The Magnetic Positioning System in Pigeons

HARUN YAHYA

A recent experiment has provided important support for the theory that homing pigeons make use of the Earth's magnetic field to determine their direction.

Since ancient times human beings have used pigeons to carry their messages to recipients at distant locations. There is evidence, for example, that pigeons were used for the purpose of transmitting messages in Baghdad in 1150.

In 1850, Paul Reuter, founder of the world famous news agency Reuters, distributed news and stock exchange bond prices between the Belgian capital, Brussels, and the German city of Aachen using a fleet of 45 pigeons.

Homing pigeons are capable of traveling very long distances. The distance record for a pigeon that succeeded in returning home again is 1689 miles (approximately 2719 km).

Up until the present day the question of how the pigeons, known by the scientific name Columba livia, manage to locate their homes was a mystery. Among the possible explanations a powerful sense of smell and the ability to perceive magnetic fields predominated. Following decades of research, scientists have revealed that pigeons genuinely do possess the ability to perceive magnetic fields.

Cordula Mora, a biologist at the University of North Carolina at Chapel Hill, and her co-workers placed the pigeons in a wooden tunnel. When the magnetic coils on the exterior of the tunnel were switched on, a magnetic field that attained its highest level in the center of the tunnel was formed. Mora trained four pigeons to fly to one side of the tunnel if the magnetic field inside the tunnel was undisturbed, and to the other side if the coils were on. The pigeons' ability to detect the magnetic field was then measured. The pigeons made the correct choice in 55% to 65% of 24 experiments carried out to that end.

Researchers had previously discovered magnetite inside the homing pigeons' beaks. In order to test whether or not this region was the center of the bird's magnetic sense, Mora attached small magnets that would weaken their ability to detect magnetic fields to each bird's beak. As a result, a significant decrease in magnetic field detection occurred. The success rate fell to below 50%. However, the birds adapted to the distortion caused by the magnets, and it was observed that the success rate rose again parallel to this.

An experimental homing pigeon with a magnet attached to its beak.

However, when non-magnetic materials (made of brass, for example) were attached to their beaks, magnetic field detection was unaffected. In the same way, the surgical severing of the olfactory nerves in the birds' beak region also failed to weaken this ability.

These findings reinforced the theory that pigeons navigate by the magnetic field surrounding the Earth.

It was known that migrating birds made use of other visual clues, such as the sun, moon, stars and memorized landmarks. Mora now added the Earth's magnetic field to these, stating that it contributes to accurate navigation, and said:

"Every point on Earth has a unique combination of magnetic intensity and magnetic inclination. This would help the pigeon know where it was in relation to its goal."

Other researchers also interpret this finding as a major step forward in understanding pigeons' sensory systems.

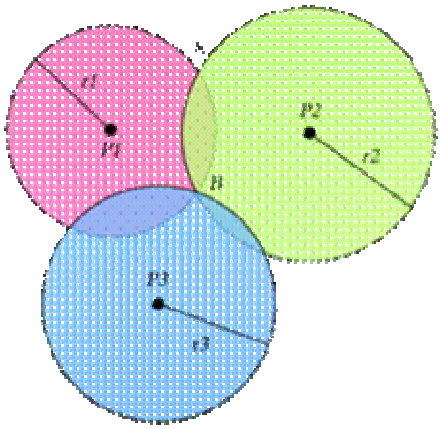
On the other hand, this magnetic positioning system illuminated in the latest study is also compatible with a system based on advanced technology.

THE GLOBAL POSİTİONİNG SYSTEM

An examination of the pigeon's magnetic positioning system immediately puts one in mind of the Global Positioning System (GPS). GPS is a satellite monitoring system used in determining the location of any object. In this system a team of at least 24 satellites is employed. The use of GPS, designed and controlled by the US Defense Department, is open to everybody and free of charge. The system consists of three elements: space, the control and the user. The space element refers to the GPS satellites. The control element refers to ground stations in various regions of the world. These stations monitor the satellites' course, synchronize sensitive timepieces in the satellites, and load onto the satellites the information they will transmit. The user element consists of the GPS receiver. A GPS receiver decodes the signals coming from several satellites and locates the position. This location is performed using a technique known as trilateration.

GPS, a sensitive positioning system, is based on advanced technology and is a product of intelligent design.

Trilateration is a method of determining objects' relative position using geometry. This calculation, performed with the assistance of the geometry of circles, requires at least three reference points. The logic behind these calculations can easily be grasped from the diagram below:



In the diagram to the left, imagine that you are traveling somewhere between points P1, P2 and P3 and that you wish to know your exact location. (Ignore the different colored circles at this stage. Imagine you can only see points P1, P2 and P3.) If you tell a caller "I am between points P1, P2 and P3" you have not stated your exact location. However, if you know your distance from these three points it will be possible for you to give your exact position. The following stages will be sufficient for this: the calculation of r1 reduces your possible location to the area of the pink circle. Then, the measurement of r2 reduces your possible position to one of two points, A and B. Finally, measurement of r3 firmly establishes that you are at point B. Your coordinates are thus established. The points referred to as P1, P2 and P3 in this description represent the satellites in the GPS system.

STRİKİNG SİMİLARİTİES

Striking similarities in terms of their functioning can be seen between the GPS system and homing pigeons' magnetic positioning system. Both contain an environment capable of transmitting data about a position on the Earth's surface. While data from satellites are transmitted through the atmosphere in GPS, it is thought that it is the Earth's magnetic field that performs this function in the pigeon system. Both contain systems to detect these data (signals) coming from outside; in other words panels in satellites and cells containing magnetite in the pigeon's beak. Systems that interpret these data also exist in both. In GPS, geometrical measurements are performed by computers and other digital equipment (as in the trilateration technique outlined above), whereas in pigeons the brain assumes the responsibility for interpreting the signals forwarded to it by means of sense.

In addition, many airline companies are today installing GPS in their planes, integrating it with their flight control systems. The fact that the pigeon cells containing magnetite have been positioned in its beak, in the same way that an aircraft's electronic flight systems are located in its nose, is a most significant similarity.

There is absolutely no doubt that the GPS system and all its satellites and ground control systems have been specially designed. The system is made up of components planned to serve a specific purpose and constituting a whole. The many electronic devices in the satellite and control systems work in harmony together in the light of this objective.

The magnetic positioning system in homing pigeons also bears such evident signs of design. The cells containing magnetite that permit interaction with the Earth's magnetic field, the nerves that transmit the data detected by these cells, and the brain that interprets all these, work in perfect harmony together. Thanks to this, the bird is able to determine the exact location of its home thousands of kilometers away with a totally accurate calculation. This is literally a perfect ability, because in terms of the thousands of kilometers traveled by the pigeon, its home

is no more than a tiny speck.

Yet how could the system that permits such a superior location determining ability have come into being? Could coincidences, devoid of any consciousness, have given rise to the pigeon with its perfect design, endowed it with perfect physiological systems, installed the magnetite containing cells in its beak and thus formed a flawless sensory system? Of course, not.

All the features in the GPS are evidence leaving no doubt that it was designed by engineers. In a similar way, a system that exhibits the same design features must also have been designed, in other words created. There is no doubt that Almighty God, the Lord of the worlds, is the Creator Who brought the pigeon into being with His infinite might and knowledge and gave it the systems enabling it to locate a point thousands of kilometers away with unerring accuracy. God reveals the following in the Qur'an:

He to Whom the kingdom of the heavens and the earth belongs. He does not have a son and He has no partner in the Kingdom. He created everything and determined it most exactly. (Qur'an, 25:2)

References:
Kathleen Wong, "A Magnetic Attraction to Home," http://sciencenow.sciencemag.org/cgi/content/full/2004/1124/3
James Owen, "Magnetic Beaks Help Birds Navigate, Study Says," http://news.nationalgeographic.com