

Nature's Amazing Migrations

Celedonio García-Pozuelo Ramos

The book is divided into several chapters by the type of animals and migrations. The author goes in depth about these phenomena with extensive knowledge and skill, using precise yet educational language.

Nature's Amazing Migrations

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Presenting information in paragraphs that stand out, such that their reading is very appealing and can be discussed among parents and their children. All of the topics are supplemented by numerous charts and amazing photographs and illustrations that are simply gorgeous.



This book offers one of the most extraordinary events that occurs every so often in nature: migration in the animal kingdom.

Nature's Amazing Migrations

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On the Move

Billions of birds journey during their great migration, and there is practically no place on Earth in which at least one of its journeys is not witnessed.

Who wouldn't know of migrating birds back home? But birds are not the only animals to travel. Migration is a necessary phenomenon, not a whim of nature. The same reasons that force birds to migrate also force mammals and other species to journey to distant geographical locations.

While it is true that no species migrate as much as birds do, it does happen and it takes place all around the globe and on some of these journeys, the power of nature is evident. Such is the case of herbivores in the African Savannah and the dangers they encounter along the way. Sadly, it is humankind and our activities that pose the biggest threat to such tireless travelers.

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Some of them are in danger of extinction because of the selfish desire to get rich or simply the desire to collect smaller or larger trophies. That is why so many animals suffer as victims of the degradation of extinction and all of creation suffers as a result.

FACTS

- The **zebras** that enjoy the abundance of the Okavango (Botswana) River Delta leave their paradise and journey 270 kilometers through arid lands in order to supply the lack of salt in their diet, venturing into the plains where this mineral abounds. Afterward, they will withstand the lack of water and food in the long journey back.
- The journeys are not always long, but the reasons are always the same. There is a particular tree on the Borneo Island. It is a special fig tree grows there and blooms every two years, producing great amounts of fruits. **Orangutans, gibbons, langurs** and other **monkeys** come to meet there. A small tree is the reason for a journey of up to 7 kilometers.
- Different species of goats in all mountains of the world, take a yearly journey up to great heights. The Iberian **mountain goat** (*Capra pyrenaica*) in the Central system of the Iberian Peninsula is one of them. During summertime it goes to 2,500 meters in elevation and it descends during winter to warmer valleys.

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The author, Celedonio García-Pozuelo, whose curiosity leads him to study everything that moves and lives, takes us magically by the hand into each of the mysteries of the phenomenon of migration, and shows us the scope of the journeys undertaken by some animals on our planet.

Journey on Ice

To live on ice is to live on the verge of death, which is evermore threatening for those species that live in the frozen kingdoms. The global warming effect may be writing a death sentence for those animals which are better suited for the cold weather. **Polar bears** are solitary nomads that move through the pack. The pack is the frozen body of water that comprises the polar oceans. At times, they must swim between ice fragments. They do it with extraordinary ability, crossing up to 100 kilometers of water. Less and less ice is continually testing these great swimmers. More and more drown to death. In addition, with no ice, they are unable to hunt for their primary prey: seals calves. The vanishing of ice is also endangering the **walrus**. If the frozen plates disappear, it's more difficult for them to reach open sea where they find their food. The body of ice is in danger, and so is the hosts.

The polar bear
maritimes
the

Like other inhabitants of the North Pole, the life of a polar bear revolves around the so-called "Arctic ring of life" between the Arctic coast's tundra and the ice pack that moves into the ocean without reaching the northern most areas. At times, bears swim from ice block to ice block reaching 1,000 kilometers in a year. They travel toward the Bering Sea.

The bones in birds are lighter because they are less dense than the bones of a fox or those of any other mammal, including us. They are, however, very resistant thanks to the trabeculae formation which is similar to certain architectural structures such as the Eiffel tower.

The **hook** on birds is lighter than the snout on mammals.

The **keel** is like our sternum, only wider to provide support for the powerful muscles used during flight.

This **goose** (*Anser indicus*) that looks so peaceful in this picture is the bird that can fly at the highest altitudes. (9 kilometers above the Himalayan Mountain range). Such a feat is possible to achieve thanks to its design as a bird and an ability to efficiently use the oxygen that is very scarce at this altitude. Any one of us would faint if we had to suddenly breathe this air, and our survival would be unlikely.

The body, the wings and the relation between the two determines the type of flight of the different birds. Fine, pointy wings like these are better suited to soaring.

We see the same situation in birds and other animals, although with an important difference: they have it all integrated in their bodies. They don't need to carry a multi-purpose blade because they are it. Among their tools, birds have a brain that provides them with remarkable intelligence. Corvids, species like the **common raven** (*Corvus corax*) or the **common magpie** (*Pica pica*) have shown remarkable intelligence and they have been shown to use logic when problem solving. In other words, they are

to resolve problems demanding several precise steps in only one attempt. No need to attempt solving it several times—what they do is they "think it through" first.

Parrots are known to speak, but are limited to only sounds. That is true, but the **grey parrot** (*Psittacus erithacus*) is able to understand and construct short phrases.

Such intelligence in birds was once thought impossible due to an error in the interpretation of their brain according to the theory of evolution in which the brain of vertebrates evolves as new structures are added to those of their ancestors. According to this theory, the brain of reptiles does not recognize anything other than instinctive behavior, and birds would have a reptilian brain with no more but to improve on their instincts.

Since the bird brain followed names were given to parts of limitations that they did not recognize these facts, it is now recognized that the reptilian brain is not a simple reptile, but a more advanced one that recognizes the awareness of these animals.

Ready to Navigate

There is no doubt that birds are a wonder of flight. For them, flying is not a hobby; however, their very survival depends on it. When flying long distances they make use of more than just their wings. In such cases, they add to the wonder even more.

When we plan a trip we need maps, compasses and a GPS in order to arrive at our proposed destination without perishing from dehydration in the desert, winning to death at the Poles or just plain getting lost in the forest. As a matter of fact, even

Doves of the Columbia River species, like the **rock pigeon**, have been trained as messengers thanks to their amazing sense of direction. The first messenger might have been the first used in the book of the

These journeys allow us to witness the spectacular sights of nature. Whether the animals are large and seemingly powerful, or small and surely fragile, all of them must use their talents, their abilities, to the highest limit to achieve their goal.

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We find unusual creation: «And the bird of the earth... given... wild... about... the giant panda bear... order of the carnivorous... eats bamboo.

Eutherians

These are the most common mammals. There are a total of 18 orders with diversity similar to that of the marsupials, but with many more species. In mammals, the uterus hosts the embryo's entire development process. Its young are born rather defenseless when they are outside the mother's body and the mother supplies milk to them. The placenta of eutherians has certain things that make it different than that of marsupials; an example is the chorionic villi which provide excellent nutrition to the embryo.

The **red panda** (*Ailurus fulgens*) is also a carnivore who primarily feeds on vegetables. Even though both are called pandas because of their obvious similarities, the great panda belongs to the bear family and the red panda is classified under Procyonids.



Rabbits and hares are rodents, even though they are classified as lagomorphs. They have two upper incisors, the other Rabbits and hares, capable of fleeing. Some hares have negligible speed of 70 km/h.

Can you picture a 35 kilogram rat? Well, there is species that can reach that size and it is in the rodent order, **capincho or chaguiro** (*Hydrochaeris hydrochaeris*) lives in South America in the eastern areas of the Andes, from Panama to Argentina. It lives in flocks in humid areas.

The insectivore order has many very strange species. Insectivores are tiny mammal carnivores. moles, hedgehogs, shrews and the peculiar tenrecs are in this order. The tenrecidae family has its entire species in Africa. All of them have a cloaca, like the Monotremes, and as in the case of the **lesser-hedgehog** (*Echinops telfairi*) shown here. Their body temperature is not as constant as it is with all mammals.



The anatomic efficiency of mammals is evident in its unmatched, elegant and powerful race of the fastest carnivores. Greyhound and cheetah alike, as shown in the X-ray image, have all muscles which are all designed to reach the maximum speed. The legs are not the only parts involved in the race. The spine is arched like a spring to add power to the limbs' movements.



The African Savanna is the setting for the pilgrimage of one of the largest mammals on land. The **African elephant** (*Loxodonta africana*) migrates in search of water, food and minerals and a better place to breed. To accomplish that, they must cross to desert areas that will take the life of many.



Even though they can breed during any time of the year, they often search for an area where food is abundant to finally breed. The Okavango River Delta, the River Chobe (Botswana) and the Banzai Lake (Mali) are such places where food abounds and they become the breeding grounds to elephants. Their wandering reaches a radius of hundreds of kilometers and they journey up to 1,000 kilometers per year.



Adult elephants have practically no natural enemies. Humankind is its biggest one. Poachers kill these amazing animals only to remove their tusks in order to later sell them.

Females are extremely watchful over their young, which were in their womb for 22 months before being born.

Hyenas are yet one more of the travelers of the African Savanna. The largest of the hyenas is the **spotted hyena** (*Crocuta crocuta*), which reaches 80 kilograms in weight and is not only an opportunistic scavenger, but also an incredibly efficient hunter. However, in places like the Kalahari Desert it must travel up to 50 kilometers to find food. Its territory spans up to 1,000 square kilometers, which is a larger area than the Lanzarote Island (Spain).



The strongest mandible in the Savanna is not the Lion's but the hyena's, which is capable of grinding the hardest of bones.



The females with calves travel in independent herds separate from the males that, at times, choose to travel alone. The family herd is usually led by a wise matriarch. The family is therefore united and protected from danger. If any of its members dies, they never journey along without first mourning their loss.

When the male titans mate, they fight over the females.

Mammal watching in Africa



- 1 Kruger National Park (South African Republic)
- 2 The five giants of Africa: 5G: The elephant, rhino, buffalo, lion and leopard as well as the hippo, hyena, impala and zebra
- 3 El G5, hipopótamos, hienas... Serengeti National Park (Tanzania)
- 4 Masai-Mara Natural Preserve (Kenya)
- 5 The 5 giants of Africa, hyena, rhino, zebra and wildebeest... Banzai lake (Mali) Elephant

But what is it that moves these animals to undertake these amazing journeys? The search for food, a milder climate, or an appropriate place to reproduce. Many of these journeys are truly migrations that the animals undertake in a collective and organized manner.

All-Terrain Animals

Sea turtles are the big travelers among reptiles. They travel tirelessly thousands of kilometers in all seas. Males do not touch dry land except but when they hatch from the egg to run to the sea. Females are the only ones that return to lay their eggs at the beach where they were originally born. They use their sense of smell and their ability to detect magnetic fields as their guide to culminate their feat. These are great journeys, but these reptiles are not the only ones that embark on such journeys. There are other known cases, and there may be even more because we are still highly unfamiliar with these animals.

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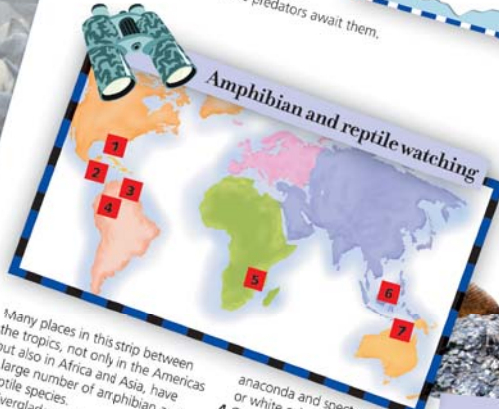
The **loggerhead turtle** (*Caretta caretta*) is a great traveler and perhaps the largest traveler of them all. Females measure around one meter and their lonesome journey can be up to 14,500 kilometers to its spawning destination beaches. Where do they live? Well, they have been found in all seas except the colder ones.



They often leave the ocean to lay their eggs during the night to avoid any predators and the blazing sun. They lay about 100 eggs and little defenseless turtles come out of them, and all they will need to do is sprint the short stretch of sand that separates them from the ocean. The distance is short, but it is a most dangerous one because predators await them.



The journey is 16 kilometers each way. The difficulty is in descending inside the volcano and then to climb up on its almost-vertical interior walls. From the coast it is 1,460 meters in height. Why such determination? It is because the heat of the volcano becomes the perfect incubator for the eggs.



Amphibian and reptile watching

- Many places in this strip between the tropics, not only in the Americas but also in Africa and Asia, have a large number of amphibian and reptile species.
- 1 Everglades National Park (US) three types of crocodiles, sea turtles
 - 2 Tortuguero and Corcoba National Park (Costa Rica) amphibian and reptile paradise
 - 3 Mariusa National Park (Venezuela) anaconda and spectacled caiman or white caiman
 - 4 Cahuinari National Park (Colombia) anaconda and white caiman
 - 5 Kruger National Park (South Africa) Nile crocodile
 - 6 Sipadan Island (Malaysia) sea turtles, hawksville turtle and green sea turtle
 - 7 Kakadu National Park (Australia) sea crocodile



The females of the **Galapagos land iguana** (*Conolophus subcristatus*) of the Galapagos Islands, Ecuador, endure a short but intense migrating journey to lay their eggs. In the Fernandina Island, they journey in June and July to the center of the island to the volcano site.

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If your life journey is a lonely one at times, don't lose heart, be strong. King David says the following words in Psalm 23: «Even though I walk through the darkest valley, I will fear no evil, For you are with me; Your rod and your staff, They comfort me.»

This book will most assuredly lead all of us to dream;
children, young people and adults alike.
We will fly with the monarch butterflies...

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This is a Lepidopteran insect, in other words, a butterfly. Its scientific name is complicated: *Danaus plexippus*. But its common name is well known, and we immediately think of the story of an amazing journey. The **monarch butterfly**. No more than half a gram of pure elegance.

Careful! Fragile!

Billions of Monarch butterflies bid farewell to their breeding grounds in North America to undertake a very long journey of thousands of kilometers to the Michoacan forests and Mexico (Mexico) where they spend winter time. Insects do not have any protection, they are soft and we may think that they cannot go far, but that is not the case, and some of these animals leave us with unbelievable images of a journey we once thought impossible.

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It has on the US and Central America...



They have been known to cross the Atlantic and Pacific Oceans, pushed by winds.

The fourth generation takes the journey back. It did not actually take any journey, but it knows it is supposed to head back. In addition to that, the monarchs' antennae detect the light which allows them to adjust their inner clock to use the sun as a compass. Its life span is not eight weeks, but eight months. It will journey from the eastern areas of the North American continent to hibernate in forests like el Rosario reserve (Michoacan, Michoacan) until the following spring.



The **green darner** (*Anax junius*) is one of the largest and... Fastest dragonflies on Earth. It can fly at up to 85 kilometers per hour. It weighs no more than one and a half grams; Entomologists have studied its migration with a radio transmitter on its back. Its migration starts from the eastern area of North America. They journey from the northeastern area of the United States and Canada to Florida, although not all dragonflies take the trip.



The **bogong moth** (*Agrotis infusa*) is another fragile traveling insect. It journeys up to 1,000 kilometers among the Australian Alps, where it spends summertime in the snow.

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... we will join in the transhumance of reindeer on the tundra,...



The Largest Mammal Migration on Land

Deer, goats, gazelle and antelopes are in the Artiodactyla order and, even though they are similar animals, they are all classified in different families. In spite of their differences, they all are long-distance travelers. We already had the chance to witness that with Thompson's gazelle and its journey through the Serengeti National Park.

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We will meet others here now and also the main character in the largest migration of mammals on land: The reindeer or caribou.



Almost 100 kilometers per hour! It's not the cheetah who holds the speed record but the **pronghorn** (*Antilocapra americana*). It is an animal with no close relatives, so it is classified in a family all its own: the Antilocapridae. They inhabit the Midwestern United States and southern Canada.



... and we will catch flight with the tiny Arctic terns that fly 17,000 kilometers each year to the Antarctic, to then return the following Spring to where they were born.

Nature's Amazing Migrations

To go from Earth to the Moon in space by flapping wings is impossible, however, there is a bird that over its 30 years of maximum lifespan can travel six times the distance between Earth and the Moon. That bird is the **arctic tern** (*Sterna paradisaea*) which can travel 40,000 kilometers in each direction of its migration journey. That is up to 80,000 kilometers in a year.



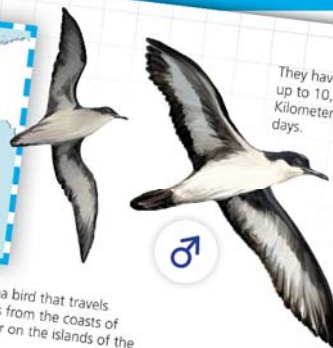
All albatross species are wonderful in their design as unmatched flying machines. The biggest of them has the largest wing span: a 3.5-meter wing span. The **wandering albatross** (*Diomedea exulans*) circles the southern oceans towards Antarctica without touching ground except to breed.



They nest in the island Antarctic perimeter single egg. They lay a single egg, since raising a great deal of their young.

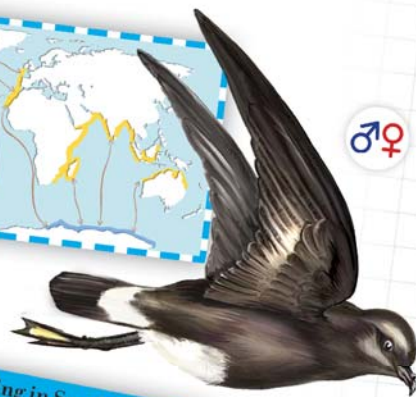
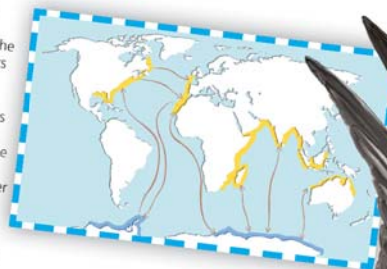


The **Manx shearwater** (*Puffinus puffinus*) is a sea bird that travels up to 12,500 kilometers in order to nest. It travels from the coasts of Argentina, Brazil and Uruguay to spend the winter on the islands of the North Atlantic, the Americas and Europe.



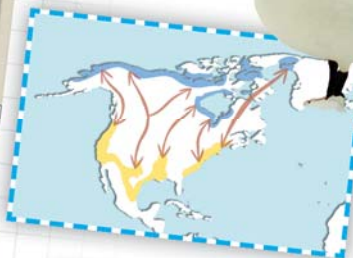
They have covered up to 10,000 kilometers in 17 days.

The **Wilson's storm petrel** (*Oceanites oceanicus*) is one of the most extreme travelers among sea birds and it journeys up to 15,000 kilometers in its adventures around the world. They breed in the Antarctic coasts during the months of November and December. In April they go the north and scatter themselves along the coasts and islands of the world.



Logbook

White goose (*Chen caerulescens*) travels from its home base in the US, to the north of Canada and Greenland to breed. The journey of up to 5,000 kilometers takes place in the spring. They mate for life and the divorce rate is unheard of. That's a huge lesson for the very rational humankind. When the cold weather starts they head back south in their trademark "V formation".



Birds have been used as an example since the dawn of ages when it comes to their moving with precision towards a goal. The Bible talks about their precise traveling with the seasons: "Even the stork in the sky knows her appointed seasons, and the dove, the swift and the thrush observe the time of their migration. But my people do not know the requirements of the Lord." (Jeremiah 8:7). The book of Jeremiah has harsh words for the chosen people of God, who are unwilling to follow the direction they are given and compares them to the birds that faithfully follow the laws that take them from place to place for their own good.

The **common starling** (*Sturnus vulgaris*) is from Eurasia and Africa, but it has started to invade other parts of the planet. In 1890 it was introduced to Central Park in New York (US). A lover of Shakespearean literature wanted to have all birds mentioned in the author's works. Soon thereafter this starling spread through North America and established a migration cycle similar to the one in the land it originated. It spends springtime in the North and travels south for winter.



Bird Watching in South America



- 1 Los Olivitos (Venezuela)
- 2 Iquitos (Peru)
- 3 Lake do Peixe (Brazil)
- 4 Punta Rasa (Argentina)
- 5 La Serena (Chile)
- 6 Tierra de Fuego (Argentina, Chile)



This is an annual journey of up to 80,000 kilometers!
What a feat of strength, resistance and direction!

The **ruby-throated hummingbird** (*Archilochus colubris*) is the Tom Thumb of birds and it is capable of a feat that nobody believed possible: it crosses the Gulf of Mexico in its migration from north to south which is up to 6,000 kilometers.

In this chapter we will cover a sampling of migrating birds from around the world. As you can see, the distances are very large and there is no relation between the size of the bird and the journey's difficulty.

The precise design of birds allows them to accomplish incredible journeys that no scientist would have dared predict. The **bar-headed goose** (*Anser indicus*) is known to fly over the Himalayan Mountains heading north during the spring and south to hibernate. While this is not the longest migration, it is the highest one, practically reaching the world's upper most limit at an altitude of 9,000 meters, where there is hardly any oxygen. This feat which traps what little oxygen there is more easily than the hemoglobin in our blood or in that of any other goose. Great effort is made by these birds to fight against terrible winds and even avoid them when they can. In spite of their attempts, these winds make their journeys sometimes impossible to continue. They continue to try relentlessly until they reach their goal. And let's not forget the little hummingbird that crosses the Gulf of Mexico without stopping!



It was once thought that this bird of only six grams in weight had to stop at the islands to regain strength but, much to the surprise of scientists, it has now been proven that this little one can do the 800 kilometer journey without any stops.

♂



The largest breeding concentration of these birds is located in Punta Tombo (Argentina) where more than a million individual birds have been sighted.

♂♀

The scientific name of the **Magellanic penguin** is *Spheniscus magellanicus*. It roams the southernmost part of South America. During the southern winter they live in southern Argentina and Chile, but when the warmth of spring comes in September, they travel up with the sea currents in order to nest in Chile, Argentina and the Malvinas Islands.



Bird Watching in Central America



- 1 Atitlan Volcan (Honduras)
- 2 Sierra de Agalta (Costa Rica)
- 3 Cerro El Diabolo (Guatemala)
- 4 Lago de Izabal (Costa Rica)
- 5 Lago de Chapala (Mexico)

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The **Swainson's hawk** (*Buteo swainsonii*) is a bird of prey that travels up to 12,000 kilometers each way in its journey north and south along the Americas. They breed in springtime in the plains of central Canada and the US. It spends wintertime in the northern central area of Argentina where it is summertime.

Due to the global warming effect of the atmosphere, many hawks do not travel all the way to the southern area of the continent and instead remain in Central America, in the northern area of South America and in southern Florida.

♂♀



♂

The **Dolichonyx oryzivorus** is known as a **bobolink** or **rice bird**. It breeds during the springtime in North America and travels up to 11,000 kilometers to its winter headquarters in northern Argentina, Paraguay and southern Brazil.



A fold-out game appears at the end of the book, where readers can review what they learned in an entertaining, educational and enlightening manner.

Nature's Amazing Migrations



The migration game



This book is a new educational tool that, along with Amazing Nature, is part of a new collection for the younger kids.

Nature's Amazing Migrations

Great Small Journeys

«Have I not commanded you? Be strong and courageous. Do not be frightened, and do not be dismayed, for the Lord your God is with you wherever you go.» (Joshua 1: 9). When we read this Bible verse, and observe many animals in nature, we get the impression that they have been given the same command and the same assurance that was given to Joshua. Amphibians are not known to travel many kilometers. In not cross continents. In spite of that, it is shown that some of these animals endure difficult and selfless journeys.



The tiny *Oophaga pumilio* measures no more than two centimeters, but takes on an amazing journey. It lays its eggs in areas close to the jungle soil. When the tadpoles are born, the males are in charge of keeping them most. Since they can survive on a leaf, but not on a large body of water the female lays one of its tadpoles on its back to climb a tree to a bromeliad, which is a plant that lives on trees. The plant serves as a small bowl with enough water to allow the tadpole to survive. What about the food? Well, the mother lays an egg every day to serve as food. It cares for four to six tadpoles at a time, so it needs to quickly repeat the process with each one. After placing each one in its individual pool, the mother will lay an unfertilized egg for each one of its young. The fifteen days of their development, means the mother has to climb one kilometer in height all by herself!

The **strawberry poison-dart frog** (*Oophaga pumilio*) can be of any number of colors. In Nicaragua and Colombia they are primarily red with blue and black dots, but in Panama there are many varieties. As it is with all dart frogs, they are venomous. Their poison comes from its source of food, which is certain species of venomous ants and ticks.



The **common toad** (*Bufo bufo*) is beautiful and one thing is for sure: it is a wonder of nature. It is the toads that live in Europe and it has spread to the continent. With the arrival of spring, toads will start their migration in order to breed. In southern northern Europe, they will finish their migration in 2.5 kilometers each way, but with their size and negligible distance.

The **common toad** lives in and when a strange noticed. Nearly under study of kilometers



The **marbled treefrog** (*Phrynobates venulosus*) is found in Mexico. Its habitat stretches all the way down to northern Argentina. It measures up to ten centimeters and when the torrential rainy season starts at the beginning of Summer, it starts its grand little 30-meter journey from the top of the trees to the small lagoons that are formed in the soil where it will breed, spawn and then climb back to its tree.



When they reach the lagoon or river after mating, the females lay a string of eggs in a jelly-like substance. After laying the eggs, they come back to where they live. It has also been shown that they come back to their place of birth.



Editorial Safeliz and the author himself invite you to take a journey, which is even better when it is shared with family, so that parents and children alike may learn while sharing great quality time together.

Nature's Amazing Migrations



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Crossing Continents

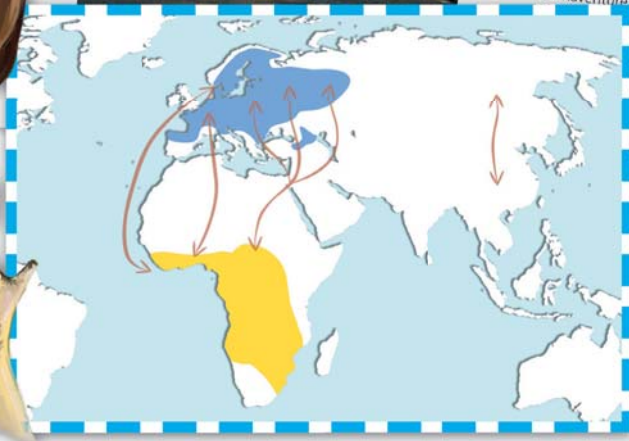
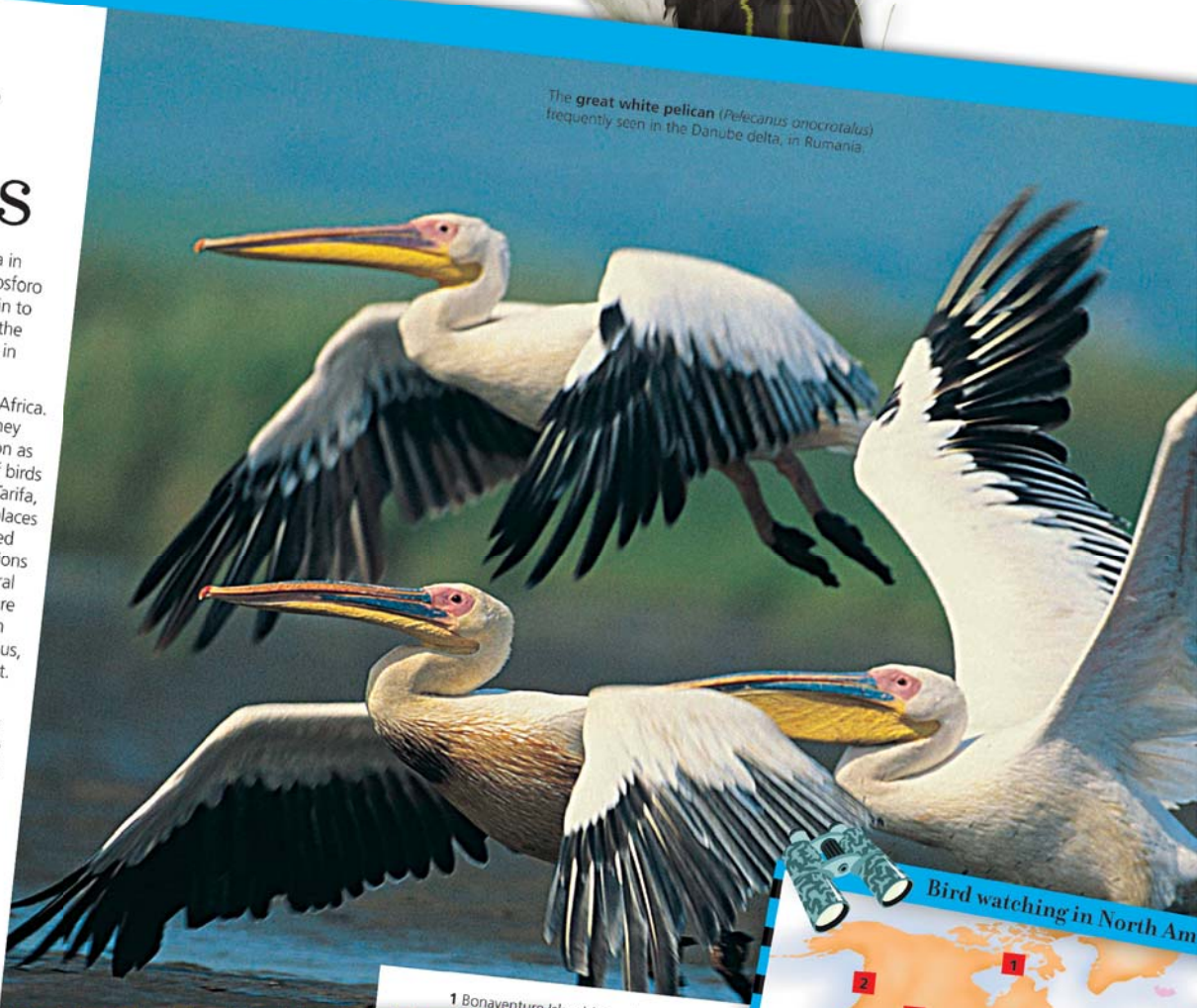
When Birds cross the Mediterranean from Europe to Africa in their migration, they use three straits for the most part: Bosforo in Turkey, Messina in Italy and the Gibraltar Strait from Spain to Africa. It is estimated that more than 30 million birds cross the latter of these. Of the 514 species, 380 live part of their life in Europe.

As soon as spring starts, millions of birds enter Europe from Africa. If there are strong winds and storms in the Gibraltar Strait, they wait patiently in Morocco for the weather to improve. As soon as the weather changes, the spectacle is amazing. Thousands of birds are seen crossing the straits. The air highway parade begins. Tarifa, at the southernmost part of Spain, becomes one of the best places in the world for bird watching. The Migres program, established by the government of Andalusia, is the largest study of migrations in the world. Studies over the past years have shown that several birds of prey that had endured serious casualties in the 1970s are now gaining numbers again in Western Europe. It has also been shown that the long legged buzzard, also known as *Buteo rufinus*, first settled in the area of Tarifa due to the global warming effect. This is an amazing occurrence in bird migration history.

There are other areas in the world where massive bird migrations parade through the skies. For example, Panama is a new route that migrating birds are forced to use in the new route from America to North America and back. Close to 100 million birds of many species can be seen in Panama—more than any other place on earth. It is a migrating bird in Canada and the US. Panama is a small area compared to the two northern giants.

Why do so many birds need to fly? They require that to meet their flight. They fly that

The great white pelican (*Pelecanus onocrotalus*) frequently seen in the Danube delta, in Rumania.



Ready to Navigate

Crossing Continents

Birds

Many scientists say that the first species of birds evolved from the dinosaurs called Coelurosauria, found among the stratum of the early Jurassic era. But there are prints identical to those found in Argentina in the stratum from the late Triassic period that predate Coelurosauria.

They evolve from

ts depicted
similar to
ized prints
ate.

Flying is a bird thing. It's not an insect or bat thing. Not even the extinct Pterosaurs mastered flying the way birds do. Flying has allowed birds to reach all corners of the planet and in short periods of time. They are travelers by nature and the more we learn about their migrations the more they surprise us. Countless birds travel huge distances from different areas of the planet to find better food sources, to find milder climates to breed and raise their young. Other species of animals migrate in the same way for similar reasons, but birds are the most renowned travelers. No other flying animal can travel the distances that birds can by their own means and no other flying animal can reach the speeds or maneuverability of many of them.

The **goshawk** (*Accipiter gentilis*), a bird of prey, lives deep in the forests of Europe, Asia and North America. It can move at high speeds

Mammals

On the Move

Journey Under Water

At Ground Level

Delicate Travelers

If we were to conduct a brief survey to find the favorite animal on Earth, it sure wouldn't be an amphibian or a reptile. These two groups of animals are studied under herpetology. These species are not among the most liked, except by herpetologists themselves. But, if we dare enter the world of these animals, we will find them fascinating in their ways and often times... amazingly beautiful. Some seem to be right out of a fantasy world, like the (*Agalychnis callidryas*) shown here.

The reptilian class includes crocodiles, turtles, lizards, snakes and the *Amphisbaena*. Then there is the tuatara from New Zealand, which is a walking breathing fossil. There are in total about 7,000 reptilian species. Amphibians are in the amphibian class and there are three groups: frogs and toads belong to the Anura, salamanders and tritons belong to the Urodela or Caudata. The *Caecilia* and *Gymnophiona*, are animals that do not have limbs and are small snakes. There are about 100 Amphibian species.

Do they journey far? We don't know. Whether large or small, they are upon great journeys.

Some of the

Fish are perfectly designed to live under water. There are about 20,000 species and they come in such shapes, sizes and physiologies that they are possibly the most heterogeneous group among the vertebrates: Amphibians, reptiles, birds and mammals. Most of them have scales, fins and gills to breathe. These allow them to extract oxygen from the water to breathe. They have extraordinary senses and because they are not forced to crawl along the bottom of the ocean. They move with all sense of freedom in the liquid medium, traveling in the three dimensions of space. Birds take their nourishment from the air simply a matter of feet from the water. It's a medium that is much denser than air, even though both mediums share the same basic patterns. That is why aerodynamics and hydrodynamics have so much in common, and what is fitting for swimming may be fitting for flying. That is the case of the shark's scales, which have inspired engineers to improve the fuselage of planes. We already talked about those designs in the book *Amazing Nature* and we will talk more about them in the next few pages.

A practical tool to learn and get acquainted with nature.

In this book of our collection we show you the sheer magnitude of the journeys endured by some animals that inhabit our planet. In them we are able to witness amazing displays of nature. Large and seemingly powerful animals and small and perhaps fragile ones alike, must make use of their abilities and skills to their limit and have unshakable faith in order to make it to their "promised land".

Once again, nature is our teacher. Nature's Amazing Migrations illustrates exceptional virtues of great inspiration to the reader. Among other interesting facts, you will learn:

- How animals prepare for the journey they must endure forced to move in search of a better place to live.
- That accomplishing their objective is never guaranteed. Even when they have the required speed, endurance or the most efficient of senses, there is never room for over-confidence or faltering when encountering obstacles.

Enjoy your journey!

