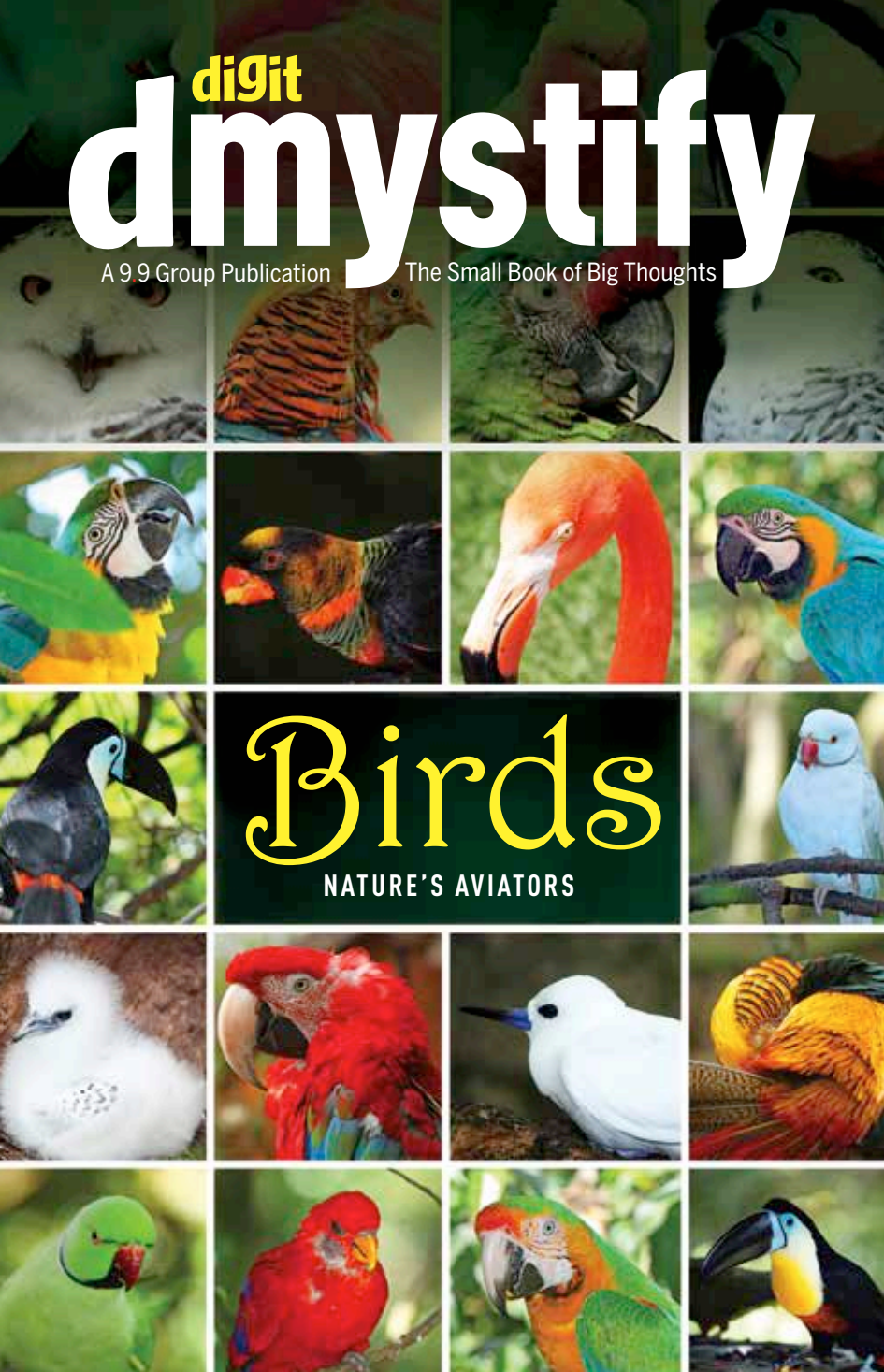


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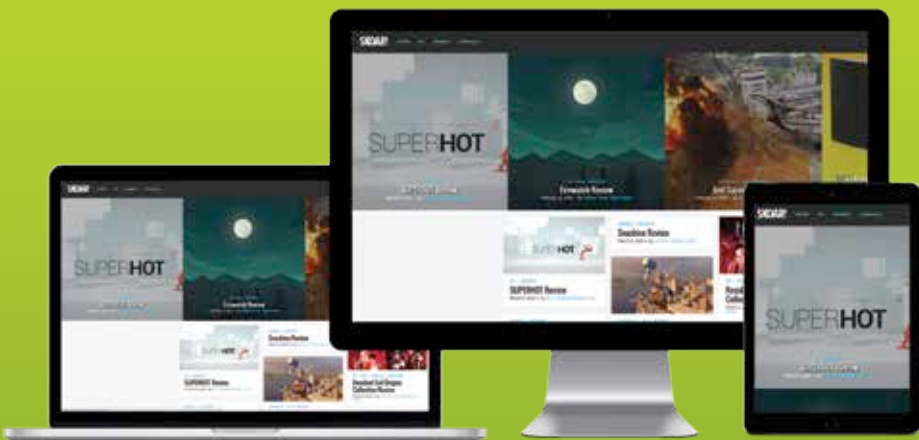
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The Small Book of Big Thoughts



## Birds

NATURE'S AVIATORS



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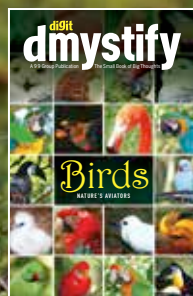
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## INSIDE

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# Master Navigators

Believe it or not, the Arctic Tern covers a distance of 90,000 km each year



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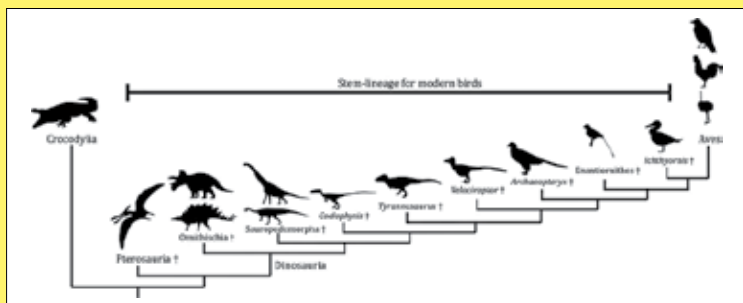
# Masters of flight!

**B**irds may not be a hot topic to learn about on a whim, if you think about it. We see them all around us all the time. They have been a part of our culture in recent times and even in the older periods where our knowledge was limited, but curiosity was abundant. However, with the evolution of modern research, we have found out a lot of things on the subject of birds, and this book will cover all that and more. So, go on... flip through the pages. ■

# The first flight

The first bird who dares to fall from the nest is the bird who learns to fly before anyone else!

Let us start with the basics of the classification of life in the animal kingdom. The first basic classification is done in two ways, between vertebrates and invertebrates. Vertebrates are simply organisms with a vertebral column or a backbone, while invertebrates are the ones that lack a vertebral column. Now, let's leave the invertebrates for another edition of the book, and focus on the vertebrates.



Within the vertebrates, we have five further classifications – pisces, amphibia, reptilia, aves, and mammalia. You have five seconds to guess which ones the birds are a part of. Five... four... three... two... one... Time's up! If you guessed aves, then congratulations – your sixth-grade science teacher would be the happiest person in the world right now. And, for the ones who didn't, she might ask you to read this book with double the attention.

## 4 The first flight

In the animal kingdom, birds are a part of the aves, or to phrase it in a simpler fashion, birds are aves. They are warm-blooded animals whose forelimbs are modified into wings, while the ones on the rear function as we know them in most cases. Birds characteristically have boney beaks, but no teeth, and they give birth to their offspring through eggs. Sunny side up, anyone?



**Ichthyornis, which lived 93 million years ago, was the first known prehistoric bird relative preserved with teeth**

We will cover each of these characteristics in detail later in the book. So, hold on to the questions that would be storming in your mind right now. For now, let's have a look at the evolution of birds and their connection to a much older and larger species of animals. Hint: They are pre-historic.

### The dino connection

From the hint that we gave you guys in the last section, you might have guessed that birds trace their roots back to the dinosaurs, the creatures that ruled the planet long before we came along. Their first connections are to the theropod dinosaurs that are named, Praves. Earlier, for a long period of time, when there wasn't enough

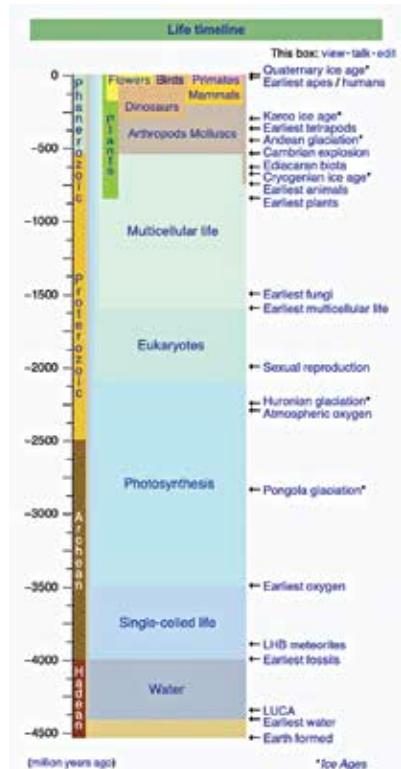
evidence for the researchers of the world to reach a consensus as to which species or family of dinosaurs the birds were related to, the one that was most widely accepted was the small theropod dinosaur *Archaeopteryx lithographica* from the late Jurassic period.

However, later research and data gathered from multiple studies have suggested that birds, a sister group of theirs, called the order Crocodilia are related to the reptile clade, the Archosauria. If you are to go deeper into the world of Phylogenetics, then you would find multiple other theories and multiple definitions of the term Aves, but for the sake of simplicity in this book and considering the modern classification and lineage of birds, calling all birds for that matter, Aves.

The direct relationship between dinosaurs and modern birds is still under debate and up for researchers to find conclusive evidence against. However, from what limited data that we have, like this study titled, *The origin and early evolution of birds*, which says, “Birds evolved from and are phylogenetically recognized as members of the theropod dinosaurs; their first known member is the Late Jurassic *Archaeopteryx*, now represented by seven skeletons and a feather, and their closest known non-avian relatives are the dromaeosaurid theropods such as *Deinonychus*”, we can safely say that there was a connection between birds and dinosaurs.

## In the modern day

When talking about the modern species of birds, it can safely be said that all the birds can be clubbed into a single apex group called Aves. We have already defined aves, so now let us understand how they are classified. At the top, we have two major branches, Neognathae and Palaeognathae.

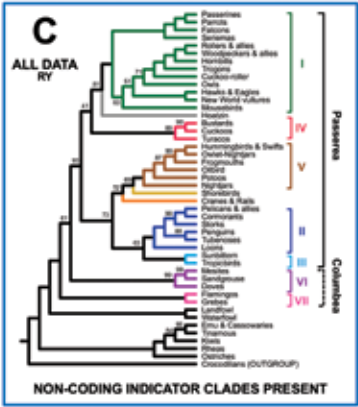
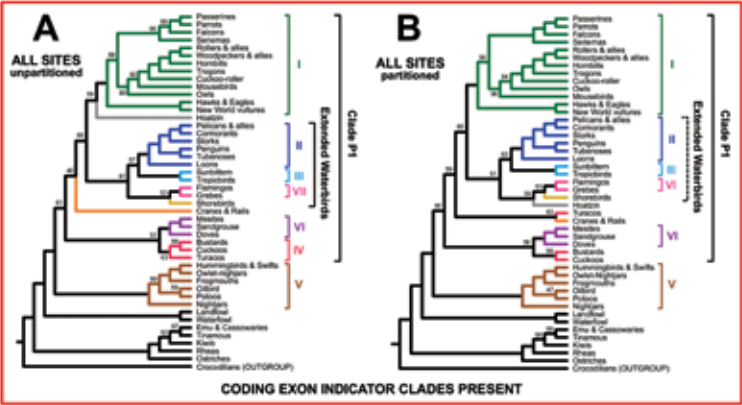




6 The first flight

Neognathae is the infraclass of birds, including a lot of modern birds, with the number as high as 10,000 species altogether. It is a group defined on the basis of palate structure, with a mobile palate and some bones reduced. Their first fossils date back 70 million years. The birds in this category are capable of swimming and diving, for example, penguins and other high-performing gliders like petrels and albatrosses. Also included are swifts and hummingbirds, which after years of evolution, have mastered powered flight.

Palaeognathae is the category that is home to some of the largest known living birds on planet Earth. These include birds like ostrich, which are known to grow up to three meters in height and 135 kilograms in weight. These birds generally lack the ability of flight, which is one of the most well-known traits of birds, which they make up for in their speed on the ground. Taking the example of ostriches again, they are known to





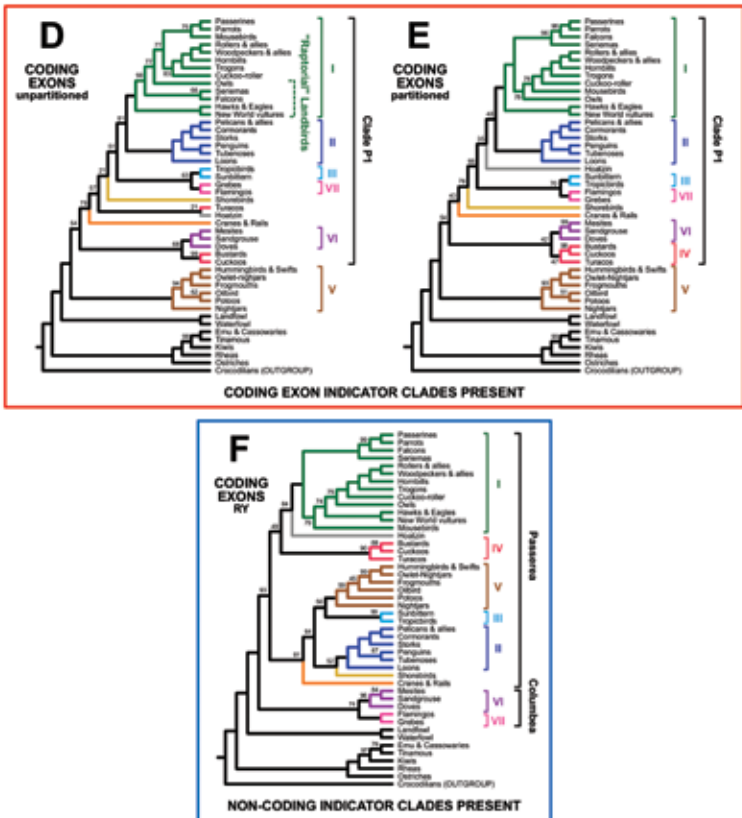
outrun a horse and kick with so much power that it can seriously injure or even kill humans. While these birds, after evolving and changes to their genetic makeup, might have lost their ability to fly, but their ancestors didn't shy away from flying.

Now... Roll up your sleeves, as things are about to get real.

Neognathae as we told you form the majority of living birds today. So we have multiple sub-classes of birds within them. The first two major categories are – Neoaves, and Galloanserae.

Galloanserae have two sub-classes – Galliformes, and Anseriformes. Galliforms consist of chickens and their relative birds, and the other consists of ducks and related birds.

Now let's get to the bigger class the Neoaves. Neoaves have three sub-classes within them – Passerea, Columbimorphae, and Mirandorithes. Within Mirandorithes, we have flamingos and grebes. Within Columbimorphae, we have two sub-classes –



Columbiformes a.k.a. pigeons and doves, and the other, which has Pterocliiformes (sandgrouse) and Mesitornithiformes (mesites).

When going into Passerea, is where things get interesting. We have 8 sub-classes – Telluraves, Phaethoquornithes, Strisores, Opisthocomiformes a.k.a. hoatzin, Charadriiformes which have waders and the related birds, Gruiformes, which have rails and cranes, Musophagiformes (turacos), Otidiformes a.k.a. bustards, and Cuculiformes a.k.a. cuckoos. We have three others, which have their own sub-categories – Telluraves, Phaethoquornithes, and Strisores. If you are lost in this name fest, then trust us, we were too, and it wasn't until we saw it all pictorially arranged, that we were able to make sense of things. So, without any delay, we have the chart that would explain the remainder of what we have and everything that we covered earlier in the chapter.

## What are they like?

Just like every time, before diving deep into the world of birds, understanding their biological makeup in-depth will stir up your brain, filling it with questions. And this time, we shall do this by talking about the major characteristics of birds. This might look like a page from an elementary school book. However, it is important to establish some things before we go ahead and talk about the remainder of what there is to talk about birds. So, here goes nothing –

1. They have large muscular stomachs.
2. They have a strong yet very light skeleton.
3. They have very sharp eyesight.
4. There is no gland on their skin, apart from the skin gland.
5. Their heart is four-chambered, and their RBCs are oval, nucleated and biconvex.
6. The alimentary canal has a crop and a gizzard.
7. Some birds lack a gall bladder.
8. Their legs have epidermal scales.
9. Their endoskeleton is bony with long hollow bones filled with air cavities.
10. They have 12 pairs of cranial nerves.



Having made you read through this seemingly random selection of facts about birds, we have prepared you for the sections that follow. However, we have one more section in this chapter before we move on. It is about Avian Genomics.

## What is it?

When talking about Avian Genomics, there is no better way in which things can be put, other than what is written in this article by OUP –

“The evolutionary relationships between modern bird lineages are contentious and have been debated for many years. In order to address this point, the Avian Genomes consortium has sequenced the genomes of 45 species of bird representing 36 orders. Together with the three previously sequenced genomes, these data have helped us resolve the phylogeny of the class Aves. As well as specific insights into bird biology, the wealth of data generated has allowed researchers to answer more general questions about evolutionary biology. A number of articles arising from this project have been published in *Science*, including the two flagship articles (DOI: 10.1126/science.1251385 and DOI: 10.1126/science.1253451).”

Honestly, there is nothing more to explain here. This covers it all. If you are interested in reading more about the topic of Avian Genomics, then we'd recommend you skim through the two papers that are listed above. For now, we will move to the second chapter of the book, which will explain the anatomy of birds. ■

# Anatomy of the flyers

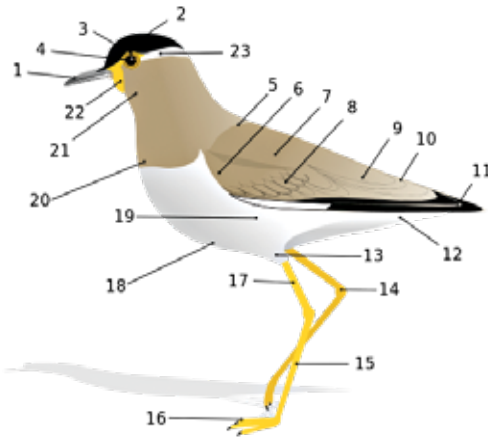
Look at what's inside these flying living machines

It is finally time for us to release all the thoughts that were doing rounds in your mind and reveal the secrets about the anatomy of birds. This chapter is dedicated entirely to exploring the anatomy of birds and figuring out how and why they are the way they are. We will look into their skeletal makeup, their digestive and excretory system, and much more as we move along.

### Lightweights

The skeletal system of birds is one of the most interesting parts to explore. Their bones tend to have large, air-filled cavities that help in bringing down the weight of their entire skeletal system. Not only this, but it is also these cavities that are connected to their respiratory system! Fascinating, isn't it?

The orbital cavities in their mouth are where we find their eyeballs, which are separated from each other by a bony partition, which is called a septum. Their skulls are also very interesting, wherein, when the birds mature and become adults, their bones are fused. However, they never show cranial structures, which essentially are fibrous joints like the ones that we find in our skull. Since they are vertebrates, they have defined spines, which have been known to have defined cervical, thoracic, lumbar, and caudal regions. Their vertebrae are known to be slightly variable, and the quality that defines them the most is their extreme levels of flexibility, which is rarely replicated in any other living animal on the planet.



1 Beak | 2 Head | 3 Iris | 4 Pupil | 5 Mantle | 6 Lesser coverts | 7 Scapulars |  
 8 Coverts | 9 Tertials | 10 Rump | 11 Primaries | 12 Vent | 13 Thigh | 14 Tibio-tarsal  
 articulation | 15 Tarsus | 16 Feet | 17 Tibia | 18 Belly | 19 Flanks | 20 Breast |  
 21 Throat | 22 Wattle | 23 Eystripe

However, the movement is reduced in their anterior thoracic vertebrae and is completely absent when it comes to their later vertebrae. In their vertebral column, the last few bones are fused with the pelvis. These fused bones form what is called the synsacrum. Their forelimbs, as we know, are modified into wings... which they



Familiar?

did not get from consuming a particular energy drink, by the way. Depending on the species, the development of their wing and the resulting ability of flight varies. Across history, there have been only two birds that have been known to have lost their wings altogether. They are – the extinct moa and elephant birds.

Talking about flightless birds, the ribs in the skeleton of the birds are flattened, and the sternum, which is supposed to be to be keeled for the attachment of flight muscles, is absent. It is only there in the birds that are known to have the ability to fly.

### Focus on excretion

Birds, when it comes to their excretory system, have a lot of similarities with reptiles. Just like the reptiles, they are uricotelic, meaning that their kidneys extract nitrogenous waste from their bloodstream that is excreted in the form of uric acid instead of urea or ammonia. Talking about anomalies in their excretory system, birds are known to lack a urinary bladder generally. We say this because there is an exception here in the form of ostriches. Due to the lack of a urinary bladder, the uric acid that is produced in the body is excreted in the form of semisolid waste alongside other faecal matter.

There is another set of exceptional birds, one of them is the hummingbird which stands out from the rest when it comes to the excretory processes that take place within their body. These birds have been found to be facultatively ammonotelic. This



Okay...

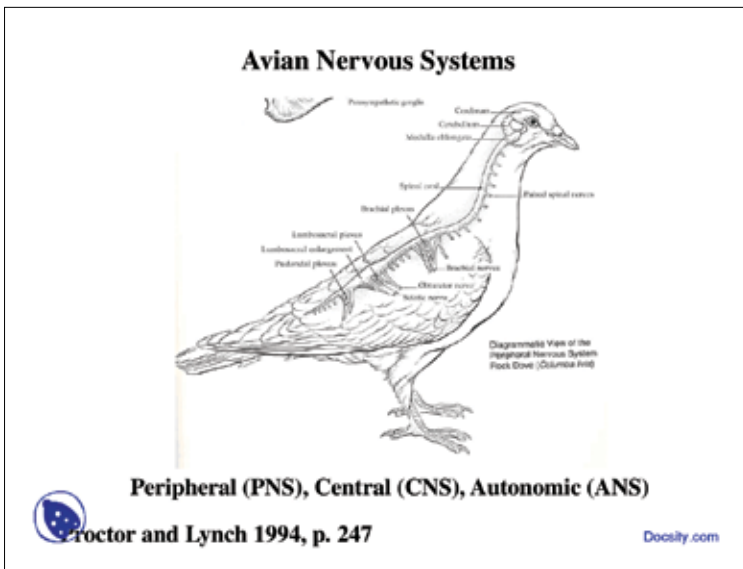
means that their excretion of nitrogenous waste happens not in the form of urea, but in the form of ammonia. These birds are also known to excrete creatine instead of creatinine which is generally the case with mammals.

The excretory orifice of birds is called the cloaca, and that opening serves more than one purpose. The cloaca is responsible for not only excreting waste through it, but it also works as their reproductive organ. It is from this very opening that birds also lay eggs.

In some birds, it has also been found that they tend to swallow some of the undigested pellets that remain in their excretory matter. This is mainly found in the altricial passerine nestlings, that are under constant parental supervision and need their assistance to ensure that they are getting a proper supply of food and nutritional matter. These birds tend to produce a faecal sac which is generally either disposed off by the parent birds or are disgusted by them to recycle the waste that had been produced. Having explored the excretory and skeletal system of birds, let's move on to exploring the system that controls it all, the nervous system.

## Nerve wracking moments

The nervous system of birds, as it is the case with most other animals dwelling on planet Earth is complicated and unique in its own way. One of the first things that catch the eye when reading about the nervous system of birds is the size of their nervous



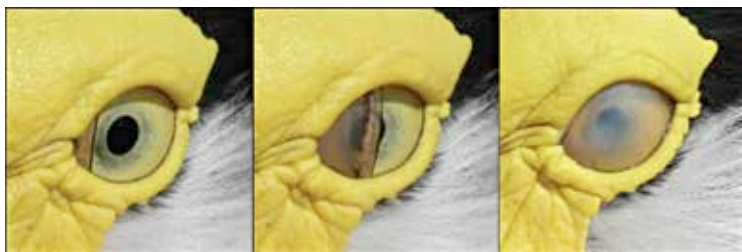


system, which, when compared to their overall size, is completely out of proportion. It is huge compared to the overall size of birds.

Like it is the case with most animals, the cerebellum controls movement, and the cerebrum is the part of the brain that is responsible for controlling their behaviour patterns and activities like navigation, mating, and nesting. If you look at some of these traits in action, like the intricate nests built by some birds and the navigational capabilities of some, you will be astonished and would appreciate their systems even more.

However, it has been found that a good percentage of all birds have a poor sense of smell. The exceptions, in this case, are birds like Kiwis and New World Vultures that have been known to possess an uncharacteristically accurate and sensitive sense of smell. The shortcomings in their sense of smell are made up for in the visual system that some of the birds have.

While it is a common trait in birds to have impeccable vision, some birds have been found to have a vision that accommodates providing visibility in air and water, too. Some birds have been found to be tetrachromats too, meaning that they have the ability to perceive an unusually wide spectrum of colours. Some birds are also known to have the ability to perceive UV rays too!



**The nictitating membrane as it covers the eye of a masked lapwing**

In birds, the eyelids, too, are not used to lubricate the eyes. There is a third eyelid, called the nictitating membrane, that is used to lubricate their eyes. It moves sideways and sometimes also acts as a contact lens in some aquatic birds. Their retinas have a blood supply system that is shaped like fans and is called a pecten.

The movement of the eyes of generally all the birds is very limited. Most birds are only able to move their eyeballs by like 10-20 degrees. However, this limitation in the movement is made up for by their wide field of vision and binocular vision that is generally found in owls. Some birds are also capable of sensing depth of field using their eyes.

### **Breathe in... breathe out**

Before moving on to understanding how birds can fly, we will take a brief stop to under-



**Maginificent doesn't even begin to describe this picture, don't you agree?**

stand the respiratory and circulatory systems in birds. We all know that pilots, in order to perform manoeuvres while locked in the cockpits of their fighter jets, require years of training, and while diving out of planes, untrained people tend to straight up pass out.

Birds inherently have the ability to fly, and their circulatory and respiratory systems are designed accordingly. If looked at closely, they have one of the most complex respiratory systems of all animals. So, let's look at how it all functions.

When birds inhale, 75 per cent of the fresh air that is taken in bypasses their lungs and flows directly into a posterior air sac. Remember the skeletal cavity that we had mentioned in one of the earlier sections? This is where it comes into play. When the birds exhale, the air stored in their lungs is directly passed out, and the residual air that was stored in their air sac rushes into the lungs to replace it. At no point are the lungs completely empty.

Now coming to the flow of blood in the bird's bodies, let us have a look at the circulatory system. In avians, the



**Didactic model of an avian heart**

circulatory system, as we have mentioned earlier, has a four-chambered heart at the centre of all things. The avian heart is composed of endocardial, myocardial and epicardial layers. When looking at the ratio of the size of the heart to the body, then the avian hearts are larger when compared to mammals. This allows for a better flow of blood inside the body, which makes up for the high metabolic need that is associated with the changes they undergo during their flights.

Their lungs, too, have a larger air exchanging volume when compared to other mammals, especially humans. They have more blood per capillary compared to what is there in humans and other mammals.

### Of the scales and feathers

The feathers are a defining characteristic of birds and help them stand out from the rest of the related species. Feathers, despite appearing to be an addition to the aesthetics of the birds, also help in thermoregulation. This means that the change in temperature of their body, which it has to undergo, given that birds descend and ascend rapidly, is moderated by the feathers that are present on their bodies.

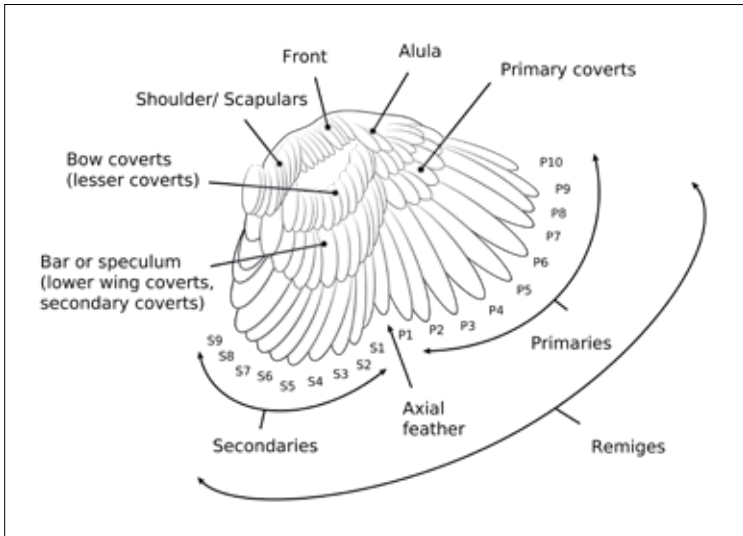
Feathers only grow in certain areas of the skins of birds, called the pterylae. And the arrangement of feathers on the body of the bird is called plumage. Plumage in birds depends on various factors like their species, age, etc. Feathers on the body of



Spot the owl in this picture

birds shed and regrow over time, and this also, in certain cases, leads to changes in certain abilities that the birds have. For example, in ducks and geese it so happens that they lose all their flight feathers at once and are devoid of their ability of flight for a short period of time.

The scales of birds are made up of the same keratin that makes up their beaks, claws, and spurs. Scales are generally found on the toes of birds and metatarsus. However, in some birds, they may also be present on the ankles.



**A chicken wing (not that)**

## You're meant to fly!

One of the most distinguishing abilities of birds is their ability to fly. That is what makes them stand out from most other vertebrates. When it comes to birds, flying serves multiple purposes. It not only helps them move from one location to other but also helps them escape predators and search for food.

Many factors and adaptations that have taken place over the years help birds in flying. Their modified forelimbs, and lightweight skeletons, large and developed flight muscles, and pectoralis are the major ones helping them soar high in the skies. Depending upon the species, different birds have different flying patterns. While some make extensive use of their muscles to have a constantly powered flight, others make use of the special wings that they are endowed with to have flight patterns that are more gliding heavy and don't involve a lot of power feeding.



**Flying together in a swarm, much like insects**

Years of research have revealed that flightlessness arises in birds that are trapped in environments that are plagued with the problem of scant resources. It has also been found that almost 60 per cent of all the birds that are there on the planet right now are flightless, and the same was the case with many extinct birds.

Commenting on the effect of the power of flight in birds, Peter Mikula, Anna Toszogyova, and Tomáš Albrecht in their research paper titled, A global analysis of aerial displays in passerines revealed an effect of habitat, mating system and migratory traits, wrote –

*“Aerial displaying is a flamboyant part of the sexual behaviour of several volant animal groups, including birds. Nevertheless, little attention has been focused on identifying correlates of large-scale diversity in this trait. In this study, we scored the presence and absence of aerial displays in males of 1732 species of passerine birds (Passeriformes) and employed Bayesian phylogenetically informed mixed models to test for associations between aerial displays and a set of life-history and environmental predictors. Our multi-variate models revealed that species with males that perform aerial displays inhabited open rather than closed (forested) habitats. These species also exhibited higher levels of polygyny, had more elongated wings, migrated over longer distances and bred at higher latitudes. When we included species where the sexual function of displays has not been explicitly described but is likely to occur, we*

*found that aerial displaying was also associated with smaller body size and increased male plumage coloration. Our results suggest that both sexual selection and natural selection have been important sources of selection on aerial displays in passerines."*



With everything said and explained about the anatomy of birds, we hope that you'd have grasped enough to explain the same to your friends and also make sense of the things that we will be discussing in the next chapter. We will be talking about the dietary preferences, migration patterns and reasons of birds, and lot more in the third chapter. ■

# Of the fight and flight

It's about survival ultimately

So far in this book, we have explained the anatomy of birds and how they evolved, albeit in much lesser words than we would love to. However, that has been the case with us for some time. Not wasting any more of what limited words that we have, let's move on and get a better understanding of the remainder of things about avians that will round up your scientific understanding of these flying creatures.

### What do birds eat?

When it comes to exploring dietary preferences, then avians are one of the most interesting subsets of animals to look at. Their diets vary immensely across species. Although, they have been

primarily known to consume nectar, fruit, plants, seeds, and a variety of small animals, which sometimes includes other birds as well. Their digestive systems have also evolved to compensate for their lack of teeth and other regional and species-specific dietary preferences.



**Sunbittern mimics a large predator**



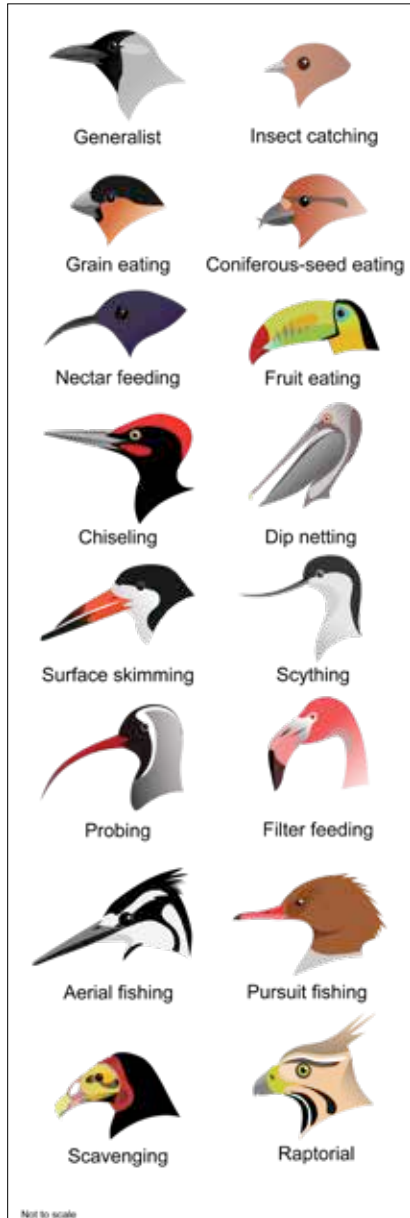
One of the best ways to identify what kind of diet a bird has is by looking at its beak. Different birds have undergone evolution to have distinct forms of beaks that help them consume different kinds of foods. There are nectar-feeding birds like hummingbirds and lorises that have curved, slender, and pointy beaks. We also have others like flamingos that have specially shaped beaks that help them filter feed.

### Quack quack

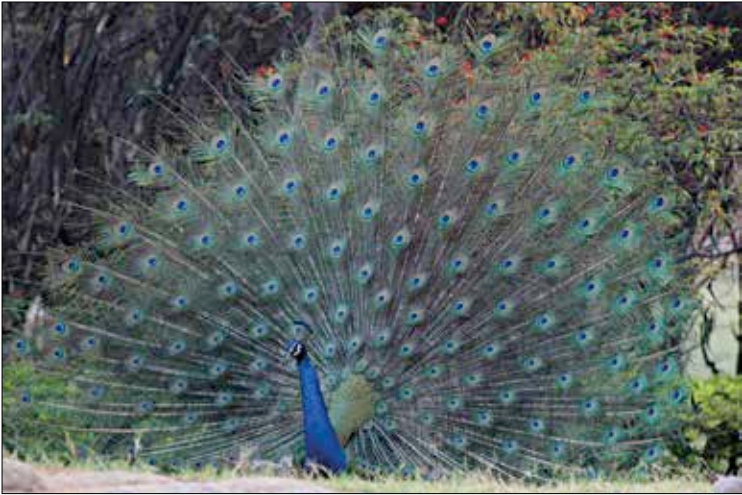
Birds have been known to be auditory and visual communicators, meaning that most of their communication takes place via audio signals and visual cues. These signals that birds have can be specific to their species or within a certain group of species. Some of the visual displays by birds have also been viewed as spectacles throughout history, with peacock's dance before rains being one of the most commonly talked about sightings.

The organ that helps birds produce the distinct sounds that they do is called the syrinx. The communication between birds can be very complex, with certain species of birds even being able to modulate their auditory cues by operating the two sides of their syrinx independently.

The calls between birds can be made for a variety of reasons,



Feeding adaptations in beaks



**Maginificent peacock unfurling nature's glory**

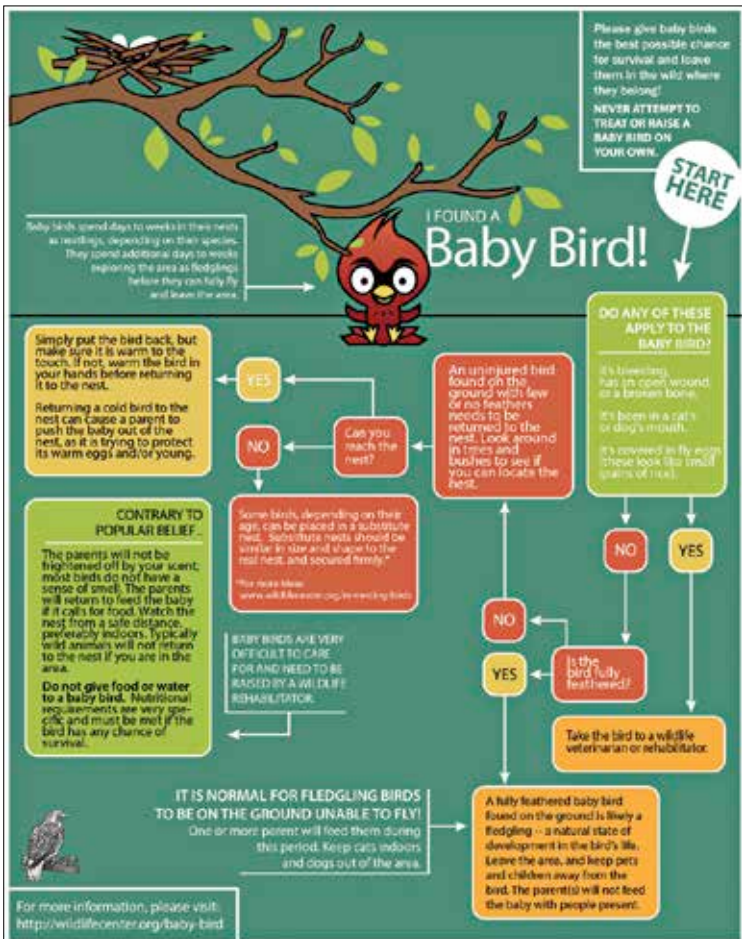
including mating and evaluation of potential mating partners. Sometimes these calls can also come into use by birds for establishing territorial dominance. For example, in a study titled Middle Spotted Woodpecker territory owners distinguish between stranger and familiar floaters based on their vocal characteristics by E. Węgrzyn and K. Leniowski notes –

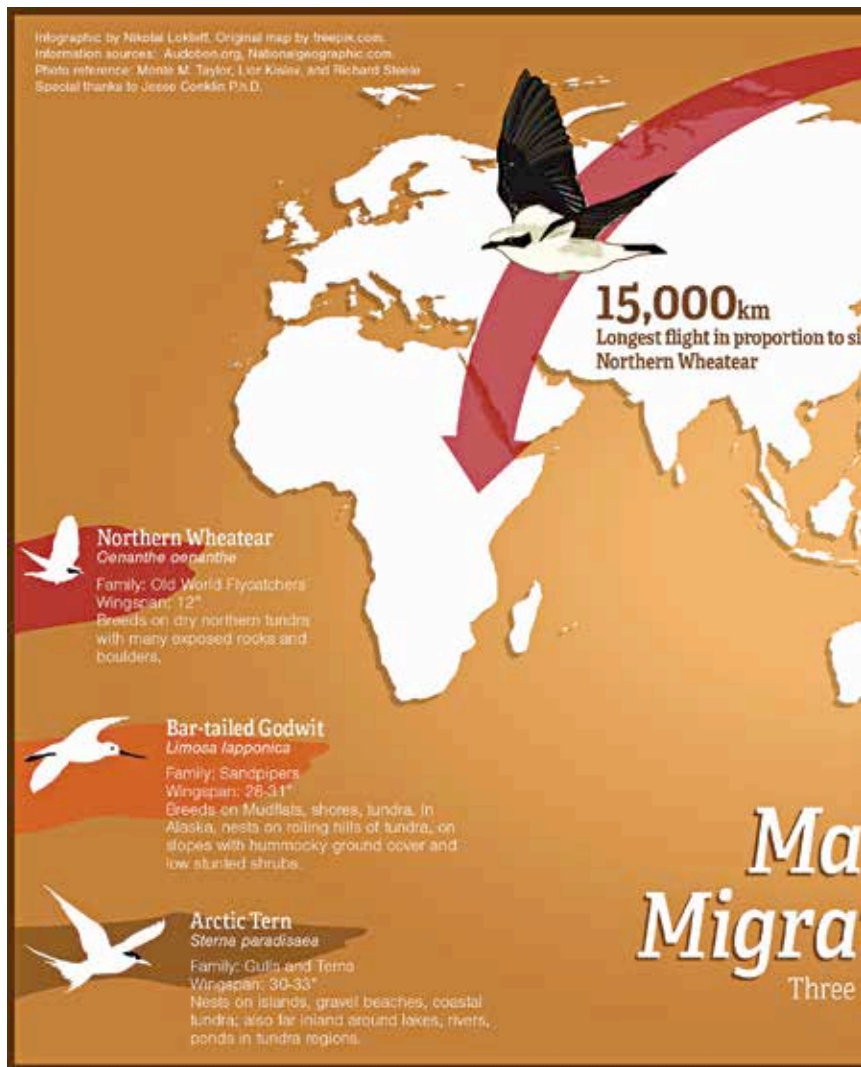
*“Abstract Acoustic communication is an important part of behaviour in many bird taxa. In most woodpecker species drumming functions in mate attraction and territory defence. However, woodpeckers also produce calls, which function has been less studied to date. Unlike other woodpeckers, the Middle Spotted Woodpecker *Dendrocoptes medius*, which is the subject of our study, drums very rarely. Instead, it uses a number of calls, which functions have not been tested to date. We aimed our study at the identification of different calls and assessing their function, both by observation of spontaneous interactions between individuals and playback experiments. We distinguished three calls of different spectral characteristics and functions. Call-1 was mostly uttered by individuals sitting on the branch or a trunk. It was an initial response of territorial pairs to any disturbance within a territory. It signals general anxiety and/or arousal of territorial individuals. Call-2 was mostly uttered by the individuals during flight and it accompanied territorial conflicts and trials to remove the intruder from the territory. It warns the intruder about a territory owner’s readiness to a direct fight. Call-3, characteristic for floaters, was a persistent vocalisation without any obvious stimulus. Acoustic analyses of call-3 revealed that it was individually distinctive and the*

experimental approach confirmed that woodpeckers were able to distinguish between calling floaters. Thus, Call-3 functions as a vocal signature of unpaired individuals."

## Making more birds

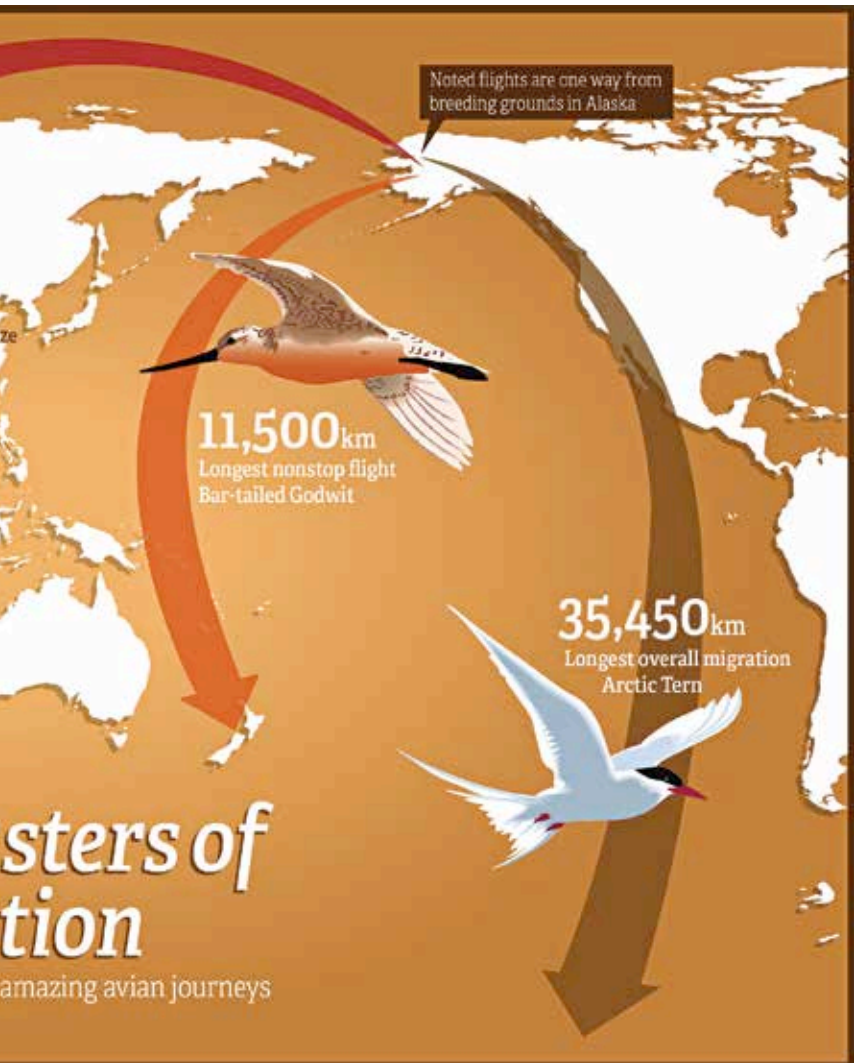
Birds have very specific mating patterns, and the process is something that many biology enthusiasts tend to spend hours examining the entire process closely. There is an entire field of study that is dedicated to this called Oology, which you may or may not know about. We reserve that for a future edition of the book. Let's skip ahead and look at the different nesting patterns that avians have.





## Flying away

Migration has been a phenomenon that has also been peculiar to birds in general and has been widely associated with them. Birds generally migrate from an area of low resource density to an area where it is generally high or has trends indicating that it will be higher. Birds that nest in the Northern Hemisphere tend to migrate northward

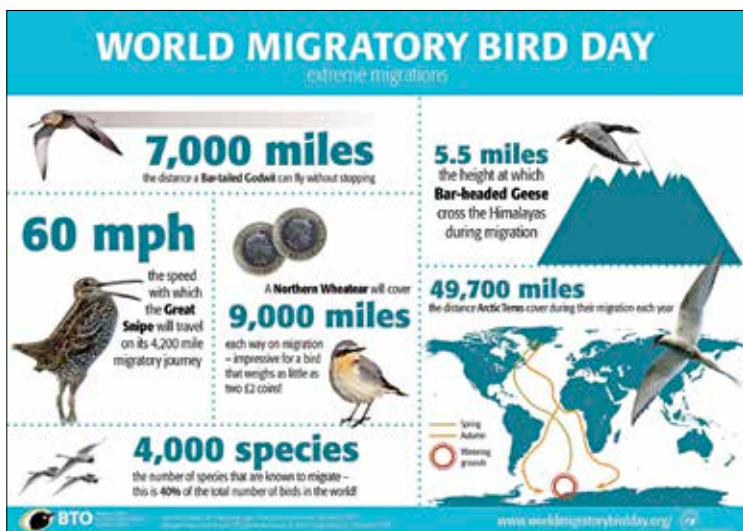


in the spring to take advantage of rapidly increasing insect populations, budding plants and a large number of nesting locations. As winter approaches and the availability of insects and other food drops, the birds move south again. Escaping the cold is a motivating factor, but many species, including hummingbirds, can withstand freezing temperatures as long as an adequate supply of food is available.



During migration, there are four basic patterns based on distances that have been observed –

- Long-distance migration: Birds generally tend to cross long distances, over a 600-700 miles at times, sometimes crossing country borders.
- Medium-distance migration: Birds cover a distance of a few hundred miles.
- Short-distance migration: This involves small movements, for example, moving from a higher elevation area to a lower one on a mountainside.
- Permanent residents: These are the birds that do not migrate at all.



Now that you have read about all that there is about the anatomy, dietary patterns, and the rest of what there was for us to tell, we think your education on the topic is almost complete. However, no story is complete without a couple of anecdotes from history. So, we packed the next chapter with plenty of such anecdotes from culture and history for you to top off all the stories you tell on your next birdwatching trip. ■

# The final call

Cock a doodle doo, yodel-ay-hee-hoo!

**H**aving learnt about almost everything about birds that there is, even if it was in a much shorter version than it would have been, let us get into wrapping up with a small dose of culture and some learnings from the degrading conditions of birds which we have a lot to learn from. There is not much science here. But the stories and connections are so interesting and important that we could not help but include these in the book.

### Birds and humans

When talking about the connection between birds and humans, there are multiple directions we can take. Birds have been such an integral part of human existence that



Painted tiles with design of birds from Qajar dynasty



binding all the ways in which they are connected to us is actually impossible. So, here we have broken down this connection into different sections.

Let's start with the historical (incl. religious and mythological) connection between humans and birds. So, when talking about this, one of the first instances where we see their presence is in religious and mythological literature. There are several instances that have been noted throughout history where humans have been known to have a religious devotion towards birds, traces of which can be seen in modern society too.

Generally, birds in mythology appear as messengers of gods and deities and sometimes play a pivotal role in mythological events. The two best examples are –

As per popular belief, in the Cult of Makemake, in which the Tangata manu of Easter Island served as chiefs. In India, the common peacock is perceived to be the symbol of Mother Earth. And, Jatayu, a mythical bird, plays a pivotal role in the happenings in the mythological scripture, Ramayana.

There are several other instances across the globe where birds have appeared from time to time. For example, the presence of birds in the historical cave paintings done



by early humans. It was their attempt to convey the vital role that birds played in the day-to-day happenings of that time.

Just rolling back to the topic of birds being messengers, until very recently, when looking at the overall existence of humanity on Earth, pigeons were actively used to carry messages. Their inherent cognitive ability to navigate on fixed routes on multiple repeated occasions was identified by individuals and put to use to carry important messages across large distances. Traces of this can be seen even today, as often there are news pieces of pigeons and other birds being stopped from flying from one side of sensitive borders to the other, owing to the worry of the guarding forces that they may be carrying vital information, which could be helpful for the other side.

Apart from this, several regions of India have been known to have sporting events involving several birds. In the northern part of the country, specific breeds of chicken that are known to be aggressive are put up to fight, and bets are placed on who'd emerge as the victor in the bout. In other regions, pigeons are trained to fly as fast as they along certain paths, and their race is enjoyed by the people as they watch them race in the skies.



**The M4A4 Griffin from CS:GO**

Now, let's have a look at the ways in which birds have been a part of modern culture.

Be it any form of art that humans have been practising over years, birds have been an important part of the cultural happenings throughout. When talking about modern culture and the presence of birds in different forms of art, let's take the example of video games.

A game as popular and engrained in modern video game culture as Counter-Strike: Global Offensive has multiple instances of birds appearing in the game in the form of artworks. There are weapon skins like the M4A4 Griffin that is popular amongst the players and were created around the central figure of a bird. If you want to expand your understanding of this subject, we highly recommend reading this blog by CS.Money - <https://dgit.in/CSMoni>

Even countries have their identities defined by birds. In the United States, the Eagle is the definitive symbol of the country, symbolically representing the valour and bravery of the citizens and their love for freedom. In India, the national bird is the peacock, which symbolizes the diversity of the country and the beauty that it brings to the place when it all comes together in one piece and dances to the tunes of the raindrops.

One trope that has transcended all the boundaries over the years has been that of the rooster waking every one up in the morning. Even in today's time when we have



### It's Murica!

alarm clocks, the trope about the rooster not making its signature sound in the morning, causing a delay in the subsequent chain of events, lives on. And its origins cannot be traced back to one single region, although people from many different places would definitely love it to be attributed to their area.

There are several books that have also been written throughout history that use birds and their characteristics as examples to impart certain lessons and learnings. One such book that has seen a lot of sales in recent times is Jonathan Livingston Seagull.

When talking about music, one can only sit, count, and admire the number of songs that have been written about birds. There are certain melodies, like the one titled *L'incroyable vie des choses* by French musician Jacques that make use of bird sounds to make a modern upbeat melody that has become immensely popular recently in Western Europe. Like it is the case with other areas where birds register their presence in



**Nature's alarm clock**

human creativity, music has also been an area where that presence has strongly been felt.

Finally, the economic importance of birds. The first thing that comes to mind here is poultry farming. That makes up a huge chunk of cash flow in the modern markets as eggs and meat make for a huge chunk of the diet of a major part of the popular across the world. Apart from that, there are several products, many of which you would be surrounded by right now, that use bird-derived products and are a mainstay in the economic activities of many places and individuals.



However, the increasing economic dependence, be it direct or indirect, has led to a lot of exploitation of a lot of species. Not only this, the rapid change in climatic conditions and the decline in forest cover have pushed multiple species of birds towards extinction, with many already long gone and others on the verge of vanishing from the face of the planet. That brings us to the last part of the book, which is about the conservation of birds.

## **What have we done?**

We have caused a lot of harm to birds all around us, causing some of the most interesting

species to go completely extinct. Every year, Wikipedia's list of extinct birds (<https://digit.in/BirdWiki>) grows longer. While there is nothing that we can do to bring the lost species back, the ones that are left can benefit a lot from the minuscule changes that we make to our lives and our lifestyle choices.

Organisations like Birdlife International are actively working toward birds conservation, fostering a mindset in individuals across the globe to ensure that their message reaches the majority of the population and has an effect on the way we treat birds. A part of their mission reads, "... We organize our work strategically around Species, Sites, Society and Systems – linking up birds, habitats and nature, and people. In this way we can tackle effectively the underlying causes of the destruction of our planet, change our behavior and our choices to ensure our children's and grandchildren's future."



**Speaks a lot, doesn't it?**

Even the governments are taking proactive steps towards conserving birds. The Indian Government, as reported by Mongabay already has a 10-year plan in the works to foster conservation of birds in the country. They wrote, "The Indian government has come out with a 10-year plan to protect birds and conserve their habitats. At least 1,317 bird species have been recorded in India and about 100 of them are in the threatened category. The draft plan proposes steps to protect migratory birds, conserve wetlands and focus on birds in urban areas. The draft plan, which has been put in the public domain, noted that anthropogenic activities leading to increased levels of greenhouse gas emissions are also impacting the environment on a global scale and urged interventions to minimise and mitigate such impacts on avifauna."

Whatever efforts are made by institutions, be it government or public, no change is actually going to come into effect until all of us come as a group to make it work. We need to become more aware. And, now that you have read through this book, understanding most of what is needed to have a healthy conversation about birds, their anatomy and how the changes affect not only the economic but ecological balance, we hope you will be a messenger for positive change too. ■

**Everything you could ask for!**

<https://dgit.in/TheBirdWiki>

