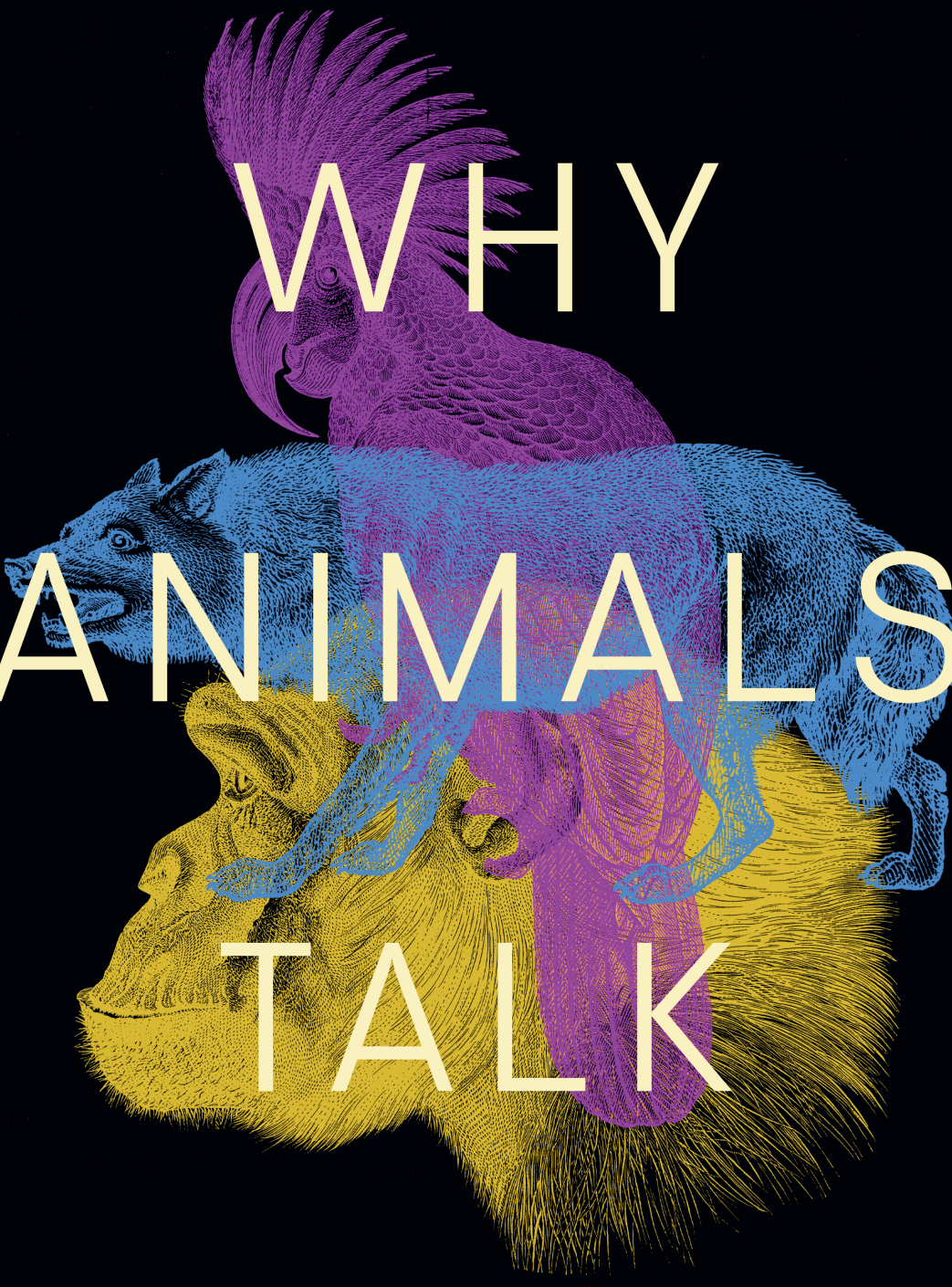
ARIK KERSHENBAUM

WHY ANIMALS TALK



The New Science of Animal Communication

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ARIK KERSHENBAUM

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Penguin
Random House
UK

First published 2024
001

Set in 12/14.75pt Bembo Book MT Pro
Typeset by Jouve (UK), Milton Keynes
Printed and bound in Great Britain by Clays Ltd, Elcograf S.p.A.

The authorized representative in the EEA is Penguin Random House Ireland,
Morrison Chambers, 32 Nassau Street, Dublin D02 YH68

A CIP catalogue record for this book is available from the British Library

ISBN: 978–0–241–55985–7

www.greenpenguin.co.uk

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To my dog, Darwin Kershenbaum, who at sixteen years old,
reached the end of his natural life and slipped away
peacefully at home, surrounded by all his family.

אַל תַּשְׁלִיכֵנוּ לְעֵת זִקְנָה כִּכְלוֹת כֹּחֵנוּ אַל תַּעַזְבֵנוּ

‘Do not cast us away in our old age; when our
strength fails, do not abandon us.’

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Introduction. Everybody's talking . . . but no one says a word

Today, as it was 100,000 years ago, we humans are surrounded by animals and all the sounds that they make. By day, the screeching of crows, the howling of dogs (sometimes wolves, even), and clouds of songbirds with their contrasting and overlapping compositions. By night, a cacophony of crickets chirping, owls hooting, and foxes crying. It's one of the oldest mysteries that has haunted humans since we began to ponder our own relationship with the natural world. What are all these animals saying? Perhaps they are talking much like we do? Or perhaps we are unique, and animals are chattering meaninglessly. Are we really the only animals on the planet to have a language? And if so, what is it that distinguishes our language, our information-packed and immensely powerful communication, from the confused and overpowering twittering of a flock of thousands of

starlings? Why is it that the dance of bees, pointing their hive-mates to the best food sources, isn't a language like our own? And can we be sure that a troop of chattering monkeys, angrily chastising the humans walking below their tree, aren't really talking, the way we talk?

When we hear animals, what do we hear?

Ancient humans, living in a time much closer to nature, were surrounded by the sounds of creatures, some insignificant, some deadly. Before traffic noise became a constant hum, drowning out not just the gentle buzzing of insects, but masking even the dawn chorus of hundreds of birds, the world was filled with animal sounds. Could it be that all of the screeching, howling, and singing meant nothing at all? Even in prehistoric times, it was inevitable that we attempted to make sense of what we were hearing. And when the only yardstick we had for interpreting communication was our own language, then it was natural to assume that these animals were talking too. The singing of coyotes at night was not so different from our own songs around the campfire. The calling of birds to each other every morning no different from greeting our own family and neighbours upon waking. Certainly, the warning roar of a lion when you approach too close to her cubs is a message that is hard to misinterpret. Of course animals spoke! And therefore, our distant ancestors felt that animals had spirits like us, desires and ambitions like ours, and, no doubt, stories and tales to tell us. What culture does not have tales of talking animals? In the Bible, Balaam had a donkey that berated him for mistreating her. Icelandic mythology tells of Ratatoskr, a squirrel who is a messenger of the gods, scampering up and down

the tree of life. And in Indian legend, Kindama the deer cursed a hunter for shooting him while he was mating.

Times have changed since that age full of legends of talking animals. We now cast a sceptical eye on the possibility that a grasshopper and an ant could have an argument about storing food for winter, as in Aesop's fable. But who doesn't believe that their pet dog or cat can tell them when it's time to be fed, or time to go outside? And our appetite for stories about talking animals hasn't diminished – from classic Disney movies like *The Lion King* to quasi-realistic novels like *Watership Down* and *Wild Animals I Have Known*. Our fascination with the possibility that animals might speak is partly because of them – we want to understand what is going through their minds – but also partly because of us. Do we have a deep need to believe that animals are not just mindless robots, but reflect our own existence in a simpler, perhaps more appealing life?

Or maybe animals do have something to say – something that we don't yet understand. Many people believe so, but how do we find the tools to check whether this is the case? Philosophy and religion, intuition and common sense have, until recently, dominated our struggle to understand animals. On one hand, some philosophers (such as Immanuel Kant, more than 200 years ago) have declared quite unequivocally that animals cannot be talking meaningfully because they lack rationality. Religious leaders have tended to agree, because placing humans on a unique pedestal supports many religious narratives of the special place that humanity occupies at the pinnacle of all creation. On the other hand, we all feel that animals might have more to say – maybe even believe that they are talking to us. Neither approach has managed to give us a really satisfying resolution – there simply cannot be a single yes/no answer to such a question. Animal life is too complex, too varied, and there are so many complications and such diversity that generalizations rarely provide a complete picture. The robin in a tree leads a simpler life than the chimpanzee in the jungle – why should their

communication be similar? The dolphin under the sea occupies an environment we struggle even to conceive of – simplistic comparisons with more familiar animals are unlikely to bring us much understanding. We need a more rigorous approach. If we don't want to be blinded by our own desire to believe that animals are talking to us, or by our assumption that we are inherently superior to other animals, then we must seek the objective truth. Maybe animals talk. Maybe they don't. We need to investigate.

Unfortunately, all our scientific advances haven't brought us very far – at least, not until quite recently. By and large, scientists have been unwilling to address such questions as 'What do animal noises *mean*?' Following the lead of Renaissance philosopher René Descartes almost 400 years ago, science preferred to consider animals as lacking any internal mental experience, without cognitive states or cognitive needs. And so, I suppose the logic would go, with nothing in their minds, they have nothing to talk about. Descartes, in fact, described non-human animals as 'automata', i.e. robots. In a peculiar literary twist, illustrating how ignoring animal consciousness is fraught with problems, the term 'robot' was coined by Czech science-fiction writer Karel Čapek in his dystopian 1920 play *R.U.R.* But Čapek also wrote an incisive novel, *The War with the Newts*, in which humanity's assumption that animals are no more than mindless automata eventually brings about its own destruction.

Even though some progress was made when experimental psychology emerged 150 years ago, scientists were still primarily interested in probing the workings of the brain as if it were a mysterious black box. By watching rats running around a maze, white-coated experimental psychologists studied how animals *reacted* to certain stimuli rather than questioning what they were *thinking*. Measuring how quickly – or how slowly – an animal learned that one button dispensed food while another button delivered an electric shock taught scientists that animals *could* learn, but gave no clues about *why* they learned. It seems obvious to us

now – used as we are to TV nature documentaries – that the scientific study of animal behaviour should examine the ways animals behave in the wild, rather than being restricted to experiments in the lab. But the rationale was that, if animals were mere automata responding instinctively to any stimulus, then it should be possible to discover everything about them inside the lab. Probing – either with clever experiments using mazes and puzzles, or by placing electrodes in an animal's brain to measure the electrical activity – should reveal 'how animals work', just as dismantling a car engine will tell you everything you need to know about internal combustion. Where was the error in this approach? Precisely in the preconception that animals must be fundamentally different from and simpler than humans – that animals must be robots. Whereas ancient cultures were happy to believe in cursing donkeys and messenger squirrels, the modern European philosophers of the last 400 years wanted to show that the entire universe – with the exception of humans, created as they were, in God's image – could be reduced to a set of clockwork mechanical instructions. Thus was the idea that animals cannot talk ensconced in Western culture.

Twentieth-century science began to challenge these old ideas of human exceptionalism. Why must animals be so different from humans? We can't simply assume that, because we appear to behave so differently from other animals, and seem to be capable of far more complex technological achievements, our fundamental makeup is therefore different. Humans, just like every other animal alive today, have been evolving for exactly the same length of time – 3,800 million years – and evolved from the same common ancestor as the rest of the animal kingdom. Placing humans and animals into an evolutionary context gave birth to a new science, one where people studied animal behaviour *in the wild* – after all, no animals evolved running around a scientist's maze and pushing buttons, so why should we probe their inner workings in such an unnatural environment, rather than in the environment for which

they are truly suited? In the 1920s and 1930s, two of the leaders in this new field, Nobel Prize winners Nico Tinbergen and Karl von Frisch, were fascinated by the way that bees forage, and this led von Frisch to his decoding of the honeybee dance 'language'.* At this point, a hundred years ago, the term 'language' hadn't yet been well enough defined in itself, so no one worried too much whether the simple messages that one bee conveyed to the rest of the hive were really sophisticated enough to bear the same label as our expressive human language. But never mind – the curse had been broken. The idea that humans are the only creatures even capable of communicating with each other no longer seemed tenable. Maybe animals do speak after all. Importantly, this new science, dubbed ethology, considered animal behaviour in the context of evolution. That's important because, rather than just describing how animals behave, it gave the explanations of ethologists a mechanism. Although Charles Darwin's revolutionary theory of evolution had already been published for seventy years, the implications were still seeping through the scientific community: yes, an animal might have big horns or a loud roar, but could we explain why? Evolution by natural selection provided that 'why'. As a result of focusing on the evolutionary mechanism for an animal's behaviour, any conclusions we draw about talking animals cannot just be wishful thinking or romanticizing – animals behave in a particular way because it gives them an advantage: they can survive better, reproduce more, or raise their offspring more effectively. The evolutionary perspective helped to remove science from the shackles of the philosophical trap that for centuries held that science must always show humans to be superior.

The religious and philosophical belief that humans were superior and fundamentally different from other animals was strong and

* Tinbergen and von Frisch, both staunch anti-Nazis, shared the Nobel Prize with Nazi collaborator Konrad Lorenz, whose compassionate observations on animal behaviour in the wild don't sit well with his role in guiding genocidal Nazi policy.

pervasive – not just in ancient times, but even today. There has been fierce resistance over the centuries, from Descartes and his religious reasons for thinking that animals lacked souls, to modern philosophers like Steven Pinker and Daniel Dennett, rejecting any claims that animals might possess something once considered unique to humans. But if talking is advantageous, if it serves the survival and reproductive needs of an animal, then we could expect that faculty to evolve. It's as simple as that. The laws of evolution permit no dogma, neither that of philosophers nor that of religious leaders. The study of communication in bees by von Frisch in the 1920s opened the floodgates: since then, there has been an explosion of interest in how, why, and even what animals communicate to each other. Books and journals, conferences and degree courses abound – animal communication is a lively and fast-moving field of scientific research. We have excellent explanations now for the role of birdsong in attracting mates, the alarm calls of monkeys that warn of different kinds of predator, and we have a seemingly unending stream of mysteries to unlock too: Why do humpback whales sing? What are elephants telling each other with their deep rumbles, inaudible to the human ear? Are the complex swirling patterns of colour on the skin of reef squid really a kind of communication?

And yet (rather ironically) we scientists have done a poor job of communicating our own findings to the public. Many people still assume that 'animal communication' means some kind of telepathic connection with whales or horses. Let's face it: we all want to believe we can talk to animals – even animal communication scientists like me. I'm guessing that not one of my colleagues hasn't at some time dreamed of holding a sophisticated conversation with some species or other. So perhaps it's not surprising that the advances in the scientific field, fascinating as they certainly are, look unimpressive compared with what we all want: we would like a computer to translate animals for us at the click of a button. It's easy enough to find books on how to interpret your dog's body

language (a very important venture, of course) but much harder to find accessible explanations of *why* animals talk, and what information they really have to impart. We scientists haven't done a good job of presenting just how much we really do know about what animals say. And we know a lot.

So here I am. My own research investigates the communication of wolves, dolphins, parrots, gibbons, and other species. What they say, why they say it, and how that message is wrapped up and transmitted to other animals. I can think of little that is more exciting, more interesting, and frankly more fun to study. My aim is not to tell you what animals are saying. My aim with this book is to bring you into the communicative lives of animals. What do animals say? A few different things – and it would be interesting to know what things they are. But to me, it is far, far more interesting to know why and how animals say these things, what drives animals to communicate the way they do, and what their communication says about who they are and how they came to be. If we can understand the why of the matter, then we can understand the animals in a more complete sense, rather than as mere translation. So, this is a very different book from anything else that's been written about animal communication. Nonetheless, running through it is a deeper question that we've all pondered at some point. What is the connection between the way that we humans speak and the communication of other animals? Can science make a link between the two? Is there something fundamentally shared between human speech, and animal – for want of a better word – speech?

In my job, I'm outrageously fortunate to meet animals in the wild, in their own environment, in the jungle or the desert or underwater, far from any other human being, where I am the stranger and they are at home. That's the only way to understand what makes animals the way they are. I'll try to communicate some of that, because without a feel for what the life of an animal is like, any attempt to understand them is to understand a

cardboard cutout of an animal. Behaviour in general is something that serves a goal – finding food, finding a mate, avoiding being eaten . . . To understand behaviour we first must understand the lifetime (i.e. evolutionary) goals that animals possess. What they need to do to be successful, and how that behaviour – communication behaviour, in our case – helps them in their quest to be successful.

But why do animals talk in the first place?

I once gave a public talk on dolphin communication, and a member of the audience asked me, 'Is it possible that dolphins are telepathic?' The inappropriate (if technically accurate) way to answer that question would have been, 'No, of course not! There's no such thing as telepathy' (for an explanation of why not, see my previous book, *The Zoologist's Guide to the Galaxy*). But my goal in science education is not to give technically accurate but inappropriate answers. In contrast to communicating to the public about other sciences, like physics or mathematics, in this field of animal communication our goal is not so much conveying facts as transmuting misconceptions. Misconceptions are rarely completely misguided, and more often require just a subtle change in the way that a concept is phrased to arrive at a more satisfying explanation. Why do people think dolphins are telepathic? What do people even think telepathy is? Literally, telepathy is the transmission of feelings over long distances. Surely this is just communication! When your dog looks at you with sad eyes and droopy ears, and you understand that it's time for a walk, this is certainly communication – and communication without words. Telepathy? No, rather it is the very essence of communication itself.

Changing the question, changing the perspective, can be as useful an educational technique as feeding information.

The first myth to remodel is that animals are furry (or feathery) little humans. If they were, then we would have no problem looking at their communication as something analogous to our own language – perhaps just a different language that simply needs to be learned, as we might learn Latin in school. But no, animals are not furry humans. They have evolved with very different needs from ours: different needs for learning about their environment, learning about the other animals around them, and passing information to those other animals. We think that there is nothing special about greeting someone in the street with the comment, 'Turned out nice today' (a translation for those non-British readers among you: this is an expression of pleasant surprise that it is not currently raining). But in fact, this uniquely British aphorism is a truly peculiar comment to pass between two strangers – conveying no useful or survival-enhancing information. As such, it tells us a lot about who we are as humans, and what our communicative needs are. We evolved to live in complex societies, where encountering strangers could offer serious opportunities – and serious dangers. Meeting someone in the street could end in a love affair or in a brutal mugging. Ritualized greetings such as 'Turned out nice today' can indicate our intentions to abide by society's rules, and so help keep the wheels of society turning smoothly. However, can we really expect two rabbits, upon meeting each other, to exchange similar greetings? Or two dolphins? Well, perhaps we might. Clearly, it depends on the nature of their societies, and the way that they grease the wheels of social interactions. Which means we can't understand animal communication without understanding animal societies. Certainly, we can't assume that other animals will feel the need to make an irrelevant comment about an obvious meteorological fact upon passing each other, just because we do. It seems almost obvious that if we want to understand what animals are really saying, we have to begin by

understanding how those individual animals relate to each other, what their societies are like, and why they should say anything at all.

For one thing, it's clear that animals make a lot of noise, and that means they invest an awful lot of time and energy into being noisy. Evolution is economical – a behaviour that wastes energy is something that should put you at a disadvantage in the long term, so such a behaviour is likely to disappear from a population in a relatively small number of generations. Our ancestors were covered with fur like all other primates, but running across the savannah chasing antelope was a hot business, and so our fur-covered bodies were a burden, and we eventually became furless. If making sounds were a useless activity, you'd expect it to disappear as well. But vocal animals are everywhere, so there seems to be some kind of evolutionary benefit to all that noisemaking. More than that, vocal communication almost seems to define many animals. A robin that doesn't sing isn't much of a robin. A wolf that doesn't howl isn't much of a wolf. There's something about the relationship between the noises that an animal makes, its lifestyle and its evolutionary history that makes these sounds fundamental to what each species really is. A wolf that doesn't howl isn't an inadequate wolf just because of our cultural assumption that wolves 'must' howl. Rather, a wolf that doesn't howl is at a decided disadvantage – she can't find her pack mates in the frozen Arctic or call to her mate to bring food to her cubs. A robin that doesn't sing will find his territory overrun by other males who have no reason to stay away, or to suspect that these resources have already been claimed. It's these evolutionary insights, only fully developed over the last fifty years or so, that can take us into the inner lives of these animals. If we know why animals talk, we can know what they say – that is, if they even mean anything at all.

Taking a sober scientific approach may not give us the answers we want. We might find that we will never be able to talk to the animals like Doctor Dolittle. Or we might find that we *can* talk to

the animals, and that we humans aren't so special after all. Most likely, the answer is somewhere in between. And bit by bit, scientists are getting closer to the real answers, the answers that describe how animals really are, rather than what we want them to be. This is a worthwhile exercise for anyone who is truly interested in the natural world. It is appealing to look at the wonders of nature – the colours of a flower, or the herds of millions of wildebeest on the savannah – and be content with just wonder, not understanding. Countless young children scream with delight at the antics of monkeys in a zoo – is it really necessary to understand why they behave as they do, as long as we can get enjoyment out of the behaviour itself? I think so. The physicist Richard Feynman once commented on the scientist's view of wonder, comparing the artist's fundamentally aesthetic view of the world to the mechanistic inclinations of the scientist. He said there were 'All kinds of interesting questions which the science knowledge only adds to the excitement, the mystery and the awe of a flower. It only adds. I don't understand how it subtracts.'[1]

I can appreciate the natural world aesthetically, perhaps even more so than many people, as I'm lucky enough to see more of it than most. I too tremble with awe at the earth shaking under the hooves of a limitless river of wildebeest. But on top of that aesthetic awe, I want to add an extra layer of wonder. I want to understand why the wildebeest congregate in such huge numbers. I don't think that we need to believe that gorillas tell each other bedtime stories, or that dolphins exchange legends of creation myths, to have a powerful attraction to these animals for who and what they actually are.

Even if we discover that we will never talk to animals in the same way that we can talk to other humans, never hold a true conversation with a dolphin, still just by probing those possibilities we will find out why they live their lives the way they do. We will understand more about what talking really is, in species that for their own reasons talk but without language, and that discovery

will also tell us a great deal about who we ourselves are as well. How humans might or might not be different from other animals has obsessed philosophers for millennia and obsesses us today as well. Are we just very clever apes? Are we something different entirely? What, if anything, do humans have that animals do not? Language would seem to be an answer to that question. We can tell stories, we have Shakespeare and J. K. Rowling, and we can write instruction books to build computers and spaceships. In many ways, language is the very thing that makes us human – or at least, that makes us a very special kind of animal. But our communication and that of other animals has almost as much in common as it is different. When we watch monkeys chattering to each other, or birds singing a duet, we are observing a set of behaviours that the ancient ancestors of humans also possessed, before any language had even evolved. At some point in ancient history, maybe a few hundred thousand years ago, our ancestors were not qualitatively different from any other species. Those ancestors gradually adapted the speaking abilities they inherited from earlier ancestors, right the way back to our common ancestor with chimpanzees, six million years ago. These were fundamentally the same communication tools as were used by the mammoths and sabre-toothed tigers who lived at the same time. Warning sounds and mating calls are common across all animals and, pushed by the spiralling complexity of our social groups, our ancestors built upon those tools until they evolved into the first language. No wonder, then, that our modern language retains many of the features and characteristics that we still see in the elephants and lions of today.* Maybe that is why we are so fascinated with what animals are saying: they seem to be saying something fundamentally related to what we say, even if we are not always aware of it. The question of how much our language has in common with other animals, then, is one that

* Although the most famous sabre-toothed 'tiger', *Smilodon*, isn't closely related to today's lions or tigers at all.

speaks to our own identity as humans, and to our place in the natural world. As you read this book, I hope you will see trends emerging, common threads that come back again and again when we ask why a dolphin or a chimpanzee has such complex communication. And these trends apply no less to us humans and our ancestors. Our language might be fundamentally different from any other animal, but its roots are in the same constraints: complex societies, where individuals have complex things to tell each other.

Many books have been written on what animals are saying, sometimes how to talk to your dog, or how to calm your horse, and sometimes from a more scientific perspective. Often, books will present an argument from a position of assuming that animals have a particular ability – either that they are rational creatures capable of using language just as we are, or that they are mindless robots chattering instinctively. Neither of those positions is particularly generalizable or accurate. Both are mistaken for a very simple reason: all animals are different. Animals evolved to fill particular niches to achieve their goals one way or another: using fangs to catch their prey, or fur to keep warm in the snow, or sounds to convey information. Some animals need to say more, some animals need to say less. It would be a mistake to think that all animals have the same communication needs, and therefore the same communication abilities. Animals such as snails and worms may not have very much that they say to each other, simply because their lives do not require much communication to get on. In contrast, species such as dolphins and chimpanzees possess impressive abilities to communicate with each other, and even with humans. That's a phenomenon that can only be explained in the context of the interactions between the animals and their environments, and particularly between the animals and other members of their species. Why animals need to talk is the important question to ask before we can answer how and what animals are saying.

The select few

Each chapter of this book focuses on an iconic or particularly relevant animal in our story. Rather than focusing on the science, I am going to focus on the animals, with some science along the way. It's more fun like that. I'm going to try to take you into their world, because only from within their world is it possible to understand who these animals are. It's not enough to rely on our deeply ingrained stereotypes of some of the most intelligent and vocal animals in the world: the vicious, evil wolf; the smiling, friendly dolphin; the mindless, mimicking parrot. Only up close and only in the wild can we begin to see what is happening in the minds of these animals.

My first chapter, Wolf, talks about the species I've probably worked with the most. Wolves are a key element in our quest because they share so much with us. They are intelligent and vocal, but most importantly, they are deeply social animals, and they cooperate so that their sociality gives them a survival edge.

In Chapter 2, we meet dolphins. These are, perhaps more than any other, the animal considered by many people to be hiding an intelligence that challenges our own. Everyone loves dolphins, but there are a lot of misconceptions about them, and some overenthusiastic comparisons with humans. Behind all the mystery and hype, though, lies a truly exceptional animal. Intelligent, yes; social, yes; communicative, very. What messages could they possibly be passing to each other – and why?

In Chapter 3, in come the parrots. Parrots constantly surprise us with their talking abilities. They seem to throw our words right back at us. Are they really saying anything? Are they really *thinking* anything? Can we even put ourselves into a bird's brain? What is it

about the life history of wild parrots that could possibly have brought about such unexpected abilities?

Next is a species unfamiliar to most: the hyrax. Small and furry like a rabbit, hyraxes are unusual creatures, but their long and complex songs uncover an important feature of animal communication: what is the role of complexity, and are animal songs just random, or do they have some important structure?

In Chapter 5, gibbons swing by. Gibbons are apes, like humans, but unlike the rest of the apes (chimps, gorillas, orang-utans, etc.), gibbons have an exceptionally complex and diverse vocal repertoire. Perhaps these long-armed relatives of ours, swinging gracefully through the jungle trees, have the closest thing to human language among our near relatives. Charles Darwin certainly thought so. If gibbons reflect the environment our non-human ancestors might have lived in fifteen million years ago, we can look at them and see a hazy image of how and why our forebears first began to use complex vocal communication.

But it is with chimpanzees – whom we will meet in Chapter 6 – that we are led most closely to understand ourselves as human beings. Seeing chimps in a zoo raises uncanny feelings of similarity: we are looking at an offshoot from our own roots. These animals express to each other more ideas – and more human-like ideas – than any other species. Not just who they are and what they want, but also emotions like friendship, concern, and displeasure. Even without a language, chimpanzees come close to living in a fully functioning and easily recognizable society. Surely they are the end-point of our search for what we have in common with the communication of other species?

Finally, where do humans fit into this menagerie? Humans aren't somehow more evolved than any other species – every creature alive today can trace its ancestry back through exactly the same billions of years of evolution as us. We don't do a better job of surviving in the world (indeed, the way things are going at the moment, we may be heading for our own self-induced mass