

Migration and Orientation in Animals

H A R U N Y A H Y A

There are many migratory animals in nature: Birds, butterflies, turtles, salmon and eels are only a few of them. The distances these animals travel during migration is expressed in thousands, even in tens of thousands of kilometers. Migration requires enormous amounts of energy. At times, birds fly thousands of kilometers without landing at all. Furthermore, migrating animals do not always come across with favorable weather conditions. Although these tiny living beings struggle against rain, storms, and similar other hardship, they manage to reach to their destination.

Before proceeding with the migration stories of birds, some consideration on the concept of orientation in living beings will provide us with a better understanding of the subject.

Navigation refers to the series of methods employed to plot a route to reach a destination. This definition already embodies the meticulously planned nature of migration. When one considers thousands of birds in a flock migrating in perfect harmony, it becomes more comprehensible that enormous skills would be required for such a planned movement. **The question is how birds acquired these skills?** It is evident that birds cannot devise these intelligent tactics themselves, the nature of which is better understood when compared to skills of human beings.

A comparison will provide a better understanding of this issue: imagine that a man, all alone and completely non-equipped, sets off to a trip of 5 thousand kilometers. During the course of this trip, any answer he would give to any question regarding his position and direction without the help of a compass, map or a similar apparatus would merely be an estimate. Based on estimated values, one can never reach a destination, and in case he gets lost, he can never locate his position. In the case of birds, however, we are not talking about a distance of 100-200 kilometers. Unlike birds or other migratory animals, man cannot cover thousands of kilometers. Let alone crossing kilometers, he is likely to lose his way even when he goes to a different neighborhood.

What kinds of things does man need to find his direction? If he does not have an apparatus, then, by observing the location of the stars or looking at plants turning to sun, he can make a general estimation about his position. This is, however, only possible if he knows how to interpret them. Still, however, he can never attain 100 % accuracy in his conclusions. For a definite result, he certainly needs a specific apparatus like a map or a compass, which may still prove to be insufficient in certain cases. Today, technological breakthroughs in finding direction have enabled precision in this field. For instance, a global positioning system called **GPS** makes use of satellites in finding direction.

The GPS system ensures a precise determination of a receiver's position on earth through signals sent by specific satellites on the earth's orbit. The GPS system yields rapid and reliable results since it operates via satellites. By the same token, birds can achieve fast and accurate results in finding direction. That birds innately accomplish the operations, which are only achievable by the support of high technology, is utterly amazing. **It is obvious that the abilities of birds in finding direction are specially given to them so that they can migrate.**

Why do birds migrate, how do they make very long-distance flights without ever getting lost, and what determines the timing of migration? All these questions are among the issues even today science fails to provide an answer. Formerly, it was thought that birds migrate on account of seasonal changes. That is to say, some scientists claimed that once there was no migration but some seasonal changes gave way to it. However, migration is by no means an incident which could be affected upon a sudden decision. It requires some special skills like orientation, food storage and the ability to fly for long periods. It is impossible for an animal not possessing these characteristics to transform into a migratory animal. Not surprisingly, experiments addressing this issue revealed that migration is unrelated to any seasonal changes and it is merely a component of the established ecological equilibrium of the earth.

One of the experiments made to address this issue was the following: garden nightingales were subjected to experiments in a lab where internal conditions such as temperature and light could be varied. Internal conditions were arranged differently from external conditions. For instance, if it was winter outside, a spring climate was

created in the laboratory, to match the migration seasons.

Under these conditions scientists anticipated the birds to organize themselves for migration. The birds stored fat for fuel, just as they do when time for migration approaches. Although birds organized themselves according to the artificial season, and prepared themselves as if they were going to migrate, they did not set out to migrate before it was time. They observed the season outside and did not migrate.

Considering this behavior of these birds, some questions occur to the mind like **"What makes birds determine for migration?"** and "What are the factors in force determining the time for migration?".

According to evolutionists, living things have **"body clocks"** that help them to know the time in a closed environment and to differentiate seasonal changes. They maintain that birds behave in compliance with this "body clock". They decide to emigrate when this clock "rings". At this point, many questions arise: What is the origin of this clock? In which part of the body is it located? Is this "body clock" the same in every living being? What would happen if this clock were out of order or stayed behind? In this case, would birds simply stop migrating? No, such problems never occur in birds' migration, nor this clock ever becomes out of order. That is simply because such a clock does not exist. **It is actually not an imaginary clock that makes the birds determine the time of migration, but the system God created for them.**

Birds consume great energy in flight. They need more fuel than all sea-dwelling and land-dwelling animals. They obtain this energy through quite different methods.

For instance, prior to migration, migratory birds get prepared and start to store fat in their bodies. Some bird species fly longer distances than others. For these species, only storing fat may not be sufficient. In such cases, they find another solution and meet their energy needs by resting at certain intervals.

Terns that fly polar -to -polar distances set a good example for this: **They cover 30-40 thousands of kilometers during their migration.**

Which methods do terns use to store energy so that they can fly 30 thousand kilometers? To see how these birds deal with the energy problem, scientists observed them for long periods of time. Their researches led to the conclusion that, besides storing fat, terns also save energy by landing on floating icebergs.

The techniques employed by birds to minimize energy consumption during migration are not limited to these alone.

Using different "flight techniques", some migratory birds reduce their energy consumption to zero. For instance, storks go up as high as 2 thousand meters with rising warm air currents, and then glide along swiftly to the next warm air current without beating their wings.

A similar flight technique is used by albatrosses.

These birds, which spend 92% of their lives on the sea, have wingspans of up to 3,5 meters. The most important characteristic of albatrosses is their flight style: **they can fly for hours without beating their wings at all.** To do so, they glide along in the air keeping their wings constant by making use of the wind.

One point deserves consideration at this stage. It requires a great deal of energy to keep wings with a wingspan of 3.5 meters constantly open. A comparison would be helpful to clarify the enormousness of their energy needs. A man can hardly keep his arms open for a few minutes. Albatrosses, however, can stay in this position for hours.

This is due to the special anatomical system they are bestowed with from the moment of their birth. During flight, the wings of the albatross are blocked. Therefore, it does not need to use any muscular power. Wings are lifted only by muscle layers. This greatly helps the bird during its flight. By means of this special design albatrosses have by birth, they can fly without any difficulty.

Flying for hours by making exclusive use of wind provides an unlimited energy source for it. For instance, a 10-kilo-albatross loses only 1% of its body weight while it travels for 1,000 kms. This is indeed a very small rate. Men have manufactured gliders taking albatrosses as a model and by making use of their fascinating flight technique.

While covering long distances, albatrosses make use of the best wind positions. In the face of counter air

currents, they prefer to fly at low altitudes above regions where winds are blocked by mountains, hills and trees. To make use of the wind pushing from the back, they go up to high altitudes where winds are strong. Albatrosses fly in perfect harmony with winds.

Another flight technique used by bird flocks is the "V" type flight formation. In this technique, big strong birds at the front function as shields against counter air currents and lead the way for the weaker. With such an organization, a saving of 23% is achieved in the flock in general.

Employing such flight techniques for the purpose of saving energy requires being knowledgeable about the laws of aerodynamics. However, the being that employ these techniques are only birds. It is unlikely that they can make such plans and devise so complicated mechanisms with their own wisdom and will.

At this point, we face an obvious truth: the One who commands them to behave so by designing them in the most perfect fashion is God, the owner of all knowledge.

Flying demands a lot of skills and many conditions other than described until now. Some migratory birds fly at very high altitudes. For instance geese can fly at an altitude of 8000 m. Well, have you ever thought how these birds manage to respire at such high altitudes? Normally, at such high altitudes, let alone managing a difficult task like flying, even breathing becomes impossible. For compulsory flights at high altitudes, man needs to take additional precautions. For instance, in airplanes, there exists a special pressure system balancing the interior pressure. Climbers, on the other hand, can only climb high altitudes such as the Everest Mountain by the help of oxygen masks. Birds, however, can fly in those altitudes without problems, which is something quite difficult for people. That is because the lungs of birds, which are already equipped with very special respiratory systems, are created in a way to enable them to fly just like their other organs.

Another subject that arouses interest about birds is how they are unaffected by storms.

It is true that birds are often not affected by storms, because they stay away from stormy regions. But, while flying fast, how do they sense a storm breaking out way ahead of them? Some ornithologists who made research into birds' sense of hearing, observed that some birds can hear sounds of extremely small frequencies, which diffuse to great distances in the atmosphere. Migratory birds can therefore hear a storm breaking out over a far away mountain or thunder over an ocean hundreds of kilometers ahead and change their route to avoid an approaching storm.

Owing to all these properties, birds can migrate to very distant regions. As we mentioned earlier, migratory birds are very knowledgeable about their destination and they reach there without being confused. But how do they accomplish this?

For example, **a pigeon flies 1500 kilometers to return to its nest with no difficulty at all.** Furthermore, it does not matter whether this journey takes place **during daytime or at night** since pigeons are equipped with the world's best quality compass. Birds have seemingly advanced "magnetic receptor" systems enabling them to find their way by making use of the magnetic field of the earth.

As known, the earth has a magnetic field. The direction of this magnetic field is the same anywhere on earth, but its intensity changes according to regions. While determining their direction, pigeons can measure both the magnetic direction and intensity of the area they fly over by their natural compass (!). They can even perceive a 2 % variation in the magnetic field of the earth.

Scientists fail to have a complete understanding of the structure of this compass. In fact, where this compass rests within the bird's body remains to be a mystery. Based on subsequent research, it is assumed that a gland located in the mid -brain holds control of this system. But how does this piece of flesh, weighing only a few grams, can measure the magnetic field of the earth?

Let's look at the phenomena of flight from a more scientific viewpoint: in the brain of a bird, there exists a central nervous system for finding direction. This system informs the bird about the direction towards which it has to beat its wings. The question is; can birds coincidentally possess such a complicated system? Did birds delay their migration until this system coincidentally formed?

Certainly, the formation of such a complicated system as a result of a series of coincidences is logically and scientifically implausible. Moreover, it is also implausible that birds can wait for millions of years for this "so-called" coincidental formation of a system vitally important for them. That is because birds which are unequipped with

such a system cannot migrate and, even if they attempted to migrate, being unable to find their direction and facing severe weather conditions, they would lose their lives and become extinct in a short while.

Such a flawless system, which could by no means be formed by coincidences, is granted to those living beings by their Creator, the One Who creates them from nothing with their flawless and excellent structure and equips them with all these perfect traits.

This fact is related in the Qur'an as follows:

He is God - the Creator, the Maker, the Giver of Form. To Him belong the Most Beautiful Names. Everything in the heavens and earth glorifies Him. He is the Almighty, the All-Wise (Surat Al-Hashr: 24)

Subsequent research regarding how birds find their direction brought along numerous questions. Even technology of today fails to explain the mechanisms through which direction finding systems in birds operate. Basing the origin of these perfectly operating systems on the random mechanisms and coincidences of the theory of evolution would be the most unwise thing to do.

The theoreticians of evolution, who even fail to explain how a single feather came into existence, cannot bring any explanation for the miraculous "natural compass" inherent in birds.

Every research on living beings reveals hundreds of delicately planned, flawlessly designed traits. All of these lead to a truth that every reasonable person can easily recognize. This is the fact that no trait peculiar to any existing living being can ever come into existence by chance. As we dwell on the details of structures and traits in living beings, we will see that they are composed of interrelated, meticulously planned, orderly and complex systems. It becomes obvious that the evolutionist scenario asserting that coincidences gave rise to these systems by adding new components to them over time is improbable.

Let us outline what we have related so far: migratory birds can all alone overcome many difficulties which seem to be impossible under normal conditions. While doing this, the only thing they make use is the perfect technology they intrinsically possess in their bodies. This is a high technology indeed; it ensures that the bird flying at very high altitudes does not die of oxygen deficiency, get tired of beating its wings across a route of thousands of kilometers, and fall down in the middle of the ocean, become confused while migrating from one hemi-sphere to another while helping it to hear a breaking storm far away and change its direction.

Migration is specially designed for birds and it has been practiced by them for millions of years.

It is not only the birds that have amazing migration stories.

The migration story of Monarch butterflies, which live in southeast Canada, is more complex than that of the birds..

Monarch butterflies normally live for only 5-6 weeks after they develop from caterpillar. Four generations of Monarch butterflies live within a year. Three of these four generations live in spring and summertime.

With the coming of autumn, the situation changes. Migration starts in autumn and the generation that migrates, lives much longer than the other generations that lived in the same year. The Monarchs that migrate are the fourth generation in the year. Indeed, the Monarchs that migrate to the south live six months longer than the previous generations. They need to live exactly this long to complete their journey and return.

Interestingly enough, the migration starts exactly on the night of the autumn equinox.

The butterflies that go down to the south do not disperse after they pass across the Tropic of Cancer and leave the cold weather behind. After migrating over half of the American continent, millions of butterflies settle down in the middle of Mexico. Here the ridges of volcanic mountains are covered with a great variety of flora. Located at a height of 3,000 meters, this place is warm enough for the subsistence of the butterflies. For a period of four

months, from December to March, they eat nothing. As the fat stored in their bodies nourishes them, they only drink water.

Flowers that bloom in the spring are quite important for the Monarchs. After a four-month fast, for the first time, in the spring they give themselves a nectar feast. They now have stored enough energy to return to North America. This generation, which lives a two-month life span extended to eight months, is no different from the three earlier generations in other respects. They mate at the end of March before setting out to their journey. On the equinox, the colony starts flying back to the north. Soon after they complete their journey and arrive in Canada, they die. However, before they die, they give birth to a new generation, which is necessary for the perpetuation of their species.

The newly born generation is the first generation of the year and lives about one and a half months long. Then comes the second and third generations. When it comes to the fourth generation, migration starts over again. This generation will live six months longer than the others will, and the chain will continue in the same way.

This interesting system provokes many questions: how is that the fourth of every four generations lives six months longer? How does this long-lived generation always coincide with winter and has done so for thousands of years? How do these butterflies always start migrating at the equinox, and how do they attune themselves so sensitively, or are they using a calendar?

No doubt, there are no answers to these questions through "evolution" or other variants on that theory. **The butterflies must have borne these interesting characteristics from the time they came into existence.** If the first fourth generation of Monarchs on earth did not have the characteristic to live long, then all the butterflies would die within that winter and these animals would become extinct.

Monarchs must have borne this extraordinary characteristic from the time they were created. "Coincidences" unquestionably do not have such a faculty as could arrange the generations of the animal according to migration. On the other hand, it is also unlikely that butterflies decided to make their fourth generations live longer and arranged their metabolisms, DNA, and genes accordingly.

It is obvious enough that monarchs are created with such a trait.

It is God, the possessor of All-Knowledge, All-Power, and the Almighty, Who has created the birds in the sky, ants on the ground, giraffes, lions, in brief, all the living beings on earth and inspired them their individual tasks. Through displaying the astonishing traits He created in living beings to man, God commands man to ponder over them:

In the 41st verse of Surat an-Nur, God states as follows:

"Do you not see that everyone in the heavens and earth glorifies God, as do the birds with their outspread wings? Each one knows its prayer and glorification. God knows what they do."