

TIMES  
EVOKE

OF WINGS — AND THEIR TALES

We humans live among superheroes — the everyday bird, perched on your balcony, singing its sweet song, is in fact a mighty warrior who has overcome all manner of hardships to reach its nest. Birds, like all superheroes, aren't who they seem. We think they're cute, chirpy little beings — but they are the descendants of dinosaurs, those mighty prehistoric reptiles who once dominated Earth. Even among dinos as fearsome as the 9-ton Tyrannosaurus or the sickle-clawed Utah-raptor, the birds we know today were the strongest — they survived an asteroid hitting Earth 66 million years, killing most species and setting off environmental disasters. Ancient birds survived earthquakes, volcanos, tsunamis, collapsing food chains — and thrived. Far from gloom at doom, early birds adapted to existing foods and ecosystems and developed new abilities. Over the years, as Earth itself revived, breathing, stretching and sighing into mountains and grasslands, seas and their shores, birds developed a dazzling range of sizes, colours, shapes, muscles — and songs.

No wonder avians have long fascinated humans, who can only stare with awe at their flights — some of these, as with the regal eagle gliding on 'thermals' or streams of air, are of fancy. Others, as with the Arctic Tern's 90,000-km-long annual roundtrip between Arctic and Antarctic, are existential, seeking ideal conditions for breeding, foraging and recharging in adequate sunlight. For these feats, birds have superhuman powers — they can see ultraviolet light, sense Earth's magnetic field, detect movement and position minutely and fly in perfectly coordinated flocks, have hollow bones and a syrinx which lets them communicate in calls, learn melodies handed down over generations — and mimic human speech. Like all superheroes, birds never sweat and their lustrous feathery capes are waterproof.

Birds first appeared on Earth 165 million years ago — we showed up just 6 million years ago. Homo sapiens can feel smug, thinking of our brain power, but a bird has 4 times more neuron value per unit volume than mammal brains, giving it extraordinary processing and expressive abilities. Today, several species, from dodos to Great Auks, have been eliminated into extinction by humans chasing their flesh and feathers. Many others face habitat loss, poachers and climate now. Will we finally drive off Earth what even an asteroid could not? A terrifying thought but there are solutions — as Times Evoke's global experts point out, learning the incredible lineage and abilities of birds will help us see them as far more than our next dish. Join TE in exploring the world of birds — and in respecting the presence of superheroes.

# 'We live with 10,000 species of dinosaurs today — birds are their descendants who survived'

Steve Brusatte is Professor of Palaeontology and Evolution at the University of Edinburgh. Speaking with Srijana Mitra Das at Times Evoke, he discusses birds and dinos, disasters, resilience — and why a thing with feathers can indeed be called hope:

**It's popularly believed dinosaurs went extinct after an asteroid crashed on Earth — how true is that?**

It's not true at all because while almost all dinosaurs did perish, including the famous ones like Tyrannosaurus and those with horns and spikes, one type survived. They had feathers, wings and could fly — these are birds. Today's birds are dinosaurs. So, some dinosaurs survived the asteroid. Perhaps the Deccan volcanoes in India played a role. As they survived, birds diversified. There are now over 10,000 species of birds — that means over 10,000 species of dinosaurs live with us.

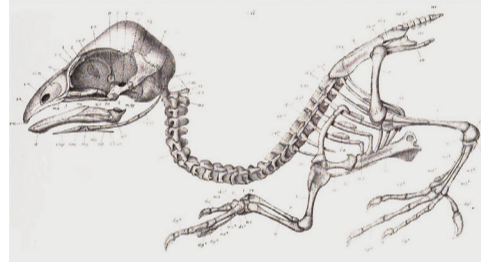
**How did the Deccan Plateau volcanoes help?**

Towards the end of the Cretaceous period, the last part of the age of dinosaurs, big volcanoes in India started to erupt. These were huge holes in the ground that opened and lava poured out for thousands of years, especially around when the asteroid hit.

That, of course, was the main reason most dinosaurs, along with 75% of all species, perished. Alongside, these volcanic eruptions were changing the climate and ecosystems — they too might have played a role. This was way back when India was an island — it had detached from the rest of the southern hemisphere before India collided with Asia.

**You mentioned most dinosaur species were eliminated — why did one group survive?**

I've written about this extensively in my new book 'The Story of Birds'. There are some important facts



**ON THE FAMILY TREE:** There are strong resemblances between South America's hoatzins and ancestors



**THE REAL JURASSIC ARK:** The Deinonychus dinosaur (R), as the fossil record shows, could grow upto 11 feet long, leaping and pinning down its prey — many modern birds also show several of these characteristics

here. First, there were birds before the asteroid hit — 150 million years ago, around the Jurassic period's end, there were birds with wings made of feathers, able to fly. When the asteroid hit, there were different birds, some with teeth instead of beaks, some with big claws or long tails. Yet, only one type survived — these were the more modern-style birds, with beaks instead of teeth, small-sized, able to grow fast and fly really well. These features helped these birds survive when the asteroid hit.

That would have been chaos then, with earthquakes, wildfires, tsunamis, all the smoke from the fires and pulverised rock from the asteroid collision. All this went into the atmosphere and blocked out the sun for many years, and Earth would have been dark and cold. Trees would have perished without sunlight — so, being able to eat seeds with beaks would have helped as seeds last longer than most foods. Also, the ability to reproduce and grow fast would help, as would being able to fly very well.

**After that happened, why did a tremendous variety of birds in size, colour, wings, flight abilities, etc., evolve?**

When those few birds survived the asteroid, they'd have looked out on a largely empty world, with most species gone. So, there would have been abundant opportunities for them to evolve and do new things. They wouldn't have had as many competitors and in such freedom, they could experiment with different ways of flying, eating diverse foods, etc. — from that came the great diversity of modern birds.

**If birds are dinos, could dinosaurs also sing?**

We don't know — but it's a fun thing to think about. What we do know is that some fossil birds that lived at the end of the Cretaceous era with other dinosaurs could make sounds like birds today. We know this as we actually see the voice box preserved as a fossil, the unique organ that birds have where the throat meets the lungs and allows birds to tweet, chirp and sing. So, there were birds singing during the age of dinosaurs. But whether T-Rex, Triceratops or similar dinosaurs could sing, we don't know. We know

that T-Rex wasn't roaring as shown in the movies sometimes — its vocalisation would have been more like a crocodile.

**EARLY BIRDS**

**Birds are intelligent and emotional — so, did dinosaurs have these qualities too?**

It's a fascinating thought. Birds are really remarkable. Most of them fly, something humans have long dreamed of doing. They bear big brains for their bodies. A parrot, for instance, easily repeats something you say while crows and ravens recognise themselves in mirrors and make tools. Many animals use tools — a cow might use a stick to scratch itself. But crows take wire or twigs and twist them into hooks to get food. This is something only humans and some other primates can do. Also, some birds have empathy. Ravens, emus and others can understand the perspective of another bird — they know it's not all about them.

Given this, I think we can imagine dinosaurs also could have had intelligence and empathy. Mapping modern birds' qualities onto the family tree, the prediction is the common ancestor would have also had high intelligence and empathy. Some close relatives of birds, like Velociraptors, could have had the same. Velociraptor had very large brains. So, they were probably quite intelligent.

**What happened to mammals with the asteroid crash?**

We actually had ancestors that stared down the asteroid, small, furry little creatures that were probably the size of shrews or mice. They had hair, they could keep themselves warm, they could hide easily, dig burrows, eat different foods, grow fast and reproduce quickly. Now, these mammals had been living with dinosaurs for over 150 million years. They were always small, never growing bigger than a house cat, because the dinosaurs kept them so. However, they were diverse — there were swimming mammals, climbing ones, digging ones, even gliding mammals with wings of skin that would glide over

the heads of dinosaurs. Once the asteroid wiped away big dinosaurs, mammals who survived took advantage of fewer predators and competitors — they began growing. Within 2,00,000 years, mammals the size of pigs existed. Within a million years, there were cow-sized mammals. Mammals survived and bulked themselves up, moving into some of the ecological niches the dinosaurs left behind.

**Did smaller beings have an evolutionary advantage?**

That depends on the environment you're living in, the climate and evolutionary pressures. When it comes to surviving sudden upheavals with change, it is often good to be small because you need less food, you can grow faster — and it's easier to hide.

**You write of how, as the world warmed in the Paleocene, beings which survived the asteroid began moving across Earth — what implications does that hold for global warming today?**

About 10 million years after the asteroid, there was a big spurt of global warming. The Iceland volcanoes started erupting. Back then, these were a lot more violent and as their lava came up, it burnt through Earth's crust, releasing greenhouse gases like carbon dioxide and methane — yet, that did not cause a huge extinction. Rather, it unleashed waves of migration — animals could move around the poles now because the climate was so warm. So, this became an age of movement and familiar groups today, like rodents, primates and hoofed animals, spread around the world.

During this time, some mammals with hooves who lived in India went into the water, turned their hooves into flippers and started to swim — they were the ancestors of whales. Some of the most advanced and developed mammals we see today came out of this period of mass migration. That shows when environments change, there isn't always a big extinction — different things can happen.

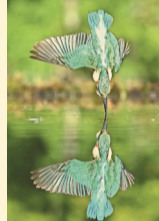
Professor Brusatte will be speaking at the India International Centre, Delhi, on May 21



**ROOTS & BRANCHES:** Scientists study the extinct teratorn bird of prey which faced climate change



● We humans like to preen — but we can't match the beauty of the bird of paradise. Members of the **Paradisaeidae** family, these birds with incredible plumage are found in **New Guinea and Australia, living in rainforests**. The males among these 44 species have **long feathers, extending upto 3 feet as tails**, elaborate head plumes and trailing streamers. These are all proudly displayed in courtship rituals — but this gorgeous bird doesn't just rely on its good looks. It **sings and dances** to win its gal's heart



● The **kingfisher** is just 18 inches — but there's **nothing small** about it. This dazzling bird has a **dagger-like beak, inspiring the design of Japanese bullet trains**, giving it the **swiftest diving speed** — kingfishers live around rivers worldwide, catching fish — and **reducing splash**. Members of the **Alcedinidae** family, kingfishers also have a special membrane to protect their eyes as **they dive 3 feet deep after prey**. No wonder, with all their blessings, a **sight of them is considered such good fortune**

● The **shoebill** is found in marshes across East Africa. Earlier called a stork, genetic data now places it with **pelicans and herons among Pelecaniformes**. The shoebill grows to 5 feet, its **feet exceptionally large, middle toes 7.3 inches long**. This helps it hunt — the shoebill famously **stands still as a statue till a hapless fish comes along**. The cute-looking bird's bill itself is 1 foot-long, enabling shoebills to even attack small crocodiles



# 'From changing their calls in loud traffic to seeing 'status' through stripes, birds keep surprising us'

Trevor Price is Professor of Ecology and Evolution at The University of Chicago. Speaking with Srijana Mitra Das in TE, he discusses the quick adaptability of birds — but worries about a future with climate change:

Trevor Price has been studying birds in the Himalayas since 1985 — and they still surprise him. The ornithologist tells TE about his research. 'We study birds of the Himalayas and, in particular, look at two aspects. First, we ask why the eastern Himalaya has many more species than the Western Himalaya.

Second, how are birds dealing with climate change and other human-driven impacts?'

Importantly, well before we humans came along, ripping up trees and making malls on meadows, birds had learnt to deal with changing climes. Price says, 'Birds go back a long way. The last famous mass extinction 66 million years ago had a huge impact on them because that wiped out many dinosaurs, pterodactyls, etc. After that, birds radiated a lot but 34 million years ago, it suddenly got much colder. Massive ice sheets started to form in Antarctica. Global wind patterns changed, turning northeast India into rainforests. It's likely that caused birds from Indonesia to enter the Himalayas. These have subsequently evolved into almost half of all bird species, showing climate change effects.'

Birds continue to adapt today. Price says, 'My colleague at the Wildlife Institute of India, Tushar Parab, and I have written about how the call of the yellow-browed leaf warbler bird has changed in just the last 40 years. This is amazing as we're looking at



**TRY AFTER LUNCH!** Scientists have found the female among bird species can see colours differently than males, using this power to choose the most vibrant and healthy mate

20 million birds, changing their language in just a few decades. This little warbler breeds in the Himalayas and goes northwards into Siberia but it spends its winter in India. It transits through Delhi, which is extremely noisy. We think the warbler has changed its call because of Delhi's loud traffic — the new call can be more easily

heard against that noise than the old call.'

Some changes are harder. Price remarks, 'With climate change, we will see whole new routes of migration. A classic example is birds from Germany that once wintered in a warmer Africa but with the expansion of the Sahara out toward the south now, they are really suffering.' There is no end, thankfully, to the ingenuity of birds though because, as Price adds, 'However, some German birds have actually learnt they could fly to England instead where they now spend their winter as an option to Africa because the winter in the United Kingdom is sufficiently mild and they can even find some fruit there.'

All that entails crystal-clear vision — Price, who has closely studied the evolution of colour vision in birds, elaborates. 'Birds can see into the shorter ultraviolet (UV) wavelength better than humans as well as seeing further into the red or long wavelength. Humans have three different colour photoreceptors and we can tell reds, greens and oranges apart quite well. But

birds, with four types of cone cells, can see a wider spectrum of colours and certainly look further into the UV and the infrared. It's very difficult to study and understand this but one of the interesting things we've discovered is that in quite a few species, female birds have different colour vision than males. They see the world in a different way than males do. They can certainly tell a lot of colours apart. In some areas of the wavelength spectrum, particularly between the greens and blues, females might be able to tell colours apart better than males — one possible reason is that females choose males and they all want the brightest, most colourful one because that bird will have the highest fitness, be likely most free from parasites, etc. So, it's a premium on females to be able to tell different shades of blue apart — males,' says Price, with a gentle grin. 'Are much less discriminating.'

There are other surprises. Price describes intense climate change in the Himalayas and outlines rainfall and hailstorm patterns in the region. 'If nesting birds there have laid eggs and there's a hailstorm, generally, they fly down the mountain and wait it out and then, they come back and sit on the eggs. If they come back, say, two days later, all that happens is the chicks in the egg stop growing for that duration — they resume when the parent is back and hatch just a few days later than they would have. Now, with significant seasonal shifts taking place, the birds are breeding earlier. Then, these massive hailstorms happen but the chicks have already hatched and the parents can't feed or protect them — that's when you lose them.'

So many of our actions — from wasting energy mindlessly to demanding never-ending rivers of goods, which means more and more deforestation — have tragic impacts on others. These remain largely hidden from our eyes, however, except for research by scientists like Price. Their work goes a long way in both bringing home the facts to us — as well as, in some cases, changing ground reality. Price says, 'The Amur falcon carries out this astonishing 22,000-km-long migration. It breeds in China and as winter approaches, it leaves

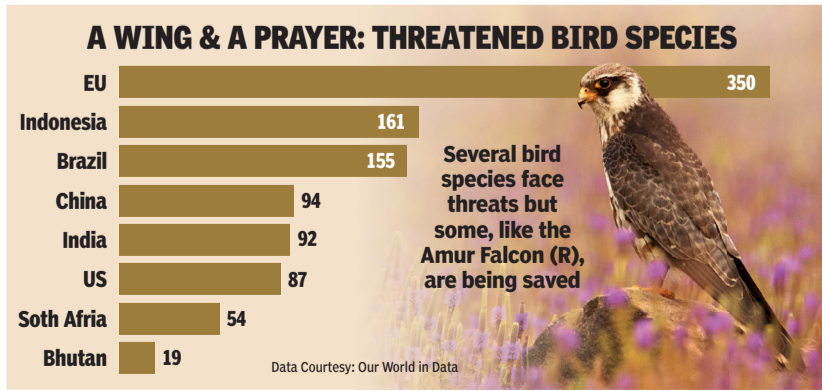
and spends about a month in northeast India. Then, it flies all the way to Africa for the rest of the winter and returns to China afterwards. Now, earlier, people in India were catching the falcon and eating it. However, thanks to the determined efforts of conservationists and some great publicity campaigns, the falcon has become a big tourist attraction. Many people travel to see flocks of falcons over the reservoirs. This success story, turning a grim picture into a bright one, highlights hope for India and the world. More and more people are appreciating these birds and want to preserve them. They pay to see them, so people are economically better-off protecting the birds than just eating them.'

The surprises aren't over. Price mentions, 'We once did research on the little yellow patch on the wing of the warbler I mentioned — in that study, we painted the yellow patch to make it bigger. It turned out if you did that, the birds got larger territory. If you painted the patch green, so it looked like the rest of the bird, they got smaller territories. It's like in the army, where the bigger the stripe you've got, the more senior you are. That really astonished me, highlighting the complexities of these birds. They're just about six grams, the same as a box of matches, and yet, they live in the middle of freezing cold snow, wait for this to melt before they build nests, produce new generations and then fly all the way to southern India for winter, returning again to the freezing cold. The thought of this could exhaust many humans — but they do it, despite being so tiny. They are,' says Price, his voice warming as he likely thinks of all the birds he has seen 1985 onwards, 'truly surprising beings.'

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**HANGING OUT:** The fire-tailed sunbird lives in Himalayan rhododendrons and conifers



**READERS WRITE**

Dear Times Evoke,  
Thank you for the very inspiring article on Sir David Attenborough (8th May)! Varun, my son, is a great fan of Attenborough. A young adult with special needs, he's made a video on Attenborough which he has illustrated. This is his tribute for Sir David, which we are sharing with TE: [https://youtu.be/GkA48DolpSw?si=r1zfw\\_PKTFg1BheR](https://youtu.be/GkA48DolpSw?si=r1zfw_PKTFg1BheR)

— Veena Naren, Mumbai

Sir David Attenborough is a true planet saver, as TE highlighted on his 100th birthday. I've read his wonderful books and watched all his highly educational and lucid programs. His work reflects the need for more naturalists who can guide us towards respecting the powers of nature. Thanks, TE!

— Shree Kelkar, Pune

The article 'Bombs, Burgers and the Banality of Evil' by Srijana Mitra Das (28th April) couldn't have been more sensitive and movingly written. Humans are relentlessly destroying this planet, harming our cohabitants, flora and fauna, et al. Mother Nature belongs to all — she is not the property of Homo sapiens alone. Live and let live is the only way to an enduring world.

— Rita Dhalbisoi, Bhubaneswar

TE featured an extraordinarily heart-touching article on the truth of war, where animals are used and killed without their consent and no one questions why. Our cruelty towards animals indeed starts from our meals. If we treat our inhumanity as 'banal', the voiceless won't ever be heard. When we kill an animal, it's 'need'. If an animal kills a human, it's a 'threat'. A civilisation should certainly be judged by how it respects animals.

— Usha H. Kumar, Delhi

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