

The marvel of bird migration

David Burges

One of the most amazing features of the animal world is bird migration. The amazing ability of birds to find their way to and from their breeding areas still puzzles scientists and provides a powerful argument for creation.

A WIDELY recognised marvel of the natural world is the phenomenon of bird migration. Many species of bird, including some of the smallest, fly often thousands of miles between their winter feeding grounds and their summer breeding areas. Migration was familiar to the prophet Jeremiah, perhaps the Bible's leading ornithologist,¹ who observed that "Even the stork in the heavens knows her appointed times; and the turtledove, the swift, and the swallow observe the time of their coming. But My people do not know the judgment of the LORD" (Jer. 8:7, NKJV). The Land of Israel is actually an important route for many species migrating between Asia and Africa. The lesson of the inspired prophet is that, whereas these birds faithfully obeyed the complex instincts implanted by their Maker, God's people chose not to follow His precepts.

Amazing feats of navigation

The true wonder of migration lies in the abilities birds display to navigate unerringly over large distances with none of the aids which humans require, such as maps, compasses, sextants or, these days, global positioning satellites. Scientists airily refer to these abilities as having evolved, without even knowing how they are accomplished, still less how they could have been acquired in small stages over millions of years. It would hardly be of any advantage to migrate just a few miles to start with, or to find the correct direction by trial and error!

One of the greatest mysteries is how young birds know how to find the traditional wintering areas without parental guidance.² Very few adults migrate with juveniles in tow, and youngsters may even have little or no inkling of their parents' appearance. A familiar example is that of the cuckoo, which lays its eggs in another species' nest and never encounters its young again. It is mind boggling to consider that, once raised by its host species, the young cuckoo makes it own

way to ancestral wintering grounds in the tropics before returning single-handedly to northern Europe the next season to seek out a mate among its own kind.³ The obvious implication is that it inherits from its parents an inbuilt route map and direction-finding capability, as well as a mental image of what another cuckoo looks like. Yet nobody has the slightest idea as to how this is possible.



Migrating white storks

(Picture: © iStockphoto.com/Fred de Groot)

The fundamental reason that birds migrate is to find adequate food during the winter months when it is in short supply. This particularly applies to birds that breed in the temperate and Arctic regions of the Northern Hemisphere, where food is abundant during the short growing season. Many species can tolerate cold temperatures if food is plentiful, but when food is not available they must migrate. However, intriguing questions remain. One puzzling fact is that many birds journey much further than would be necessary just to find food and good weather. Nobody knows, for instance, why British swallows, which could presumably survive equally well if they spent the

1. There are a total of twenty-one references to birds and their behaviour in Jeremiah (18) and Lamentations (3).
2. Information from BBC Science and Nature: www.bbc.co.uk/nature/animals/birds/weeklyfeature/migration.
3. See "The Cuckoo", *The Testimony*, Feb. 2002, p. 61.

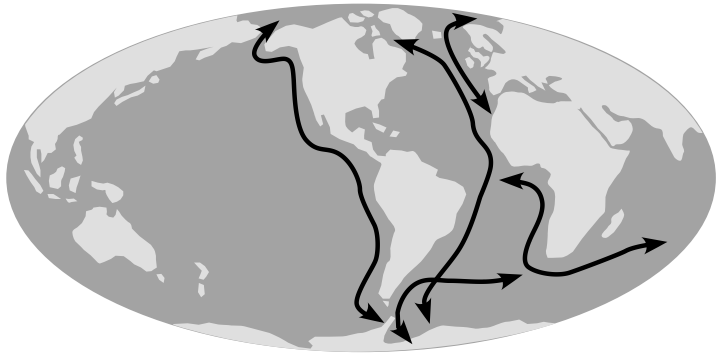
winter in equatorial Africa, instead fly several thousands of miles further to their preferred winter home in South Africa's Cape Province.

Another mystery involves the huge migrations performed by arctic terns and mudflat-feeding shorebirds that breed close to polar regions. In general, the further north a migrant species breeds, the further south it spends the winter. For arctic terns this necessitates an annual round trip of 25,000 miles. Yet, en route to their final destination in far-flung southern latitudes, all these individuals overfly other areas of seemingly suitable habitat spanning two hemispheres. While we may not fully understand birds' reasons for going to particular places, we can marvel at their globetrotting feats.

Unique abilities

Birds have many unique design features that enable them to perform such amazing feats of endurance. They are equipped with lightweight, hollow bones, intricately designed feathers providing both lift and thrust for rapid flight, navigation systems superior to any that man has developed, and an ingenious heat-conserving design that, among other things, concentrates all blood circulation beneath layers of warm, waterproof plumage, leaving them fit to face life in the harshest of climates. Their respiratory systems have to perform efficiently during sustained flights at altitude, so they have a system of extracting oxygen from their lungs that far exceeds that of any other animal. During the later stages of the summer breeding season, when food is plentiful, their bodies are able to accumulate considerable layers of fat, in order to provide sufficient energy for their long migratory flights.

Mounting evidence has confirmed that birds use the positions of the sun and stars to obtain compass directions. They seem also to be able to detect the earth's magnetic field, probably due to having minute crystals of magnetite in the region of their brains. However, true navigation also requires an awareness of position and time, especially when lost. Experiments have shown that, after being taken thousands of miles over an unfamiliar landmass, birds are still capable of returning rapidly to nest sites. In one instance a Welsh Manx shearwater carried to America and released was back in its burrow on Skokholm



The migration routes of the Arctic tern

Island, off the Pembrokeshire coast, one day before a letter announcing its release! Conversely, each autumn a small number of North American birds are blown across the Atlantic by fast-moving westerly tail winds. Not only do they arrive safely in Europe, but, based on ringing evidence, some make it back to North America the following spring, after probably spending the winter with European migrants in sunny African climes.

Such phenomenal powers are the product of computing a number of sophisticated cues, including an inborn map of the night sky and the pull of the earth's magnetic field. How the birds use their 'instruments' remains unknown, but one thing is clear: they see the world with a superior sensory perception to ours. Most small birds migrate at night and take their direction from the position of the setting sun. However, as well as seeing the sun go down, they also seem to see the plane of polarized light caused by it, which calibrates their compass. Travelling at night provides other benefits. Daytime predators are avoided and the danger of dehydration due to flying for long periods in warm, sunlit skies is reduced. Furthermore, at night the air is generally cool and less turbulent and so conducive to sustained, stable flight.

Nevertheless, all journeys involve considerable risk, and part of the skill in arriving safely is setting off at the right time. This means accurate weather forecasting, and utilising favourable winds. Birds are adept at both, and, in laboratory tests, some have been shown to detect the minute difference in barometric pressure between the floor and ceiling of a room. Often birds react to weather changes before there is any visible sign of them. Lapwings, which feed on grassland, flee west from the Netherlands to the British Isles, France and Spain at the onset of a cold snap. When

the ground surface freezes the birds could starve. Yet they return to Holland ahead of a thaw, their arrival linked to a pressure change presaging an improvement in the weather.

A witness to Divine wisdom

In each natural region of the world, in each country, birds come and go with the seasons. Many, like the swallow, take on lengthy and arduous journeys, returning each year to the same traditional places to breed, but spending much of the year travelling back and forth to their wintering grounds in another hemisphere. On the way they

face constant danger and a daily requirement to find food, water and safe roosting sites. Swallows and millions of other birds perform this annual miracle of bird migration, observed so long ago by Jeremiah, obeying instincts and using the astonishing abilities implanted in them by the Creator. Truly they witness to the wisdom and providence that lies behind all of the creation, as we are reminded by the Lord Jesus: "Look at the birds of the air, for they neither sow nor reap nor gather into barns; yet your heavenly Father feeds them. Are you not of more value than they?" (Mt. 6:26, NKJV).

The developing brass mountains

Nigel Bernard

The increased self-confidence of Russia, shown in a recent speech by President Putin, and the increase in military spending by Gulf Arab states, are signs that the brass mountains in Zechariah 6 are fast developing.

IN ZECHARIAH 6 the saints setting out from Israel to establish the Kingdom are described as chariots: "And I turned, and lifted up mine eyes, and looked, and, behold, there came four chariots out from between two mountains; and the mountains were mountains of brass" (v. 1). The two brass mountains represent the disposition of the kingdoms of men around Israel immediately after Armageddon.

In Daniel 2 the Greek empire is referred to as the "kingdom of brass" (v. 39). In Daniel 11, the break up of the Greek empire following the death of Alexander the Great is described. Two parts in particular are dealt with. These are the Seleucid empire, called the king of the north in Daniel 11, and the Ptolemaic empire, known as the king of the south. These two 'brass' empires, the two thighs in Daniel 2, located, as they were, either side of the Land of Israel, are used as a pattern to describe the powers around Israel at the time of the end: "And at the time of the end shall the king of the south push at him: and the king of the north shall come against him like a whirlwind, with chariots, and with horsemen, and with many ships; and he shall enter into the countries, and shall overflow and pass over" (v. 40).

The "king of the north" at the time of the end will be the Gogian force, coming from "the north parts" (Ezek. 38:15). The original king of

the south, the Ptolemaic empire, was based in Egypt. At the time of the end the king of the north enters Egypt: "He shall stretch forth his hand also upon the countries: and the land of Egypt shall not escape" (Dan. 11:42).

However, the king of the south is still able to exist in other Middle Eastern countries. In Matthew 12, Christ refers to the queen of Sheba as "The queen of the south" (v. 42). Sheba is one of the countries that question, with Tarshish, the invasion by Gog (Ezek. 38:13). Therefore, if a queen in Sheba can be called "The queen of the south", it is reasonable to conclude that the power at the time of the end based in the area of Sheba and Dedan can be called the king of the south; that is, Tarshish, Sheba and Dedan are the latter-day southern brass mountain.

In this article we look at recent signs relating to the development of the king of the north and king of the south powers.

The king of the north

On 10 February 2007, at the Forty-third Munich Conference on Security Policy, the Russian President, Mr Putin, made a speech which, according to the BBC, "may well be remembered as a turning point in international relations".¹ As the *Economist* notes, some are comparing it in significance to Churchill's 'iron curtain' speech in 1946.²

1. <http://news.bbc.co.uk/1/hi/world/europe/6349287.stm>.
2. "Not a cold war, but a cold tiff", *Economist*, 17 Feb. 2007, pp. 65-6.