appear longer than line segment CD. The two line segments actually are the same length. The slanted lines clearly cause the illusion, because if you removed them you could easily judge the two horizontal lines to be equal.

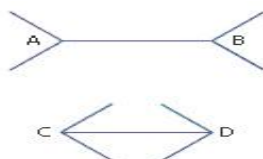


Fig.(1):Müller-Lyer illusion

In the Ponzo illusion (Fig. 2), the top horizontal line seems longer than the lower horizontal line, even though the two lines are equal in length. One explanation for the Müller-Lyer illusion is that people inappropriately apply their perceptual experience with three-dimensional objects to a two-dimensional problem. The outwardly slanted lines may cause our perceptual system to interpret line segment AB as farther away, while the inwardly slanted lines may cause our perceptual system to see line segment CD as closer to us. Because we take distance into account when judging size, if two objects project the same image size on the retinas of our eyes, we interpret the object that seems farther away as larger. This principle may explain why we interpret AB as longer than CD. However, this explanation is only one hypothesis, and psychologists have proposed many other explanations for the Müller-Lyer illusion.



Fig.(2):Ponzo illusion

B. Illusions of shape

Against a background of slanted lines, a perfect square appears trapezoidal—that is, wider at the top than at the bottom. This illusion may occur because the lines create a sense of depth, making the top of the square seem farther away and larger.

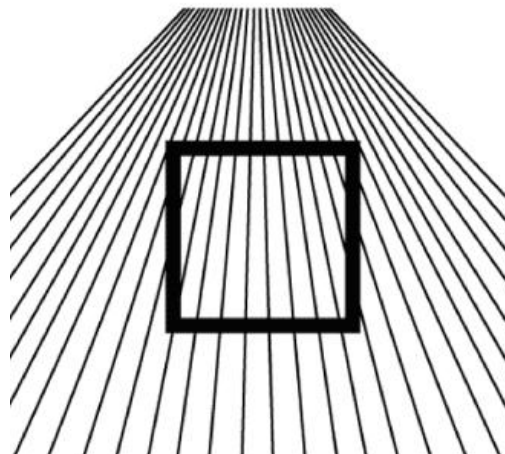


Fig.(3)

Studied areas and used methods

The studied areas are the mysterious places(Chinarok and Koya Palace Hotel)fig.4.The first place is located near to Chinarok before arriving the Haybat Sultan Mountain with the following coordinates: $N = 36.11791^\circ$; $E= 044.66946^\circ$; elevation= 693m, gravity= 9.8277 m/s^2 The second place is located on the drive toward Hotel Koya Palace with coordinates= 36.09121° ; $E=044.66044^\circ$;elevation=644m, gravity= 9.8279 m/s^2 The apparatus used in this study are: Wild 1010 Total Station,GPS, simple Pendulum, Compass and Video-camera

Discussion and conclusion

If you stop your car in any of the two mention places, and put it into neutral and then slowly release the brakes, the car will gradually, but apparently roll up the hill. The rolling up distance for the Chinarok Hill is 32m with a slope of 7.82 degrees as shown in figs. 5, 6, 7.

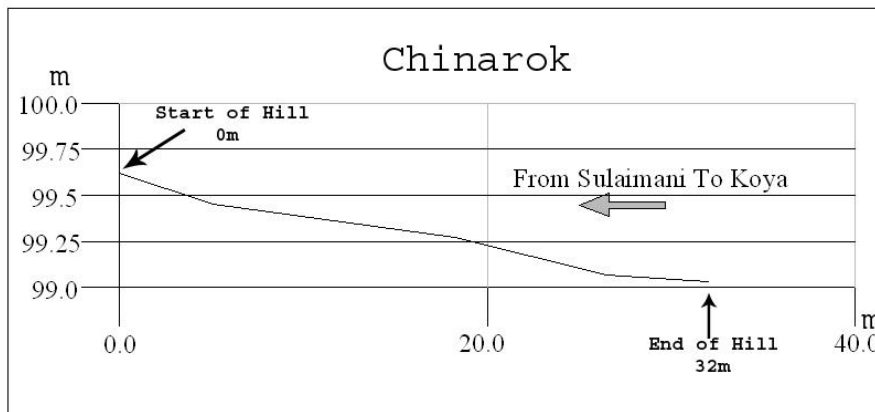


Fig.(5)

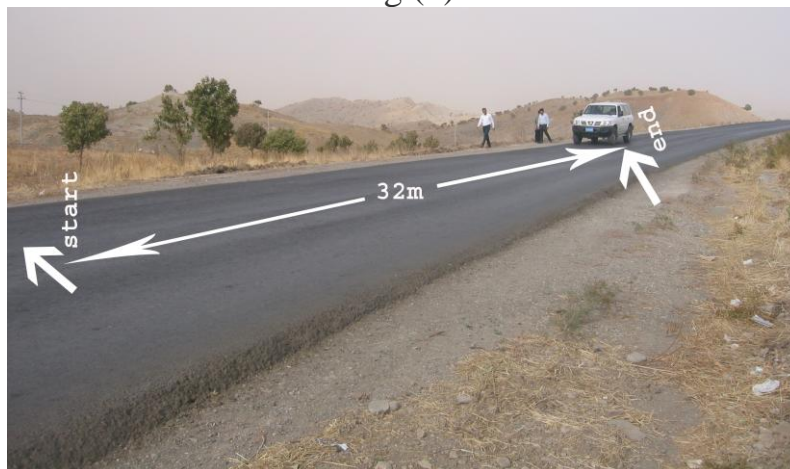


Fig.(6)



Fig.(7)

fig.5 presents the experimental result obtained from studying the characteristics of Chinarak's slope. It is clear that the slope of the hill is toward Sulimaniya by an angle of 7.82 degree, but peoples often over estimate the angle of a slope if they are standing on it, if you are standing on a slope of one degree it will seen like a slope of five degrees because of this effect the anti-gravity illusion can seen stronger than it should be even when you know the cause. This magnetic or gravity hill is a type of optical illusion created by the surrounding landscape because the more distant hills in the direction of travel toward Sulaimani are rather lower than the nearer ones plus the surrounding trees which are leaning slightly. The rolling up distance for the Koya Palace Hotel is 200m with a slope of 3.84 degrees as shown in Figs. 8, 9, 10. Her the driver became aware that he had lost the sense of whether he is traveling uphill or downhill, because while his eyes is telling him, he is going uphill, the engine's revolution and the car's speed told him he is definitely going. Here in addition to the reasons of illusion in Chinarak, the wall at the right side of the way is not true vertical, it is leaning slightly. This creates the maximum part of the optical illusion. In fact the magnetic and gravity anomalies are never that strong and are never the cause as is easily shown so these hills are not really magnetic, but optical illusion produced by the local topography is the wall reason of these illusions. However, errors in perception are only considered illusions if they are experienced by a large number of people. For example, if you are the only person who misreads a word, that is not an illusion. But if a large number of people misread the word in exactly the same way, then it may be considered an illusion exact like what is happening in this case.

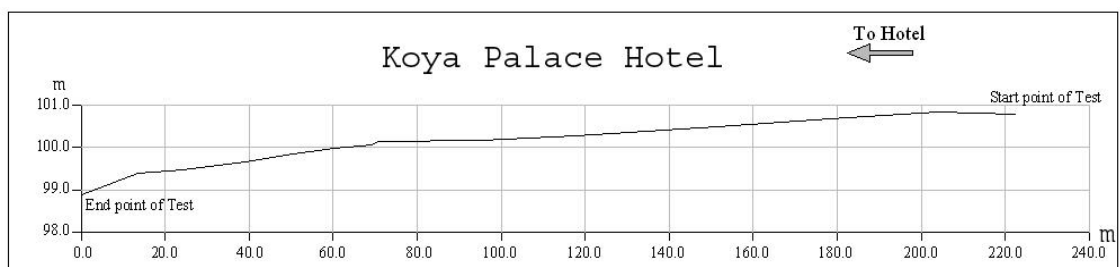


Fig.(6)

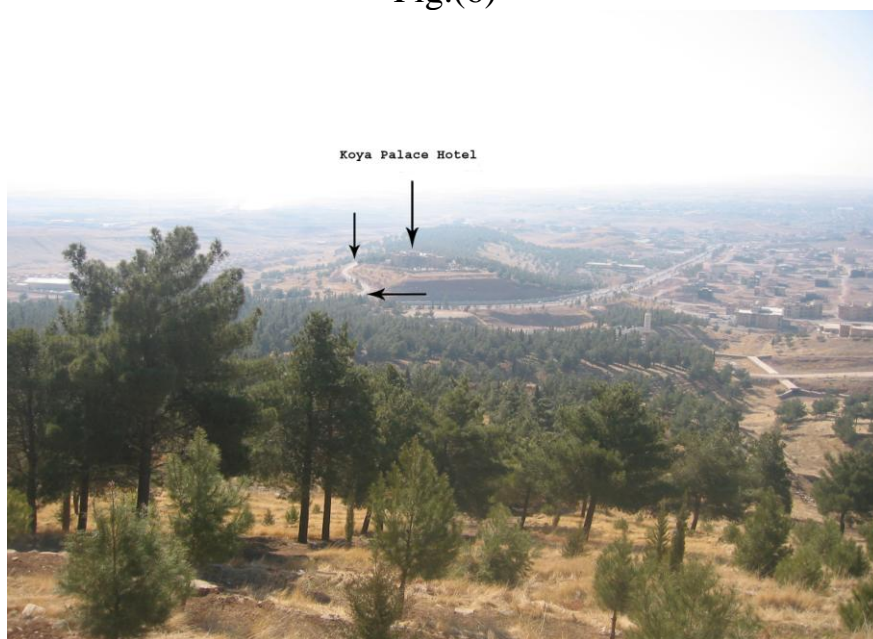


Fig.(9)



Fig.(10)

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الخداع البصري والتلال المغناطيسية في منطقة كويسنجق، إقليم كردستان-العراق

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الخلاصة

تم دراسة بعض م يسمى بالتلال المغناطيسية في منطقة كويسنجق في كردستان العراق. تبدو طرق المواصلات في التلال المدروسة منحدرية إلى الأسفل بينما أثبتت الحقيقة عكس ذلك وللتعبير عن مثل هذه الظواهر تستخدم مصطلحات مثل التلال المغناطيسية، التلال المصطادة أو التلال المضادة للجاذبية والتي تعبر عن خصائص المنطقة كأنها فوق الطبيعية أو مغناطيسية. تم قياس الجاذبية، القوى المغناطيسية وإنحدار الطريق. لم نجد تأثير غير طبيعي لأية من القوى المذكورة. تبين بأن انحدار الطريق نحو الأسفل هو خداع بصري لا غير ناتج عن طبوغرافية الموقع.