

BBC

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2020 WINNERS INSIDE PLUS HOW TO WIN IN 2021



Wildlife

COVID & WILDLIFE
How conservationists are responding to the crisis

FLYING SOUTH

Follow the swallows on their epic migration

URBAN JUNGLE

From leopards in Mumbai to boar in Berlin, the metropolis is going wild

November 2020 | Vol. 38 No. 12

Q&A

DO HIBERNATING BEARS GET STIFF LIMBS?

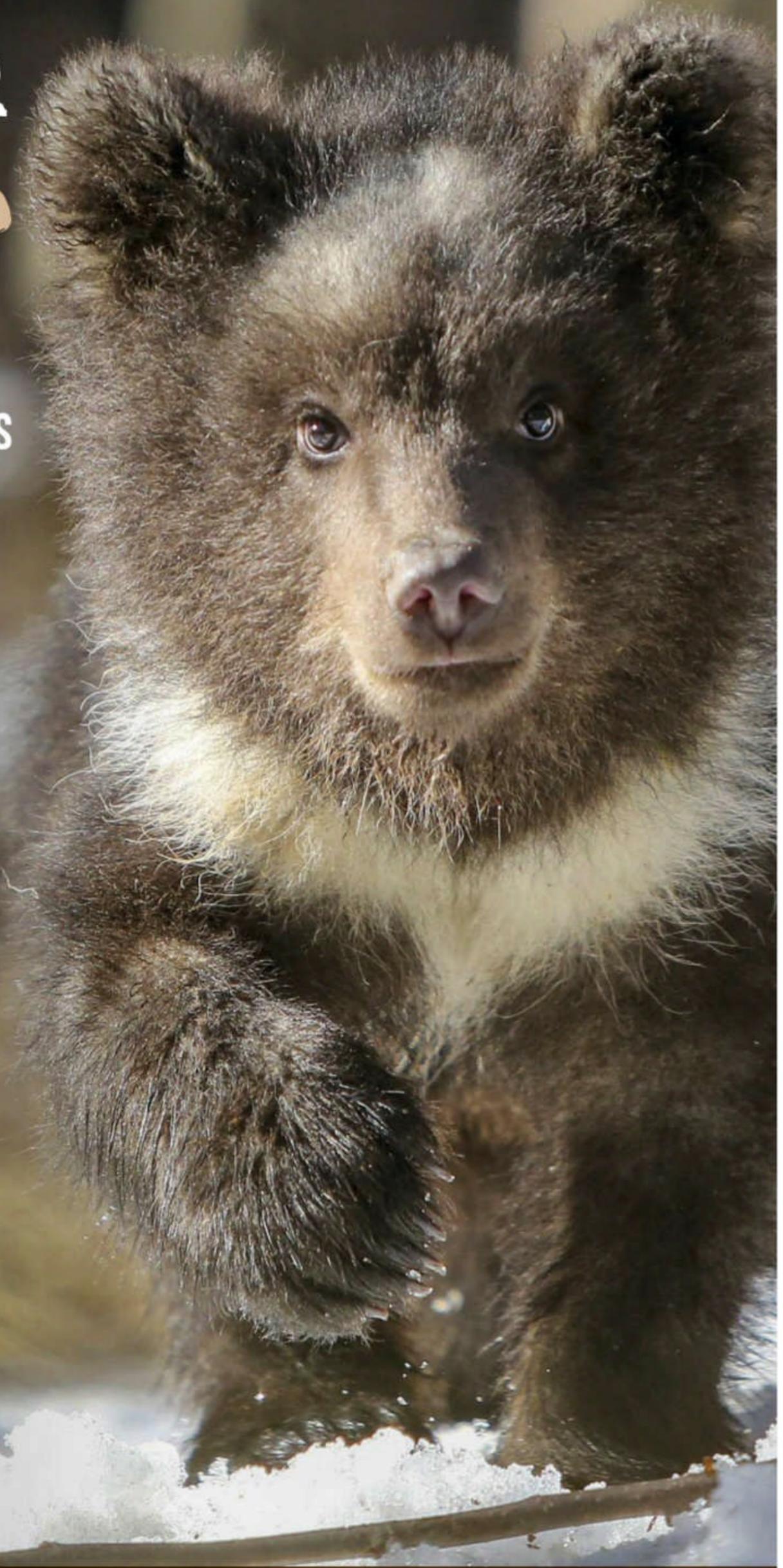
GARDEN OF UNEARTHLY DELIGHTS

Welcome to Socotra, land of the dragon's blood tree



RAISING CUBS

IT'S NO PICNIC FOR THESE BEARS



Wild bears in Russia face many threats. When faced with these threats, terrified mother bears are forced to flee for their lives, leaving their newborn cubs alone. These helpless cubs are taken to the Born Free-supported Orphan Bear Rescue Centre, which rescues, rehabilitates and prepares bear cubs for release back to the wild.

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Shelter from the storm

It had been a perfectly pleasant stroll along the side of the canal when the snow hit me. Looking up, white flakes floated down, and yet just a few yards up the pavement, it was a bright, clear morning. I knew this spot well, as I stopped to watch the peregrines on the top of the old warehouse most mornings on my daily commute, so it didn't take me long to twig that my snowstorm was actually a shower of feathers, as a falcon plucked away at its breakfast high above.

These inner-city wildlife encounters are worth their weight in gold – especially as, this year more than ever before, we've been so focused on the wildlife on our doorsteps. So, this issue, we decided to take a whirlwind tour of the world's wildest city breaks.

As Ben Hoare explains on page 42, "Wild animals just want a safe place to live, where they can find food and shelter, and perhaps raise a family." We're not so different really, are we?

Paul
Paul McGuinness
Editor



Stephen Moss follows 'his' swallows from Somerset to Durban on p72.

Cover: Leopard: Nayan Khano/kar; proboscis monkey: Mogens Troe/WPY 2020; dragons blood trees: Davor Lovnc/Getty; This page: Frederic Desmette/Bosphoto/FLPA

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Macaw: Joao Marcos Rosa; gorilla: Ernie Baccera/agefotostock/amy; other: Andy Rouse/2020VISION/NPL; Abde Kur Rock Gaecko: V. sua's Unlimited/NPL; barn swallow: Mathias Schaefer/BIA/Minidrop/FLPA; muntjac illustration by Peter David Scott/The Art Agency

November 2020



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The people behind our stories



HILARY BRADT

Travelling to Socotra saw the author encounter some weird and wonderful species: "Several trees are found only on Socotra, giving the landscape its distinctive appearance." See p52



ROZ KIDMAN COX

A long-time judge of the Wildlife Photographer of the Year competition, Roz tells us what makes an eye-catching entry. "It is fascinating how the impression an image makes can grow with looking," she says. See p70



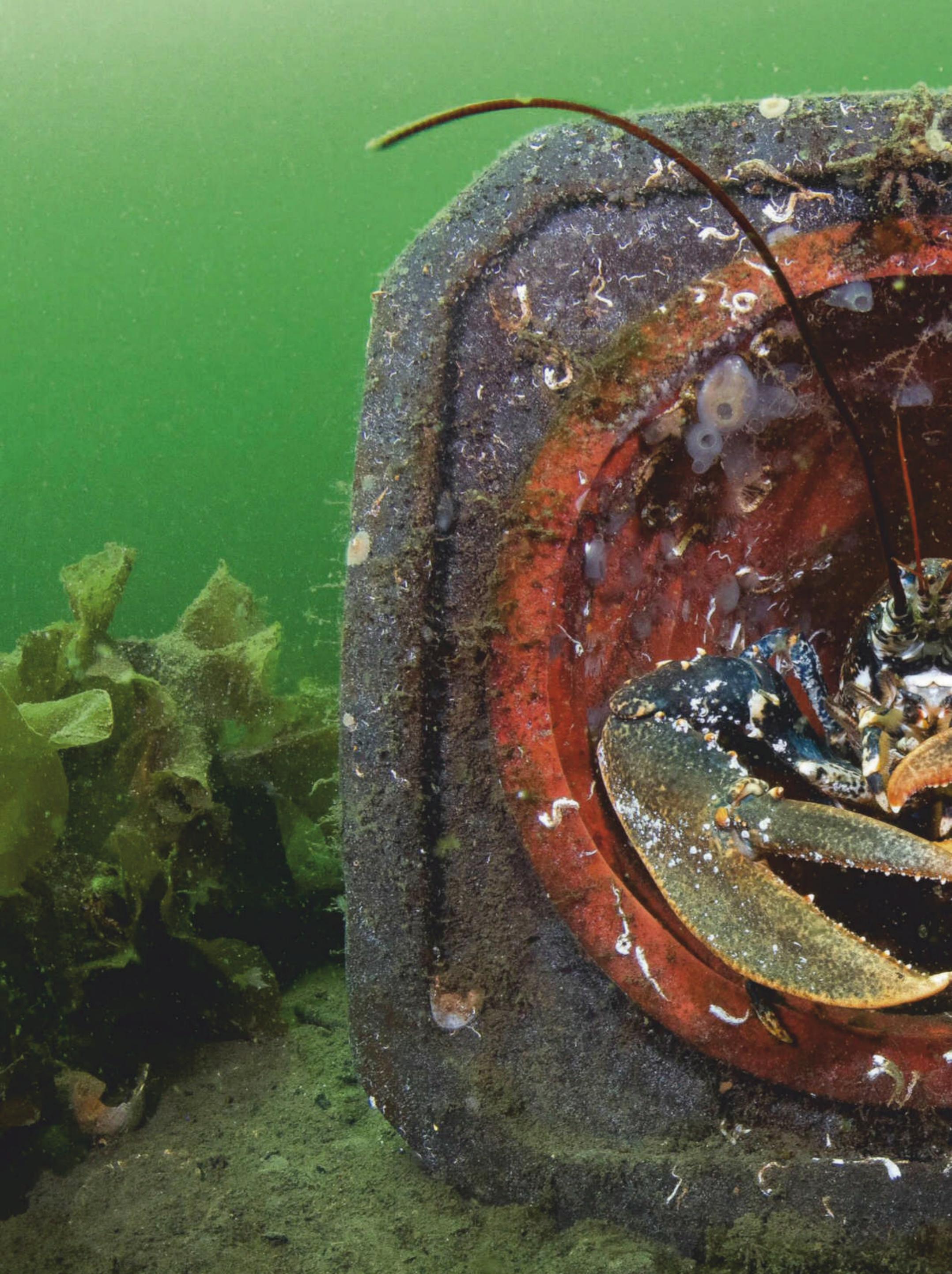
STEPHEN MOSS

Naturalist Stephen followed in the slipstream of swallows, from Somerset to South Africa. "Like all long-distance migrants, the swallow is highly vulnerable to changes in the weather and shifts in climate," he says. See p72



HAMZA YASSIN

Living on the west coast of Scotland, the CBeebies presenter tells us what he admires about the local white-tailed eagles: "This species was here way before us, and should be respected." See p98





IN FOCUS | *Cone sweet cone*

Plastic pollution is a real problem for marine species – reports of carrier bags being removed from the stomachs of beached whales, not to mention microplastics being ingested by all sorts of sea life, are far too familiar. However, this common lobster appears to have discovered a way to use our castoffs to its advantage. Concealing itself inside a discarded traffic cone, the cunning crustacean has found the perfect hideout, enabling it to survey the seabed in safety.



IN FOCUS | *White-out*

Apart from the glint of a golden eye, this snowy owl blends in beautifully with its wintery surroundings, as it takes to the air across the Canadian tundra. Far from being a night owl, these birds are diurnal and rely on their camouflage to avoid detection while hunting – lemmings are a favourite snack, though ptarmigan, hares and (occasionally) fish are also on the menu. With a wingspan of about 1.5m, it's one of the largest owl species in North America and can be seen flying, phantom-like, above the glistening white landscapes of the Arctic Circle.

Milo Angelo Ramella







IN FOCUS | *Ups and downs*

Silhouetted at sunrise, an Alpine ibex descends a slope in Switzerland's Bernese Alps. The species' impressive horns make it instantly recognisable, but have also been coveted as a trophy. After being relentlessly hunted, these surefooted wild goats were teetering on the brink of extinction in the 19th century. However, reintroduction efforts have since seen ibex numbers climb and there are now stable populations across the species' entire range.

WILD MONTH

Milder winters mean there's more wildlife out and about in November than you might think.

By Ben Hoare

1 | ATLANTIC SALMON

Epic struggle

Surging rivers in northern Britain, Wales and Ireland, swollen with autumn rain, witness one of our greatest wildlife dramas. Rising water levels are a cue for Atlantic salmon to move upstream – traditionally between September and December – the penultimate stage in an odyssey whose climax is spawning. These fish are the handful of survivors that dodged bigger mouths and fishing fleets to grow strong in cold Arctic waters, as far north as Greenland

and the Barents Sea, a fabulously rich region, which writer Charles Rangeley-Wilson has called the “Harrod’s food hall of the oceans”. After several years here, many salmon return to their natal river catchment, even the same part of it. Maybe they are guided by magnetic particles in the ‘lateral line’ along each flank, which might serve as a compass.

The famous salmon’s leap isn’t easy to observe. The fish may move after dark, lying low in shady

parts of the river until conditions are just right, and salmon numbers in the British Isles have crashed in recent decades. But with repeat visits, a smidgen of luck and armed with local knowledge – ask anglers or river wardens, if you see them, or try one of the salmon viewing centres in Scotland – you’re in for a treat.

FIND OUT MORE

Canal and River Trust’s guide to freshwater fish: bit.ly/2R6odWm

ONLINE WILD YEAR

Watch salmon migrating upstream in the *North York Moors* episode.

EPISODE
TWO



2 | HEDGEHOG

Still active

A mix of external and internal cues prompt hedgehogs to hibernate, including longer nights, falling temperatures, waning food supplies and body condition. So, while more hedgehogs are now out and about well into November and beyond, rather than hibernating, it is hard to pinpoint the main reasons. In 2019, the UK's Big Hedgehog Map recorded an incredible 846 sightings of active animals in November, up from 354 in 2015. However, Grace Johnson, the popular project's Hedgehog Officer, cautions that the rise in reports is probably due to greater awareness, rather than a true reflection of increased hedgehog numbers. The impact of warmer winters is fascinating, but complex.

FIND OUT MORE Hedgehog guide: discoverwildlife.com/hogs



Hedgehog: Colin Varnell; pochard: David Trilling; red admiral: RobinChittenden.co.uk



3 | POCHARD

On the move

Though pochards breed here, mainly on eastern England's lakes and reservoirs and on Northern Ireland's loughs, these ducks are primarily winter visitors. How many turn up from November onwards largely depends on weather conditions on the Continent. The same is true of many wildfowl species: milder winters see birds remain further north and east, while sustained icy spells push flocks south and west. A drake pochard is unmistakable, with his smart, red-brown head. But even the plainer female is easy to identify, thanks to the species' distinctive sloping forehead.

FIND OUT MORE UK ducks: discoverwildlife.com/ducks-uk

4 | RED ADMIRAL

First and last

Often the red admiral will be your last butterfly of the year, as well as the first you see the next. It is no longer unusual to see the species active in November, especially in southern areas, perhaps sipping sugar from fallen fruit or imbibing ivy blossom nectar on a tree or garden fence. For such a common butterfly, there's a surprising degree of uncertainty whether it can survive entire British winters, as either a dormant adult or caterpillar, or whether it relies on spring migrants to keep the population going.

FIND OUT MORE All about UK butterflies: butterfly-conservation.org





5 | ASPEN

All a quiver

Aspen may be associated with North American forests and Rockies ski resorts, but it is a native (if uncommon) British tree, too. Mostly it grows in the Scottish Highlands, though it is often planted elsewhere because aspen foliage turns glorious yellow or red in autumn. The leaves famously rustle in the breeze, a beautiful whispering effect produced by the structure of the stems, which are strangely bendy. Aspen looks much like silver birch, and grows in similar places, but it is related to poplars and willows.

FIND OUT MORE British trees: woodlandtrust.org.uk

ONLINE
**THE
SUSURRATIONS
OF TREES**

Sounds of autumn leaves.



6 | BAY BOLETE

Delightful decay

You know it's time to explore the woods "when the air is sweet and winy with decay", says Helen Macdonald in her new essay collection, *Vesper Flights*. A dank November sees all manner of fungi erupt into view, and woodlands – with their plentiful soggy leaf litter and rotting wood – host more species than any other habitat. Many are tied to particular trees or soil. The bay bolete, however, appears in both coniferous and mixed woodland. Look for the chunky mushroom under pine, beech or oak trees.



FIND OUT MORE

Fungi facts and ID guide:
[discoverwildlife.com/
fungi-id](http://discoverwildlife.com/fungi-id)

7 | BLACKBIRD

Settling down

These thrushes don't half make a fuss while they get ready to roost on autumn and winter evenings. Parents of young children may smile in recognition as the birds chase each other around the garden, worked-up and calling repeatedly. Here a 'jink', there a 'jink', everywhere a 'jink, jink'. The rumpus continues until it is almost dark. At this time of year, you can't be certain that these or any other blackbirds are 'yours', as large numbers arrive from Scandinavia and eastern Europe to winter in the UK.

FIND OUT MORE

Our guide to blackbirds:
discoverwildlife.com/blackbirds



ONLINE
**TWEET TAKE
5: BLACKBIRD**

Extended episode with
Chris Packham.



Aspen: Laurie Campbell; bay bolete: David Chapman; blackbird: Drew Buckley

Hidden BRITAIN

An eerie bark echoes in the night. If I tell you that the mysterious creature in question sports recurved fangs, it might conjure up a mental image of something out of a vampire horror flick. Anything large with sharp fangs must be after a bit of flesh, right? Not in this case. You've actually just heard our smallest deer – a Reeves's muntjac, *Muntiacus reevesi*.

The muntjac's bark is definitely worse than its bite, because, like all deer, it is a herbivore. As it happens, most other species of deer in Britain are also surprisingly vocal, especially during the rut. But the muntjac is one of the loudest and most consistent. It breeds in any month, and females can conceive immediately after giving birth. Somewhere, there will always be a muntjac buck looking for love.

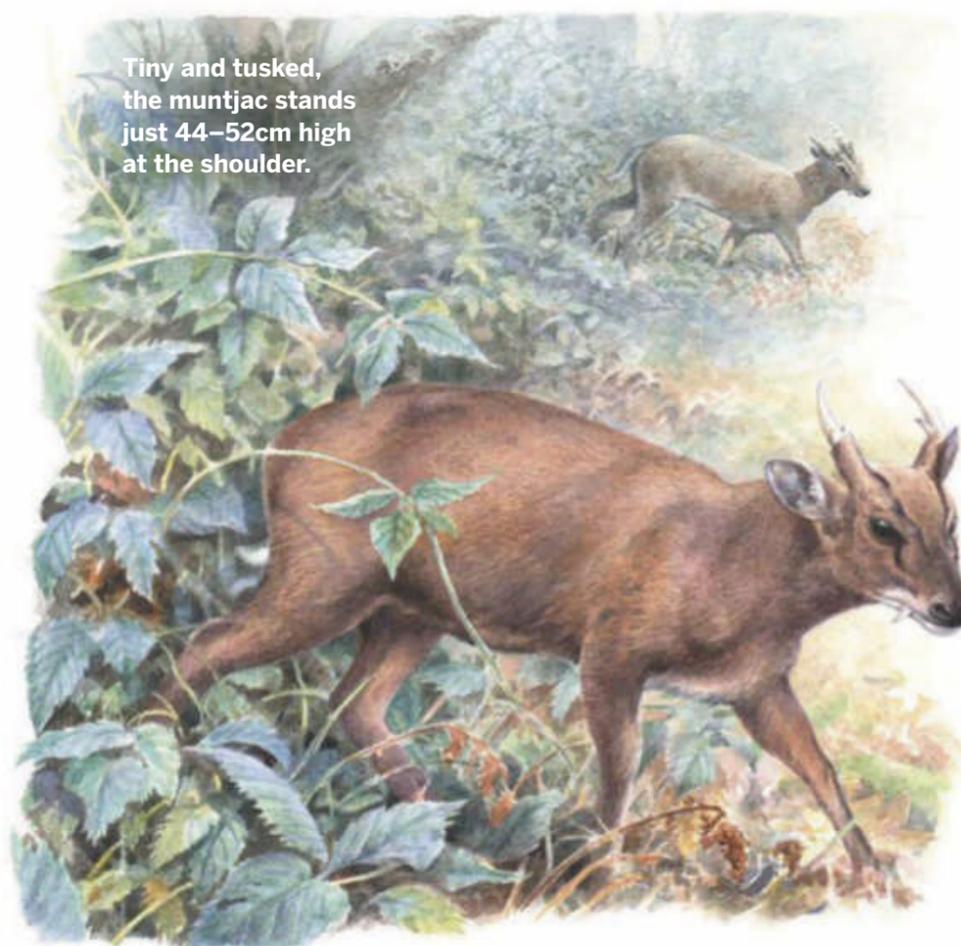
About the size of a fox, this is a minuscule deer, barely coming up to an adult human's knees. It doesn't belong in the UK, but originates in the upland forests of subtropical Asia. Since being introduced at Woburn by the 11th Duke of Bedford around the turn of the 20th century, the species has done well here.



NICK BAKER

Reveals a fascinating world of wildlife that we often overlook.

REEVES'S MUNTJAC



Tiny and tusked, the muntjac stands just 44–52cm high at the shoulder.

Everything about this bijou Bambi is designed around the dense vegetation of its native home. On the rare occasions you see one out in the open, you may notice its strangely low profile. Its hindquarters are higher than its front end, in addition to which it has a dainty physique. This enables the deer to slide away, head held low, into the tangle of a hedge.

Visual displays are, for this deer, largely redundant.

What's the point of showing off if you live in a thicket and nobody sees you very often? Eerie barks and screams are much more effective. Both male and female muntjac bark

(which, incidentally, gives them their alternative name of 'barking deer').

Deer also communicate with scent, and here too Reeves's muntjac goes further than other species. Its face is full of scent glands! One pair of slit-like organs is on the forehead. These are disguised by V-shaped black markings in the coat. But difficult to miss is another huge pair, just in front of each eye. These preorbital glands are closed most of the time, but can be opened and even turned

inside out if a deer is excited or marking territory.

Reeves's muntjac also has a habit of inserting its long tongue into its preorbital glands, no doubt to help spread the perfume. Were you to examine the animal's skull, you would see that these glands take up more space than the eye sockets, giving you some idea of the relative importance of the two senses.

Odd though these adaptations are, it is the 'fangs' that really seem out of place. Most prominent in the adult male, the elongated upper canines are up to 6cm long. Whereas most male deer use antlers to fight and display their fitness, the male muntjac has only an elementary set. Once again, the tangle of shrubby habitats preferred by this species explains why. Big antlers would simply be impractical; the fangs are for close-up combat.

There are many older bucks that wear the resulting scars on their faces and flanks, and have ragged ears. But there's one more surprise. These extended canines are hinged, and can be folded back when not needed, so as to not get in the way of feeding. They're more flick knives than daggers. 🐾

NICK BAKER is a naturalist, author and TV presenter.

DID YOU KNOW?

This deer is named after John Russell Reeves, an official of the East India Company.

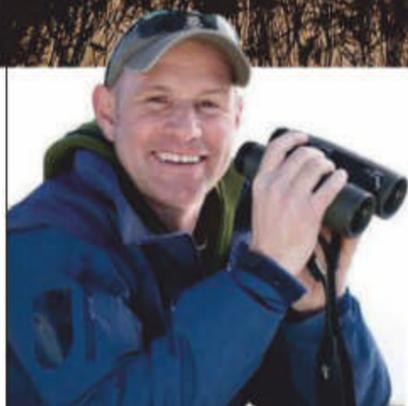
DINKY BUT DESTRUCTIVE

Why this species has been labelled as a troublemaker.

For both gardeners and many conservationists, this deer is public enemy number one. It has high reproductive potential, and one particular problem is its penchant for browsing out low growth, including much-loved woodland wildflowers such



as bluebells and primroses. There is also a suggestion it might be implicated in the degradation of nightingale habitat. The species appears to be spreading from its original range in south-east England at an alarming rate, causing ecological upset in its wake.



MIKE DILGER'S WILDLIFE WATCHING

REEDBEDS IN NOVEMBER

In his series of great places to watch wildlife in the UK, the star of BBC One's *The One Show* this month roots through reedbeds, and turns our attention to the species found along the water's edge.

Forming either extensive swamps in lowland floodplains, or feathery fringes along the margins of rivers, ditches, lakes and reservoirs, reedbeds are highly unusual in that the habitat is almost entirely composed of one species – common reed. Looking verdant all summer, the plant's green coloration will by now have given way to the distinctive golden-yellow hues of late autumn and winter.

Reedbeds bridge that gap between land and water. The reeds themselves sprout from specialised structures called rhizomes, which run horizontally just below the ground. The visible components of this dominant and domineering grass are the densely spaced upright shoots, eventually sprouting to over 2m in height when fully grown.

Able to survive, and indeed thrive, in both submerged environments and locations that flood frequently, this super species can also cope with the challenging saline conditions encountered in brackish or tidal waters.

Despite a distinct lack of floristic diversity, reedbeds are able to support a fantastic range of specialist wetland wildlife. Provided, that is, this transitional habitat is comprised of different-aged stands of reed.

During the breeding season, the bittern is the iconic bird to listen out for on any reedbed

ramble, but this grassy monoculture also offers both year-round and exclusive sanctuary to species such as bearded tits and Cetti's warblers. And while reed and sedge warblers will have long since departed for wintering grounds in sub-Saharan Africa, their absence will be more than compensated for by the annual influx of roosting flocks of starlings and pied wagtails. Reedbeds in winter also draw in wildfowl from across the northern hemisphere, which are attracted to the patches of open water and ditches among the reeds.

Admittedly, most naturalists visiting reedbeds in winter may have birds foremost in their mind, but with a resurgent otter population now thriving in the food-rich reedbeds, don't forget to keep a lookout for fur as well as feathers. Additionally,





Clockwise from top left: Norfolk's Hickling Broad is rich with reedbeds; the Chinese water deer was introduced to the UK in the 19th century; bitterns rely on reedbed habitat; the vocal Cetti's warbler; otters are making a comeback after decades of decline; you're more likely to spot the elusive water rail in winter.



when visiting any reedbed located in that arc swinging from Buckinghamshire across to the Norfolk Broads, special effort should be paid to catching a glimpse of the introduced Chinese water deer. Here, a burgeoning population has seen them becoming increasingly spotted at dawn and dusk, when crossing the reedy rides.

Only 50 sites nationwide are thought to cover an area greater than 20ha, making extensive reedbeds a surprisingly rare commodity. This has, fortunately, resulted in the best sites coming under the wing of various conservation organisations. As the main emphases at these locations have been put on both habitat management and access, reedbed reserves have become exemplars on how to reward those visitors keen for a wildlife fix. ►

Clockwise from top left: Steve Doornik/Alamy; Robin Chittenden/nature.com; Simon L. Tennant/FLPA; David T. P. ng/nature.com; Andy W. Somers/500px/Getty

Many sites, for example, have excellent interpretive facilities, such as clear maps, suggesting which hides, footpaths and boardwalks might offer the most productive returns. The hides tend to be elevated, giving great views across the reedy vistas, which in turn makes spotting a marsh harrier quartering the reedbed, or an otter crossing the open water, far easier. However, for the real marshland experience, head into the reeds. While the

Hearing comes into play when pinpointing the location of a furtive Cetti's warbler by its explosive song.

paths and boardwalks are admittedly more restrictive from a viewing point of view, this is where your hearing should come into play when pinpointing the location of that skulking, squealing water rail or a furtive Cetti's warbler by its explosive song.

It should come as no surprise that, as with many other habitats, reedbeds have been lost from much of Britain due to drainage. But with biofuel markets now more developed, the ability of reedbeds to treat sewage better understood, and an upsurge in support for locally cut reed for thatching, there is hope the nadir may have passed for this habitat. And certainly, the estimated 1,500ha of reedbed recently planted will be welcome news to all those charismatic species calling *Phragmites* home sweet home. 🐾

SPECIES TO LOOK OUT FOR

Starling

Smaller than a blackbird, with a distinctive pointed bill and triangular wings in flight, this gregarious bird is easily identified. Britain's population of starlings is substantially bolstered by birds from the Continent as winter sharpens. By day, they feed in the countryside. As dusk approaches, they gather in large flocks, with reedbeds a roosting habitat of choice.

Cetti's warbler

After first breeding in Kent in 1972, this secretive, chestnut-coloured warbler has now become a year-round feature of reedbeds in the southern half of England and Wales. It is far more commonly heard than seen. The male's song, belted out from among the reeds and bushes, can (unusually for a warbler) be heard throughout winter.

Water rail

This attractive waterbird is smaller than the related moorhen, with



Enjoy the show: a starling murmuration.

streaky-brown upperparts, blue-grey underparts and barred flanks. But surely the key diagnostic feature is that bright red, dagger-like bill. Difficult to spot, unless icy conditions draw them out of the reeds, the rails make their presence felt with pig-like grunts and squeals.

Otter

Storming back to our waterways after years of decline, otters love reedbeds, which nowadays offer one of the best opportunities to catch up with these charismatic predators.

The combination of their large size, brown pelage and sinuous nature should differentiate otters from widespread, introduced American mink.

Chinese water deer

A black nose, beady eyes, large ears and absence of antlers give this dainty 'alien' the appearance of a teddy bear. The species was introduced to London Zoo and Woburn Abbey in the 19th century – today's wild deer are descended from escapees. The population is largely confined to East Anglia's wet fens and reedbeds.

CHOICE LOCATIONS



1 Dearne Valley Old Moor RSPB, just outside Barnsley in South Yorkshire, has reedbeds recently colonised by bearded tits and Cetti's warblers. It also hosts a fine starling murmuration in winter.

2 Hickling Broad NNR, managed by Norfolk Wildlife Trust, is the largest of the county's broads. It's an excellent place to spot Chinese water deer, and there are resident common cranes and marsh harriers, too.

3 Walberswick NNR, on the Suffolk coast, is managed by Natural England. The reserve's Westwood Marshes cover 190ha, making it one of the largest reedbeds in Britain and a great place to spot otters.

4 Ham Wall RSPB on the Somerset Levels is part of the huge Avalon Marshes complex. The reserve offers all the reedbed specialities, in addition to sharing with Shapwick NNR the largest starling roost in Britain.

5 Valley Wetlands RSPB, on Anglesey off the coast of North Wales, is one of the most important reedbeds in Wales. Cetti's warblers and plentiful wildfowl are the winter highlights.

Take a hot drink to keep the chill at bay while waiting for starling murmurations to arrive. November is often when temperatures drop dramatically – and the colder it gets, the bigger the flocks.



Murmuration: Woistenholme Images/Getty; flask: Getty

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WILD NEWS

By
STUART BLACKMAN,
JAMES FAIR, BEN
HOARE and JO PRICE

KEEPING YOU UP TO DATE WITH THE BIG NATURE STORIES

WELL-BEING

COVID-19 strengthens our connection with nature

As new *BBC Wildlife Magazine* research reveals, the natural world is more important than ever to our well-being.

53%

are noticing more British wildlife than they did before lockdown.

People seem to be more appreciative of the benefits of the natural world since lockdown.

There is no denying that the COVID-19 pandemic has dramatically disrupted our lives and brought about huge changes to the way we live. Of the 1,921 UK participants who took part in a *BBC Wildlife Magazine* questionnaire in September 2020, 58 per cent have spent more time outside in green and natural spaces since government restrictions were introduced, and 82 per cent say they will continue this behaviour.

BBC Wildlife editor Paul McGuinness says: "Our study backs up what many of us suspected – that now more than ever before, it is vital for people to connect with nature, for both our physical and mental well-being. The key challenge will be how we maintain or increase this engagement."

Those who took part in the study are all members of the Insiders Panel, a group of people who have opted to take part in research for publisher Immediate Media Company. Nearly two-thirds agree that wildlife and visiting local green and natural spaces are more important than ever to their well-being, with exercise being the

top reason for getting outside.

The media has reported that people have found increasing comfort in gardening and growing their own food this year. About 9 in 10 in this study have access to a garden or allotment where they frequently provide food for wild animals, use water butts and watering cans and grow pollinator-friendly species.

The vast majority (92 per cent) worry about the consequences of a decrease in biodiversity in the UK, and 94 per cent agree it is important to look after the environment: key reasons for doing so include protecting animals and plants and safeguarding the planet for children and future generations. Environmental issues that concern participants the most are the decline or



Birds such as wrens were heard more often in lockdown.

extinction of flora and fauna, climate change and plastic pollution.

Thirty-one per cent of respondents are prepared to make changes to protect the environment and 58 per cent have already made changes. Since restrictions were introduced, they have reduced the amount they travel

by car considerably and decreased the quantity of food they throw away, how much meat they consume, and volume of plastic they use. They have also increased the amount they're recycling.

Parents have spent months juggling work and childcare – 41 per cent questioned for this research say they have been teaching their children about nature more frequently, too. Jo Price

FIND OUT MORE

discoverwildlife.com/covid-and-nature

60%

use a reusable face mask – avoiding more single-use masks going to landfill.

43%

pick up litter when they see it – helping to limit the impact on natural habitats.

65%

composted their food waste or put food waste out for collection.



The new bill calls for stricter measures to tackle climate change and biodiversity loss. Below: the high brown fritillary has suffered a massive decline.

DID YOU KNOW?

Farming is one of the biggest drivers of biodiversity losses, but one-third of the food we grow is lost or wasted and one-third fed to livestock.

ENVIRONMENT

Alliance forms to propose Climate and Ecological Emergency Bill

Call for urgent action from UK Government to meet ambitious targets for climate change.

The campaign group Extinction Rebellion (XR) has made a name for itself over the past two years through street protests and acts of civil disobedience.

Most people knew it was highlighting the need for the Government to tackle climate change, but there was little sense of how it believed that should happen.

But now XR campaigners have helped to draft the Climate and Ecological Emergency (CEE) Bill, which would require ministers to adopt more extreme measures to combat global warming and biodiversity declines. Key objectives are to ensure the UK plays its part in limiting global temperature increases to 1.5°C and to protect and restore its ecosystems.

The bill has been introduced into the House of Commons by Green MP

Caroline Lucas and is supported by MPs from all major political parties, except the Conservatives.

Dr Charlie Gardner is a conservation biologist who has joined XR protests, and he helped to write parts of the bill relating to the biodiversity crisis. One of the significant aspects of the bill, he argues, is that it connects the issues of climate change and wildlife losses. “The climate and ecological crises are two sides of the same coin,” he says.

The scale of the issue was highlighted by the WWF’s *Living Planet* report, published in September, showing that the populations of more than 4,500 species have crashed by 68 per cent since 1970.

Conservationists have failed to stem the tide of declines, Gardner argues, and

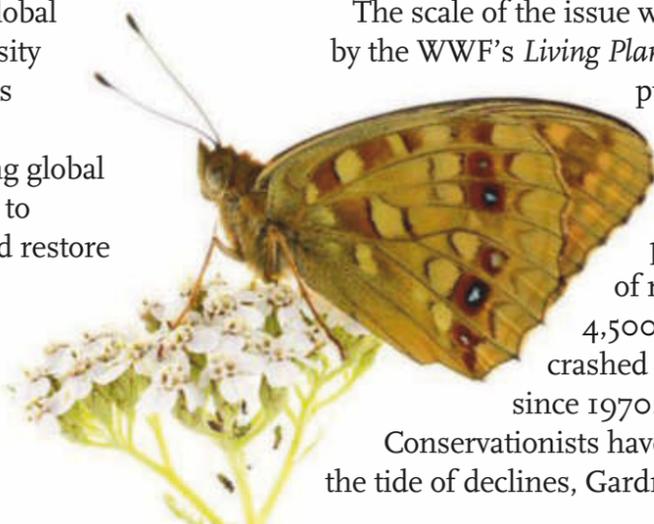
part of the reason for that is the way the argument has been framed.

“With species such as pandas and avocets, it is easy to dismiss them as peripheral concerns and conservation as an altruistic pursuit,” he says. “But conservation is vital because natural systems are essential in the fight against climate breakdown.”

The CEE Bill is unlikely to become law, because it would need government support to pass through parliament.

Dr Dave Goulson, from the University of Sussex, who helped with drafting the bill, says it still has a crucial role to play in drawing attention to the ecological crisis: “I still worry we are not giving it enough attention,” he says. “Biodiversity is essential to our food production systems – you can’t grow crops without healthy soils and pollinators.” **James Fair**

FIND OUT MORE Climate and Ecological Emergency Bill: ceebill.uk *Living Planet* report 2020: bit.ly/2H6ioXr



Emissions: Jeremy Walker/Getty; butterfly: Dirk Funhoff/MV/N/PL; snail: Kenneth Hayesand Norine Yeung; frog: Leo Malagoli

AMPHIBIANS

Track
and trace

Carla Lopes of São Paulo State University and her colleagues have been scouring water bodies in Brazil's Atlantic forests for environmental DNA (eDNA), which is shed by animals via skin cells, faeces and other secretions.

Their search turned up eDNA sequences matching 3 of 27 species that have not been recorded for 10 years or more, including one, *Megaelosia bocainensis*, that has not been seen since 1968.

This might suggest that 11 per cent of missing species still cling on in the wild, though

Lopes cautions that simply detecting their presence tells us little about the viability of the populations.

The team is now applying its techniques to other habitats, such as leaf litter, and other groups of animals. But they aren't yet finished with amphibians: "There are three iconic species that would be fun to look for – the Costa Rican golden toad, the Australian gastric brooding frog and the Tanzanian spray toad," says Lopes. "The first two are presumed extinct, the last one has been reintroduced, but searching for it in new locations would be a great project."

Stuart Blackman

FIND OUT MORE

Molecular Ecology bit.ly/35DUsoC



Phasmahyla guttata was one of the species detected via eDNA.

NEW SPECIES DISCOVERY

Auricullela gagneorum

WHAT IS IT? More species of Pacific island land snails have been driven to extinction since 1600 than any other animal group. This new discovery, which sports a 5mm-long shell and comes in a variety of colour patterns, brings a sliver of hope that at least some of those believed to have been lost forever might still cling to existence.

WHERE IS IT? *Auricullela gagneorum* is the first new species of land snail to be found for 60 years in the Hawaiian archipelago, which has lost more than half of its 750 native snail species to habitat destruction and invasive predators. **SB**



The bijou *Auricullela gagneorum*.

FIND OUT MORE

ZooKeys: bit.ly/2Rs9KnN

IN NUMBERS

16m-long

Otodus megalodon, a prehistoric mega-shark, likely had a 4.65m-long head and a tail 3.85m high, says a University of Bristol and Swansea University study.

3.26°C

is the temperature the black metaltail hummingbird reduces itself to at night to cope with the climate of the Andes mountains, reports *Biology Letters*.

7,000

is the approximate number of badgers that will be shot this autumn in the Government's largest ever seasonal cull.

BIRDS

Record-breaking year for hen harrier breeding

The news that 2020 was the best breeding year for hen harriers in England since 2002, with 60 chicks fledged from 19 successful nests (24 if you include unsuccessful ones), suggests they may be finally recovering after decades of decline.

Last year saw 47 chicks fledged, and as recently as 2013, English hen harriers produced no offspring at all.

Conservationists have given the news a cautious welcome. Illegal persecution on grouse moors is the biggest factor limiting their numbers in England, but there is no evidence that less persecution is helping hen harriers recover.

According to Mark Avery, of the campaigning group Wild Justice, this year's increase could just be down to it being a good vole year. "It's a bit difficult to go from zero successful nests to 19 and claim everything is okay, when there could be 300 in total," Avery adds.

Persecution rates are known to be highest between when harriers fledge in June or July to the end of the grouse-



Hen harrier chicks fledge when they are about one month old.

shooting season in December. The RSPB has questioned how many of this year's chicks will survive, saying a paper published last year found that only 17 per cent of young birds made it to the age of one.

Amanda Anderson of the Moorland Association says 12 of the successful nests were on moorland managed for grouse

shooting, reflecting "a commitment from moor owners and managers to work with others and help rebuild the harrier population". JF

FIND OUT MORE

Natural England tracking update: bit.ly/2Rt4Sif

TRUTH OR FICTION?

Zebra stripes are designed to dazzle

A new University of Bristol study sheds light on the theory, but finds it isn't black and white.

THERE ARE ALMOST as many theories about the appearance of zebras as they have stripes, but research by biologists at the University of Bristol has added weight to the leading hypothesis. Their recent paper reports that zebra stripes are probably a form of disruptive coloration, just not in the way that had been suspected.



Earning their stripes: patterned coats keep biting flies at bay.

Previous work by the Bristol team, using domestic horses wearing patterned rugs, showed that stripes are most likely a response to bothersome biting flies. Those studies found that the blood-sucking parasites spot stripy horses as easily as plain ones, meaning zebra stripes are not an effective anti-fly camouflage. But stripy targets do still fool the flies, since they fail to slow down or land successfully.

In their new research, the scientists examined whether zebra stripes dazzle flies using the same optical illusion as the barber-pole signs once common outside hairdressers. What they found was surprising. Flies have equal difficulty landing on striped and checked patterns. In other words, while we probably now have a reasonable idea what zebra stripes do, we can't yet explain why zebras have stripy rather than checked coats. **Ben Hoare**

FIND OUT MORE *Proceedings of the Royal Society B*: bit.ly/2ReOpA4



WANT TO COMMENT? Email wildlifeletters@immediate.co.uk

MY WAY OF THINKING

MARK CARWARDINE

The conservationist discusses a recent video that shows a shark being shot at, and invites your thoughts on the subject.

I've just seen a truly shocking video – 'US coast guard crew have near-miss with shark in Pacific Ocean'. Nearly 40 crew members of the US Coast Guard Cutter *Kimball* are swimming around their boat, in the Pacific Ocean, when their party is crashed by a 2m shark (the footage is too bad to identify the species). Complete pandemonium ensues and, as everyone scrambles to get out of the water, a petty officer on board shoots at the shark several times. Thankfully, his aim is eye-wateringly dreadful – especially given the close range – and the shark swims away unharmed.

This is the US Coast Guard, for heaven's sake. They are supposed to be highly trained, courageous and (you'd have thought) at least moderately well informed about the sea and its inhabitants. Yet I couldn't find a single news report that questioned such madness. The headline should have read 'Innocent shark has near-miss with gun-toting American'.

Meanwhile, a few days later, drone footage of a curious great white in South Africa was posted online. This shark was at least twice the size of the 'deadly' shark encountered by the US Coast Guard and was investigating surfers sitting on their boards, waiting for a set. But this time there was no panic. Such close encounters are a daily occurrence in South Africa and all the surfers knew that the likelihood of being attacked was ridiculously small.

I've spent many hundreds of hours diving and snorkelling with all sorts of sharks over the years – including bull, tiger and great white – and have survived unscathed. I'd expect nothing less.

The truth is that our fear of sharks is out of all proportion. At least some of the blame must rest with the book *Jaws*, published in 1974, and with the high-profile movies that followed. They literally scared audiences out of the water and are largely responsible for the anti-shark hysteria that has gripped the western world ever since. But even today, the fear is stoked by the demand for shocking and titillating – and poorly researched – stories in the popular press.

“You are 20 times more likely to be bitten by a New Yorker than a shark.”

Worldwide, on average, there are 80 unprovoked shark attacks every year, resulting in about five deaths (most 'attacks' result in relatively minor injuries). The numbers are minuscule considering the millions of people swimming, snorkelling, diving and surfing in the sea every day: if sharks were deliberately out to get us, there would be many, many more attacks.

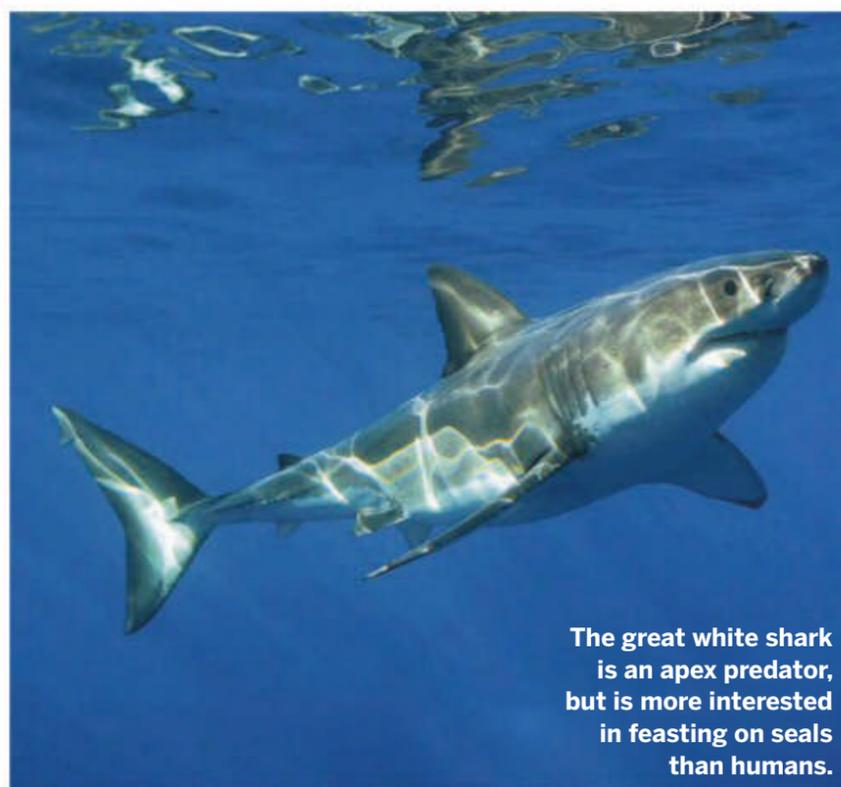
You are nearly twice as likely to be killed by a coconut falling on your head (150 people per year) than bitten, bumped, nipped or chewed by a shark, and several times more likely to win the EuroMillions jackpot (roughly two or three dozen people every year) than to be killed by a shark. Best of all, according to figures published by the New York City Health Department, you are 20 times more likely to be bitten by a New Yorker than you are by a shark.

But perhaps the most shocking statistic – and this really puts things into perspective – is that we kill many millions of sharks every year. Does that make headline news? No, of course not, because most people don't care.

Yet even if sharks were dangerous, we should still protect them. As top predators, their disappearance would disrupt entire ocean ecosystems. I feel passionately that we should respect and care for them – as we should for all wildlife – dangerous or not. An ocean without sharks is unthinkable, like the Serengeti without lions. 🐾

MARK CARWARDINE is a frustrated and frank conservationist.

WHAT DO YOU THINK? If you want to support Mark in his views or shoot him down in flames, email wildlifeletters@immediate.co.uk



The great white shark is an apex predator, but is more interested in feasting on seals than humans.



MEET THE SCIENTIST

Wesley Larson

Freelance wildlife biologist

On a mission to reduce human-wildlife conflict, one bear biologist has embraced social media to improve the visibility of his study animals.

Polar bear mothers invest a huge amount into their cubs, isolating themselves in dens arduously dug into snowdrifts to provide care and nourishment through the unforgiving conditions of Arctic winter. It's little wonder, then, that the bears are reluctant to leave when disturbed, even when oil drilling equipment is in operation perilously nearby. "We found that bears wouldn't desert their dens even with vehicles driving right overhead," says Wesley Larson, a self-confessed carnivore fan as tenacious as the animals he admires, who worked his way from office assistant to a graduate student position with Utah's Brigham Young University, monitoring polar bears on Alaska's North Slope.

Scientists have recorded an increase in human-wildlife conflict in the area, as offshore pack ice has diminished, forcing the bear population to create their dens closer to

Larson enjoying the northern lights. Below: the biologist has studied polar bear activity.



"Infrared cameras only work when conditions are perfect, and they rarely are in Arctic winter."

petroleum industry activity. With mounting concern at the Trump administration's plans to allow oil and gas leasing in the Arctic National Wildlife Refuge, robust evidence to help support and enforce protective measures for the vulnerable species has never been more important.

Wildlife managers in Alaska depend on a rule that industrial activity and research cannot take place within 1.6km of a maternity den.

Working with 15 years of monitoring records, and 30 years of notes regarding interactions between the industry and the bears, Larson and colleagues were able to

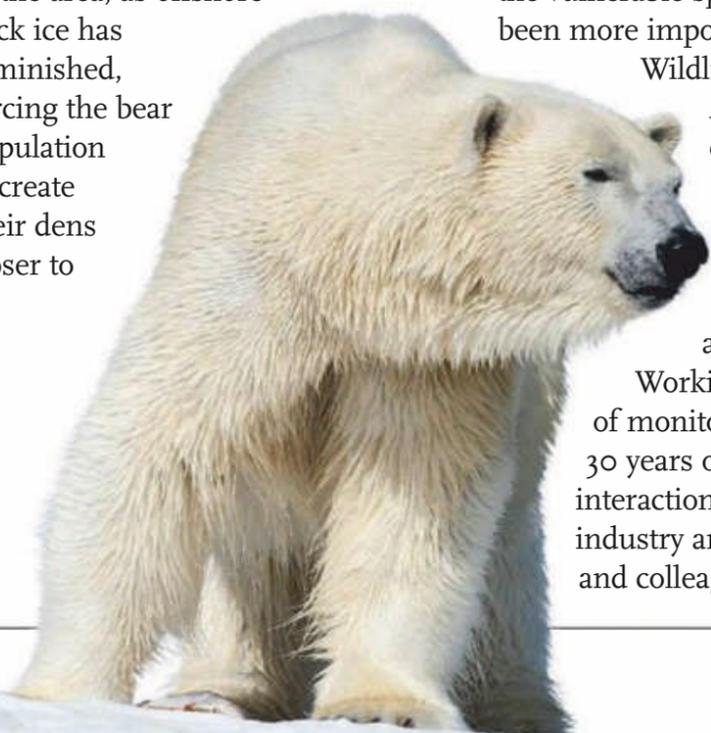
confirm that the regulation was sufficient, but that more needed to be done to actively locate dens. He explains that with entrances quickly covered by snow and dens closed-up until spring, they are effectively invisible to the naked eye.

"While technology such as forward-looking infrared cameras can be used to try to pick up a heat signature inside the den, [it] only works when conditions are perfect, and they rarely are in Arctic winter," says Larson. He is now consulting on a project using radar technology to identify dens and ensure protection for the iconic animals.

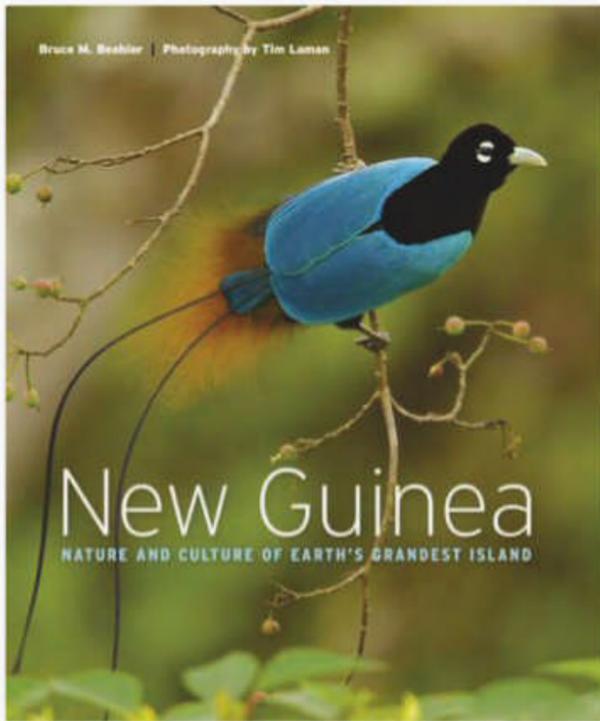
While the pandemic has paused much of his fieldwork, the ursine specialist has been busy channelling his energy into digital engagement projects – teaching online classes to socially isolated children and inspiring his 126,000 Instagram followers with photos from his archive of adventures. Whether he's crawling into caves to change the radio-tracking collar on a black bear or watching a mother grizzly and her cub catch salmon, Larson is passionate about sharing a close connection with wildlife. **Ella Davies**

FIND OUT MORE

ARCTIC: Journal of the Arctic Institute of North America: bit.ly/3hfh3Y



Wesley Larson (x2); polar bear: Justin Lo/Gaety



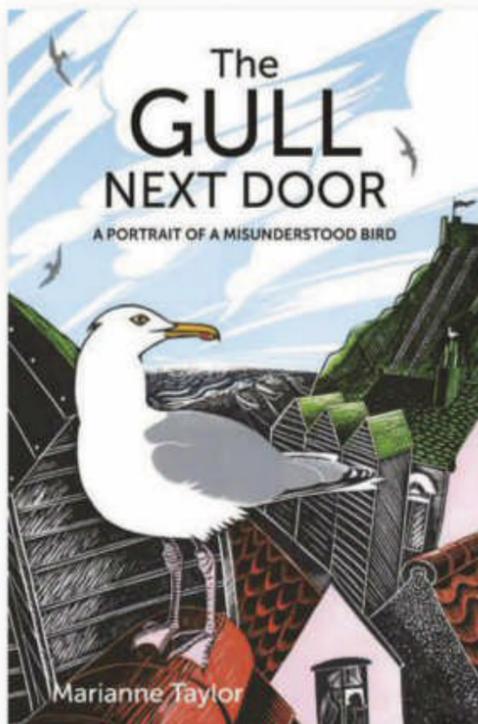
“A highly readable and appealing account of the natural and cultural history of New Guinea.”
 —Allen Allison,
 Bishop Museum, Honolulu



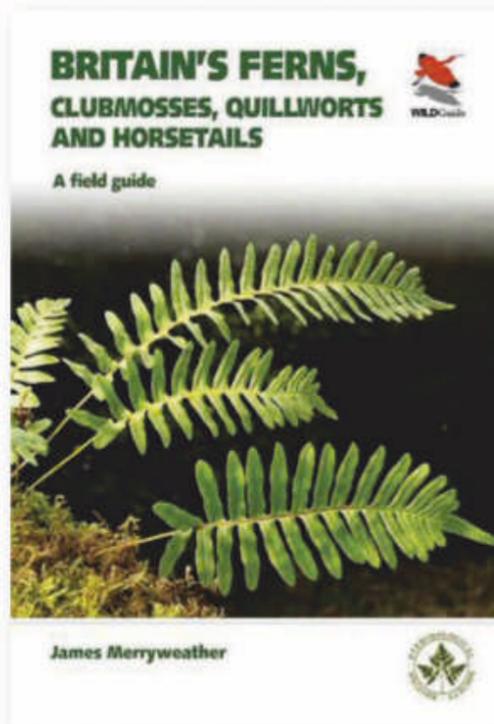
“This is still by far the best photographic guide to Britain’s birds.”
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An accessible, comprehensive and beautifully illustrated guide—the only one to cover all the orchids found in Britain and Ireland
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“A very nice addition to the study of these magnificent insects; it will further widen public awareness of their beauty and the relative fragility of their habitats.”
 —Andrew Wakeham-Dawson,
Entomologist's Monthly Magazine
 WILDGuides



As the pandemic takes its toll on all aspects of life, we find out how conservationists in Africa and the UK are coping with the crisis.

COVID AND CONSERVATION

Reports by Joanna Eede and Catherine Smalley

THE VIEW FROM AFRICA

From her camp in Kenya's Westgate Conservancy, Shivani Bhalla, founder of Ewaso Lions, is describing the biblical rains that have brought the floodplains of the Ewaso Nyiro River to abundant life. "It's pretty much rained all year," she tells me. "I said to our team of Samburu warriors, 'This must be enough now!' And they replied, 'No, you can never have enough rain. It's what keeps us going.'"

At the start of 2020, wildlife was flourishing in wet northern Kenya. Just three months later, the sinister COVID-19 pandemic forced the world

to shut down. Human movement was restricted, borders and supply chains closed and quarantines enforced. When international flights were grounded, tourism across the African continent collapsed. "We had a healthy booking sheet for 2020," says Tom Silvester, founder of Loisaba Conservancy. "Then we lost \$1,000,000 overnight."

Money makes the world go round

According to the World Travel and Tourism Council, tourism was worth \$168 billion to the African continent in 2019, when it employed 24 million people. Eighty per cent of tourists' visits are dedicated to wildlife watching, which generates over \$29 billion annually and employs 3.6 million people. The fees from tourists fund the protection of Africa's globally important wildlife habitats, from the grass plains of the

Serengeti to the swampy river delta of the Okavango and the tropical forests of the Congo.

Successful conservation is about people as well as wildlife, and park fees also provide socio-economic benefits – jobs, schools and hospitals are created from tourist revenue. The fallout, to date, is profound – widespread budget cuts, salary reductions and job losses. "There are no furlough or social benefit systems about to kick in," says Charlie Mayhew, CEO of Tusk Trust. As people turn to natural resources to feed their families, so protected areas come under increased pressure. "There is no income stream going into many local economies," says Roland Purcell, co-founder of the Tongwe Trust in Tanzania. "So, into that yawning vacuum will come poaching, encroachment by pastoralists, illegal mining and habitat loss."

\$168 billion

Amount tourism was worth in Africa during 2019.

Left: great-ape projects are on hold, as these animals could contract COVID-19 from humans. Below: Rafiki was fatally wounded by a poacher's spear. Bottom: Tourism has declined massively during the pandemic.

The Democratic Republic of the Congo's Virunga National Park – Africa's most biologically diverse protected area, where a third of the world's endangered mountain gorilla population lives – has lost 40 per cent of its income. Wire snares, laid to catch game such as antelope, also trap other animals – an infant gorilla named Theodore was caught in a snare in July. With the help of park rangers and a vet team, the snare was removed. Tragically, one of Uganda's well-known silverbacks was less lucky. Twenty-five-year-old male 'Rafiki' was fatally wounded by a poacher's spear in Bwindi Impenetrable National Park – the poacher was hunting bush pig. On the Kenyan coast, where tourism is 'almost non-existent', according to WWF, there have been reports of green turtle poaching, and in the highly bio-diverse Ntakata forest in western Tanzania – one of the few places in Africa where chimpanzees and elephants share space – accounts are emerging of bush pig poaching, tree felling and mining for nickel.

Pausing progress

Conservation activities have fallen by the pandemic's wayside. The Grumeti Fund is in the process of re-establishing a 'founder population' of Eastern black rhino to the Serengeti ecosystem, and was due to move rhino from Europe at the end of the 2020 dry season – owing to quarantine restrictions, this has been delayed until 2021. The necessary mountain gorilla 'habituation process' in Virunga National Park – a process whereby gorillas are gradually exposed to human presence, and

“My team is receiving more calls from people saying ‘Get rid of these lions’.”

which allows tourism to thrive – is on hold due to the possibility that the great apes, who share 98 per cent of their DNA with humans, could contract COVID-19.

Movement restrictions also mean that some of the vital face-to-face community work, such as 'conflict mitigation', becomes a challenge. "If a member of a Samburu community has lost a cow to a lion, we normally bring warriors together to resolve it peacefully," says Shivani Bhalla (since lockdown eased in Kenya, the issue has been resolved).

One of the biggest conservation 'gains' over the past 20 years is the development of successful community conservancies – years of painstaking work mean that many communities now see the value of tourism and, consequently, the incentive to protect wildlife. This goodwill may be endangered if financial benefits fall away. "If no money is forthcoming, those hard-won gains will be lost," says Charlie Mayhew. "As people lose jobs, so resistance to further losses lowers, and tolerance to the carnivores that predate on livestock decreases," says Alayne Cotterill, founder of Lion Landscapes. "My team is receiving more calls from people saying, 'Get rid of these lions'."

On the front line

Despite the financial cutbacks, maintaining the presence of wildlife rangers is non-negotiable. "We have to view rangers in the same way we see health workers," says Roland Purcell. "They are on the front line, putting their lives at risk." Rangers often have numerous dependants and are the sole breadwinners in their families. Despite being classified as an 'essential service', the Game Rangers Association of Africa estimates that most have had their salaries reduced by up to 80 per cent. A multi-million-pound fundraising initiative, Wildlife Ranger Challenge – launched by NGOs Tusk Trust and Natural State – aims to cover the salaries for at least 8,000 rangers. \$2 million has already been distributed. ▶



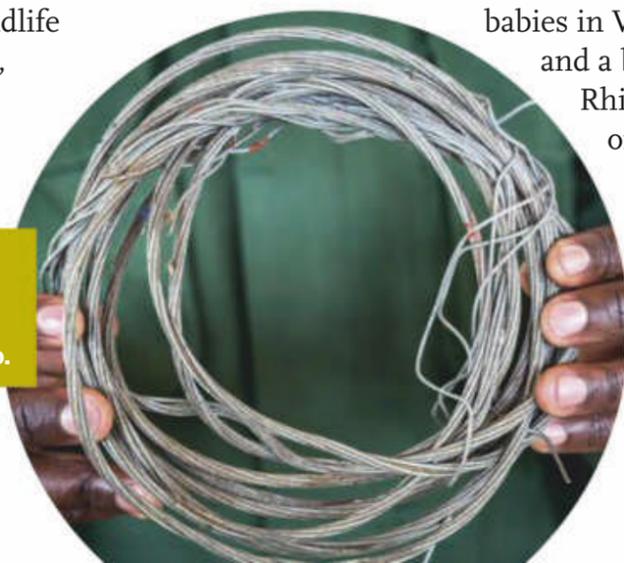
A bright light has been shone on the risk of the over-dependence on tourism – a ‘fickle mistress’, as Charlie Mayhew says – to fund conservation, particularly given the sector could take months, or years, to recover. A global recession could, in addition, have ongoing effects on donations from zoos and foundations, and the crisis money currently being channelled by governments into African conservation will not last forever. “African countries are continuing to fund essential services by taking on more state debt,” says Chris Thouless of the Elephant Crisis Fund. “The question is: for how long can they afford to do this?” It is clear that additional means of attracting capital to fund biodiversity need to be sourced. “A mix of revenue streams is the answer,” says Paul Herbertson, CEO of Wild Philanthropy.

Making the best of a bad situation

There are also positive stories of hope, however. Elephant poaching, which has been on the decline in eastern and southern Africa over the past two years, shows, “no evidence of a substantial increase due to COVID-19,” as Thouless tells me. Good has sprung from bad: conservation organisations have sponsored the distribution of hand-sanitiser, food parcels, social distancing posters and masks to communities. Increased collaboration has been fostered, too: “It’s been good to learn from each other,” says Bhalla, and the resilience of community-led, grass-roots organisations such as Ewaso Lions has been laid bare. Economic alternatives are being devised. Lion Landscapes, for example, is researching the viability of a ‘lion-friendly’ beef product, and Ol Pejeta Conservancy has created live online sessions with rangers for children around the world. In Uganda, a group of reformed poachers are starting an onion-growing project to generate income for the families of tour guides and El Karama Lodge has created a long-stay ‘remote living’ package for adventurous families seeking a COVID-safe sabbatical.

One of the lasting impacts of the pandemic might be, as Ian Craig of Lewa Wildlife Conservancy says, “the wake-up call to the world of our absolute

Wire snares are used to catch game but injure other animals, too.



connectivity to and dependence on nature... and the need to care for it for our own well-being and future”. The WWF’s *Living Planet* report released in September 2020 that revealed a “catastrophic decline” in species’ population, is testament to the consequences of abusing this dependence.

Many conservationists feel that despite the current bleakness, the world has a singular opportunity to rethink the fragile relationship between humans and the natural world, and to elevate the economic and ecological value of Africa’s landscapes as a priority for the political elite. “If ever you can understand the need to invest in wildlife, it is now – not just for its intrinsic value, but as a human health policy,” says Max Graham of Space for Giants.

New life is the best reminder of the need to value the natural world. Since the beginning of the COVID-19 pandemic, more than 140 elephants have been born in Amboseli National Park, six gorilla babies in Virunga National Park and a black rhino calf in Sera Rhino sanctuary. In a time of deep uncertainty, these births – and the glorious profusion of life the prolonged rains have brought about – give hope. It’s what keeps us going. **Joanna Eede**

MEANWHILE, BACK IN THE UK

Goats running riot in the deserted streets of a Welsh town; birdsong rising where once there was traffic noise; wildflowers blooming on verges left uncut by local councils. The brief period of respite afforded to the nation’s wildlife was met with hopeful cries that nature was clawing back the country. This, people said, was the silver lining of the devastating pandemic sweeping the globe: as we retreated indoors, nature was having a resurgence. But conservation organisations across the UK have a different story to tell.

“We certainly feel very cautious talking about a big comeback for nature,” says Craig Bennett, CEO of The Wildlife Trusts. “I think the perception of nature bouncing back might actually be people being outside more, taking time to see it and enjoy it.”

If you put these stories of UK wildlife flourishing during lockdown into the context of last year’s *State of Nature* report, which says that 41 per cent of UK species have decreased in their abundance since the 1970s, the picture isn’t quite so rosy. Insect populations have more than halved in that



£124 million

of projects stopped or deferred at the National Trust.

Left: it's not all doom and gloom – more than 140 elephants have been born in Amboseli National Park. Below: the headway that has been made in land management, such as creating wildflower meadows, can unravel in a few months.

time and the UK is now rated as among the most nature depleted countries in the world. The idea that you can just have a few months of lockdown and suddenly nature will recover is a bit dangerous, Bennett says – it gives false hope.

The sad irony is that even if there had been a boom, there is a lack of data to show it was a real phenomenon. Just as the surveying season began in March, many of our usual freedoms ended. The Wildlife Trusts, as well as many other conservation organisations, had to abruptly stop all bird, invertebrate and plant surveys – activities that necessarily involve travel and, perhaps more significantly during this time of social distancing, group working.

As lockdown rules eased, wardens reported shocking levels of damage – even illegal raves.

On warm, still evenings in May and June, large gatherings of staff and volunteers would usually be found across the heathlands of the Thames Basin searching the skies during the annual nightjar survey, organised by Surrey Wildlife Trust. Not this year. Anecdotally, there is a feeling that numbers of migratory birds, including swallows, were down this summer, but conservationists will not know for sure.

These large data gaps matter because they impede the ability to make evidence-based conservation decisions in future years. Equally, pressing the pause button on habitat restoration has consequences. Many years of labour spent on clearing scrub and bramble to create wildflower meadows, or removing invasive and ecologically damaging Himalayan balsam from waterways, can be undone within just 12 months.

Challenges and changes

On top of the disruption to ongoing conservation work, thousands flocked to their local reserves as the lockdown rules eased and wardens reported shocking levels of damage and wildlife disturbance, from littering and dogs off leads to vandalism and even illegal raves. Obviously, more people enjoying wild places is to be welcomed, but conservationists have their work cut out improving the public's understanding of what is and isn't appropriate behaviour on sensitive sites.

The starkest challenge facing UK conservation, though, is the double whammy of a dramatic loss of income and unexpected costs this year. Twenty-seven per cent of environmental charities say they are either at high risk of becoming financially unviable in the coming months or have financial reserves for four months or less, according to research by Wildlife and Countryside Link.

Like many other charities, the Bat Conservation Trust had to turn on a dime to shift its operations online. Social distancing meant that checking on roosts in people's homes was difficult, and a virtual solution for the National Bat Helpline had to be developed. Add to that the need to move all training and conferences online, and the expense of new software and lost time quickly represented a significant blow to the organisation's already overstretched resources.

For the RSPB, one of the biggest financial shocks came from the postponement of the charity's Gough ►





2%

of environment and conservation organisations not yet affected by coronavirus outbreak.

Top: RSPB work on Gough Island has been suspended due to COVID-19. Bottom: many nature reserves have had to close their gates, affecting their income.

to carry out their vital work for nature's recovery in the future.

Chancellor Rishi Sunak is reportedly planning a "green industrial revolution", and on 30 June the Government announced a £40 million Green Recovery Challenge Fund "to help charities and environmental organisations start work on projects across England to restore nature and tackle climate change." Craig Bennett points out that this sum was already part of the existing Defra budget and is "tiny, really" in comparison to the £27 billion earmarked for roadbuilding.

Reconnecting with nature

On the same day, the Prime Minister's "project speed" economy speech, in which he blamed "newt-counting delays" for holding back building development, sent a chill down the spine of many in the conservation community. It is feared that a deregulation agenda is at the heart of the post-COVID economic recovery that threatens the planning checks and balances protecting Britain's wildlife. "There's so much awry with the PM's analysis that it's difficult to know how to respond," reads a blog response from Amphibian and Reptile Conservation.

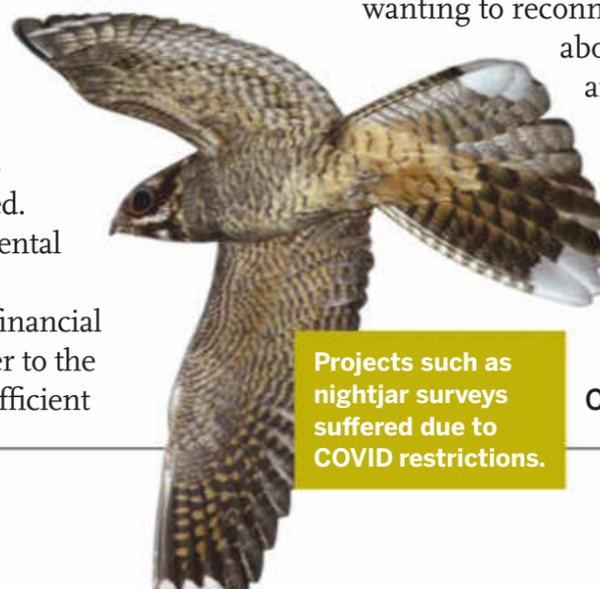
It certainly seems out of step with public sentiment. According to a YouGov survey commissioned by the RSPB, 84 per cent support an increase in accessible nature-rich areas. Online interest in conservation organisations boomed during lockdown, with The Wildlife Trusts witnessing more than a 2,000 per cent increase of people visiting its wildlife webcams, and the National Trust reporting Facebook and Twitter engagement having risen by a third.

As charities stare down the barrel at the oncoming recession, the hope is that this resurgence of interest in the natural world translates into a continued commitment to their causes.

"I've never detected a time like this before now, where you just feel a really strong undercurrent in society of people wanting to reconnect with nature, care

about the environment and have a positive agenda for nature in recovery," reflects Bennett. "With people's support, we'll be fighting for nature in the years ahead."

Catherine Smalley



Projects such as nightjar surveys suffered due to COVID restrictions.

Island project, involving the protection of seabirds from invasive non-native mice on this remote island, 2,700km west of Cape Town (featured in *BBC Wildlife*, March 2019). When the COVID-19 outbreak escalated in March, a team of 12 embarked on a mammoth – and expensive – 12-day sailing voyage and RAF military flight back to the UK. The costs of returning again will have to be incurred next year.

"We have undoubtedly used some of our financial reserves this year," says Beccy Speight, CEO of the RSPB. Income from retail and catering stopped when all 221 reserves shut during lockdown. She also explains that, like all membership charities, the RSPB relies heavily on face-to-face membership recruitment at reserves during the summer months. Normally they would attract about 100,000 new members in a year and, though online membership

recruitment has doubled, there is now a shortfall.

"I feel as worried about the years to come," Speight admits. "It's just about making sure that we can cope with what the recession might bring in future years and the cumulative impact in terms of having missed out on growing membership as much as we had anticipated this year."

Speight is grateful for the Government's furlough scheme, which has been a "lifesaver" – about 50 per cent of RSPB staff were furloughed. However, environmental charities are deeply concerned that the financial aid currently on offer to the sector will not be sufficient

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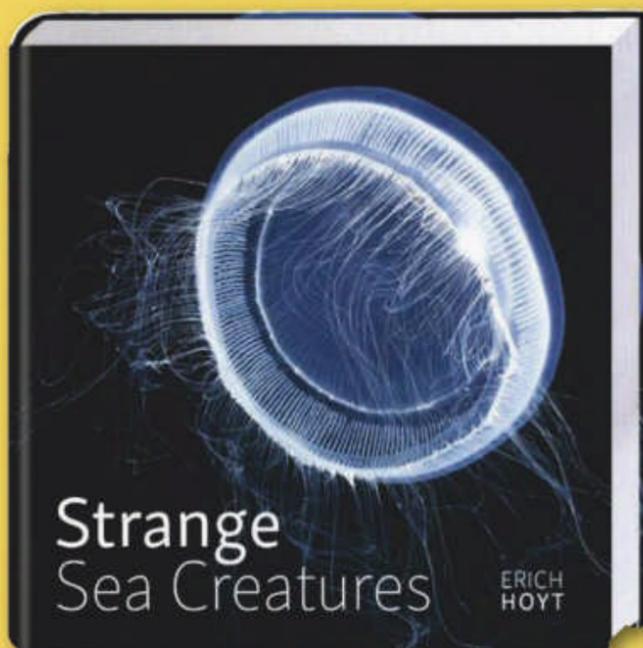
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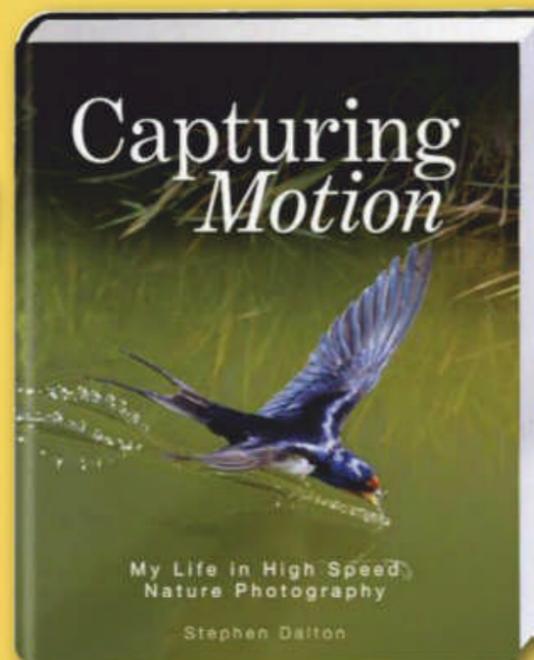


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**BBC
Wildlife**

Our most beloved animals are dying out due to human greed.



Credit: Juan Pablo Moreira/FFI

Millions of endangered animals are being illegally and cruelly slaughtered to satisfy the demand for markets that exploit human weakness. It's time to stand together to end illegal wildlife trade.

- **Fauna & Flora International is working to stop illegal wildlife trade at its source and dismantle the trade networks.**
- **Illegal wildlife trade threatens some of our most iconic and beloved animals, like pangolins, elephants and tigers.**
- **A terrible human price is being paid too as people are exploited through this trade – but the traffickers will stop at nothing.**

Over the last 50 years, illicit trade in wildlife has become one of the greatest threats to our natural world. Syndicates of traffickers are exploiting communities in developing areas, driving them to illegally hunt down animals for their body parts. These criminal networks only pay a tiny portion of the final price they get for the animals they receive. Beautiful animals are reduced to gory lumps of gristle, bone and keratin, then shipped off to far-flung markets.

Angry? We've barely started yet.

The animal parts are being shipped along with weapons, drugs, even people – these heartless profiteers don't care about the devastation they cause. Live animals are concealed during transport with no thought for their survival. Many of them don't make it. Perhaps it's a mercy when they choose to kill and freeze the animals, before hiding them in cargo containers the size of a small bus. Because that's the industrial scale they're working on. It's not one or two animals here and there – it's entire species that we are seeing driven

towards extinction, lost forever from our global heritage. And for one reason alone. To put more money in the pockets of these criminals – whatever the cost.

Ruthless doesn't come close to describing them.

Organised criminal networks are taking advantage of people desperate for miracle cures.

“If you value the natural world – if you think it should be protected for its own sake as well as humanity's – then please support Fauna & Flora International.”

Sir David Attenborough, Fauna & Flora International vice-president

Trading on fears and desires, they ply their products at a hefty price – exploiting insecurities to fatten their wallets. You see, *these people will stop at nothing to turn a profit.*

Now, we all pay the price.

COVID-19 has affected us all. It's unravelling our economies. It has sealed us up in our homes and is attacking the most vulnerable

among us. In a short period, almost every person on the planet has been affected – and we still don't know the final toll.

The source could well be these criminal profiteers.

We don't know for certain how the pandemic started. Some scientists suggest that the disease might have been

Wildlife Trade at Fauna & Flora International (FFI) says, “We would like to see stronger action to halt illegal hunting, trafficking and consumption of illegally-sourced wildlife. It is no longer an option to ignore the dangers of illegal and unregulated wildlife trade and consumption, to human health and to healthy, functioning ecosystems needed for life on earth to thrive. We must ensure that the lessons from COVID-19 pandemic are applied to prevent repeats of this global crisis.”

Illegal wildlife trade must be stopped.

The governments of the world are doing what they can. But while bans are put in place, the despicable individuals driving the trafficking will try to use their illicit networks to keep selling, lining their pockets until they are stopped. It's precisely because this is a trade that happens in the shadows, that we must stop it at source. That's why FFI is raising funds – to help put a stop to this vile trade. To do so, they are asking you to make an urgent contribution today.



Credit: Cary Morrisroe/FFI

transferred to a person from a pangolin being traded illegally in one of these markets – these are the most trafficked wild mammals in the world, with over a million consumed by the trade since 2000. Yet we would never have imagined that these markets for body parts of wild animals would affect us in this way. It's time to say “enough”. Dr Rebecca Drury, Head of

Your response by 16 November could help stop the traffickers.

Act now to stop the traffickers.

FFI are working to stop illegal exploitation of wild species - supporting governments to collect vital evidence that can help convict traffickers, disrupt their networks and bring them justice instead of profits.

FFI are also keeping dedicated rangers going, making sure they have essential equipment and training to respond like lightning to every poaching threat - stopping the trade at its very source.

There's not a moment to waste.

We must act now to save countless animals from this grim, ravenous, all-consuming market.

Please cut the coupon and return it now, and you could help save beloved creatures like elephants, tigers and pangolins. If the coupon is missing, please send your cheque (payable to FFI) to: Freepost RTTH-TXTL-AJRK, Fauna & Flora International, The David Attenborough Building, Pembroke Street, Cambridge, CB2 3QZ by 16 November.

How you could help stop the trafficking

Your gift could help stop illegal wildlife exploitation at its source and dismantle trafficking networks. Illegal wildlife trade is one of the most serious and persistent threats to endangered species like elephants, tigers and pangolins. Here's how your support could help:

£5,000 could help build a case against a wildlife trafficker, collecting vital evidence needed to secure convictions.

£1,000 could help train rangers to tackle poaching threats in the field. The first line of defence, these brave people respond immediately to poaching incidents.

£500 could help pay for DNA analysis of important evidence, helping us to understand the trading networks so we can focus our efforts where they matter most.

£100 could help pay for an important item of equipment for a ranger, like a first-aid kit.

£50 could help pay for monitoring equipment like camera traps and GPS units, helping us run patrols in the highest-risk areas.

Any donations, large or small, will be received with thanks - every gift makes a difference. You could help strike a vital blow at the markets that make this trade so profitable. Please respond by 16 November at the very latest. Thank you.

Just some of the animals suffering from the illegal wildlife trade:



Elephants
slaughtered for their skin and tusks

Pangolins
killed for meat and scales

Tigers
reduced to a pile of skin and bones

Cut the coupon and return it with your gift to FFI, and you could help stop illegal wildlife trade. Alternatively go to www.stopiwt.org or call 01223 749019. Thank you.

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URBAN

If you go down to the corner shop today, you're sure of a big surprise, as everything from leopards and lizards to bats and wild boar are making themselves at home in our cities.

Leopard: Nayan Khanolkar; raccoons: Jim Rankin/Toronto Star/Getty; macaw: João Marcos Rosa; otter: Luke Massey/naturepi.com





Clockwise from far left: leopards, raccoons, macaws and otters have all made the move to city living.

jungle

Words by **Ben Hoare**



Two yellow orbs shine back at you in the darkness, as something catches the beam from your headlights in its eyes. Moments later, they're gone. Should you find yourself driving along the back streets of Mumbai after dark, you might just have glimpsed a leopard. Against the odds, the world's most cosmopolitan big cat has gained a pawhold in the megacity, home to more than 20 million people.

By day, the leopards mostly hide up in Sanjay Gandhi National Park, the green heart of the city, where

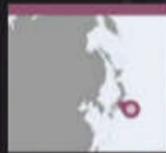
researchers counted 47 adult cats and eight cubs in 2018. At night, they prowl the neighbouring alleys and backyards, picking off stray dogs, and feral pigs and goats.

Should we be surprised? The labels 'city' and 'countryside' mean nothing to Mumbai's leopards, or to Aspen's black bears, Stockholm's beavers and Beijing's weasels. Wild animals just want a safe place to live, where they can find food and shelter, and perhaps raise a family.

In the urban jungle, you're rarely far from exciting wildlife. Here, we search the back streets and scour the sewers to introduce you to some of our wilder metropolitan neighbours. ▶

You're welcome, deer

SIKA DEER, NARA



If wildlife is to thrive in our cities, it often all comes down to cultural norms – what we deem acceptable – rather than just being

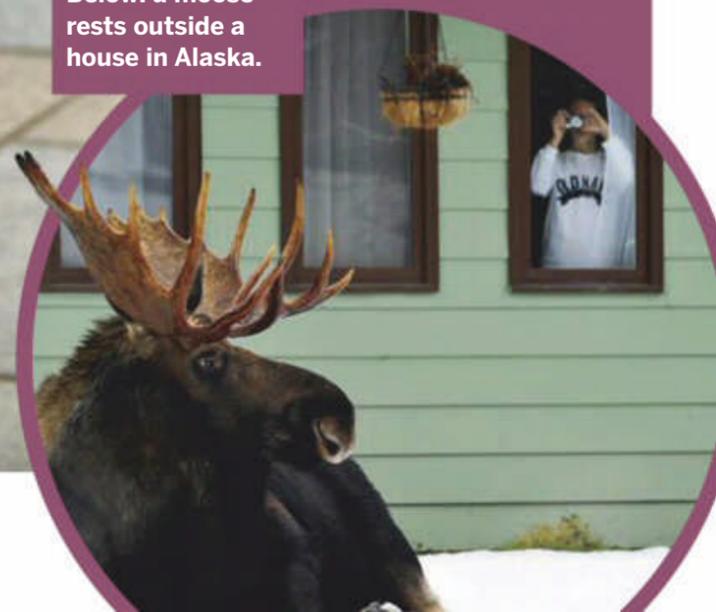
a question of whether there's enough food, water or shelter. Take the sika deer that roam Japanese streets. Deer are not small animals by any stretch, yet in the temple city of Nara and on the touristy island of Miyajima, it's considered perfectly okay for them to mingle with pedestrians and wander around cafes and shops. In part, this may be due to a lingering sense of tradition, since the country's Shinto religion held deer to be sacred. It also makes economic sense, as local businesses appreciate the hordes of phone-toting visitors keen to snap each other feeding the 'pavement Bambis'. At any rate, the welcome does not extend to Japan's rural hinterland, where farmers are quite happy to persecute deer as they see fit.

URBAN DEER

A surprising number of deer find cities to their liking. After dark, groups of **fallow deer** emerge from pockets of woodland inside the M25, such as Hainault Forest and Dagnam Park, to explore the verges and gardens of nearby housing estates.

In frenetic Mumbai, herds of **spotted deer** can be seen nibbling bags of rubbish. While in the Alaskan city of Anchorage, it's far from unusual to see a **moose** on the loose.

Above: sika deer delight tourists. Below: a moose rests outside a house in Alaska.



Taking centre stage

SMOOTH-COATED OTTER, SINGAPORE



Apex predators might not seem well suited to urban life. But if the prey is there, they will come. Stealthy by nature, the hunters slip in and out of cities largely unseen, often under cover of darkness. Occasionally, however, they show no fear, like the smooth-coated otters that have moved into Singapore's Marina Bay area. The otter families include one super-approachable group,

at times 9 or 10 otters strong, that has cavorted in front of crowds of onlookers in and around the Gardens by the Bay urban nature park. In 2016, the family starred in BBC One's *Planet Earth II*.

Singapore, which plants 50,000 trees a year, can reasonably claim to be the world's greenest megacity. The otters' return, a sure sign of pristine water, is the crowning glory of an anti-pollution drive that began way back in 1977.

TOP CAT

In May 2013, a male **mountain lion** called P-22 triggered a camera-trap as it strolled through LA's Griffith Park, below the iconic Hollywood sign. Steve Winter's unforgettable photograph turned P-22 into the most famous urban animal on the planet, yet it also highlighted the growing pressures on this isolated population of mountain lions, cut off by traffic-choked freeways in the dusty hills around Los Angeles and Malibu. A record 15 mountain lions were born here in 2020 during what has been hailed the 'summer of kittens', but for how much longer will these cats cling on?



Above: otters in Singapore. Below: a mountain lion steals the show in Hollywood.



Sting in the tale

YELLOW SCORPION, SÃO PAULO



Brazil's ever-expanding concrete jungle is proving attractive to yellow scorpions, which as a rule used to keep to the surrounding fields and forest. The recent spike in sightings appears most pronounced in São Paulo, and since these scorpions happen to be large and highly venomous, their arrival in town has not gone unnoticed. Overblown news stories talk of "invasions", "infestations" and a "scorpion crisis", when all the arachnids are after is cockroaches and bugs – arguably, they're the best pest-controllers the city has ever had. True, the yellow scorpion's tail packs a punch, and the Brazilian government has said that the number of people stung by the species each year is now 10 times higher than in 2000, but the scorpion is rarely aggressive if left alone.

At least there's an easy way to find the eight-legged newcomers. Like all scorpions, they glow greenish-blue under UV light. The fluorescence is produced inside the hard outer cuticle that covers their exoskeleton: substances in the cuticle absorb UV light, then retransmit it as a visible eerie glow. Why? It's a mystery.



The invasive, and tiny, yellow-tailed scorpion is likely to go unnoticed.

PORTS OF CALL

Coastal towns are well known for being the first port of call for exotic species. Ship-assisted additions to the British fauna include the black rat and **yellow-tailed scorpion**, though neither has gained much ground in the UK. One of the few

places that the scorpion – a small species, up to 4cm in length – can still be found is Sheerness docks, on the Isle of Sheppey in Kent. Here, scorpions hide in cracks in south-facing walls, seldom noticed and causing no harm.

Deer: Carl Court/Getty; moose: Marc Lester/Anchorage Daily News/Getty; otters: Luke Massey/naturepl.com; mountain lion: Steve Winter/Nat on a Geographic Image Collection; scorpion: Stephen Dalton/naturepl.com

Man-made structures act as jungle gyms for raccoons.

ATTIC WILDLIFE

Many roof spaces could host a veritable safari. In European cities, the wildlife above residents' heads includes breeding **pipistrelle bats** in summer, and hibernating **edible dormice** and **peacock butterflies** in winter.

Old buildings in the historic heart of Krakow, Poland, support a thriving population of **stone martens**. These pine marten lookalikes have been known to scent-mark parked cars and leave bite marks in the engine wiring, too.

Svelte stone martens get into all sorts of nooks and crannies.

Climbing to the top

RACCOON, TORONTO



Before the urbanisation of North America, raccoons scampered mainly through deciduous woodland. With much of their former habitat

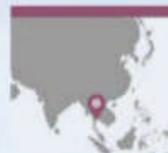
gone, these excellent climbers began denning in attics instead, even in city centres. In 2018, one enterprising raccoon went viral by scaling a 25-storey Minnesota high-rise. After its 20-hour ascent, streamed live, the animal was rescued on the roof.

Intelligent, omnivorous, adaptable, nimble with their hands... raccoons share so many human traits, no wonder they feel at home in our built environment. The 5kg bandit-masked carnivores are regarded as the ultimate urban pest by many North Americans. Not only do the 'trash pandas' tip over wheelie bins and dig up flowerbeds in search of food, but those dextrous digits can also raid backyard birdfeeders, pinch ornamental carp from ponds, open fridge doors in unattended kitchens and filch picnics in parks. Five years ago, Toronto – which has been called the raccoon capital of the world – spent US\$24 million on a 'moonshot' bid to design a raccoon-resistant bin. Yep, you guessed right: the raccoons cracked it.

Raccoon: Alamy; stone marten: M. an Rad's cs/naturep.com; python: Chr's Mattison/Alamy; monitor: Olivier Born/Biosphoto/FLPA

Underground, overground

WATER MONITOR, BANGKOK



Under every city is a maze of pipes, storm drains and sewers, where you might expect to meet rats and mice, spiders and cockroaches. Sometimes, however, the subterranean fauna can be rather larger. Bangkok is visited by several hundred water monitors, huge lizards in the same family as Komodo dragons that may be as long as an adult human is tall and will eat pretty much anything. They have learned that sneaking into sewers and drains is a great way to get around the Thai capital, as seen in BBC Two series *Cities: Nature's New Wild*, broadcast in 2018. Unfortunately, water monitors are traditionally thought to bring bad luck in Thailand, so they are heavily persecuted. It is the job of the Bangkok fire service to try to relocate any big or overly bold individuals, though the monitors keep coming back. ►

Large reticulated pythons navigate their way through the sewer system.



SNAKES IN THE SEWER

Apart from a handful of abandoned pets, New York's celebrated 'sewer alligators' are nothing more than an urban myth, but in southern Asia, sewers really do lure big reptiles. **Reticulated pythons** frequently enter sewers and drainage channels in the region, both as somewhere to hide and to hunt rodents and stray dogs. In cities such as Bangkok, Kuala Lumpur and Singapore, the giant snakes can end up in swimming pools and other odd places, especially during the rainy season.

Like miniature Godzillas, water monitors cause havoc in the city.





At dusk, Mexican free-tailed bats become a popular urban attraction.



STRANGE FRUIT

Many trees in Sydney and Melbourne parks are studded with what, at first glance, appears to be fruit. Then you realise you're looking at hundreds of fruit bats hanging upside-down, with leathery wings wrapped tight around furry bodies. These are **grey-headed flying foxes** and they have proved divisive, by inadvertently defoliating their roosting trees. However, the species plays an important ecological role by dispersing tree seeds.

Going batty

MEXICAN FREE-TAILED BAT, AUSTIN



A million – yes, a million – bats roost on a single bridge in this self-styled ‘Bat City’. Congress

Avenue Bridge, which spans Lady Bird Lake in downtown Austin, Texas, could almost have been designed with bats in mind. When it was renovated in 1980, small bat-sized gaps were added to the structure and it was not long before the local free-tailed bats began roosting there. Now the bridge is close to capacity and provides a perfect case study of sustainable urban wildlife tourism.

On balmy summer evenings, the bridge is packed with tourists, while boats and kayaks throng the water below, as everyone enjoys the dusk spectacle of clouds of bats swirling into the sky. Within about 45 minutes, the bats have dispersed to hunt insects, returning to their waiting pups by dawn.

Numbers peak in mid-August, when the annual Bat Fest brings a carnival atmosphere to the bridge.



BLIZZARDS OF WINGS

During the southern-hemisphere spring, Canberra's bright lights lure down blizzards of **bogong moths** en-route to the Australian Alps, where they spend the summer.

These 30mm brown moths look ordinary enough. However, during their nocturnal migration, they do something extraordinary – almost covering buildings when they settle.

Inside a dense swarm, there may be thousands of moths per square metre.

Left: bogong moths fill the sky. Right: pavement ants clean up after New Yorkers.

The tiny majority

ANTS OF MANHATTAN, NEW YORK



It's not every day that you find a species new to science while on your lunch break in the midst of a bustling city. But when biology students working with professor Rob Dunn – a leading authority on ants, and *BBC Wildlife* contributor – spotted an interesting ant off Broadway, they took it back to the lab. It didn't match any described species, so for now – until formally named – goes by the moniker ‘ManhattAnt’.

The ManhattAnt is one of numerous New York ants attracting scientists' interest. A study of the foraging behaviour in the pavement ant, for instance, estimated that each year the ants of a single street cart off food equivalent to the weight of 60,000 hot dogs. Dunn's team discovered that urban pavement ants had different features to their country counterparts, which could be due to diverging diets.

Ants aren't the only city-dwelling animals to show genetic differences, either. The London Underground has a unique subspecies of mosquito, while New York's white-footed mice are distinct from those in the countryside.





Pig in the city: wild boar forage in Berlin, paying little attention to humans.

To cull or not to cull?

WILD BOAR, BERLIN



Of all the wildlife stories that stole our hearts during 2020's grim spring lockdown, one stands out for sheer silliness: the widely circulated photos of a female wild boar called Elsa and her stripy piglets romping through a Berlin park, with a nude sunbather in hot pursuit. Moments earlier the cheeky swine, accustomed to handouts, had swiped a plastic bag containing the naked man's laptop. There may be several salutary lessons here, chief among them that feeding boar is not a good idea.

As in Gloucestershire's Forest of Dean, offerings of peanuts and other treats only worsen the conflict between boar and people in the leafy German capital, where an estimated 3,000–5,000 of the wild pigs now live. Boar cause traffic accidents and create a mess; they leave lawns and road verges looking as if an excavator has run riot. The earth-moving and trampling mean boar are valuable ecosystem engineers, but in an urban setting that doesn't cut the mustard, and Berlin's municipal authorities cull hundreds of boar a year. ▶

PESKY PRIMATES

It's the same story the world over. When non-human primates move into cities, they divide opinion and kick off fierce arguments about culling. From the **Barbary macaques** of Gibraltar to the **chacma baboons** of Cape Town, and the **long-tailed macaques** of Kuala Lumpur, emboldened monkeys searching for food can't help getting into trouble.

Cape Town's 500 or so baboons clamber over vehicles and buildings, delighting some but enraging others. Human Wildlife Solutions is tasked with managing baboon numbers in the city, and has been accused of unnecessary brutality.



Chacma baboons don't always endear themselves to the neighbours.

Blue-and-gold macaws relocated to Campo Grande in search of food.



PENGUINS ON PARADE

Locals in Simon's Town, South Africa are very protective of their penguins. This well-to-do suburb on the Cape Peninsula, south of Cape Town proper, has a remarkable **African penguin** colony at Boulders Beach. The colony is in safe hands, thanks to barriers, a dedicated viewing area and much-photographed 'penguin crossing' road signs. Nevertheless, overfishing, oil spills and food shortages due to climate change are serious threats.



People flock to see penguins on the beach. Left: signs make road users aware of the birds.



Parrot fashion

BLUE-AND-GOLD MACAW, CAMPO GRANDE



Urban parrots are a growing phenomenon, bringing raucous squawks and flashes of colour to cityscapes worldwide. Most of the exotic arrivals are escaped pets or their descendants, and not all populations become self-sustaining, but Campo Grande's blue-and-gold macaws turned up under their own steam and are thriving. Campo Grande, in Brazil's midwestern state of Mato Grosso, is the gateway to the vast Pantanal wetland – 10 times larger than Florida's Everglades. A severe drought in the Pantanal in 1999 forced groups of macaws to disperse in search of food, and these birds seem to be the origins of today's urban population.

Neiva Guedes, president of the Instituto Arara Azul (Hyacinth Macaw Institute), says that according to the latest survey, there are about 700 macaws in the city. A total of 259 nests were recorded in the 2019 breeding season, roughly from July to December. Campo Grande residents are so taken by their flashy new neighbours that they erect nestboxes to encourage them, and the city's proud new nickname is 'Capital of the Macaws'.

The high life

PEREGRINE FALCON, LONDON



From the Empire State Building and Brooklyn Bridge to Gaudi's La Sagrada Familia and the Houses of Parliament, dozens of city landmarks across the northern hemisphere have a pair of peregrines in residence. To these falcons, any tall building or tower is a substitute cliff, ideal for nesting and roosting.

Prey is plentiful in built-up areas, especially pigeons, crows and other medium-sized birds. The nocturnal city glow benefits the peregrines by enabling them to hunt after dark, too.

There is one other factor at play. City peregrines are relatively safe from persecution, certainly compared to rural areas, which is why the UK's urban peregrine population exceeds 100 breeding pairs. This wildlife success story was unimaginable 60 years ago, when pesticide poisoning brought peregrines to the brink of extinction.



A PLAGUE OF PARROTS?

Visitors to Madrid, Barcelona, Seville and Malaga can hardly help noticing the **monk parakeets** flying around the elegant squares and boulevards.

Native to Argentina, these small, long-tailed parrots are now, unfortunately, ruffling feathers in Spain. Chief among the complaints are the mess from droppings, damage to colonial nesting trees, and the threat posed to native species.



Above: peregrine falcons in London. Below: urban monk parakeets are seen as a nuisance.

Macaws: João Marcos Rosa; sign: Sohm/Alamy; penguins: Ian Dagnall/Alamy; peregrine: Bertie Gregory/2020VISION/NPL; parakeets: David Soanes Photography/Getty



BEN HOARE'S latest

children's book *Wild City* (Pan Macmillan, £12.99) meets the amazing animals who share our city spaces. benhoare.com

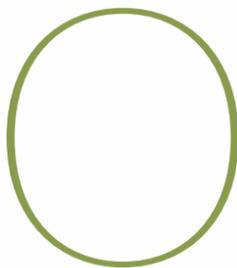


Socotra has an almost otherworldly landscape, dotted with succulents.

ARABIAN TREASURE

The archipelago of Socotra is famed for unique flora and fauna found nowhere else on the planet, earning it the nickname 'Galápagos of the Indian Ocean'.

Words by Hilary Bradt



n my first day in Socotra, as we walked to what became known as the infinity pool, the sheer improbability of the landscape made me stop and gaze around

in wonder. We were following a stony track along a narrow bed of salmon-pink limestone, scalloped and pleated by the elements, with a fast-flowing stream to our left and thrusting peaks ahead. Squished between the rocks or clinging to the sides of them were bottle trees, everyone's favourite living thing on the island.

The common name, desert rose, does nothing to conjure their appeal or appearance. The scientific name is much more descriptive: *obesum*. Little dumpy things, with the smooth skin of obesity, their plumpness takes a wide variety of forms, many irresistibly reminiscent of buttocks or bellies. Some were leafless (they shed their leaves before flowering), while others were frothing with pink funnel-shaped blossoms. *Adenium obesum* is also found in Africa and Arabia, but the golden Socotran subspecies is more endearing.

Also scattered through the landscape and silhouetted on the horizon were the famous dragon's blood trees, resembling

Above: resembling something out of *Alice in Wonderland*, dragon's blood trees look like giant toadstools. Right: the 'infinity pool' is fed

by a small waterfall and enjoys incredible views out to sea. Far right: female Somali starlings sport a grey hood, unlike the Socotran starlings.





The gold of the East

Throughout history, the natural treasures of Socotra have been prized and traded.

The Bible gives us a clue about how valuable the natural products of Socotra were in ancient times – the Magi brought Jesus gifts of gold, frankincense and myrrh. The latter two, derived from the sap of Arabian trees, were as costly as gold and both grew on Socotra (the myrrh used by the Egyptians for mummification was a mainland species). The medicinal sap of the Socotran aloe and pigment from the dragon's blood tree were also greatly prized. No wonder the island's name might derive from the Arabic phrase *suq-qutra* – 'emporium of resin'. Socotra lay on the shipping route between Arabia and India and merchant



Frankincense trees ooze sap, which is then harvested.

vessels would have called there regularly. Ethiopians, Egyptians, Greeks and Romans knew this island and its riches, most notably frankincense, which was burned during religious ceremonies. Pliny the Elder reported that an entire year's harvest was burned at the funeral of Emperor Nero's wife.

giant mushrooms – solid and perfectly symmetrical, green on top with a fan of reddish or grey branches below. Ahead, cradled in a pink limestone hollow on the brink of a precipice, and fed by a small waterfall, lay our destination – a deep pool of clear water. No amount of reading or photos could have prepared me for this.

Distinct character

Isolated Socotra is found 354km from mainland Yemen, between the Guardafui Channel and the Arabian Sea. Millions of years ago this elongated piece of land broke away from the horn of Africa to settle in the Indian Ocean, some 240km from its parent. Nineteenth century employee of the East India Company, lieutenant James Wellsted, described it as "a pile of mountains almost surrounded by a low plain" and it is these mountains that give the island its character, beauty and high level of endemism. The main island of Socotra (there are three others in the archipelago) is scarcely larger than Cornwall and yet its highest peak is 1,550m above sea level. The range also supports a cloud forest, which affects the isle's climate and habitat.

Islands are known to be hotbeds of endemism. Millions of years of isolation encouraged animals and plants that found themselves stranded after the breakup of Gondwanaland, or volcanic activity, to take advantage of their environment through evolution, and Socotra is no different. Well, a little different. While well-known islands

such as the Galápagos and Madagascar are famous for their wildlife, Socotra's speciality is plants, 39 per cent of which are endemic. And of the 830 plant species, 100 are trees and several are found only on Socotra, giving the landscape its distinctive appearance.

The percentage of unique animal species is higher – 60 per cent of spiders, 90 per cent of reptiles, 95 per cent of land snails, 100 per cent of cave crustaceans and a handful of birds found on the archipelago are endemic. The majority of fauna tends to only capture the interest of specialists with, perhaps, the exception of the Socotran chameleon and the magnificent blue baboon tarantula spider – which would be on everyone's must-see list if it wasn't so hard to find. There are no native mammals, apart from one species of bat.

The importance of this diversity and endemism was first recognised by UNESCO in 2003 when Socotra was made a Man and Biosphere Reserve, promoted in 2008 to a World Heritage Site. Since then, however, the complex politics of the region, combined with natural disasters, have collectively frustrated ▶

We saw adolescent baby dragons, spiky like agave and very different from the parent tree.





attempts to uphold this status. A detailed UN report in 2013 identified unregulated road building as a major threat, along with unsustainable tourism. It recommended “an effective collaborative approach to the biodiversity, conservation and sustainable management of natural resources.”

This would be fine in a country with a stable government. But Socotra is part of Yemen, which is racked by civil war and therefore has been unable to prioritise the conservation of a far-off but strategically valuable island, where both Saudi Arabia and, more prominently, the UAE, have for some time been competing politically for influence, a struggle that has now escalated to a mini coup by South-Yemeni separatists, the UAE-backed Southern Transitional Council. A parallel threat is immigration from the Yemen mainland, to escape the war, which has resulted in a haphazard construction boom. However, the physical tourist infrastructures, such as campsites, mostly destroyed when a cyclone devastated the island in 2015, have not yet been rebuilt.

Our group of nine knew the realities of travel here. Arriving on the once-weekly flight from Cairo, and with only one usable hotel and a hostel in Hadibo, we had to camp

on sites with no facilities, sometimes sharing the space with other tourists. Journeys took longer than expected on this island, which is only 132km long. Fortunately, road building has paused and the route into the mountains demanded such skill that our driver, whose real job is a botanist, needed an assistant for the tricky bits. He splashed through streams and wrenched our 4WD around hairpin bends, while we looked down on dizzying ravines, longing for our next walk.

Telling tall tales

On Firmihin plateau we wandered through a forest of dragon’s blood trees – some collapsed dead in a tangle of bare branches. Our guide was keen to show us how the tree got its name, scraping at a lesion on the trunk until the blood-red sap flowed. He said it derived from a tale of two warring brothers, but I prefer the alternative version – of deadly combat between a dragon and an elephant; their blood splashed to the ground and a tree sprang up from the reddened earth. Later, we bought hard crystals of the sap from local boys. I am still deciding what to do with them, but the ancients had no such problem.

As its name implies, *Dracaena cinnabari* sap was a substitute for the toxic cinnabar,

Clockwise from above: an Egyptian vulture against the dramatic backdrop of the Haggeher mountains; Hoq cave delights with stalactites and stalagmites; bottle

trees come in all sorts of swollen shapes and sizes; the blue baboon tarantula can be a challenge to track down; a mass gathering of snails engulfs a tree trunk.

a mineral produced by volcanic activity and used as a pigment. Dragon’s blood is harmless, and therefore safe for a wide variety of uses, including cosmetics and medicine. The Romans smeared it on gladiators, both as decoration and as a disinfectant (less glamorously it’s said to cure haemorrhoids). It was also employed later in the finishing stages of violin making – craftsman Antonio Stradivari is thought to have used dragon’s blood lacquer.

Some of the trees were tufted with creamy-coloured flowers following the rains. Later, the blooms would develop red berries – the starlings’ favourite food (there are two species, the common Somali starling and the much rarer and endemic Socotran starling). The seeds pass through



the birds' guts and are spread around to produce the next generation of dragon's blood trees. Except they don't – at least, not in the lowlands – because the ubiquitous goats devour the seedlings before they have a chance to develop their prickly defensive leaves. This is where our botanist driver, Ahmed, plays his part. He is the custodian of a plant nursery started by his father, Adeeb Hadid, to nurture seedlings of endemic trees until they are mature enough to be safely replanted.

When visiting his small sheltered garden, we saw adolescent baby dragons, spiky like agave and very different from the parent tree. They were ready for safe replanting as were some of the seven varieties of frankincense trees. But Ahmed was despondent: "When

Socotra has been described as resembling a Swiss cheese, as it's so riddled with holes.

my father started this place, the government helped. I was sent to Edinburgh to be trained as a botanist, and we planted many trees. But now...?" He waved his arms in despair. "It's no good. No help. I look after it, but the government? Nothing."

Going underground

One of the best walks or, rather, climbs – we ascended 350m – was up to the extraordinary 2.5km-deep Hoq cave. Socotra has been described as resembling a Swiss cheese, as it's so riddled with holes, but only two caves are open to tourists. Hoq is spectacular in every way. The trek up there took a couple of hours, not so much because it was difficult but because there was so much to look at. Endemic rock geckos and skinks scuttled and slithered under stones and we wondered how the trunk of the biggest tree on Socotra, the *Sterculia africana*, managed to be mauve, except for a strange grey-brown patch. On closer inspection, this turned out to be huge clusters of snails, packed so tightly they formed one mass. These were *Achatinelloides socotrensis*, aestivating during the dry season – there's safety in numbers, and a certain amount of camouflage.

Hoq itself did not disappoint. Even before we needed to turn on our head torches, there were dramatic stalagmites and stalactites that became ever more bizarre as we went deeper into the darkness. Visitors are only allowed to go about a kilometre inside, but in the far recesses, archaeologists have found artefacts such as incense burners and pottery fragments, and also pictograms, including one of a ship dating from about the second century AD. It has been speculated that Hoq was a mariners' religious sanctuary.

Though spoilt by the wealth of plant endemism, one disappointment was how few of the endemic birds we managed to see. The only one I could identify with certainty was the Socotran starling, but it turns out I was wrong – it was the similar



The Socotran chameleon is just one of many endemic reptiles.

1



Somali starling. The female wears a grey hood descending to her breast, and both sexes have a flash of red on their wings. The rarer Socotran starling is very similar to its relative, though with a shorter tail, and the female lacks the grey hood. One non-endemic that was unmissable, however, was the handsome Egyptian vulture. Rare in the rest of its range, it is the commonest bird in Socotra and known affectionately by the locals as *soeydu*, or garbage bin. These scavengers watch the preparation of outdoor meals with great interest – and the aftermath of these meals too; as one local description charmingly put it, “They eat the remnants of tourists.”

The future of Socotra is uncertain. Is it doomed or can it be a beacon for sustainability? Most urgently, will it survive the political tussle for sovereignty that is currently being fought – so far non-violently – on the island? There’s an innocent rawness to the island that reminds me of my visits to the Galápagos and Madagascar in the 1970s. Like Socotra, both of those wildlife hotspots were excitingly unregulated, but therefore dangerously vulnerable to uncontrolled tourism. Without a stable government to oversee this World Heritage Site, or a responsible tourism infrastructure with the power to protect, it’s hard to see how the unique appeal of the island can survive. Will it be a triumph or a tragedy? Only time will tell. 🐾



HILARY BRADT is a travel writer and co-author of *Socotra* (Bradt Travel Guides, £16.99, published 1 November).

FIND OUT MORE

Friends of Soqotra: friendsofsoqotra.org

Fascinating flora

Socotra has 830 vascular plant species, 322 of which are found nowhere else. **Dr Alan Forrest**, of the Centre for Middle Eastern Plants at the Royal Botanic Garden Edinburgh, introduces some of the archipelago’s more unusual species.

1 SOCOTRAN FIG

Dorstenia gigas

Though in the fig family, this is not a *Ficus*. It has the appearance of some magical plant from an ancient herbal remedy, with its clusters of wrinkled leaves and swollen stems. It’s often seen in large numbers growing on vertical cliff-faces.

2 THE CUCUMBER TREE

Dendrosicyos socotranus

Large, with a massively swollen trunk, it belongs in the gourd family Cucurbitaceae, and is the only tree in a family of climbers and vines. Not found on mainland Arabia, it has likely been isolated on Socotra for the entire lifetime of the island.

3 EUPHORBIA ARBUSCULA

This must be one of the most characteristic trees on Socotra. It flowers during the dry season, when it is used as fodder for goats. It is also an insecticide and the caustic latex it produces

is sometimes used as an adhesive to stick together hand-written pages of the Koran, to make a small booklet.

4 CARALLUMA SOCOTRANA

Despite its name, this species is not actually an endemic (it is also found in north-east Africa) but it is the showiest of the 30 or so species of the succulent asclepiads found on the island, with symmetrically jointed stems, like green coral, and deep crimson flowers.

5 FRANKINCENSE TREE

Boswellia bullata

Of the 20 or so species worldwide, at least eight are found on Socotra. *B. bullata* is found only on cliffs where they have evolved holdfasts at the base of the trunk, to cling to the sheer rock face.

6 PERSIAN OR SOCOTRAN VIOLET

Exacum affine

Popular in the horticultural trade, it is not a violet at all – the common name derives from the colour and



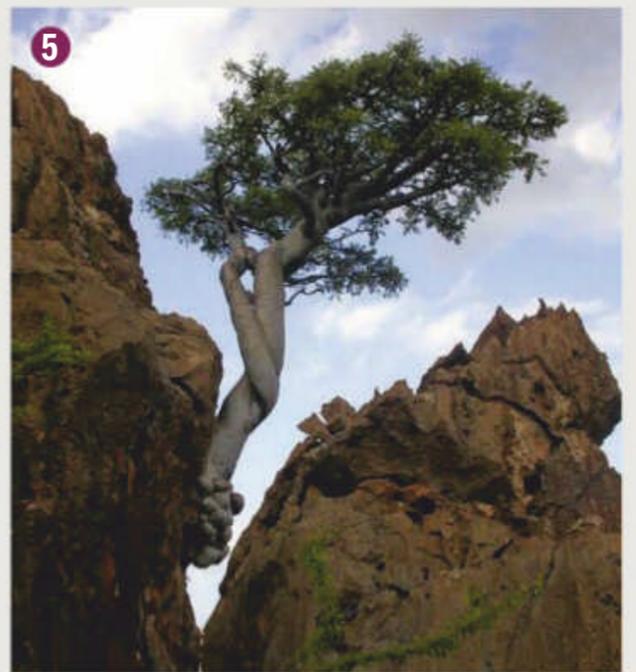
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5

scent of its small flowers. All seed derives from a collection made by the German naturalist Georg August Schweinfurth in 1881.

7 SOCOTRAN POMEGRANATE

Punica protopunica

The only known relative of the cultivated pomegranate is endemic to Socotra. The fruits, however, are small and bitter, so provide little value as a food.



6



7

8 SOCOTRAN BEGONIA

Begonia socotrana

This is the only known begonia that is winter-flowering in nature. As such, all winter-flowering begonias are, in some way, derived from the founding collection at the Royal Botanic Garden Edinburgh.



8



9

9 DUVALIANDRA DIOSCORIDES

An extraordinary asclepiad that grows in a very specialised and rare niche – pockets of soil on dry and exposed south-facing slabs of granite in an otherwise wet habitat at high altitude.



Photo
story

Wildlife Photographer of the Year

Enjoy a selection of this year's winning images from the Natural History Museum competition that showcases some of the best nature photography on the planet.



LIFE IN THE BALANCE

JAIME CULEBRAS, SPAIN

Winner 2020, Behaviour: Amphibians and Reptiles

A Manduriacu glass frog snacks on a spider in the foothills of the Ecuadorian Andes. Jaime's determination to share his passion for these little amphibians had driven him to walk for four hours, in heavy rain, through the forest, to reach the frogs' streams in Manduriacu Reserve.

As the downpour grew heavier, forcing him to turn back, he spotted one small frog clinging to a branch, its eyes like shimmering mosaics. Not only was it eating (he had photographed glass frogs eating only once before), it was also a newly discovered species, distinguished by the yellow spots on its back and lack of webbing between its fingers. Serenaded by a frog chorus, Jaime captured the first ever picture of the species feeding.



THE EMBRACE

SERGEY GORSHKOV, RUSSIA

*Wildlife Photographer of the Year 2020 overall winner.
Winner 2020, Animals in their Environment*

An Amur tigress hugs an ancient fir in Russia's Land of the Leopard National Park, leaving scent secretions on the bark. This big cat – now regarded as the same subspecies as the Bengal tiger – is found only in this region, with a few individuals in China and possibly North Korea. Hunted almost to extinction in the past century, the population is still threatened by poaching and logging, but recent (unpublished) camera-trap surveys indicate that numbers may be growing.

Determined to take a picture of the symbol of his Siberian homeland, Sergey scoured the forest for signs, focusing on trees along regular routes. He installed a camera-trap opposite the fir in January 2019; in November, he achieved the image he was hoping for.





ELEONORA'S GIFT

ALBERTO FANTONI, ITALY

Winner 2020, Rising Star Portfolio

On the steep cliffs of a Sardinian island, a male Eleonora's falcon brings his mate a meal. These raptors breed on cliffs and small islands along the Mediterranean coast in late summer, specifically to coincide with the mass autumn migration of small birds to Africa.

Alberto was watching from a hide on San Pietro Island, from where he could photograph the adults on their cliff-top perch. He couldn't see the nest, hidden in a crevice in the rocks, but he could watch the male pass on his prey.



ETNA'S RIVER OF FIRE

LUCIANO GAUDENZIO, ITALY

Winner 2020, Earth's Environments

From a great gash on the southern flank of Mount Etna, lava flows within a huge tunnel, re-emerging further down the slope as an incandescent red river. Luciano and his colleagues had trekked for several hours up the north side of the volcano, through stinking steam and over ash-covered rocky masses.

What Luciano most wanted to capture was the drama of the lava river flowing into the horizon. The only way to do that was to wait until just after sunset – 'the blue hour' – when contrasting shadows would cover the side of the volcano and, with a long exposure, he could set the incandescent flow against the blue gaseous mist to capture 'the perfect moment'.

THE LAST BITE

RIPAN BISWAS, INDIA

Winner 2020, Wildlife Photographer Portfolio Award

On a dry riverbed in India's Buxa Tiger Reserve, a weaver ant bites defensively into the slender hind leg of a giant riverine tiger beetle. In the seconds that followed, the beetle used its large, curved mandibles to snip the ant in two – but the ant's head and upper body remained firmly attached. "The beetle kept pulling at the ant's leg, trying to loosen its grip," says Ripan, "but couldn't reach its head." Ripan used flash to illuminate the lower part of the beetle, balancing this against the harsh sunlight to achieve a dramatic, eye-level shot.



WATCHING YOU WATCHING THEM

ALEX BADYAEV, RUSSIA/USA

Winner 2020, Urban Wildlife

The Cordilleran flycatcher is usually very specific in its choice of nest-site in Montana's Rocky Mountain Front – selecting crevices on canyon shelves. But this pair chose to make their home in the window frame of a research cabin instead. So as not to disturb his guests, Alex hid his camera in the bark of a nearby tree and operated the set-up from inside. He captured this shot as the female checked on her four nestlings.



OUT OF THE BLUE

GABRIEL EISENBAND, COLOMBIA

Winner 2020, Plants and Fungi

It was a sunset shot of Ritak'Uwa Blanco – the highest peak in the Eastern Cordillera of the Colombian Andes – that Gabriel had set out to photograph. But the foreground of white arnica captured his attention instead.

The plant flourishes in the high-altitude paramo of the Andes, adapted to the extreme cold with a dense covering of woolly hairs and 'antifreeze' proteins in its leaves. As dusk faded, the scene became drenched in an ethereal light. But while the silver-grey leaves were washed in blue, the flowers shone bright yellow, leading the eye towards the mountain but stealing its limelight.



PERFECT BALANCE

ANDRÉS LUIS DOMINGUEZ BLANCO, SPAIN

Winner 2020, 10 Years and Under

Andrés had spotted European stonechats hunting insects in a meadow near his home in Andalucia. Photographing the birds through the open window of his father's car, he saw a male alight on a flower stem, which began to bend under its delicate weight. The bird kept perfect balance and Andrés framed his composition.



THE POSE

MOGENS TROLLE, DENMARK

Winner 2020, Animal Portraits

Pale blue eyelids now complement the auburn hair of a young proboscis monkey in Labuk Bay, Borneo. In some primates, contrasting eyelids play a role in social communication, but their function in proboscis monkeys is not yet known. Mogens's unforgettably peaceful portrait connects us, he hopes, with a fellow primate.

BACKROOM BUSINESS

PAUL HILTON, UK/AUSTRALIA

Winner 2020, Wildlife Photojournalist Story Award

A young pig-tailed macaque is put on show, chained to a wooden cage in Bali's bird market. Pig-tailed macaques are energetic, social primates living in large troops in forests throughout South-East Asia. As their habitats are destroyed, the monkeys increasingly raid agricultural crops and are shot as pests. Orphaned babies are then sold into lives of solitary confinement as pets or zoo animals, or for biomedical research. Paul photographed this monkey in a dark backroom, using a slow exposure.





A TALE OF TWO WASPS

FRANK DESCHANDOL, FRANCE

Winner 2020, Behaviour: Invertebrates

This remarkable simultaneous framing of a red-banded sand wasp (left) and a cuckoo wasp, about to enter next-door nest-holes, was achieved thanks to an elaborate camera set-up in a sandy bank on a brownfield site in Normandy. The female *Hedychrum* cuckoo wasp parasitises the nests of certain solitary digger wasps, laying her eggs in her hosts' burrows. The larger wasp lays her eggs in her own burrow, which she provisions with caterpillars.

Frank's aim was to photograph the cuckoo wasp, and – despite the extremely narrow depth of field and tiny subjects – he was gifted this perfectly balanced composition by the insects' fortuitous flightpaths.

WHEN MOTHER SAYS RUN

SHANYUAN LI, CHINA

Winner 2020, Behaviour: Mammals

This rare portrait of a family of Pallas's cats on the remote steppes of the Qinghai-Tibet Plateau in northwest China is the result of six years' work at high altitude. These small cats are normally elusive and solitary, and mostly active at dawn and dusk.

Through long-term observation, Shanyuan knew his best chance to photograph them in daylight would be in August and September, when the kittens were a few months old. Hours of patience were rewarded when the three youngsters came out to play, their mother keeping her eye on a Tibetan fox lurking nearby.



GREAT CRESTED SUNRISE

JOSE LUIS RUIZ JIMÉNEZ, SPAIN

Winner 2020, Behaviour: Birds

After several hours up to his chest in water in a lagoon near Brozas, Spain, Jose Luis captured this intimate shot of a great crested grebe family. His camera floated on a U-shaped platform beneath the small camouflaged tent that also hid his head. To avoid predators, chicks leave the nest within a few hours of hatching, living on a parent's back for the next two to three weeks.

On this particular morning, not a breath of wind rippled the water as the parent on feeding duty emerged with a tasty meal. The stripy-headed chick stretched out of its sanctuary, open-beaked, to claim its breakfast.





THE GOLDEN MOMENT

SONGDA CAI, CHINA

Winner 2020, Under Water

Caught in Songda's light beam, a diamondback squid paralarva in the Philippines stops hunting for an instant and gilds itself in shimmering gold. A paralarva is the stage between hatching and subadult, when the animal is already recognisable as a squid. Chromatophores (organs below the skin) contain elastic sacs of pigment that stretch rapidly into discs of colour when the muscles around them contract. Deeper in the skin, iridophores reflect and scatter light, adding an iridescent sheen. From above, Songda captured the fleeting moment when, hovering in perfect symmetry, the youngster showed its true colours.



WILDLIFE PHOTOGRAPHER OF THE YEAR is run and developed by the Natural History Museum, London, where the winning and highly commended entries can be viewed until 6 June 2021. For details of the exhibition, how to enter the next competition, and dates and venues of the regional exhibition tour, visit: wildlifephotographeroftheyear.com

Turn the page to find out what the judges are looking for...



Interview by
Sarah McPherson

Giving it your best shot



The Natural History Museum's Wildlife Photographer of the Year competition is the most prestigious of its kind. Chair of the jury, and former *BBC Wildlife* editor, **Roz Kidman Cox** reveals what makes an entry catch the eye.

Why is this competition important?

For photographers of wildlife and environmental subjects, it is the most renowned competition in the world, with a long history of rewarding the very best individual pictures and stories. Having pictures placed in the top 100 can help make careers and reputations, and for professionals, the reward goes beyond financial, bringing huge international exposure. That value is immense for photographers motivated

by the desire to see coverage of the stories their images carry.

Owned by the Natural History Museum – an institution with a mission to create advocates for the planet – the competition is itself an institution. Both a photographic art exhibit and a story-telling platform, with a tale attached to every image, its reach is both huge and continuous through the year. As well as a major exhibition at the museum, there are exhibition sets touring the world and commemorative books in several languages. The competition also brings together a community of photographers, providing creative inspiration and moral support.

In a nutshell, what are judges looking for?

Originality. That can mean fresh ways of looking at familiar subjects as much as new ones or surprising situations. The emotional impact or resonance of a picture is also important. But on the international jury, that can differ among the judges, depending on their visual knowledge and background

and also their emotional history. Differing reactions can be influenced by culture as much as experience.

Among thousands of great shots, what makes an image stand out?

Immediate impact can be important, but that may not last through the subsequent three to four rounds of judging. So, increasing the contrast to catch the eye is not the answer. After the first rounds, it is fascinating to find out if the judges have seen an image that stands out as a potential overall winner. Rarely do they all have the same choice. It is also fascinating how the impression an image makes can grow with looking, whether resulting from the beauty of form and balance, its underlying emotive power, or both.

Over the years, what images have really stopped you in your tracks?

For me, the test is lasting power – whether I get the same pleasure every time I look at the picture. That can be a mixture of

SPIRIT OF THE MOUNTAINS

STEFANO UNTERTHINER

Winner 2016, Land

ROZ SAYS: Taken in Italy's Gran Paradiso National Park (the photographer's home ground), this is a picture that you can look at again and again.

The flow of the choughs, the line of ancient larches and the protrusion of volcanic rock, sprinkled with snow, create a weave of texture and colour.

Emerging ghost-like from the clouds, a bearded vulture gives an extra brushstroke of magic.





THE SACRIFICE

BRIAN SKERRY

*Runner-up 2010,
Wildlife Photojournalist Story Award*

ROZ SAYS: A bigeye thresher shark hangs in a drifting gillnet, as if crucified. A truly iconic image – graphically powerful but hauntingly beautiful – symbolising the destruction caused by industrial fishing and the enormous toll on wildlife from abandoned plastic nets.



TRUE LOVE

STEVE RACE

Commended 2013, Behaviour: Birds

ROZ SAYS: A male presents his mate with a wreath of red campion. Many people have created portraits of gannets but never one like this, with such simplicity of composition, perfection of colour and touchingly beautiful behaviour. It was shot on the photographer's doorstep at the Bampton Cliffs gannet colony in Yorkshire.

marvel at the wonder of the subject or scene, the design perfection, or both of those, or it can be a reaction to the emotion or thought-provoking impact of the image. There are many pictures that do that for me, so it's hard to pick out just a few, but 'Spirit of the Mountains', 'True Love' and 'The Sacrifice' (all pictured here) are good examples.

Can you tell if images are the result of time and skill or luck and timing?

There are always the 'how on earth did they achieve that?' pictures, and camera-trap and remote region images will obviously have taken an enormous amount of time and planning. But it is the end result that is judged, not the effort. Many behaviour pictures result from serendipity, but a photographer has to be primed and ready

to catch those moments – and catch them perfectly.

What tips can you give when submitting images of well-trodden subjects?

Are you familiar enough with what has already featured in the competition to see your image as special enough to be better? Also, it's worth getting a second opinion from an honest critic.

What are the key do's and don'ts when selecting an image to enter?

Don't select your entries in a rush. Review your selection afresh several times and get a second opinion, if only to verify your own. Make sure you have the RAW files to match. And don't enter a photo that has already been placed in another competition.

What happens when the judges disagree?

As with all competitions, it's the majority decision that stands, though discussion can swing the balance. This does mean that winners can be the result of compromise.

Are any new categories planned for the 2021 competition? If so, what will the judges be looking for?

Yes, including two very important ones, given our planetary emergency: Oceans and Wetlands. Images should have something to say – symbolically or literally, whether through broad strokes or specifics, beauty or impact – about the importance and functions of freshwater and marine ecosystems and their living components. So, as well as the aesthetics, think about the message that can accompany a picture. 🐾



By Stephen Moss

A Bird of two Seasons

Follow in the flightpath of swallows and discover what awaits them after an arduous journey to South Africa.

It's January 2020, and the swallows are home. They arrived a while ago – at first in ones and twos, then in small flocks, and finally in their hundreds of thousands, bringing joy to people across the land.

Don't worry – I haven't got my seasons muddled up. I'm not talking about the annual return of swallows to Britain (and the rest of the northern hemisphere) in March and April, but their arrival in September and October to a place 10,000km away: South Africa. We may think of swallows 'flying south for winter',

but the truth is that they actually enjoy a second spring and summer, half a world away, in their ancestral home.

In it for the long haul

Swallows are a truly global species – breeding right across the northern hemisphere from Alaska to Japan, and wintering in South America, Africa, Asia and Australia. This year, for the first time in more than half a century as a birder, I decided to follow 'my' swallows – all the way from Somerset to the province of KwaZulu-Natal. It was only as I emerged

from Durban's King Shaka Airport, into searing heat and unfamiliar sounds, that I realised I had just made the very same journey as the birds, crossing Europe, the Mediterranean, the Sahara and the length of equatorial and tropical Africa. But while I was ensconced with cups of coffee and a good book, the birds were on the wing, constantly threatened by predators and bad weather, desperately trying not to succumb to fatigue. Of the youngsters embarking on their first long-haul flight, fewer than half would survive.

Unlike other songbird migrants, such as warblers, flycatchers and chats, which migrate by night, swallows travel by day, stopping to feed as they go, at traditional rest stops. They can cover as much as 190km in one leg, with the entire journey taking up to two months. Thanks to the miracle of modern air travel, I had covered the same distance in just 24 hours.

As I emerged from Durban's airport, into searing heat, I realised I had made the very same journey as the birds.

Flying between the UK and South Africa, swallows reach speeds up to 35kph and cover about 10,000km in total.



I'd flown into Durban for one reason: to visit the 35ha wetland of Lake Victoria, adjacent to the quiet village of Mount Moreland. Not to be confused with the larger, distinctly more famous lake on the Uganda-Tanzania border, this unassuming reedbed is an island in a sea of sugar cane plantations – and happens to host the largest swallow roost on the planet.

Attracting a crowd

Angie Wilken, chairperson of the Mount Moreland Conservancy, has dedicated her life to helping swallows. Originally from Yorkshire, she emigrated to South Africa with her parents as a child. Later, she and her husband moved to Mount Moreland. On spring and summer evenings, she couldn't help but notice the enormous flocks of swallows gathering over the wetland, descending to roost in the reeds, safe from predators. She decided to promote the spectacle, setting up the

Conservancy and creating viewing terraces for visitors. Her efforts led to the roost being designated an Important Bird Area (IBA) by BirdLife International in 2006.

At its peak, the roost became a major tourist attraction, drawing visitors not just from the local area, but from much further afield – including Britain. More than 1,000 people would trickle onto the viewing slopes each evening, weighed down with picnics and blankets, settling in to experience one of the world's greatest natural spectacles: the gathering of up to three million swallows. In total, it is thought that up to 10 million individuals may use the roost during the course of a single season – accounting for 2 per cent of the global population.

But in May 2004, a shadow was cast over the roost's future. Following the announcement that South Africa would host the 2010 FIFA World Cup, plans ▶



Swallows of the world

There are about 80 different species of swallows and martins. Together, they are the most widespread of all the world's bird families – found on all six inhabited continents.



PACIFIC SWALLOW

This compact little swallow can be found on islands and archipelagos across much of the South Pacific, as well as in hilly and coastal areas of tropical southern Asia. Another island species, the Mascarene martin, is found in the Indian Ocean, on Madagascar, Mauritius and Réunion.



SAND MARTIN

Known in North America as the bank swallow from its habit of nesting in sandbanks, this is the only other member of its family found in both the Old and New Worlds. In Europe, it is the earliest species to return from Africa, often arriving in good numbers by mid-March.



were assembled for the construction of a new international airport just 3km from the site, whose incoming flightpath would skim one end of the reedbed. This would be King Shaka Airport, whose very terminal I had just passed through.

Off the radar

Though campaigns against the airport by Angie and other members of the Conservancy were ultimately unsuccessful, the authorities were persuaded to install a swallow radar system, which safeguards aircraft against bird strikes. The technology gives an early warning if flocks of swallows move into the flightpath when a plane is approaching, and the aircraft is diverted until the birds have settled. In addition, the airport operator has a legal obligation to maintain the roost. Thus, in the decade since the airport was built, planes and

swallows have managed to coexist – partly because, as it turns out, the swallows fly well under the flightpath.

In recent years, however, a mystery has befallen the roost. In 2016–17, instead of remaining at the site from October through to April, the birds only stayed for a few weeks. The following year, they arrived late and left early, and in 2018–19, they were present for just three days. Angie believes that the spraying of insecticides in the surrounding plantations might be reducing the food available for the swallows. Other roosts are also dotted along the coast, and it is possible that some of the birds are selecting those instead. Faced with the swallows' increasing unreliability, Angie was forced to close the viewing area.

When I arrived, I assumed that the birds would still be absent. But things appeared to be back to normal, with reports of several

Wherever I went in South Africa, I noticed that the swallows behave very differently to back home.

Top left: these birds are highly gregarious. Above, left: swallows set against the sunset. Above, right: gathering nest building material.



HOUSE MARTIN

The French call it the *hirondelle de fenêtre* – the ‘window swallow’ – from its habit of nesting under the eaves of our homes. House martins used to nest in caves and on cliff-faces – and still occasionally do – but have adapted better than most species to life alongside humans.



PURPLE MARTIN

One of the largest members of its family, this North American species has taken to nesting in colonies in artificial nestboxes, provided by communities and individuals. Long welcomed as the first sign of spring, numbers are now in steep decline, possibly because fewer people are providing nestboxes.



BLUE SWALLOW

One of the most elegant of all the world’s swallows, with a tail far longer than its body, this species is also one of the rarest, confined as a breeding bird to the damp mist-belt grasslands of southern Africa. It nests in sinkholes and disused burrows before migrating to Lake Victoria for the winter.

million individuals flying in each evening. It seems likely that changes in weather patterns, with heavy rainfall along the coast to the south, had made other sites temporarily unsuitable. I was delighted – as was Angie. “Swallows touch your emotions in a way you can’t describe,” she said. “Even though I see them every night, and have done for many years, it always feels new and special.”

Aerial display

The next evening, I made my way to Lake Victoria, hoping to witness the spectacle for myself. Conditions seemed good: a light breeze and no sign of rain. Waiting on the grassy terrace, I enjoyed the view – verdant hills stretching away to the west; the twinkling lights of the darkening city to the east.

An hour and a half before sunset, the first swallows passed briefly overhead. Soon, I started to make out what resembled a horde of midges in the far distance, right at the back of the reedbed. These were not insects, but swallows, taking their final opportunity to feed before nightfall.

The birds began to rise higher into the air, consolidating into bigger and tighter flocks. Every now and then, a group would break away and head down towards the reedbed, as if about to land. Then, at the last moment, they would pull up again, as if reluctant to be the first to commit. Minute by minute, the numbers continued to build, as hundreds of thousands of swallows arrived from every point of the compass. Looking at a bright circle of sky through my telescope, the tiny specks swept up and down, swirled and poured in on themselves, bulged and sagged, in three very crowded dimensions.

By now, the sky looked as if it had been invaded by tiny tornadoes: kettles of birds reaching all the way from earth to the heavens. Then, as the sky began to darken, tens of thousands of swallows dropped rapidly into the reeds, some closing their wings into a plummet, others descending slowly to settle on bended stems.

Wherever I went in South Africa, I came across swallows, but soon noticed that they behave very differently to back home. In the UK, they form pairs ▶



Feeling at home: these birds nest on buildings.

Pacific swallow: Sebastian Kennerknecht/Windens/Alamy; a and martin: ulstein bild/Getty; sunset: Stephen Moss; tree: NSP-RF/Alamy; water: Mark Hamblin/2020VISION/NPL; nesting: Steve Grett/NPL; house martin: Gary Chaker/Getty; purple martin: Ivan Kuzm n/A amny; blue swallow: W m de Groot/Bu ten-Bee d



Fly me to the moon: migration myths

Nowadays, we take it for granted that swallows migrate to and from the northern and southern hemispheres in spring and autumn. But in the past, people came up with all sorts of bizarre, ingenious and misguided theories about where the birds spent the winter.

The Greeks were the first to propose that swallows hibernated in the mud at the bottom of lakes and ponds. This was presumably because, in late summer and autumn, swallows can often be seen swooping down to drink from the surface; they also gather in reeds, willows and other waterside vegetation to roost. Even the great 18th-century Swedish taxonomist Linnaeus subscribed to this erroneous theory, as

did his English contemporary Gilbert White – though he had his doubts.

Perhaps the most outlandish theory came from 17th-century scientist Charles Morton, who proposed that swallows and other summer visitors flew to the moon and back, a journey he deduced would take roughly four months, at a speed of 125mph (actually a fairly accurate calculation).

By the middle of the 19th century, the idea that birds could undertake vast global journeys was finally accepted. Yet for swallows, the first irrefutable proof of their travels did not emerge until December 1912, when a swallow ringed earlier that year in Staffordshire was caught in KwaZulu-Natal.

With a sense of urgency, the latecomers folded their wings and plunged like guided missiles.

Above: the long-distance flights of swallows saw them become something of a mystery for centuries, as people wondered where they went.

and raise one or two broods, so are tied to a specific location. Here, free from the rigours of breeding, they are free to roam in large and noisy flocks, in constant search of their flying insect prey. They often turn up just ahead of rain – as one local birder told me. In this parched land rain is always welcome, and so, therefore, are the swallows.

Winds of change

I have seen swallows almost everywhere I have travelled – from New Jersey to Patagonia, Iceland to Botswana, India to Israel. This is the only species of songbird to have been observed on all seven continents, thanks to a vagrant reaching Antarctica a few years ago.

So, you might imagine that, of all the world's birds, it would be the least likely to

be under threat. Unfortunately, that is not the case. Like all long-distance migrants, the swallow is highly vulnerable to both short-term changes in the weather and long-term shifts in climate, which are accelerating as a result of the current global emergency. Swallows rely on accurately timing their travels to optimise the maximum amount of available food – whether breeding in the north, overwintering in the south, or en route between their two seasonal homes.

Another worrying issue is the reduction of cattle farming. For health and environmental reasons, we are shifting towards diets containing less meat and less dairy. Swallows are often described as living alongside humans, but their closest relationship is in fact with cattle and other

livestock, and the places where they live – hence their official name of 'barn swallow'.

Ironically, more than a century ago, the pioneering conservationist W H Hudson envisaged a dystopian future, with no room for either swallows or us: "There would be few swallows in a dispeopled and savage England, with all its buildings crumbled to earth."

It has become something of a cliché to make comparisons with the miner's canary, warning us of impending doom. But in the swallow's case, it might just be true.

Back at Lake Victoria, against the radiance of sunset, the swallows were silhouetted, twisting and turning as they performed a farewell dance. With a sense of urgency, the latecomers folded their wings and plunged like guided missiles down into the reeds.

Now, the only clue to their presence was a gentle murmur, like a rushing wind, emanating from the depths of the reedbed. It was the sound of millions of swallows preparing to go to sleep. 🐾



STEPHEN MOSS is a Somerset-based naturalist and author. His latest book *The Swallow: A Biography*, is out now (Square Peg, £12.99).

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This month's panel



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Science writer



GILLIAN BURKE
Naturalist & TV presenter



ED DREWITT
Naturalist



ALIX HARVEY
Marine Biological Association



BEN HOARE
Editorial consultant



LAURIE JACKSON
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Q&A

MAMMALS

Do hibernating bears get stiff?

As bears begin their long winter sleep, it's a reasonable question to ask. After just eight hours' sleep, we need to stretch to get our muscles working properly again. Were we to rest for five months – as hibernating grizzlies do – we'd waste away. It takes only a few hours on a life-support machine for the human diaphragm, which powers our breathing, to weaken enough that it struggles to take over from the ventilator. Yet grizzly bears emerge from their dens pretty much as fit as they went in, albeit much lighter. How they maintain muscle mass is of great interest to medics treating muscle-wasting conditions, and several of the genes involved have been identified by studying hibernating bears. One trick bears use is to recycle proteins that would otherwise be expelled in urine, rather than raid their muscles for raw material (which also means less getting up for the loo).

Stuart Blackman

Left to right: brown bears bounce back with a spring in their step after hibernation; honeybee stings are best avoided; feathers aren't as fragile as you might think.

Bear: Danny Green/naturepl.com; honey bee: Ingo Arndt/naturepl.com; feathers: Plainview/Getty; fossil feather: WaterFrame/Alamy

ORNITHOLOGY

Where do all the feathers go?

After breeding, many birds undergo a post-breeding moult. But once all those feathers have been shed, they don't last long, or else we'd soon be knee-deep in them. So have you ever wondered how such lightweight, intricate structures sometimes manage to survive as fossils? Rest assured, you're not the only one. A group of scientists has gone to great lengths to answer this conundrum. Feathers of all shapes and sizes were put through various regimens – including being soaked in water and then baked at 350°C – for 10 years.

Despite the extreme treatment, these delicate wonders of nature proved to be remarkably durable and resilient. When they need to be, that is – which just happens (mostly) to be when they're still on a bird. Only on rare occasions do feathers become fossilised. Otherwise, they decompose efficiently and disappear without trace. **Gillian Burke**

ENTOMOLOGY

Bee or wasp sting: which is worse?

Bee and wasp venoms are highly toxic chemical cocktails. A dose of only 15 microlitres (about 1/65,000 of a gram) causes intense pain, swelling, redness and local tissue damage. You'll need a sit down with a cup of tea after 10 stings, and should seek urgent medical attention with 100. There's no antivenom, but immediate dialysis can remove the toxins before serious damage to internal organs. Most adult humans would be lucky to survive 1,000 stings. Europe's honeybees

and social wasps (yellowjackets) possess stings of similar potency, but the barbed stinger of the former keeps it lodged in your skin, along with the pumping venom sac. Even if the bee is brushed away, the pain continues. The bee also releases an airborne alarm scent, tagging you as the enemy, which recruits others from the hive into a potentially dangerous escalating attack. Honeybee stings are the ones to be wary of.

Richard Jones

BOTANY

What plants are Britain's biggest bullies?

Victorian gardeners once praised the “glorious invasiveness” of introduced garden plants that hopped the hedge and swarmed across the countryside like a plague. Today, Britain's biggest plant thugs have become a serious problem, and include over 100 non-native species. They lack natural pest controllers, outcompete natives (robbing them of light, space and nutrients) and multiply fast – by seeding prolifically or reproducing from

the tiniest plant fragments. The most concerning invasive aliens are listed on Schedule 9 of the Wildlife and Countryside Act, including Japanese knotweed (which is incredibly hard to eradicate), giant hogweed (which spreads up to 50,000 seeds per plant), *Rhododendron ponticum* (which shades out woodland plants), Himalayan balsam (which smothers riverbanks) and New Zealand pigmy weed (which forms dense mats in waterways). The ‘Plant Alert’ system enables the public to report potentially invasive garden plants (plantalert.org). Alex Morss



Rhododendrons have taken hold in the Brecon Beacons, Wales.

BEHAVIOUR

Do animals drown other animals?

Yes. Drowning has occasionally been seen in a range of animals, including orcas, bottlenose dolphins committing infanticide and territorial coots holding other birds down. But for one group of animals, it is a key part of their life-cycle. The larvae of horsehair worms are parasites of insects such as grasshoppers and cockroaches, developing inside their body. Often there's more than one worm larva, so eventually the parasites fill their host's exoskeleton. As the larvae near maturity, they start to manipulate their host with behaviour-altering chemicals. This compels it to jump into water, whereupon it drowns, enabling the now-adult horsehair worm to swim away to find a mate. Laurie Jackson



Horsehair worms are unnervingly persuasive.

Bring me a dream: we may never find out what goes on inside the minds of sleeping cuttlefish.

MARINE BIOLOGY

Do cuttlefish dream?

It's almost impossible to prove definitively if animals dream. But many species, including most mammals and even some reptiles, experience something like rapid eye movement sleep (REMS), which, at least in humans, is associated with dreaming. Lab rats map out new routes through mazes during their REMS, while zebra finches rehearse their songs in their sleep. Cuttlefish, too, not only display behaviour resembling sleep, but also exhibit REMS-like states.

Recently, researchers filming European cuttlefish in the lab observed short periods during their sleep-like states where individuals would erratically change colour and body pattern, and make irregular eye and arm movements. This strange behaviour, which was not repeated when awake or during inactive periods of ‘sleep’, wasn't triggered by any external stimuli and was very different from normal cuttlefish activity. Do cuttlefish dream? No one knows, but we have our first clue. Alix Harvey



REPTILES

Why don't crocodile wounds get infected?

Though fairly social, as reptiles go, crocodiles have frequent disagreements with those around them, which can quickly escalate into fierce battles. Their sharp teeth and crunching bite make injuries inevitable. But crocodile wounds rarely become infected, despite crocs lurking in a watery world perfect for microorganisms.

It's all down to a powerful immune system. Crocodile blood contains a germ-fighting chemical cocktail that protects against a whole

host of bacteria and also inhibits the growth of fungi. Compounds called antimicrobial peptides in the blood actively target the cell membranes of invading microbes, causing them to bulge and break down. As well as attacking the invaders, croc blood has antioxidant and anti-inflammatory properties that help wounds to heal more quickly. It seems these ancient reptiles are perfectly adapted to their murky environment, right down to their blood. Laurie Jackson

It's just a flesh wound: their battle injuries can seem severe but crocodiles are quick to heal, thanks to properties in their blood.

Below: barn swallow. Below, left: green woodpecker.

3 questions on

How do birds go to the bathroom?

1 DO BIRDS PEE? IF NOT, WHY NOT?

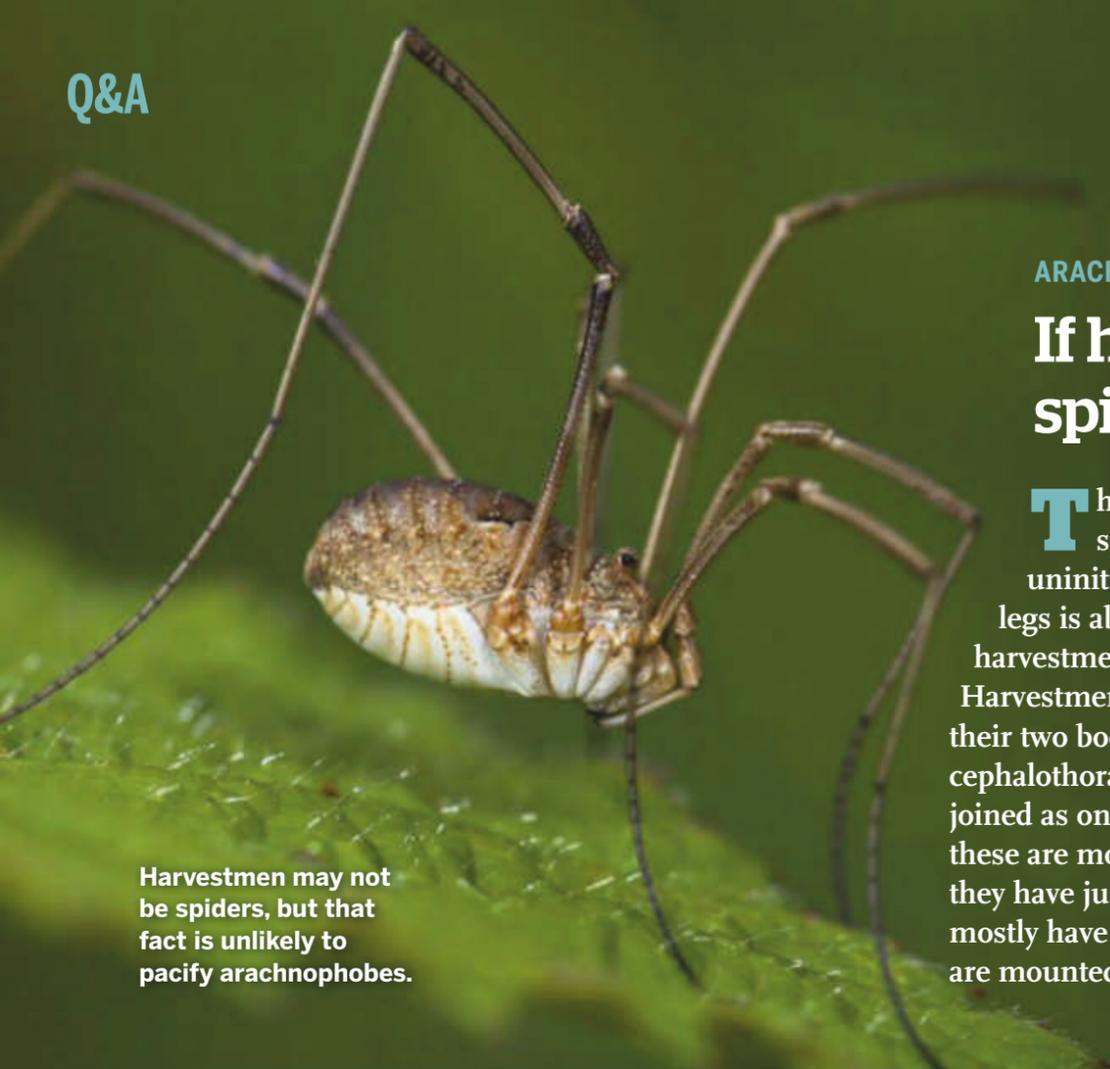
They don't. These creatures of the air need to reduce weight and have myriad adaptations to do so, including their entire excretory system. Producing pee as well as poo involves holding urine – nitrogen-rich urea diluted with lots of water – in a bladder. Not very helpful if you want to take off. Instead, birds get rid of all their nitrogen waste in one go, as highly concentrated uric acid.

2 WHY DO THEY ALWAYS TARGET MY CAR?

That's rather unfair, since many birds are quite careful about where they 'go'. Parent tits and swallows, for example, remove the neat white faecal sacs (the avian equivalent of full nappies) produced by their chicks, and fly off to dispose of them discreetly away from the nest. Other young birds push their posterior out over the edge of the nest, then squirt a white jet of uric acid as far as they can. If in doubt, don't park your car near to a bird's nest or its favourite perch!

3 CAN I IDENTIFY BIRDS BY THEIR POOP?

In 1991, *What Bird Did That?* was published. The self-described "field guide to the ornithological dejecta of Great Britain and Europe" was, of course, a spoof. But you can ID a few birds solely by what comes out of their rear end. Canada geese dump squidgy, grass-coloured coils beside lakes. Green woodpeckers deposit chalky cylinders like cigarette ash. Woodpigeons that have gorged on berries stain pavements purple – however, thrushes and starlings also produce purple poop during berry season. Ben Hoare



Harvestmen may not be spiders, but that fact is unlikely to pacify arachnophobes.

ARACHNIDS

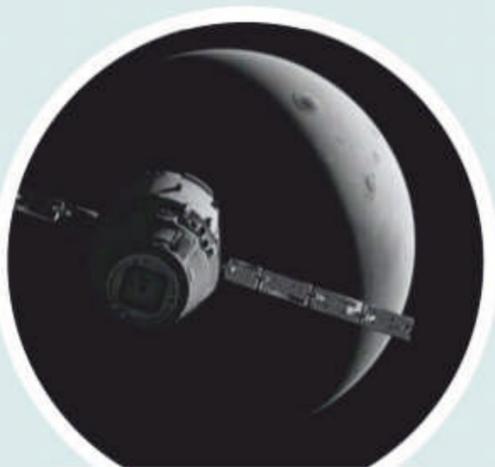
If harvestmen aren't spiders, what are they?

They certainly look like spiders, at least to the uninitiated. However, eight legs is about the only feature harvestmen and spiders share. Harvestmen don't produce silk, their two body segments (the cephalothorax and abdomen) are joined as one oval unit (in spiders these are more clearly divided), and they have just two eyes (spiders mostly have eight, some six) which are mounted on a turret. All this

makes harvestmen more closely related to scorpions. Harvestmen are slow-moving arachnids, active by night or at dawn and dusk. During the day, you'll usually find them resting on tree-trunks or under logs. They can't see well, so use their second, longest pair of legs to feel the way ahead. Though they do take small prey, they also scavenge dead insects and bird droppings, and feed on decaying plant material and fungi. Richard Jones

The Explainer

Biosignature



Life on Mars: are there biosignatures to be found?

Biosignatures have opened up an exciting, new(ish) field in the search for living things. If this all sounds a bit high-tech, that's because it often is. A biosignature is any sign of life, from either present times or the past. It could be part of the actual animal, plant or other life form (or something it has made) or it might be a faint chemical trace that the organism has left behind in the environment. Humanity's endeavour to detect extra-terrestrial life is, in essence, a quest to boldly go in search of biosignatures.

Ben Hoare

ORNITHOLOGY

Why do female birds sing?

Male birds dominate the springtime airwaves in temperate parts of the world, as they compete for females, defend a territory and stop rival males mating with their partners. But females also speak up, sharing similar calls with their mates and sometimes also singing. In Europe, females of 100 bird species have been recorded singing, probably due to higher-than-normal levels of the sex hormone testosterone. Throughout winter, a female robin often sings to defend her feeding patch, while in spring a female dunnock sings to a male to catch his attention when she is ready to mate. Among tropical birds, it's much more common for both members of a breeding pair to sing or even duet together. While there are many theories about why this is, the most plausible are advertising their bond to each other, mate guarding against rival birds and jointly defending their territory.

Ed Drewitt

When it comes to robins, both sexes make sure their voices are heard.





What is it?

POLYCHAETE WORM

The feeling on the *BBC Wildlife* team is that this creature resembles something dreamed up by Jim Henson's studio. But this magnificent marine worm is real enough, and lives happily on deep-sea hydrothermal vents in the Atlantic. It is a polychaete, or bristle worm, in the family

Nereididae, which forms part of a stunningly diverse class with well over 10,000 species described so far. The worm's impressive 'toupee' is a cluster of sensory hairs. French photographer Gilles Martin took its portrait in a studio using specialist optical microscopes. **Ben Hoare**

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Monty Don reflects on our relationship with the natural world in his latest book.

Monty Don's not-so-secret garden

The presenter and writer shares his observations and celebrates wildlife.

Book choice

MY GARDEN WORLD
BY MONTY DON, TWO ROADS, £20

The much-loved gardening personality and columnist for *BBC Gardeners' World Magazine* Monty Don has written "millions of words about gardens". This is a gaze cast wider on the wildlife that, for Monty – a committed organic gardener – has always been there.

My Garden World does not attempt to be a reference book, nor is it nature writing as such, rather it is a seasonal scrapbook of notes and personal reflection on a lifetime spent noticing nature. It mingles facts with often lyrical observations from his life, Herefordshire garden and Welsh farm, in a conversational and warm voice.

Through the year, we get ducks, toothwort and mason bees, ash trees, larks and orchids, coltsfoot "leaping out in bright yellow stargazies" and ladybirds like vicars in Morris Minors.

Monty doesn't shy away from acknowledging a rural childhood community of foxhunting, shooting and gamekeeper's gibbets (where bodies of 'vermin' were displayed) but is sad, angry and remorseful about it, too.

He celebrates refreshingly common species like nettles and discovers the ghost of an elm tree in their physical presence; whilst woodpigeons coo "the safest of sounds."

"My sky is never empty," he says, though curlews and swifts are a haunting memory. "We get the countryside we

deserve... the way we bludgeon the insect and invertebrate population."

People listen to Monty. And that is the most important thing about this book. This is how wildlife gets in – in the long, back-straightening moments, the cuppa drunk on a damp bench – when we are doing other things.

I wasn't sure at first what this book wanted to be with its mix of memories, observations, and dates from this strange spring. Some themes are repeated. But this won't matter to the legions of Monty fans.

This book has a gentle charm, but its power to turn gardeners into naturalists (those who aren't already) can't be underestimated.

Nicola Chester Nature writer

BOOK

The Lost Spells

BY ROBERT MACFARLANE, ILLUSTRATED BY JACKIE MORRIS.
HAMISH HAMILTON, £14.99



Take a deep well of love for the more-than-human world, throw in sorrow at what we have lost, fury at what we might yet lose, and stir well.

The magic that conjured up *The Lost Words* three years ago is back, this time in pocket-sized form. Many publishers have tried to replicate the feel of that beautiful bestseller, but once again, Macfarlane's impish wordplay and Morris's sensuous paintings prove to be a class apart – a match made in heaven.

With their chanting rhythms and tongue-twistery, the 21 new nature poems (or 'spells') demand to be read aloud and shared, entrancing young children as surely as grown-ups. Some fill a spread, while others dance and sing over eight pages, all bookended by beguiling, gilded scenes... shape-shifting foxes, fluttering moths, slippery seals, life-giving silver birches. This book is bound to appear under many Christmas trees. Ben Hoare Nature writer



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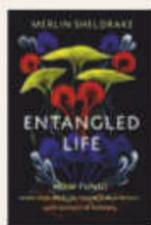
A behind-the-scenes look at the work of the RSPCA, as it rescues and treats wild animals in the UK.

dplay, streaming now

BOOK

Entangled Life

BY MERLIN SHELDRAKE, BODLEY HEAD, £20



It ought to be common knowledge that nature cradles us in a web of connection so dense and intricate we cannot leave.

The more attentive already realise that the material from which that mesh is woven is partly fungal. But how easily we forget that those fungi, and the web they embody are themselves alive and therefore subject to the same motivations that move us.

To open the pages of *Entangled Life* is to tumble like 'Alice', into a wonderland both familiar and fantastical, with Sheldrake as your guiding white rabbit.

I lost count of the times I exclaimed out loud, or reread passages to check I wasn't dreaming. A trippy, mesmerising, utterly exhilarating must-read.

Amy-Jane Beer Nature writer

BOOK

Secrets of a Devon Wood

BY JO BROWN, SHORT BOOKS, £14.99



Having followed Jo Brown's beautiful artwork on Twitter, it was a delight to discover that Short Books would be publishing them.

Beginning in spring 2018, and coming up to spring 2020, nature lover and professional artist Brown started recording the wildlife species she was spotting in the wood behind her home in Devon. There's a wide variety of species covered, from tiny scarlet elf cups and mating leopard slugs, to great spotted woodpeckers.

The pages are an exact replica of her notebook, with gorgeous illustrations that seem ready to bloom, crawl or fly off the page, surrounded by helpful annotations on identification features, life-cycles and behaviours. Megan Shersby

TV

Tiny World

APPLE TV PLUS

If you're a fan of the often-overlooked small species, then this series on the "tiny heroes" is for you. Written by *Planet Earth II*'s showrunner Tom Hugh-Jones, *Tiny World* is narrated by Paul Rudd – who played the miniature superhero Ant-Man in the Marvel films. Over 200 species were filmed over the course of nearly a decade, including the diminutive Cuban bee hummingbird, and Africa's smallest carnivore, the dwarf mongoose. The majority of filming took place in the wild, though in some cases – due to animal welfare considerations – captive animals were filmed.

The first six episodes are available to stream now, each focussing on a different habitat. The remaining six episodes will be released next year.

Megan Shersby



A small chipmunk faces big threats.



YOUNGER READERS

The Brilliant Book of Animal Bones

BY ANNA CLAYBOURNE, HATCHETTE, £12.99



Take a peek inside the bodies of humans and other animals in this fascinating guide to skeletons. Beginning with an introduction to what exactly bones are, and the difference between vertebrates and invertebrates, this book takes a look at a range of species, the differences between them, and how their skeletons are adapted for their lives. For

example, did you know that despite having such a long neck, giraffes have only seven neck bones, the same number as humans, and most other mammals? Though they are, of course, much larger – up to 25cm!

There's a good range of species represented across the five groups of vertebrates (fish, amphibians, reptiles, birds and mammals), and with plenty of surprising facts to learn, it's an excellent book for returning to again and again – for children and adults. Megan Shersby

● MORE CHILDREN'S NATURE BOOKS
Read our reviews: discoverwildlife.com/childrens-books

OUT IN THE GARDEN

WINTER IS COMING

Start to move delicate plants into greenhouses, or otherwise protect them from the worst of the winter weather.

CREATING COLOUR

Now is the time to plant tulip bulbs, if you want to ensure vibrant bursts of colour come spring. For the best results, follow the RHS's guide to choosing and planting tulips: bit.ly/2HJacfY

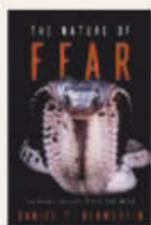
REMEMBER, REMEMBER

Whether you're celebrating Guy Fawkes night or having a bit of a tidy up around the garden, don't forget to check for hedgehogs and other wildlife before lighting your bonfire.

BOOK

The Nature of Fear

BY DANIEL BLUMSTEIN, HARVARD UNIVERSITY PRESS, £20.95



It's an emotion most of us would move mountains in order to avoid, yet we have much to thank fear for. It drives evolution and helps us to stay alive. Blumstein has studied fear in the animal kingdom for more than 30 years. In this highly readable book, he explains how related insights can help us do everything from composing scary music to managing biodiversity and imposing effective public health measures.

Along the way, there are some choice fact-lets (did you know you can buy coyote pee online?) and ripping yarns (did you hear the one about the researcher who dressed up as a moose and lobbed bags of faeces at unsuspecting ungulates?). Embrace your fears, and give it a read! Helen Pilcher Science writer

BOOK

The Wild Life of the Fox

BY JOHN LEWIS-STEMPEL, DOUBLEDAY, £9.99



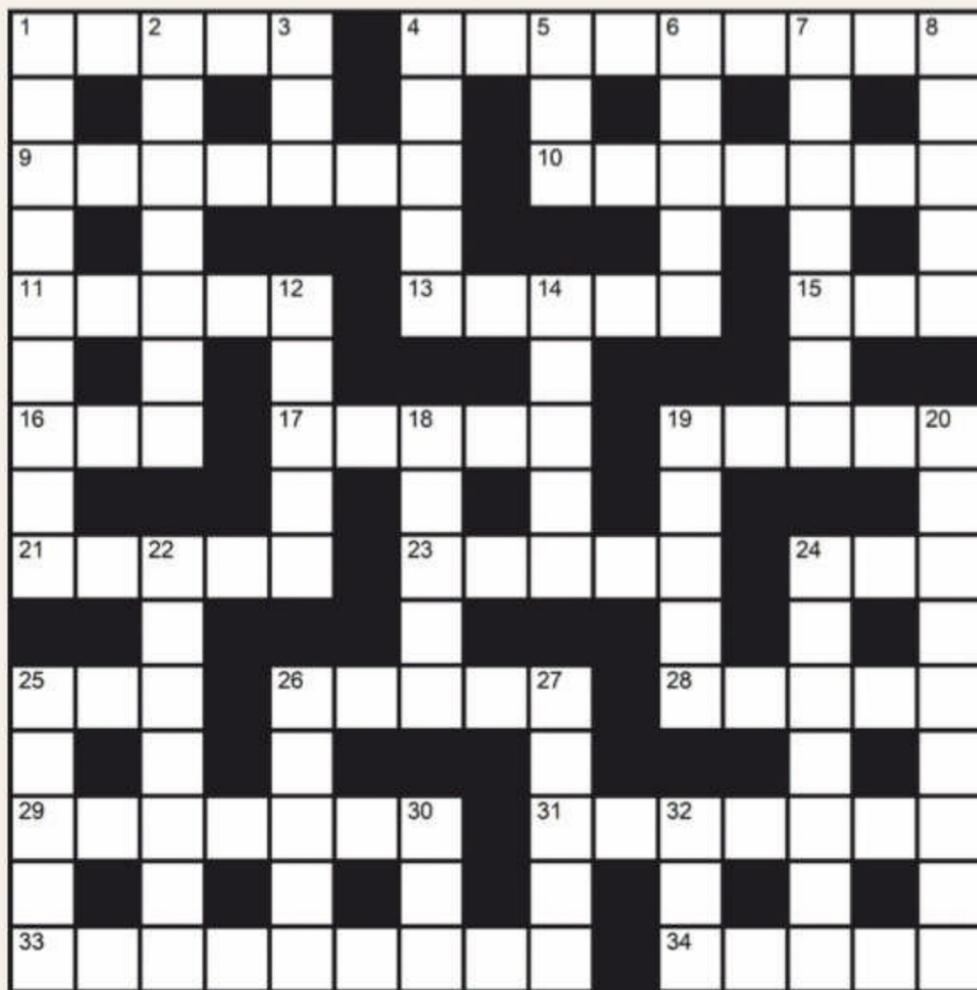
Almost every person will have their own opinion on the humble fox – no other creature in British history has ever been so polarising as these alluring tricksters.

Written in the lyrical, masterful prose that Lewis-Stempel is well known for, this book tells the story of this familiar species through history, art and culture, with a mixture of poetry, natural history, rural folklore and historical accounts.

The fox's many guises are uncovered: an assassin, a worthy foe of the hunted countryside, or even a much-loved children's fiction character. This book will leave you simultaneously enchanted, and vengeful for Lewis-Stempel's slaughtered chickens.

Tay Aziz Wildlife film-maker

PUZZLES Win a prize with our crossword, and test your wildlife knowledge.



Answers in our January 2021 issue

SEPTEMBER'S ANSWERS

ACROSS: 8 catnip, 9 Ethiopia, 10 mahi-mahi, 11 muscle, 12 capsid, 13 marsh owl, 15 firefly, 17 Old Moor, 20 psyllium, 22 grebes, 23 cough, 25 redshank, 26 tomatoes, 27 leaves

DOWN: 1 Kalahari, 2 snail-shell, 3 upland, 4 seriema, 5 whimbrel, 7 willow, 14 hammerhead, 16/6 Leighton Moss, 18 oleander, 19 empress, 21 school, 22 gadfly, 24 ural

SEPTEMBER'S WINNER
J Robinson Leicestershire

ACROSS

- 1** Curlew, dunlin or knot, perhaps (5)
- 4** Fragrant tropical plant of South America and the Caribbean (9)
- 9** Hummingbird that might be white-tufted or black-hooded (7)
- 10** Term for an arboreal rodent (4, 3)
- 11** Diving duck, *Aythya marila* (5)
- 13** Raptor that might be golden or white-tailed (5)
- 15** ___ fish, elongated sea-fish – some species grow up to 8m in length (3)
- 16** Moose or wapiti (3)
- 17** Grub (5)
- 19** Soapberry fruit (5)
- 21** Elongated front teeth of elephants or walrus, say (5)
- 23** Old Man's ___, clematis alias (5)
- 24** Fungus, *Boletus edulis* (3)
- 25** Razorbill or puffin, for example (3)
- 26** Dog-like mammal (5)

- 28** ___ dolphin, aquatic mammal such as the baiji (5)
- 29** ___ newt, European amphibian (7)
- 31** Burrowing Old-World rodent (4, 3)
- 33** ___ spider, *Araneus bradleyi*, common Australian arachnid (9)
- 34** Desert watering place (5)

DOWN

- 1** Home to social insects of the genus *Vespula* (5, 4)
- 2** European country, home to the Silkeborgskovene forest (7)
- 3** Fish eggs (3)
- 4** Kathleen ___, Scottish poet (5)
- 5** Ocelot or caracal, perhaps (3)
- 6** Female ruff (5)
- 7** UK county, home to Strumpshaw Fen RSPB reserve (7)
- 8** Genus of plants with star-shaped flower-heads (5)

- 12** Trees, shrubs or climbers in the family *Arecaceae* (5)
- 14** Fruit of a tropical tree in the myrtle family (5)
- 18** In Europe, *Erithacus rubecula*; in the US, *Turdus migratorius* (5)
- 19** UK native venomous snake (5)
- 20** Middle East river, home to the Mesopotamian soft-shelled turtle (9)
- 22** Scottish archipelago (2, 5)
- 24** Feather type that helps to smooth airflow (7)
- 25** Edible fruit of a tree in the genus *Malus* (5)
- 26** Long-legged bird that might be whooping or demoiselle (5)
- 27** Shaped like the nest of a wren (5)
- 30** Long-bodied fish such as the moray (3)
- 32** *Panthera* ___, scientific name for the lion (3)

Wild quiz



Juan Pablo Reyes/EcoMinga

1) Which tour company is this frog named after?

- A** Naturetrek
- B** Steppes Travel
- C** Wildlife Worldwide

2) What do bony fish use their swim bladder for?

- A** Buoyancy
- B** Digestion
- C** Storing water

3) A November full moon was once known as the...

- A** Fox moon
- B** Pheasant moon
- C** Woodcock moon

4) What animal makes the noise 'huff-quack'?

- A** Groundhog
- B** Red panda
- C** Serval

5) The 2-spot, 14-spot and 22-spot are all...

- A** Damsel fish
- B** Earthworms
- C** Ladybirds

6) Which artist took their pet giant anteater for walks?

- A** Andy Warhol
- B** Frida Kahlo
- C** Salvador Dali

Crossword compiled by **RICHARD SMYTH**, quiz set by **BEN HOARE**

WIN SOPHIE ALLPORT GOODIES

HOW TO ENTER This competition is only open to residents of the UK (including the Channel Islands). Post entries to **BBC Wildlife Magazine, November 2020 Crossword, PO Box 501, Leicester, LE94 0AA** or email the answers to November2020@wildlifecomps.co.uk by 5pm on **15 November 2020**. Entrants must supply name, address and telephone number. The winner will be the first correct entry drawn at random after the closing time. The name of the winner will appear in the January 2021 issue. By entering, participants agree to be bound by the general competition terms and conditions shown on this page.

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Enter for the chance to win a Sophie Allport oven glove, apron and tea towel from her new Ducks collection. sophieallport.com

Find out the answers on p93

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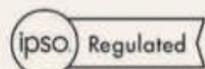
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DON'T MISS NEXT ISSUE



- » **Javan rhino** - a close encounter with the world's "almost mythical" rarest large land mammal
- » **Rewilding Scotland** - one man's mission to transform a Highland farm into a haven for nature
- » **Army ants** - meet a tropical rainforest species with an extraordinary set of skills

Toby Nowlan

DECEMBER ISSUE ON SALE **19 NOVEMBER**

Your photos

Amazing images
taken by our readers

Enter our Your Photos
competition at discoverwildlife.com/submit-your-photos



Star photo

Leading the way

Mass nesting of the Vulnerable olive ridley sea turtle had happened for the second time in a year at Rushikulya, India.

One morning, I witnessed the adult females coming out from the sea as tiny newborns headed towards the water.

Once they had finished laying their eggs, the females returned to the depths, along with some of the recently hatched youngsters from other nests. A rare natural history moment.

Arghya Adhikary, Kolkata, India



ENTER TO WIN A HANDCRAFTED CAMERA BAG

This month, our star photo wins a Billingham Hadley Small Pro Camera Bag, worth £200. Handmade in England from waterproof fabric and top-grain leather, it is designed to protect a mirrorless or small DSLR camera with two or three small to medium lenses. [Billingham.co.uk](https://www.billingham.co.uk)





1



2

1 Welcome return

I was working as a photographer for The Crees Foundation in the Peruvian Amazon. Crees works in a regenerating rainforest which, only 30 years ago, was completely cleared for farming. Now, 87 per cent of species – such as this horned forest dragon – have returned.
Eilidh Munro, Edinburgh

2 On your doorstep

Birdwatching is a fulfilling hobby that can involve expeditions to remote places in search of rare species, or spending time in your local patch. This photo of a red-vented bulbul was taken on the outskirts of Bangalore, where I had gone for a few hours with my son Aurko.
Amartya Mukherjee, Bangalore, India



3

3 Catch of the day

In Katmai National Park, Alaska, a drought had meant the salmon were all caught in the bay. This grey wolf trotted past and started fishing right in front of us.
Stephen Laycock, Blackrod, Bolton

4 Dividing opinion

On a trip to Galiano Island, Canada, it was amazing to see double-crested cormorants in the breeding season. But they are not loved by everyone – in other parts of Canada, they're viewed as 'the black plague'.
Macus Ong, Georgetown, Malaysia



4



5

5 After the rain

I was teaching wildlife photography to a group on a game drive in South Africa when someone noticed a boomslang snake drying off from a recent rainstorm in a nearby tree.
Sophie Brown, Maidenhead

Feedback

Want to get something off your chest? This is the ideal place

By contacting us, you consent to let us print your letter in *BBC Wildlife Magazine*. Letters may be edited.

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wildlifeletters@immediate.co.uk



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WRITE TO US BBC Wildlife, Eagle House,
Colston Avenue, Bristol, BS1 4ST

Star letter

Drawn to lions

I really enjoyed reading the August 2020 issue, as the stories were so compelling, and even astonishing. In particular, the article on 'Scarface' and the Mara lions stood out to me, as lions are among my favourite animals. The article gave a very interesting overview of the dynamics within a pride, showing how the males

start out as nomads then group together to form, grow and strengthen their pride, only to be overpowered by younger males who follow in their footsteps, and the cycle continues. It is quite hard, but not surprising, to read about the effects of climate change on the lions, but it was great to see Mara's conservancies pledging to do more to create a safer environment for these animals.

Reading about the changes facing the lions of the Mara just shows how much wild animals need to adapt to live, with not only natural shifts affecting them but also those made by humans.

I am also quite passionate about drawing – so, I decided to do a small sketch of Scarface (pictured).

Lucy Chidlow, via email



Taking pride of place: Lucy's Scarface sketch.

Benefits of nature

Nature has a place right in the centre of my heart. It has special meaning to me because it was the only thing that got me out of bed when I was going through my second mental breakdown. I was off work for 10 months and admitted into St Ann's hospital in Poole twice. When you're going through a mental breakdown, there's no 'off switch' – all my anxiety, paranoia and depression went constantly around in my head.

However, when I am staring through my camera, concentrating on that one moment in time, all my worries fade into the background and give me some much-needed headspace. Since 2018, I've been telling my story to try and help others struggling with their mental health. I've found a new passion and motivation that I never had before, and I feel far stronger in myself. There's life after a breakdown and I am proof of this.

Trevor Parsons, via email

Trump and the environment

Mark Carwardine is right to draw attention to the Trump regime's attacks on the environment (My way of thinking, September 2020), but it is far from the only government that is hostile to the environment – perhaps we should focus on shortcomings nearer home. The Cameron regime came to power with comments about feathered impediments to economic progress and tried to sell off the Forestry Commission woodlands. Boris Johnson

doesn't 'get' climate change and his 'newt unfriendly' comments about planning permissions and the destruction wrought by HS2 show his preferred direction of change. Of course, the lack of prosecutions for raptor

The black-footed ferret is a US species in trouble.



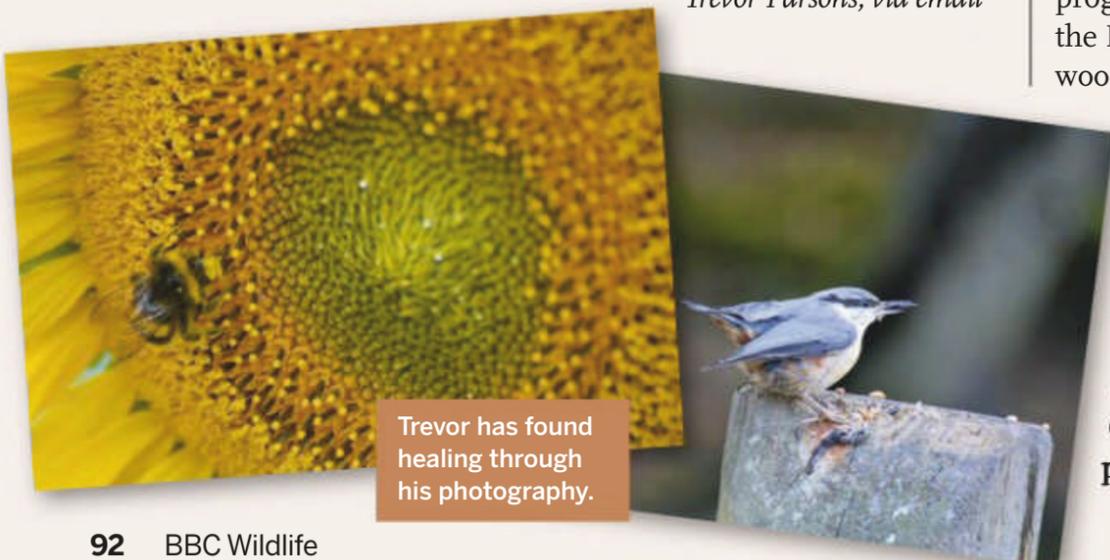
persecution is an implicit encouragement for landowners to flout the law. I think it is wrong to assume that most people care, as the treatment of the countryside during lockdown has shown – there is widespread disregard for the environment, which is reflected through our voting preferences.
David Armitage, North Yorkshire

I always look forward to reading Mark's articles, and his September column didn't disappoint. It is indeed sickening to hear how Trump is undoing so much hard-earned environmental progress in the USA and I do wish there was more we could do to turn the tide. I'm not sure about Joe Biden's commitments on climate change and environmental protection, though what I read seems promising, but surely he would offer an improvement on Trump's short-sighted and foolish actions. Thank you for speaking out, Mark. As always, your views need to be aired and shared widely.

Aynsley Halligan, North Yorkshire

While Trump has definitely put economic prosperity ahead of environmental concerns, he's not as bad as many make him out to be. The desire of many environmentalists to end fossil fuels in favour of wind and solar energy (while well-intended) is, in some ways, misinformed.

Philip Simmons, via email



Trevor has found healing through his photography.

Scarface sketch: Lucy Chidlow; bumblebee and nuthatch: Trevor Parsons; black-footed ferret: Kerry Hargrove/Alamy

Wipe out whaling

I read Mark Carwardine's article concerning Iceland's continued whaling (My way of thinking, August 2020) with much interest. I could not help thinking that the answer is in our own pockets and mouths. If we all did not visit Iceland for a short holiday, or buy any of its fish products, its economy would surely suffer?

I am sure that the Icelandic government would have a quick rethink on its whaling activities, with positive results for the whales. Other countries with whales in their territorial waters now find it more profitable to watch whales rather than brutally kill them. This economic choice, on a wider scale, could also be applied to other countries that treat their wildlife badly.

Norman Marshall, Wales

Be fair to farmers

I somewhat take offence at Mr Buxton's letter making scurrilous insinuations that farmers may be tempted "to breach terms" (Feedback, August 2020). Yes, farmers do feel embattled when such accusations are made. Yes, the uncertainty of Brexit does not help and nor does anyone know the fallout from COVID-19 in the long-term, and that goes for many industries.

But the real issue is that farmers do not receive enough at the farmgate for the risk they take. It is the fashion today that people get paid for risk taken. For example, it takes about 18 months to rear a calf (longer if you take into account the pregnancy and getting the cow in calf), the wholesaler or retailer has it for 30–45 days, the consumer a few days. The farmer gets no more than 50 per cent of the end price, yet we've taken the risk for the longest. The same can be said for vegetables, etc. Is that fair?

Patrick Harrison, via email

QUIZ ANSWERS (see p88)
1A, 2A, 3C, 4B, 5C, 6C

TALES FROM THE BUSH

Mad for March hares

Stumbling upon a prized species in an unlikely setting left Luke O'Brien with an extra spring in his step.

Have a wild tale to tell? Email a brief synopsis to sarah.mcperson@immediate.co.uk



This pair of hares entertained Luke during lockdown.

Luke O'Brien

Living in the city of Coventry – a place not exactly renowned for its abundance of wildlife – getting my nature fix usually involves hopping in the car and driving to reserves that have a reputation for attracting my target species of the month. With mid-March approaching, I had one thing in mind: the sprightly antics of the 'mad' March hare, a concept immortalised by writers such as Lewis Carroll when Alice, in *Wonderland*, hypothesises that the March hare won't be "raving mad" in May, "at least not so mad as it was in March."

Alas, with the Government's sudden announcement of a nationwide lockdown scuppering my plans to catch these elusive mammals in mating mode, it was time to hang up the car keys, embrace the less romantic wilds around my suburban locality and see what my daily walk could deliver.

I wasn't expecting much, given that in one hour my legs could only take me to the edge of a city burgeoning with human inhabitants. But I was wrong. My first outing, only two days into lockdown, had me frozen-browed on the edge of a field as two pairs of black-tipped, upright ears hovered above a cereal crop, before vanishing.

"The bouts of sparring were feisty enough to keep Sugar Ray Leonard on his toes."

Was my sighting a freak one, or had I hit on an unlikely hare hotspot on the fringes of suburbia? Being within walking distance meant I could easily return and find out.

The next day, I arrived at dawn to notice a lithe figure leaping about for joy. Mr Ballerina, as I named

him, was clearly out to impress, and there she was – the object of his desire – paying close attention to her suitor. Soon, they were at it like... well, hares, all between bouts of dizzying chasing and sparring feisty enough to keep Sugar Ray Leonard on his toes.

Just when it seemed things couldn't get better, the pair decided to take a break from their courtship ritual and approach their unusual spectator. They got so close that I could have counted the number of whiskers flaring from their mop-pad noses. Suddenly, it felt like the observer had become the observed. Their bulbous eyes glared at the gangly frame in the hedge clutching a completely conspicuous camera, as if to ask: who is the mad one here? 📷



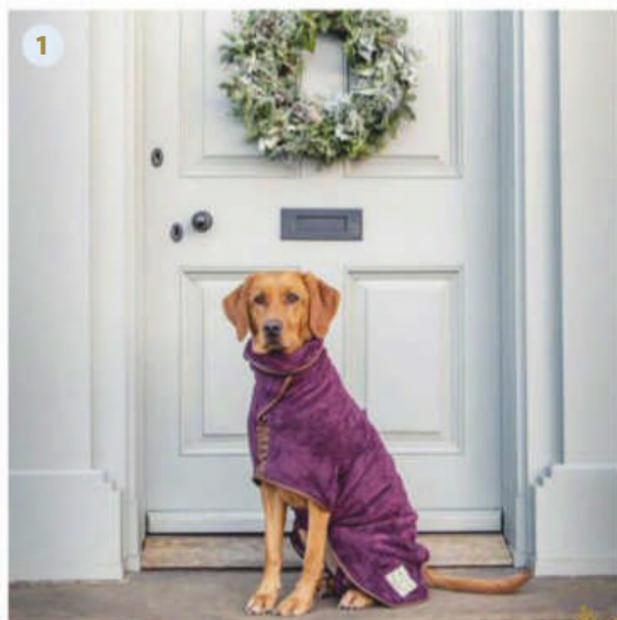
LUKE O'BRIEN is an English teacher with a passion for wildlife photography and writing: thethoughtbadger.com

Christmas

GIFT GUIDE

Looking for something wild to buy?

Whether you're buying for the outdoor enthusiast or wildlife lover, here are a few ideas for that perfect gift.



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2. Halinka's Christmas Fairies

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furniss-foods.co.uk



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01539 766619

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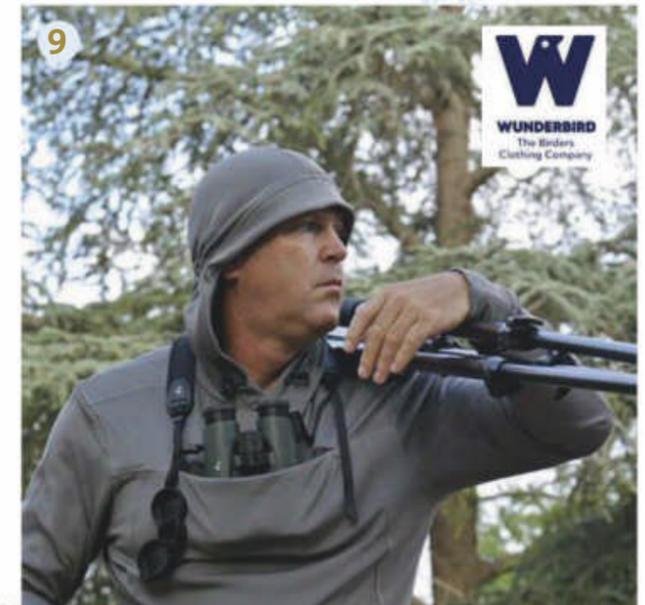
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farrar-tanner.co.uk
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6. NatureSpy

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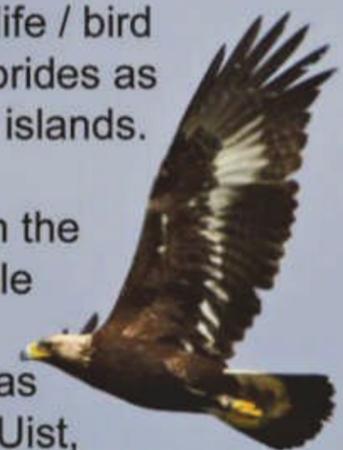
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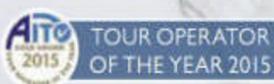
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WILDLIFE CHAMPION

HAMZA YASSIN

In our series about people with a passion for a species, we ask the CBeebies presenter and wildlife cameraman why he loves the **white-tailed eagle**.

Interview by Jo Price

Have you spent a lot of time observing white-tailed eagles?

I live in the west coast of Scotland, near the Isle of Mull. This year, after obtaining a special licence, I've been filming an eight-year-old breeding pair for four months in a nest that is less than 3.2km from my home. It's about a 1.5-hour slog up to the hide with 15kg of camera equipment on my back, but it's one of my favourite walks. Once I arrive, I tend to spend 12 hours watching 'Agatha' and 'Lawrence' raising their two chicks, and have recorded over 300 hours of footage. To get so close to the largest bird of prey in the UK is just wonderful.

What does the species mean to you?

White-tailed eagles are beautiful, charismatic predators that bring balance to an ecosystem and also help clean up the environment by scavenging. The species was eradicated in the UK during the early 20th century, due to illegal killing, and the



"I'd like to see the Scottish population slowly spread down through the UK."

present population is descended from reintroduced birds. This bird of prey was here way before us, and should be respected – a view that many have adopted but there are still some that see the species as a threat to livestock. To live harmoniously with eagles, we have to be open-minded.

What do you think of the reintroduction project on the Isle of Wight?

It's really positive for white-tailed eagles, because it has been done correctly. Eventually, I'd like to see the Scottish population slowly spread down through the rest of the UK and meet an expanding

south-coast population in the middle. Of course, this will take a long time, as white-tailed eagles don't become sexually mature until five or six years old and most prefer to breed close to their natal site. 'My eagles' established a territory 12 nautical miles from where they were born and now have a territory of about 6–10m², which expands in winter when food is harder to find. In November, their offspring will be old enough to find their own territories and fend for themselves.

How has your new CBeebies series inspired children and their parents?

Presenting *Let's Go for a Walk* is an amazing opportunity to encourage children to head outside with their parents and experience wildlife – the programme has received really positive feedback from viewers. It's all about inspiring the younger generation, who are going to be picking up the baton and fighting to protect the natural world in the future. If I can encourage one kid to follow their dreams as I did, I'm a happy person, I've done my job. 🐾

HAMZA YASSIN is a wildlife cameraman, photographer and presenter of *Let's Go For a Walk*: bbc.co.uk/programmes/m000fjck

The expert view



Seven juvenile white-tailed eagles were released on the Isle of Wight in early August this year, in the second year of a five-year reintroduction project with Forestry England. It has been exciting to follow the progress of the 2019 birds, which have explored widely around England and learnt to live successfully in the landscape. We have been encouraged that they have learnt to catch grey mullet and cuttlefish.

Tim Mackrill, Roy Dennis Wildlife Foundation





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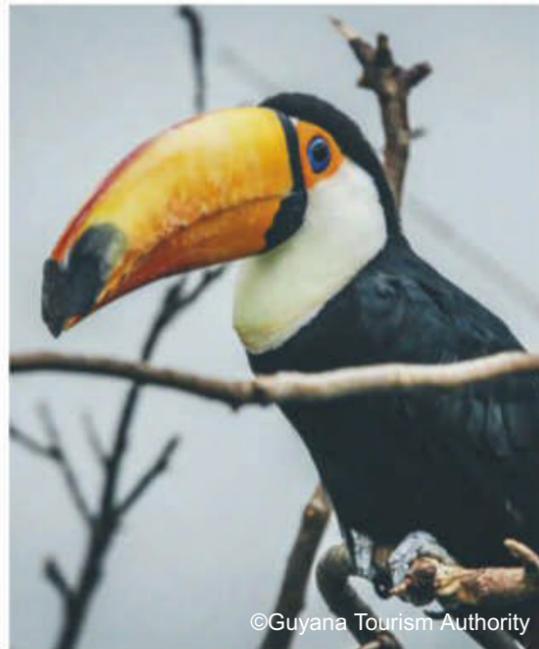
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