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Wildlife

A HISTORY OF
THE WORLD IN

100

**NATURAL
OBJECTS**

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PET CATS & WILDLIFE

New study reveals
extent of killing spree

CONFESSIONS OF A TOUR GUIDE

Hilary Bradt shares a
lifetime of wildlife
adventures

Living with man eaters

Face to face
with the tigers
that have us
on the menu



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68

PET CATS & WILDLIFE
"One cat brought back a blue tit every single day for a fortnight."
Rebecca Thomas



46

LIVING WITH MAN EATERS
What is it like to have one of the world's most dangerous jobs?
Christina Greenwood leads the Sundarbans tiger response team.



22

PHOTOS FROM AMERICA'S PRAIRIES
Jim Brandenburg photographs the beauty of the land he calls home.

ON THIS MONTH'S COVER



COVER Subharghya Das
INSET Great auk egg: Dorling Kindersley

AMERICA'S PRAIRIES 22

Celebrate America's big sky country – and its hardy wildlife – with Jim Brandenburg.

LIVING WITH MAN EATERS 46

What causes a tiger to hunt humans and how can it be stopped? We find out.

100 NATURAL OBJECTS 54

Pat Morris' very personal pick of 100 objects that symbolise our relationship with nature.

PET CATS & WILDLIFE 68

The impact of domestic cats on wild animals is revealed.

Contents November 2010

HIGHLIGHTS 6

Brett Westwood on the natural wonders of the month, while Elliott Neep offers his top grey seal photo tips.

GO WILD 15

Our experts pick their favourite wildfowl spectacles.

RICHARD MABEY 20

How weeds create a sense of place and history.

NEWS OF THE EARTH 37

Breaking wildlife and environmental stories from around the globe.

DISCOVERIES 42

Fresh revelations from the natural world.

SUBSCRIBE TO BBC WILDLIFE 66

Don't miss your free copy of *Wildlife Photographer of the Year: Portfolio 19*.

BBC WILDLIFE ARTIST OF THE YEAR 74

Our popular natural-history art competition returns.

Q&A 77

All your wildlife questions answered by our experts.

OUT AND ABOUT 95

David Lindo goes birding abroad, Steve Harris

explains how stoats hunt, Miles Irving searches for sea beet and Ross Reynolds looks forward to fog.

YOUR LETTERS 107

Share your opinions on any issues raised.

YOUR PHOTOS 110

The editor chooses your best pictures.

TALES FROM THE BUSH 114

Tony Jones has a reptilian dream come true – but discovers that not everything is as he expected.

W2

82 BOOKS
November's top nature reads reviewed.

85 TV CHOICE
Rachel Ashton picks the month's best natural-history programmes.

86 ON THE COVER **CONFESSIONS OF A WILDLIFE TOUR GUIDE**
Hilary Bradt shares the adventures of a lifetime.

93 ALMERÍA
James Parry explores the dry desert of Spain.



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**THIS MONTH'S
CONTRIBUTORS**

JIM BRANDENBURG



Photos from America's prairies, p22
Jim is an internationally renowned nature

photographer. He says, "The broad and simple prairie landscape was an inspiration during my learning years. Having gone on to work in the most spectacular locations, it now seems fitting to return to say thank you and give something back to the land of my youth."



CHRISTINA J GREENWOOD
Living with man eaters, p46
Christina works in

the mangrove swamps of the Sundarbans, home to one of the world's largest tiger populations. "The tiger for me is the ultimate symbol of wilderness," she says. "But despite its popularity, numbers are still plummeting, so I resolved to join the fight."



PAT MORRIS
A history of the world in 100 natural objects, p54
Pat has loved natural history

since he was a child, collecting curiosities from his travels around the globe. He says, "I am fascinated by animals and their interactions with people, so my choice of 100 objects that evoke memories and ideas about the natural world is rather quirky!"



HILARY BRADT
Confessions of a tour guide, p86
Hilary has led adventure and

wildlife tours since 1979. "Though it's the disaster trips that make the best stories," she says, "some of my fondest memories are of sharing the delight of my clients when they see their first lemur, blue-footed booby or leaping impala. I've been very, very lucky."

Year of the tiger?

LOST LAND OF THE TIGER was drenched in tears of joy. If you missed it, this moving BBC series confirmed the existence of a population of the big cats living in the mountains of Bhutan, in the Himalayas.

The tigers were filmed above 4,000m, a higher altitude than previously thought possible. And, what's more, they appeared to be breeding. When cameraman Gordon Buchanan discovered that his camera traps had footage of two wild tigers – a male and a female who looked to be lactating – he put his head in his hands and wept.

The implications are enormous. Recent reports suggest that the number of tigers left in the wild could be as low as 3,200. It is now hoped that creating a nature reserve around the tigers in Bhutan, and establishing habitat corridors, could help to connect fragmented populations across Asia, and ultimately prevent the species' extinction.

The governments of the 13 tiger range states are working with WWF and other conservation organisations to try to double the wild tiger population by the next Year of the Tiger in 2022 (see News, September). Progress has been made, but there's still a lot of work to be done, including reducing poaching to a level



When Gordon Buchanan found footage of wild tigers he wept for joy.

where it is no longer a threat.

Relive the moment when Bhutan's wild tigers were caught on camera and share Gordon's emotional response at www.bbc.co.uk/nature/species/tiger. Meanwhile, we visit the sharp edge of tiger conservation when we join Christina Greenwood and her team, working with one of the world's largest populations of these big cats (p46).

PLUS, PHOTOGRAPHER Jim Brandenburg celebrates the wild prairies on which he grew

up (p22). Pat Morris picks the 100 natural objects – from ammonites to water fleas – that have most influenced our relationship with the wild world (p54), our Artist of the Year award makes a welcome return (p74) and Hilary Bradt reveals the highs and lows of her career as a wildlife tour guide (p86).

We are also delighted to give you our exclusive mini-mag, featuring all of the winners from the Veolia Environnement Wildlife Photographer of the Year 2010 competition, absolutely free. Enjoy it!

Sophie

Sophie Stafford, Editor

New features, photo masterclasses and galleries are going up on our website all the time: www.bbcwildlifemagazine.com

HERE'S HOW TO GET IN TOUCH WITH US


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A crowd of dunlins, in their pale winter plumage, cram together on the rocks.

HIGHLIGHTS NOVEMBER



WITH **BRETT WESTWOOD**

"The sapphire gleam of a kingfisher over the muddy waters of a river in spate, and goosanders, white with a hint of peach, battling against the currents are two of the delights of November birding," says Brett, a naturalist, writer and BBC radio presenter from Worcestershire.

SEASONAL SPECTACLES

Mud stitchers

SHOULDERS HUNCHED against the cold, scurrying like mice across the mud of a November estuary, dunlins *Calidris alpina* are arch-probers. Their gently curved bills are tweezers with which they wrinkle out small crustaceans, worms and molluscs from just a few centimetres below the surface. Follow a flock before the tide returns and you'll see the lines of stitch marks in the mud left by the sewing-machine action of thousands of bills.

The UK has an international responsibility for dunlins. Our relatively small breeding populations on northern and western bogs are swelled in autumn by birds pouring in from Scandinavia, Russia and even Greenland. Some of them are on their way further south and may have left again by November. But others will have stopped to moult on the Wadden Sea (an expanse of tidal mudflats stretching from Denmark to the Netherlands) before flying in this month to feed on our eastern estuaries, in particular the Wash.

Here, the waders perform spectacular acrobatics as they are displaced by the fast-approaching tides. Individually, dunlins are attractive birds with dark boot-button eyes and soft grey plumage, and they release purring trills as they take flight.

FIND OUT MORE

Learn more about dunlins and listen to their cries at www.rspb.org.uk/wildlife/birdguide/name/d/dunlin

Eric Medard

THREE TO SPOT



Laurie Campbell

▲ Standing out like a beacon in dark conifer woods, the FALSE CHANTERELLE *Hygrophoropsis aurantiaca* is a common, orange-yellow fungus that appears in small groups this month. Its fluted gills extend down the stem like those of the true chanterelle, but are closer packed, and the flesh is thinner than that of its edible namesake. Never eat a false chanterelle – its toxins cause hallucinations.



Arterra Picture Library/Alamy

▲ Found among drifts of beech or oak leaves, the rich, plummy AMETHYST DECEIVERS *Laccaria amethystina* are an autumnal delight. The fungi vary dramatically in size and shape, fooling even experienced mycologists, though these slender toadstools generally have slightly flattened stems and broad gills. The glorious purple colour fades to grey as the deceivers dry out.

▼ November is a month noted for decay and drab hues, so colourful fungi stand out even more. In woods and hedgerows, look out for the VERDIGRIS AGARIC *Stropharia aeruginosa*, a strikingly beautiful turquoise mushroom. The white flaky stem may have a ring, or volva, around the base, and the cap has scurfy white edges. The related *S. caerulea*, with less scurf and a paler cap, is more common in gardens. Both species are poisonous.



Steen Drozd Lund/OSF/Photolibrary.com

With rivers in flood this month, otters seek easier meals away from the water.



Paul Hobson [captive]

WILD NEIGHBOURS

Hitting the highway

FOLLOWING NOVEMBER rains, spare a thought for our increasing population of otters *Lutra lutra*. Their expansion is slowing as the animals are forced out of riverside holts by autumn's rising water levels, only to fall prey to the hazards of life on land.

At times like these, traffic poses an even greater danger than usual, because these slender hunters prefer to cross roads rather than swim under bridges or navigate through blocked culverts. The problem has been addressed in many areas: wildlife underpasses are installed along new roads where they cross watercourses. These can be life-savers, especially for young and inexperienced animals.

Even the strongest swimmers find it hard to battle powerful currents, and the most skilful predators struggle to catch fish in swirling, murky, silt-laden waters. Instead, otters often scavenge along the

verges of roads, feeding on the remains of rabbits killed by cars, but the unwary sometimes become casualties themselves when they are hit by traffic.

A spike in deaths during the autumn can seriously affect the population – otters breed throughout the year, and the loss of a pregnant female or one feeding young cubs will set back recolonisation efforts.

Male otters range over river territories of up to 40km² and are especially vulnerable as they cross a countryside increasingly divided by roads. If you do find a dead otter, get in touch with your local Wildlife Trust, which will keep a log of the details including the cause of death.

GET INVOLVED

Record otter sightings at the International Otter Survival Fund website www.otter.org/otterwatch.aspx

A visiting skylark hides out in an unploughed field before heading south for winter.

Arto Juvonen/birdphoto.fi



IN THE FIELD

Stealth in the stubble

A QUIET WALK through an apparently lifeless stubble field could be enlivened by a flight of skylarks *Alauda arvensis*, flushed as they forage between the furrows. Each autumn, large numbers of what Shelley called 'blithe spirits' pour into Britain from northern Europe, where they are summer visitors. Many of them are heading for the warmth of France and the Iberian peninsula, where between 25 and 100 million skylarks spend the winter. But some will stay on, boosting our dwindling breeding population. November arrivals can be dramatic and take place over large fronts; an estimated 360,000 skylarks passed over London in just four days in the autumn of 1956.

The birds that do winter here gather in flocks of between 10 and 300 individuals, sometimes more in harsh weather. You find them almost exclusively on arable farmland, where they feed on grains and any surviving insects from unploughed stubble. The remains of barley, oilseed rape and linseed crops are especially popular, though fields treated with herbicide are usually avoided.

Birds lie low, creeping across the ground rather than walking. On a dull November day, they can be hard to see among the drying stalks. When flushed, skylarks fly in a loose-winged pack, showing off their white outer-tail feathers and chirruping softly as they circle low over the ground before settling and becoming invisible once more.

MOTHS OF THE MONTH

If you drive along a country lane at night this month, you will see small scraps of tissue flutter weakly in your headlights: November moths *Epirrita dilutata* have emerged. These delicate insects seem ill-equipped for the cold, damp season. Their colour differs greatly, ranging from dark grey to light brown, each cloak-shaped wing banded with fine lines. Despite their small size, they give anyone trying to identify them a major headache. There are also pale November moths *E. christyi* and another two species of autumnal moths out there, only really differentiated by their genitalia. For moth enthusiasts, the long November evenings just fly by.



J.C. Schou/Biopix.dk

IMPROVE YOUR NATURE PHOTOGRAPHY

This month, pro photographer **Elliott Neep** explains how he got his best November shot – and shares his top tips.

Everyone photographs grey seals, so to stand out you must showcase extreme beauty, behaviour or weather. It was the end of the season with a winter storm forecast, so I was sure that I would be the only one on the beach at Donna Nook in Lincolnshire – a prime opportunity.

On arrival, it was -3°C with a 65kmph gale. Frozen sand raked my eyeballs and blasted my kit. Happily, I was well prepared, with camera covers and polar-standard clothing.

I approached cautiously to avoid panicking the seals. Crawling along on all fours, I dragged my heavy lens tripod behind me, pausing every few

metres to check for raised heads. In a horizontal blizzard, these animals are easily alarmed.

I always photograph at eye level for the most intimate portraits. After an hour, I was in a great position, but almost instantly I felt icy hail, and my quarry lumbered down the sandbank for the shelter of the sea.

I tracked them as best I could, but with every second the visibility worsened. In a white-out, I could just distinguish this form. I composed my shot and got only two frames before it vanished. But I managed to capture the speed and ferocity of the storm and the battling motion of the seal.

Grey seals are often photographed lying around, so try to capture motion or other active behaviour.



ELLIOTT NEEP'S TOP WILDLIFE PHOTOGRAPHY TIPS

» MAKE THE MOST OF BAD CONDITIONS
When the light fades or the weather deteriorates, most photographers pack up and head for home. But nature just carries on whatever the conditions. If you cover your kit and endure the discomfort with good-quality clothing, you will be rewarded with remarkable and strikingly different wildlife images.

» BLUR IS NOT ALWAYS YOUR ENEMY
High ISOs produce crisp images with fast shutter speeds even in low light. But if you are trying to photograph action, a certain amount of blur is essential to capture a sense of energy, motion, speed and power. This effect is lost with a fast film producing those perfectly sharp, freeze-frame shots.

» ROOM TO BREATHE
It used to be all about the close-up, but I soon learned that omitting the environment from a wildlife photograph leaves you with nothing more than a snapshot. Framing a wild animal within the context of its habitat can tell a story, document a relationship or simply provide a dynamic space into which the subject can move, making a better photo.

ID PARADE

Empty nests

A SEASON of nest-building, egg-laying and infant-rearing activity is laid bare in November. Falling leaves and shrivelling grasses reveal the edifices of a bustling spring and summer that have long been confined to history. Like detectives, we can read the clues amidst the stark landscape, and piece together the success of our local birds and mammals by searching for their deserted nests.

It's eyes to the ground first, where the neat, round, tennis-ball-sized nests of harvest mice are built in bramble thickets and scrub. Old carpets, corrugated iron panels and discarded timber hide the grass homes of field voles. In thickets of gorse and hawthorn, long-tailed tits construct their flask-shaped nests from as many as 3,000 feathers interlaced with animal hairs and flakes of lichen. These sturdy constructions should survive the winter, though, like the wren's similar nests of moss and leaves, they will not be used again.

As the foliage of deciduous trees falls, the minimalist platforms built by wood pigeons, so flimsy and half-hearted that you can often see the eggs through the base, are exposed. Slightly higher and often in quite small urban trees are the twiggy cages of magpies, with their characteristic arch of sticks overtopping the main nest. In the fork of large trees, grey squirrel dreys are common, while at the very top, still holding tight in autumn squalls, are the beautifully laid constructions of rooks, twigs interwoven skilfully to provide stability in even the fiercest gale.

FIND OUT MORE

The nests of most birds and mammals are protected by law. Search the RSPCA website, www.rspca.org.uk, for advice on problem nests. It is best to leave even empty nests alone, since other animals may find them useful.

GET INVOLVED

Nests are one of the indicators of mammal numbers used in the National Small Mammal Monitoring Scheme run by the Mammal Society. To volunteer, visit www.mammal.org.uk



Grey squirrel drey

SCIURUS CAROLINENSIS

Round plait of twigs up to 50cm across in the fork of a tall tree.



Hedgehog

ERINACEUS EUROPAEUS

Flimsy summer nest of woven leaves and stems hidden in shrubs.



Field vole

MICROTUS AGRISTIS

Ball of nibbled grass stems, often located under discarded planks.



Harvest mouse

MICROMYS MINUTUS

Neat ball of straw in hedgerows and among tall herbs.



Sparrowhawk

ACCIPITER NISUS

Broad twig platform often deep in a conifer, but also in deciduous trees.



Magpie

PICA PICA

Mess of twigs with tell-tale 'basket handle' over main structure.



Rook

CORVUS FRUGILEGUS

Large twig nest at the tops of trees, usually in small groups.



Woodpigeon

COLUMBA PALUMBUS

Flimsy platform of twigs in trees, often see-through from below.



Mistle thrush

TURDUS VISCIVORUS

Mud-lined weave of grass and moss, in tree forks close to trunk.



Blackbird

TURDUS MERULA

A cup of grass and feathers lined with mud, often low in bushes.



Wren

TROGLodyTES TROGLodyTES

Neat ball in shrubs and on rocks, but males' nests are less robust.



Long-tailed tit

AEGITHALUS CAUDATUS

Interwoven ball of lichen, feathers and hair, often in gorse or brambles.

November is a torrid month for male Arctic char, as they fight each other for breeding territories.



A Hartl/Blickwinkel/SpecialistStock

LURKING IN THE DEPTHS

Love in a cold climate

IN THE CHILLY depths of northern and western waters, things are hotting up for the Arctic char *Salvelinus alpinus*. The males, handsome at the best of times, flush even redder on their bellies and lower fins as they take on their breeding livery. Their name is actually derived from the Gaelic *tor* meaning 'belly'.

Spawning has already started this month and will continue through the early winter along the gravelly shores of lakes or on the beds of swollen streams feeding into larger waterways. Such places offer the best chance to spot these very attractive fish.

Eggs are laid at depths of between 1m and 3m, and the female char, like salmon, takes her time choosing where to put them. She swims in and out

of territories guarded by the resplendent, posturing males, before using her body to dig a redd, a hollow for her eggs, in the area patrolled by her chosen mate.

Because the Arctic char can withstand much lower temperatures than our other native trout and salmon species, it is often believed that this is exclusively a fish of deep, post-glacial lakes that are low in nutrients and have little other wildlife. However, this is too simplistic. Arctic char can often be found in quite fertile waters in Ireland, and live in water only 5m deep in some Scottish lochs. What is undisputed, however, is that it is a master of exploiting cold, deep lakes, and may have the most northerly distribution of any freshwater fish.

ALSO OUT NOW



Heather Angel/naturalvisions.co.uk

▲ The brilliant-white scribbles highlighted on bramble leaves as they darken this month are the graffiti of the BRAMBLE LEAF-MINER *Stigmella aurella*. Its minute caterpillars live between the upper and lower layers of the leaves, creating mines as they munch their way along. A life's work can extend for several centimetres, and the leaf-mine widens as the larva grows and finally pupates. The tiny metallic moths, 6mm long, fly in late summer and early autumn.



Laurie Campbell

▲ Lumbering along a woodland ride, driven by the lure of animal dung, bumble-dors or DOR BEETLES *Geotrupes stercorarius* are at large on warm November days. These well-armoured insects, legs bristling with all manner of grappnels and spikes, often carry a cargo of tiny mites, and because of this were once known as 'lousy watchmen'. Gently turn one over to reveal a dazzling metallic purple and blue underside.

WILD ART BY FEDERICO GEMMA

Composition directs the eye of the observer through a picture. The asymmetry in this flock of greylag geese adds dynamism – a diagonal runs left to right through the birds, and the alternating head heights and neck positions create a rhythm for the viewer. The crop gives the impression that we are seeing part of a flock moving across the page.



federicogemma.it

HIGHLIGHTS NOVEMBER'S MUST-SEE

Mountain hare

AS TEMPERATURES drop and days shorten, mountain hares *Lepus timidus* usually begin to moult their long grey-brown summer fur, replacing it with a white winter coat. But this change of clothes doesn't happen everywhere in the British Isles.

In the Irish Republic and Northern Ireland, hares often spend the winter in a blue-grey pelt or are brown with white bellies and feet. In Scotland, they are prone to blanching even further, especially where snow lies longest, though, even there, many individuals retain parts of their summer coats through the coldest periods. In the English Peak District, where the hares are introduced, the thriving populations contain many winter-white animals, though most are smudged with brown.

A pure white hare bounding off through brown heather is hardly inconspicuous, and in snowless winters such animals are targets for foxes and birds of prey. In Scotland, you'll find them on mountains and heather moorlands, but in the Irish Republic they occur all the way down to sea level. On hills they live in forms – depressions dug into the ground that provide shelter in rough weather, especially on the leeward slopes. It is not unusual to come across several hares together at this time of year, feeding among heather clumps where they nibble shoots of common heather with sharp incisors.

BRETT'S SIX MOUNTAIN HARE HOTSPOTS

Mountain hares are confined to the uplands of Scotland and central England, but are more widespread in Ireland. However, the Irish subspecies is in decline – numbers have dropped by a quarter in recent years.



- 1 Cairngorms NP
- 2 Atholl Hills
- 3 Perthshire Hills, near Crieff
- 4 The Cairnwell, near Braemar
- 5 Ben More, Isle of Mull
- 6 Peak District, near Buxton

READER CHALLENGE

NOW IT'S YOUR TURN.

We've told you how and where to look for dunlins, mountain hares and other wildlife in November, so let us know if you have any luck spotting them. Send us stories of where

you went and what you saw, plus any images, and we may publish them in the Your Photos section (p110). Send your images via email to wildlifephotos@bbcmagazines.com or to the address on p107.

Over to
you!

A mountain hare's speed is the only thing on its side – its white winter coat makes it an obvious target among the rusty autumn browns of the Peak District.



GIVE A DAY LIKE NO OTHER

BE A KEEPER FOR THE DAY

Come beak to beak with the penguins, stretch tall enough to feed the giraffes and remember to take a deep breath before mucking out the rhinos. All this and more are part of the Keeper for a Day experience, getting closer than ever to some of the world's most fantastic animals. It may be called Keeper for a Day but the impact is for life!

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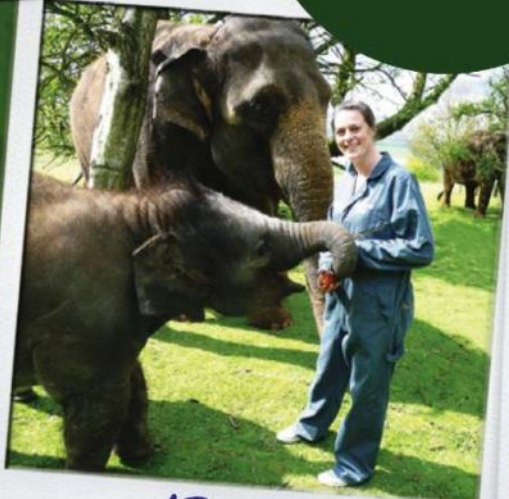
ZSL
**WHIPSNADE
ZOO**



9-15
slice of toast



10:30
trip to the gym



12-00
a light Lunch



1:30 clean out
Fluffy



2-15 a quick
tidy round



4:30
story before bed

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This is a sample itinerary incorporating activities from both zoos. Activities and locations mentioned are subject to change. Please see itinerary information on website for more details.



GO WILD NOVEMBER

THE BEST WILD PLACES TO VISIT THIS MONTH

Loch of Strathbeg

Aberdeenshire

NOT A PLACE for softies, the Loch of Strathbeg is situated on the chilly east coast of Scotland near Peterhead. Winter arrives early here and bites hard. But that does not put off the flocks of pink-footed geese that commute to its shallow waters at this time of year, their skeins scribbling lines in the winter sky. The loch is surrounded by dunes, reedbeds and fens, and is a short walk from the sea. It was once a lagoon, only cut off in 1720 when a storm dumped a sandbar across its seaward channel. On nearby Rattray Head, scan the stony grey waters for seabirds or seals – and contemplate the mighty storm that made the loch. **Dominic Couzens**

FURTHER INFORMATION

Website www.rspb.org.uk/reserves/guide/l/lochofstrathbeg

Best B&B Rattray Head Eco-Hostel ☎ 01346 532236



A crowd of pink-footed geese fly out over marshy fens after roosting at the Loch of Strathbeg.



1 TREE SPARROW

This small, neat bird has suffered a sharp nationwide decline, but is thriving in this corner of Scotland. Up to 60 of these delicately coloured sparrows are known to use the feeding stations at the loch in autumn, including the one near the visitor centre and car park.



2 GREY SEAL

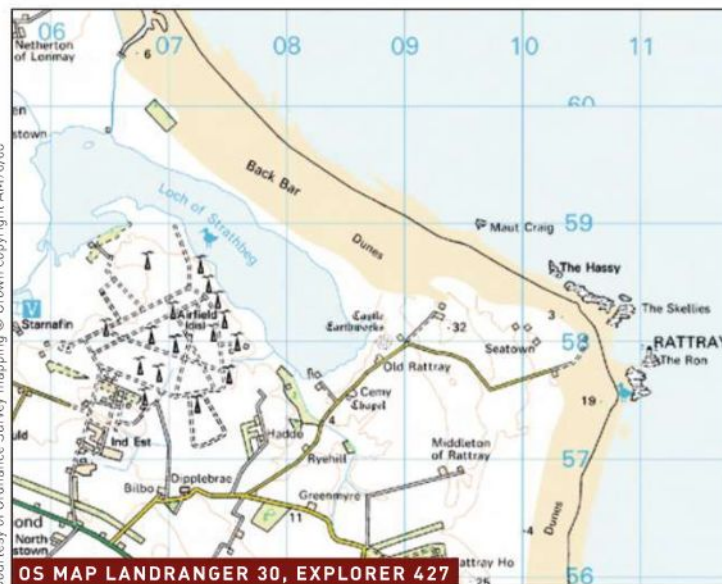
Grey seals live side by side with common seals in this area. The nearest haul-out site used by both species is a few kilometres north of the loch. However, the two can be difficult to tell apart from a distance: greys are generally larger and have longer snouts.

6 WHOOPER SWAN

Regal beauties visiting from Iceland, whooper swans can arrive in their hundreds. Watch out for birds craning their necks in display. You may also hear their trumpeting triumph ceremonies.



Courtesy of Ordnance Survey mapping © Crown copyright AM90/08



3 PINK-FOOTED GOOSE

At least 20,000 of these birds roost at the loch, double that in some years. The RSPB holds a 'Goosewatch' to show off the spectacle of the geese taking to the air in the morning.

5 ROE DEER

Wild deer are common around the loch and can often be seen grazing out on the marshes. The animals will have their winter coats by now, making the white rump patch even more conspicuous. The bucks are also shedding their antlers this month.



4 BARNACLE GOOSE

The pink-foots dominate, but smartly patterned barnacle geese also winter on the loch in small numbers, having bred on Svalbard. In some autumns, larger numbers pass through for a few days on their way to the Solway Firth. Listen out for their peculiar yapping calls.



Strathbeg: Steve Austin/rspb-images.com; 1. Mike Wilkes/naturepl.com; 2. Brian W Mathews; 3. Alan Williams/naturepl.com; 4. APFO/naturepl.com; 5. Allen Holmes; 6. John Waters/naturepl.com

GIBRALTAR POINT

Reedbeds and marshes surround Tennyson's Lake, a gathering point for geese near Gibraltar Point's West Dunes.





GO WILD NOVEMBER

THE BEST WILD PLACES TO VISIT THIS MONTH

Gibraltar Point Lincolnshire



SAFEGUARDED BY OUR most highly prized wildlife conservation protection orders – it is both a National Nature Reserve and a Ramsar wetland site – the fabulous Gibraltar Point should be on more naturalists' 'must visit' lists.

The expansive reserve's most obvious features are the West and East Dunes, which run in parallel for 5km along the coast between Skegness to the north and the corner of the Wash in the south. These two sandy backbones are separated by a saltmarsh, and to the seaward side by shingle and muddy beaches.

Gib Point (as it is affectionately known) therefore offers an intricate mosaic of coastal habitats, which attract an astonishing array of

wildlife, such as the wintering shorebirds that arrive from the Arctic this month.

From the car park, head east across the saltmarsh towards the East Dunes, which are flecked with colour by salt-tolerant buckthorn and sea holly. To the south, The Spit is a haunt of shore larks, one of the Gib's rarest birds. To the north, the dunes rise to Mill Hill, which provides a terrific view across to the West Dunes – a good place to spot hares.

Mike Dilger is a presenter on *The One Show*



FURTHER INFORMATION

Website www.lincstrust.org.uk/reserves/gib

Best café Visitor Centre and Café ☎ 01754 898079



1 BROWN HARE

No other British mammal is better able to cope with our changeable weather than the brown hare. Watch out for its black-tipped ears and lolling gait particularly around Mill Pond Road between Mill Hill and the West Dunes.



2 FIELDFARE

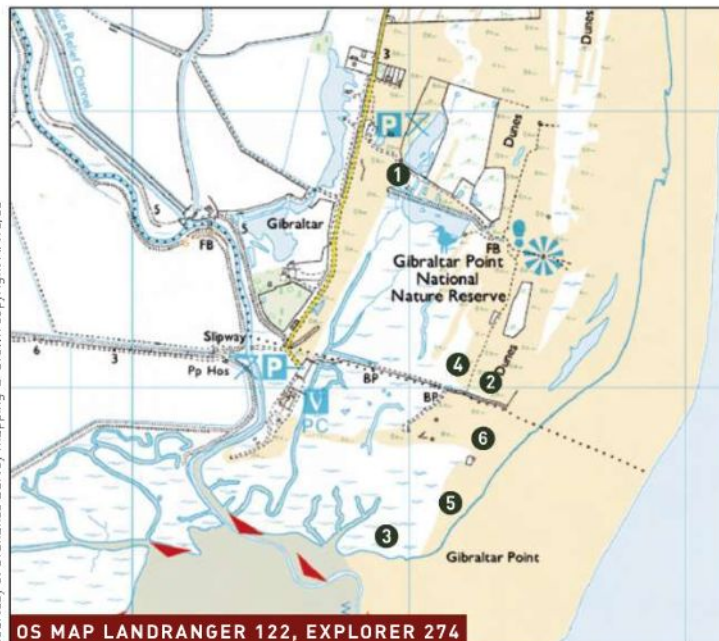
By November, up to 2,000 hungry fieldfares will have arrived from their breeding grounds in Scandinavia to partake of buckthorn berries and other fine Lincolnshire fare. Listen out for their 'chack-chack-chack' calls as they fly in for dinner.

6 SEA HOLLY

With its pale, frosty-blue leaves and prickly nature this little plant is guaranteed to brighten up any walk along the dunes. Surviving sun, salt spray and windblown sands, it is best looked for on seaward slopes.



Courtesy of Ordnance Survey mapping © Crown copyright AM90/08



OS MAP LANDRANGER 122, EXPLORER 274



3 SHORE LARK

Gib Point is one of the best places in the UK to see this rare winter visitor from beyond the Arctic Circle, as it endures the winter in small numbers on our eastern coast. Its lemon-coloured face, complete with bandit's mask, is hard to forget.

5 KNOT

During late autumn, tens of thousands of knot exchange their breeding grounds in Arctic Canada and Greenland for the glorious mud off Gib Point. The best time to enjoy their swirling aerial displays is at high tide, when they are pushed off their dining table by incoming waves.



DON'T MISS

4 SEA BUCKTHORN

Cloaking the East Dunes, this spiny shrub is easily identifiable at this time of year by its striking combination of silvery foliage and bright orange berries. Sea buckthorn is native to the east coast, and its stiff architecture is a stabilising influence on Gib Point's dune system.



GO WILD NOVEMBER

THE BEST WILD PLACES TO VISIT THIS MONTH



Cudmore Grove

Mersea Island, Essex



TO WALK A REMOTE Essex seawall in November is to step into a wild and desolate landscape, infused with the smell of muddy creeks and the salty tang of sea air. This month, there is the added spectacle of flocks of geese and waders wheeling above the nearby marshes. Cudmore Grove Country Park, at the mouth of the Colne Estuary, is a good place to start your adventure. Time your walk for high tide so that the feeding waders are at their closest. With geese gathering in the park's fields inland, the seawall path passing the Mersea Stone pillbox to the saltmarshes of the Colne provides the best vantage point from which to watch the action in all directions.

Dougal Urquhart, senior ranger Cudmore Grove CP

FURTHER INFORMATION

Website www.visitparks.co.uk/placestovisit/cudmorecountrypark.php

Best pub The Dog and Pheasant, East Mersea ☎ 01206 383206



Sharp eyes are needed to spot wildlife on Mersea Island's glistening mudflats.



1 WIGEON

The sight and sound of vast flocks of wigeon are a feature along the Essex coast this month. Up to 1,000 of these birds spend the winter snacking on the park's marshy pastures. When a flock takes to the air, the spectacle is a conversation-stopping moment.



2 MARSH HARRIER

A dozen of these hunters winter around the Colne Estuary. The birds can usually be seen from the northern end of the park seawall, especially when they gather to roost on the nearby Langenhoe Marshes, to the north of Mersea Island.

6 BRENT GEESSE

These noisy geese love the Essex coast in winter. They divide their time between the saltmarshes and the park's grazing land. Unfortunately, they also have a fondness for the island's winter wheat crop.



Courtesy of Ordnance Survey mapping © Crown copyright AM90/08



OS MAP LANDRANGER 168, EXPLORER 184



3 SHELDUCK

These handsome ducks feed on snails at low tide. Dozens of them often gather around the Mersea Stone to sieve the mud with their red beaks. The estuary's winter population is one of the UK's largest.

5 OYSTER

Mersea Island has been famous for its oysters since Roman times. Masses of empty shells are washed up on the beach. Look for the distinctive flat and rounded Colchester native oyster among the introduced rock oysters with their more irregular shapes.



4 GOLDEN PLOVER

There have been some impressive flocks of 'goldies' in recent winters, with up to 2,000 birds arriving around this time of year. They are often seen in the park's fields or roosting on the nearby mudflats. Flocks passing overhead sound like gusts of wind!



Mersea: D Berrichon/Alamy; 1: M Hamblin/rspb-images.com; 2: G K Smith/naturepl.com; 3: B Ooster/PhotoLibrary.com; 4: R Brooks/FLPA; 5: R Tamblin/Alamy; 6: A Williams/NPL



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TADOBA

One of the best kept secrets among the wildlife parks in India. Located 3 hours drive from Nagpur, this park is an unspoilt gem with a comparatively low number of vehicles visiting the park.

GIR

Gir National Park and Sanctuary, in the western state of Gujarat, is the last home of the Asiatic Lion.

SUNDERBANS

The delta of the Ganges forms the largest expanse of mangrove forest anywhere in the world. Its swamps, waterways and woodlands are home to a large population of Tigers.

KAZIRANGA

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A BRUSH WITH NATURE

RICHARD MABEY

Weeds are demonised as the vagabonds and invaders of the plant world, yet they are part of the essence of a place.



I LAST WROTE about weeds in this column three years ago. Since then I've been immersed in writing a cultural history of these naggingly persistent plants, which stretches, so to speak, from the Garden of Eden to *The Day of the Triffids*. Two things have struck me above all others.

First, how we demonise weeds' invasiveness when we should be blaming the environmental carnage that gives them their opportunities. Second, our deep ambivalence towards them, which is nowhere more evident than in the field poppy, simultaneously destroyed in the fields and revered as a symbol of new life for more than 3,000 years, from the heyday of the Assyrians to Remembrance Day.

I am far from immune to these contradictory feelings. Our 'house' weed policy in Norfolk is whimsical and sometimes downright hypocritical. It nods to culinary need and social conventions, but is hedged about with sentimentality and a strong sense of the history of the place. Weeds are one of the few lines of continuity in an old garden. The mugwort and small nettle that edge our drive may be direct descendants of the weeds that grew when the garden was a hemp field two centuries ago. The groundsel in the lettuce bed may belong to a lineage that goes back 3,000 years to the time when Bronze Age farmers first worked in this valley.

We normally think of weeds as invaders, but in a precise sense they are also part of the heritage or legacy of a place, an ancestral presence, a time-biding genetic bank over which our buildings and tinkering are just an ephemeral carapace. We still hoick them out when they get in our way, but, for me, this is always a capricious assault, tinged with respect and often halted if I'm in a romantic mood. A sense of the antiquity of weeds is also a reflection of how long they have been familiars in one's own life. They turn up at the same time of year, every year, like garrulous relatives you wished lived just a little further away.

There weren't many obvious weeds when we first moved in – the garden was tidy to the point of prissiness. It had been hoed, mown and pruned almost every week by the previous owners. In our first summer, with our energies concentrated on work on



Giant hogweed looms, triffid-like, above all other British weeds. Native to south-west Asia, it was introduced here in 1820.

"Weeds turn up at the same time of year, every year, like garrulous relatives you wished lived just a little further away."

the interior of the house, the weeds *de la maison* erupted into mischief as mice are supposed to do when cats are away. The ground seemed to breathe them out in the heat, like puffs of floral vapour.

Scarlet pimpernels studded the gravel, opening their flowers at breakfast time and closing them after lunch. A big, ferny tansy shot up by the side of our oil fuel tank. Evergreen alkanet (from Spain) showed itself to be the happiest colonist in the whole garden and appeared everywhere: in the potato patch, paths and pots of herbs. In the rough grass, its clear blue flowers studded the white lace of cow parsley like cobalt buttons.

One summer, after we'd lugged some dried giant hogweed stalks home for use in lieu of a Christmas tree, another giant 'hog' shot up by our front door. That July its cartwheel-sized blooms waved magnificently outside our bedroom windows.

Increasingly, I find that weeds are far from happenstance, that we, as users and workers of the house and garden, are in some way generating them – cultivating them if you like – by our personal affections and behaviour. Many of them are here because of the people we are, with our own histories and hoardings. They reflect the way we dig and mow, the walks we take, the holidays we go on, our odd habits.

There is an allegory here for weeds' presence in the larger world. They aren't arbitrary alien invaders, but direct responses to our behaviour. From the cogon grass that has moved in where the American aircraft sprayed Agent Orange on Vietnamese forests, to the Himalayan balsam carpeting dredged and canalised riversides, almost all weed nuisances are the consequence of the disruption of natural systems. Looked at cynically, they're our most successful crop.

But, ecologically, weeds are simply trying to revegetate disturbed ground. If we don't like this, perhaps we should reflect on our own behaviour. We get the weeds we deserve.

RICHARD MABEY has contributed columns to *BBC Wildlife* since 1984. His new book, *Weeds*, is out now (RRP £15.99, reader price £14.99, subscriber price £13.99). Order on p84, quoting code W1110/09

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PORTFOLIO: BIG SKY COUNTRY

Jim Brandenburg's breathtaking photos celebrate

MANY PEOPLE ARE most familiar with my images of wolves and northern forests, but I actually grew up in the tallgrass prairies, near the Minnesota/South Dakota border. This is where I learned the visual language that I've used my whole life as a photographer. I love these open spaces – in fact, I was given my first assignment with *National Geographic* magazine because no one else wanted to make prairie photos.

There's nothing like a healthy wild prairie, with no fences or signs of human impact. It's a tough place to photograph, however, and you have to keep an eye out for strong counterpoints like the changeable weather and light. These silhouetted bison and dramatic clouds on the 260km² Triple U Buffalo Ranch in South Dakota animate an otherwise featureless scene.



the wild American prairies he calls home. Interview by David Lukas



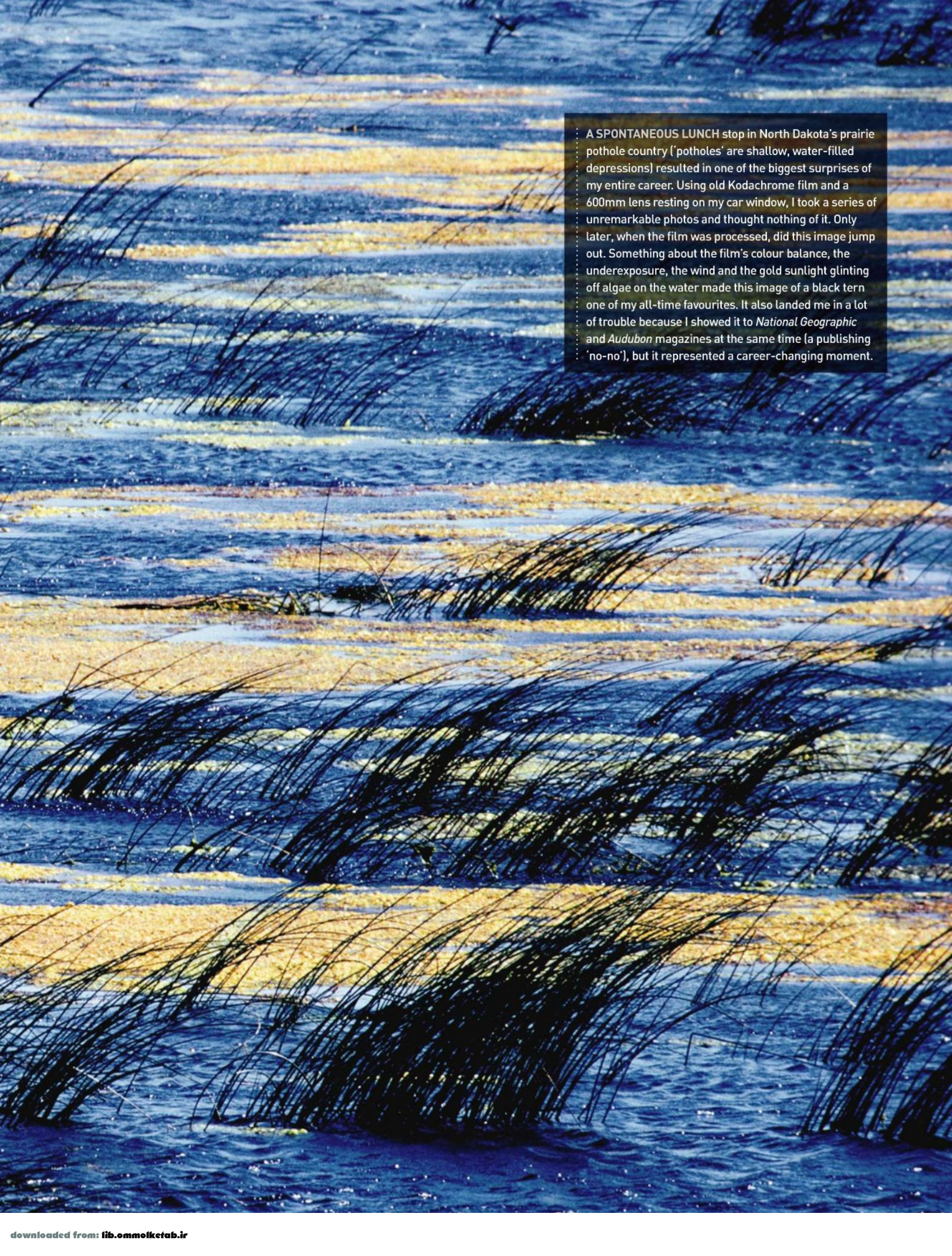


▲ PRAIRIE RATTLESNAKES ARE notoriously bad-tempered and this individual was no exception, not least because I had just carried it off a road to safety with the legs of my tripod. I sneaked in a quick telephoto shot while lying on my belly, using a narrow depth of field to highlight the snake's angry pose and rattles, but when I switched to a fish-eye lens and crawled in for a closer image the rattlesnake struck the front of my lens and splattered venom all over the glass.

► I STUMBLED ACROSS this mourning dove nest under some bunchgrass in Minnesota's Blue Mounds State Park. It was totally unexpected, like finding an exclamation mark in the landscape. Normally the doves nest on a tree branch, but in a land almost devoid of trees they find ways to adapt, as must all animals in the prairie. Though I didn't realise it at the time, the juxtaposition of fragile white eggs with the strong lines of the wiry old grass is a compelling metaphor for life on the prairie.







A SPONTANEOUS LUNCH stop in North Dakota's prairie pothole country ('potholes' are shallow, water-filled depressions) resulted in one of the biggest surprises of my entire career. Using old Kodachrome film and a 600mm lens resting on my car window, I took a series of unremarkable photos and thought nothing of it. Only later, when the film was processed, did this image jump out. Something about the film's colour balance, the underexposure, the wind and the gold sunlight glinting off algae on the water made this image of a black tern one of my all-time favourites. It also landed me in a lot of trouble because I showed it to *National Geographic* and *Audubon* magazines at the same time (a publishing 'no-no'), but it represented a career-changing moment.



I HAD JUST a few seconds to capture this fleeting eagle-shaped cloud over a swath of purple blazing star flowers on the Touch the Sky Prairie (see p35). I was shooting video at the time and grabbed an automatic camera, only to discover afterwards that it was set to f2.8, an aperture I wouldn't normally use for a photo like this (if you look carefully, you can see the picture is slightly out of focus at the edges). Nevertheless, this image means a lot to me because I took it the day after my father's funeral and the trees of the homestead where I grew up are visible in the distance.




◀ FERRUGINOUS HAWKS ARE often called 'prairie eagles' because they are the largest hawks in the region. They nest on the ground and are skittish, so can be tricky to photograph. I approached this nest, on the Ordway Prairie in South Dakota, by gradually moving my hide closer over the course of a week. I'm delighted with the final images, but wouldn't feel comfortable disturbing a bird like this again.

▼ IF ANY SOUND evokes memories of the prairie where I grew up, it would be the haunting song of the eastern meadowlark. This photo was taken at the Touch the Sky Prairie, a few miles from my childhood home.



▲ ONE DAY, WHILE photographing a prairie dog town on the Triple U Buffalo Ranch, I seized the opportunity to take some pictures of this cottontail rabbit. Quite by chance, I captured it yawning. This is not a favourite image of mine, but when it was first published I received so many favourable letters that I can't leave it out now.





THE BADLANDS OF South Dakota are an extreme aberration, an island of dramatic jagged ridges amid a vast sea of grass, but they serve as a reminder that the flat prairies of North America are more varied than they first appear. These slowly eroding formations may look barren and forbidding, but even here prairie grasses grow – notice the lush sward near to this pair of mule deer. Eventually, over many thousands of years, the Badlands' ancient volcanic ash will be whittled down and returned to the prairie.







◀ THIS SHOWY FLOWER has many names, including three-flowered avens and old man's beard, but in our local vernacular we call it 'prairie smoke'. I took this photo on a typically windy day at Blue Mounds State Park and it is a perennial bestseller in my gallery, perhaps because it is the quintessential prairie image.

▶ TALLGRASS PRAIRIE IS dominated by big bluestem, or turkey foot grass as I like to call it. I photographed this twelve-spotted skimmer amid a forest of spectacular stems on the Leopold Memorial Preserve in Wisconsin, where ecologist Aldo Leopold began one of the first prairie restoration projects in North America.



▲ PASQUE FLOWERS ARE one of the first flowers to bloom in the prairie, sometimes appearing at Easter when there's still snow on the ground. The strong backlighting in this photo highlights the fuzzy hairs that keep the flowers warm on cold days.

▶ PURPLE CONEFLOWERS ARE just one of the 350 plant species that can be found in a single acre of healthy tallgrass prairie. Most of them are lost when the land is tilled or grazed, but fortunately many species can be successfully reintroduced when a prairie is restored.









THE NORTH AMERICAN prairie is a land of contrasts, where long, uninterrupted vistas and periods of relative calm are punctuated by spectacular moments of intense colour and energy, as in this image of an electrical storm in Oklahoma. I could only photograph it by leaving my camera on a long exposure in the rain while I retreated into my car to escape the downpour.

I have devoted my life to capturing images of these places and moments, starting with the first photos I took at Blue Mounds State Park when I was 14 years old. Since then, the grasslands of central North America (once the largest ecosystem on the continent) have continued to disappear at a frightening rate. Every time I'm out taking photos, I never stop thinking about these wild places – what we can do to save them, and how my images could perhaps make a difference.

THE PHOTOGRAPHER: JIM BRANDENBURG



Raised on the tallgrass prairie of south-west Minnesota, Jim has gone on to become one of the world's most celebrated nature

photographers. He has been taking photos for *National Geographic* for more than 30 years, resulting in 23 magazine features and many books, and has contributed to several tv programmes.

Jim has a lifelong love of America's 'big sky country'. Four of his images were recently chosen by the International League of Conservation Photographers (ILCP) for a collection of the 40 most important nature photographs of all time.

To find out more information about Jim's work, visit his two websites: www.jimbrandenburg.com and <http://jimbrandenburg.blogspot.com>

TOUCH THE SKY PRAIRIE

In 1999, Jim and Judy Brandenburg established the Brandenburg Prairie Foundation, with the goal of promoting and preserving the native prairies of south-west Minnesota. Very little of this habitat remains, and the Foundation has been instrumental in setting aside the 400ha Touch the Sky Northern Tallgrass Prairie National Wildlife Refuge near Jim's childhood home to encourage native species to return.

Safari in Style

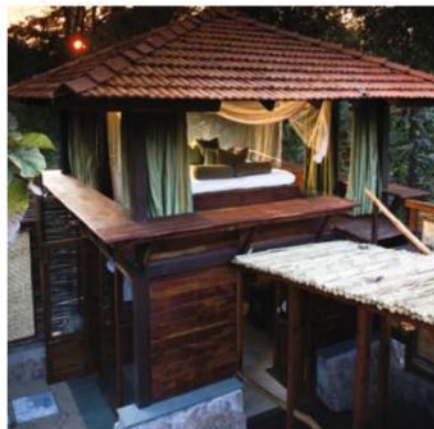
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THE DESTINATION

Bandhavgarh has one of the highest densities of tiger in the country. The park is home to a variety of other mammals, including leopard, Indian bison, hyena and wild dog. It is estimated that 150 species of birds, including the migratory steppe eagle that arrives in winter, can be found here.

Kanha's lush Sal and bamboo forests and green meadows provided the inspiration for Kipling's *Jungle Book*. Along with the elusive Bengal tiger, 22 animal species are regularly spotted here. With more than 200 recorded bird species, Kanha is also a renowned bird watcher's paradise.

THE OFFER

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Cash for cats.....

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The potential cost of keeping the world's remaining wild tigers alive each year, according to a paper published in *PLoS Biology*. The money would protect the cats in 42 key reserves and wildlife areas.



Saola sighting.....

Villagers in the Annamite Mountains of Laos captured a live saola in August, the first time this rare bovine is believed to have been seen in 10 years (the animal later died). The saola only became known to western scientists in 1992.

David Hulse / WWF-Canon

NEWS OF THE EARTH

Everything you need to know about what's happening to wildlife around the world

House sparrows rely on spaces in roofs and eaves in which to breed, particularly in cities.



DECLINE AND FALL

A new theory that the Cockney house 'sparrow' prefers poorer parts of town could help conservationists to protect the species, reports **James Fair**.

RESEARCHERS ARE TO

investigate a theory that house sparrows do better in areas of human social deprivation.

That the Cockney 'sparrow' may actually prefer to inhabit less affluent urban areas adds a new twist to the story of the bird's decline over the past two decades.

Numbers have halved in the past 25 years, and those in cities have fared especially badly. Greater London lost 70 per cent of its sparrows between 1994 and 2001.

A study carried out in Leicester between 2001 and 2003 clearly established that sparrows there were unable to find sufficient insects to raise their young.

Deciduous, insect-rich habitat correlated with better breeding success, while the condition of the chicks was worse where air pollution was high, it revealed.

This has led to suggestions that the trend for paving-over gardens, planting evergreen shrubs and renovating roofs could be depriving sparrows of nest sites, as well as of food for their chicks. The effects of air pollution are unclear.

Then, last year, a thesis by Exeter University PhD student Lorna Shaw concluded that "the prevalence of roof repairs and the presence of extensive paved areas are linked to areas with low levels of socioeconomic deprivation" and

that house sparrows are less likely to occur in these wealthier areas.

Now Avon Wildlife Trust is to explore this idea by asking the public to report house sparrow sightings in Bristol over the next six months. "We want to find out if the correlation is true," said project leader Steve Micklewright. "There are affluent areas of the city where we rarely see them."

Should the theory hold up, Micklewright said, then in the future it may be possible to adopt planning policies that take account of the needs of sparrows.

FURTHER INFORMATION

www.wildsparrows.org.uk

WHAT IS CAUSING THE SPARROW'S DECLINE?

» House sparrows need good

numbers of invertebrates in the spring to rear their young – in particular, craneflies, weevils, caterpillars, spiders and aphids.

» There seems to be a problem for sparrows, but other garden birds such as blue and great tits that feed their young on insects such as caterpillars are doing well.

» House sparrows prefer to nest under the eaves or tiles of roofs, and these spaces do get blocked by renovations. They can also nest in hedges, however, if these sites are not available.

» There is no evidence that they are being hit by magpie predation or competition with rising numbers of woodpigeons and collared doves, which, like adult sparrows, are grain-eaters.

Wild words

"THEY DO IT BECAUSE THEY LIKE TO PIT THEIR DOGS AGAINST WHAT THEY SEE AS BRITAIN'S TOUGHEST MAMMAL." The RSPCA's Ian Briggs on the increase in badger baiting in England and Wales. Reports of badger sett interference have doubled in the past five years.



Snailing home

Snails have a homing instinct and will return to their 'patch' even if they are taken 30m or more away, according to Ruth Brooks, who won a BBC competition to find the country's best amateur scientist.

Stephen Dalton/NHPA

NEWS OF THE EARTH UK & IRELAND



Conservationists are attempting to turn 40,000ha of upland around Pumlumon, Wales, into wildlife-friendly habitat.

EXISTING PROJECTS

NENE VALLEY

Covering an area of 4,000ha, the Nene Valley project is restoring habitat and creating opportunities for recreation between Northampton and Peterborough. The project focuses on 12 nature reserves along the course of the River Nene, that, it is hoped, will be linked up over time.

» Key species: otter, water vole



Andy Rouse/naturepl.com

GREAT FEN PROJECT

Taking in two National Nature Reserves (Holme and Woodwalton Fen), Huntingdonshire's Great Fen Project is buying and re-wetting drained agricultural land to create a single, much larger area of wetland. Over time, the aim is to recreate 36km² of fen.

» Key species: marsh harrier, bittern



David Tipping/naturepl.com

MAKING SPACE FOR WILDLIFE

A new report has said that conservation of our native wildlife will only work if we approach it in a much more joined-up way, reports **Julian Rollins.**

THE CREATION OF large-scale habitat restoration zones across England is one feature of a £1bn-a-year blueprint that sets out to "rebuild nature".

The report, *Making Space for Nature*, is the outcome of a year-long review of conservation in England by an independent panel of experts. It says that the current approach has failed to halt species and habitat loss.

Its main criticism is that England's most protected sites – which together cover around 7 per cent of land area – amount to islands of good habitat surrounded by countryside that does not support wildlife.

The report calls for existing wildlife sites to be extended and new ones set up, and habitat

corridors to be established. As a start, the team recommends that 12 Ecological Restoration Zones (ERZs) are set up by a process of local communities bidding for the funds to do so.

MEETING LOCAL NEEDS

Stephanie Hilborne, the chief executive of the Wildlife Trusts, was a panel member. She told *BBC Wildlife* that ERZs could mirror existing landscape-scale habitat-restoration projects currently being led by individual wildlife trusts and other voluntary sector organisations.

Zones would vary in size to meet local needs, and the means used to create them would differ, too, she said. "If you are a borough on the edge of London,

you'd need to restore your ecology in quite a different way to what would happen in a rural, upland area. The important thing is that it has to be suited to the local area."

Inside a zone, priority would be given to wildlife in decisions about land-use planning and farm payments.

The Government has said that it will respond to the recommendations in the Natural Environment White Paper, which is due to be published next spring. Stephanie Hilborne hopes that this will take the ERZ idea forward: "We had the Government's commitment to nature protection in 1949, now we're looking for a commitment to nature's recovery."

Hedgehogs in the home.....

Nearly a quarter of UK gardens are regularly visited by hedgehogs, according to the RSPB's Make Your Nature Count annual summer survey. More than 90,000 people (with 70,000 gardens) took part in the survey.



Multiple moths.....

1,083

The number of moth species in England's protected woodlands, according to a survey carried out by Natural England. One site – Roudsea Wood & Mosses Site of Special Scientific Interest – has 348 species.

Making a stand against bird crime

Landowners pour cold water on RSPB's call for a change in the law to protect birds of prey.

Landowners should be held legally responsible if people working for them are found guilty of killing birds of prey, the RSPB has said in this year's annual *Birdcrime* report.

With 384 reported cases of raptor persecutions, the RSPB described 2009 as a "shocking year".

"Crimes against birds of prey have not really shown any reduction," said spokesman Grahame Madge. "At the core of this issue is that some shooting estates across the UK continue to target birds of prey."

But Christopher Price, legal and policy director for the Country Land and Business Association, said he was disappointed by the RSPB's recommendations.

"It is so frustrating when the RSPB makes these glib,

attention-seeking statements that don't achieve anything and alienate the sort of people they are hoping to win over.

"It cannot be right that an employer can be criminally penalised for the acts of his employee if he knew nothing about what was going on."

REVIEWING THE LAW

Richard Crompton, head of wildlife crime for the Association of Chief Police Officers, said that the police were committed to using existing laws to prosecute people who broke them.

But Crompton added that protecting birds of prey was just one of a number of priorities, with another being tackling the trade in endangered species.

About a third of crimes against raptors take place in Scotland, and the Scottish Government said that wildlife crime was an area that was under review. "We are considering a variety

of proposals before deciding on a course of action," a spokeswoman said. There are no plans for any changes to existing laws in England, however.

Madge said that, despite decades of dialogue with estate owners, birds of prey were still being killed. "Crimes against birds of prey, or any wildlife, are socially and morally unacceptable, and the RSPB is going to make a stand." *Mark Kinver*

BIRD CRIME STATISTICS

- » Of the 384 reported 'raptor crime' incidents in 2009, 224 took place in England, 123 in Scotland, 17 in Wales and 11 in Northern Ireland; nine could not be assigned a country.
- » It was the second-worst year in the past decade, surpassed only by 2007 when there were 389 cases.
- » In England, North Yorkshire fares worst: 64 incidents since 1990.
- » The next worst police areas were (in order): West Mercia, Northumbria, Devon and Cornwall, and Cumbria.

1-MINUTE GUIDE



Badger culling

What's happening now?

The Government has issued a consultation paper on tackling bovine tuberculosis (bTB) by culling badgers in 'hotspot' areas. This potentially reverses the decision of the previous Labour administration that culling was not viable, which was the advice of the Independent Scientific Group on TB.

Why the policy change?

Launching the consultation, new agriculture minister Jim Paice said, "It's clear that the current approach has failed to stop the spread of this terrible disease."

Are farmers happy?

Yes. The NFU described it as a "major step forward in the battle to control the spread of bTB" and a "significant day for thousands of cattle farmers".

How will the cull be carried out?

By cage-trapping and shooting, or by shooting 'free-running' badgers. In order to get a licence to cull, farmers will have to form landowner groups that cover at least 150km² and demonstrate that they can access 70 per cent of the land.

What do wildlife groups say?

The Wildlife Trusts said "the scientific evidence does not support the culling of badgers as part of the solution" and that it could, in fact, make matters worse by disturbing the remaining badgers and spreading the disease further. *JF*



Nothing can save this peregrine, but would a change in the law help other UK birds of prey?

The number of new species described in the Greater Mekong region of south-east Asia in 2009, according to WWF. They include Asia's only bald songbird, the bare-faced bulbul, and a new genus of fang-less snake.



A new species of elephant shrew may have been discovered in north-east Kenya. The animal was photographed by camera-traps set up by scientists from ZSL and the Kenya Wildlife Service.

NEWS OF THE EARTH INTERNATIONAL SPECIAL REPORT

IS SERENGETI PLAN THE ROAD TO RUIN?

Tanzania needs to modernise its transport links, but at what cost? **Stephen Mills** investigates the threat to the greatest wildlife show on Earth.

ON 23 SEPTEMBER, Dr Ladislaus Komba, permanent secretary in Tanzania's Ministry of Natural Resources and Tourism, announced the formation of a 'task force' to advise the president on one of the most controversial issues in the nation's history: the construction of the Arusha-Musoma road.

This £300m highway, linking the town of Arusha with the Lake Victoria port of Musoma, will cross Serengeti National Park at the point identified as its most sensitive in the government's own 10-year review of 2005. Work will begin in 2012.

The threats to wildlife have been described as potentially

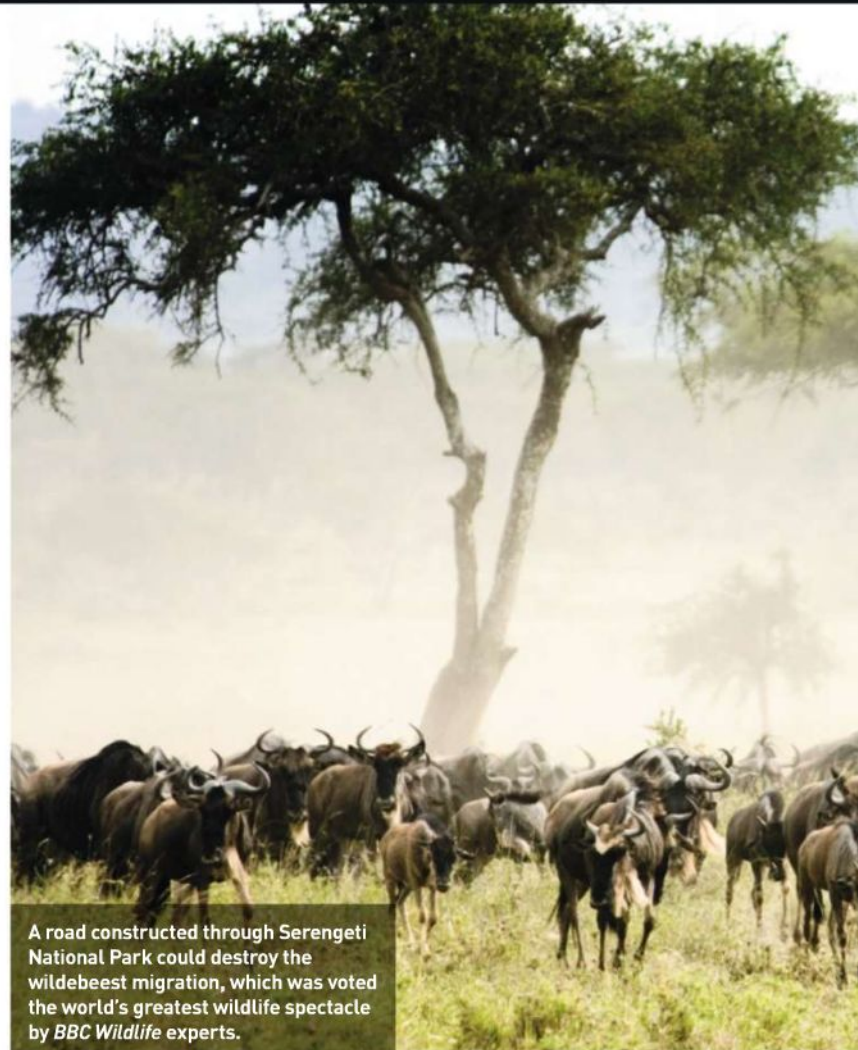
cataclysmic. The 14,700km² Serengeti is the core of one of the last great, undefiled ecosystems on Earth. It is defined by the circular movement of up to 2 million wildebeest, other antelopes and associated grazers such as Thomson's and Grant's gazelles and zebras, which have evolved to exploit the seasonal pattern of rainfall and grass growth throughout the system.

At periods from August to November, the entire mammalian mass is crossing back and

forth over the very line proposed for the new road, as the animals travel between the Serengeti and the connected Masai Mara National Reserve in Kenya.

3,000

The number of lions that "profit from the wildebeest meat avalanche as it thunders through the Serengeti", according to Frankfurt Zoo.



A road constructed through Serengeti National Park could destroy the wildebeest migration, which was voted the world's greatest wildlife spectacle by BBC Wildlife experts.

The inevitable animal-truck collisions are likely to lead to the fencing of the road, severely disrupting the movement of antelopes to and from the vital dry-season grazing in the area north of the highway. According to Frankfurt Zoological Society (FZS), if the wildebeest were cut off from this year-round water source, "the population would collapse from 1.3 million animals to about 200,000".

The international outcry has been vociferous. Nearly 4,000 travel companies and associations have signed a petition against the road. Tourism, worth \$1.15bn (£730m) a year, accounts for 23 per cent of Tanzania's exports.

A recent letter, published in the influential science journal *Nature* and signed by 27 leading environmental scientists, argued

that the whole wildebeest movement could collapse.

Few benefits of the road have been put forward by the Tanzanian government. BBC Wildlife approached five ministers and permanent secretaries, but received no replies. This official reticence is compounded by the fact that the potential beneficiaries of the road are out herding cattle and not putting their case on the internet, and appear to have few friends in the media to make a noise for them.

CONNECTING COMMUNITIES

That a new road would help those 431,000 people who live in the north-east of the park is accepted by conservation groups, however. As FZS said in a statement: "Infrastructure is needed to help connect farmers to markets, to

NORTH-SOUTH DIVIDE: THE TWO SERENGETI ROUTES



The devil's in the DNA

Hugh Clark / FLPA

Scientists in the UK have mapped the genome of the Tasmanian devil, the Australian marsupial that has declined by 80 per cent because of a facial cancer. The breakthrough, by a team from the Cancer Genome Project, raises hopes that a way to tackle the disease can be found.



Botanical fears

20%

The proportion of the world's plants that are at risk of extinction, according to a special analysis carried out by the Royal Botanic Gardens, Kew, and other conservation organisations.



link communities and encourage commerce and trade."

Take the example of traders working in the Arusha and Mara districts in the northern Serengeti. In order to move any goods to Musoma on Lake Victoria, they currently have to take a 418km detour.

"The wildebeest population could collapse from 1.3 million to 200,000."

The alternative route (see map) suggested by FZS reaches Musoma by skirting south and then west of the Serengeti. Though it is longer, it links with existing roads, making it cheaper to construct because it

would use less tarmac. It would also service five times as many people, but it would not help those in the northern sector. Other alternatives have also been mooted, including one circling north into Kenya.

In his address to the nation in July, President Jakaya Kikwete said, "I'm not going to allow something that will ruin the [Serengeti] ecosystem to be built." The 50km of road through the park would be made of gravel, like the other park roads, he said.

But he stressed his duty to care for the development of people dwelling close to the park – a duty made more acute by General Elections on 31 October.

FURTHER INFORMATION

Read more about the project at www.savetheserengeti.org



MARK CARWARDINE WILD THOUGHTS

I was surprised to see a recent photograph of Michelle Obama wearing a necklace made from woolly mammoth tusks. Mammoth ivory is already the height of fashion, and the President's wife was giving it a special boost.

There are believed to be as many as 150 million mammoths lying under the permafrost in northern Siberia. Until recently, they were largely out of reach. But now, possibly due to global warming, the permafrost is dwindling and offering up this remarkable collection of bones and tusks.

So mammoth-mining has become big business. Every summer, thousands of Russians scour the melting tundra for tusks. Traders send planes to pick them up, paying the locals by weight and exporting a staggering 60 tonnes a year.

According to a recent report by Care For The Wild, Hong Kong is the major importer, and from there most tusks are distributed to carvers in mainland China. These products then make their way around the world, into markets in Asia, North America and Europe.

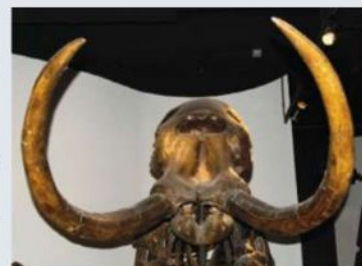
Some people believe that this is good news. Mammoths have been extinct for thousands of years, and they argue that their tusks are an ethical alternative to elephant ivory. They even claim that so much mammoth ivory is entering China that it may reduce the poaching of elephants for their tusks.

I'm not so sure. I believe that all ivory, wherever it comes from, fuels the ivory trade, and there's a risk that mammoth ivory will be used as a front for laundering illegal elephant ivory, too.

The evidence suggests that this is not yet happening – if only because mammoth ivory products have yet to find their way into Africa (mammoth ivory is worth much more than elephant ivory and so is beyond the reach of most Africans). But, if we turn a blind eye, this could change.

India is the only country that bans mammoth ivory, specifically because of fears that it could be used as a cover for elephant ivory. Shouldn't the rest of us be erring on the side of caution, too?

Mark Carwardine is a zoologist, photographer and tv presenter.



Is mammoth ivory the ethical alternative to elephant tusks?

Mammoth ivory mining has become big business, with thousands of Russians scouring the tundra for tusks every summer.

Chuck Eckert/Alamy



Ancient fig wasp

The oldest known fossil fig wasp has been unearthed – mislabelled in a storeroom at London's Natural History Museum. Collected from the Isle of Wight in 1920, the specimen is high-identical to modern species, revealing that the insect has barely changed in 34 million years.



Dating game

Mother bonobos *Pan paniscus* help their sons 'score' with the ladies. They prevent the highest-status males from monopolising the females, giving their boys a shot at love. They even go so far as to attack rivals who try to disrupt sons engaged in mating.

Martin Harvey/NHPA

NEWS OF THE EARTH

IN BRIEF

BACTERIAL SACRIFICE

If a population of *Escherichia coli* encounters a new antibiotic, a few highly resistant mutants release a chemical that helps to safeguard the vulnerable masses. It's an altruistic act – the bacteria expend so much energy that they may die prematurely, risking their own survival to save others. The discovery could lead to better antibiotics (Nature, vol 467, pp82–6).

REMODELLED RIVER LIFE

Dams are literally reshaping fish by removing the swift flow to which their bodies are adapted. For example, the blacktail shiner *Cyprinella venusta* in the south-east of the US has a plumper profile, smaller head and shorter dorsal fin in rivers with dams than in free-flowing streams (Biol. Letters, doi:10.1098/rsbl.2010.0401).

AMOROUS AMPHIBIANS

When a male red-legged salamander *Plethodon shermani* courts a female, he releases a pheromone that quenches her appetite. This may reduce her drive to hunt and thus shift her attention to mating. Importantly, the 'spell' does not affect his love interest's faculties – she can still detect threats efficiently and run away quickly (Anim. Behaviour, vol 78, pp1421–5).



David M Dennis/OSF/Photolibrary.com



Peter Oostendorp/ausjbie.com.au

Choosy stingless bees use flower nectar to keep their body temperature at just the right level.

Hot bees crave cold drinks

The newest buzz on bees: they use drinks to warm up and chill out.

For the Australian stingless bee *Trigona carbonaria*, a flower's nectar is like a hot tea or a cold beer, depending on the weather.

The temperature of a flower depends on a host of factors, such as whether it grows in a sunny or shaded area. Some species also generate heat and have ways of cooling themselves off. Hence, the temperature of the nectar inside flowers may vary even among blossoms on the same plant. Could this affect insect foraging?

To find out, a team of scientists led by Adrian Dyer, from Monash University in Australia, offered identical samples of nectar to a group of bees in a climate-controlled setting in their lab. Using artificial flowers attached to miniature heaters, they served

up two options: nectar that was warmer than the air or at air temperature, which they also varied. They filmed the scene with heat-imaging cameras.

Their sweet-toothed subjects made a beeline for warm elixirs under mild conditions, but chose the cooler drinks when the lab was hot. It turns out that the insects' preference switches abruptly once the air temperature exceeds their optimal body temperature – approximately 32°C.

Essentially, the stingless bee takes a warming drink when it is chilly, but seeks out a cold one when feeling overheated.

This study is the first report of an insect using food in a dynamic way to regulate its thermal state. The findings suggest that warmer weather could have a major impact on pollinator preference and thus plant survival.

HOT SHOTS

» Insects warm up as they fly, but start to cool as soon as they land. In this study, bees that drank warm nectar on cool days maintained an elevated body temperature during downtime.

» Many insects visit the warm interior of flowers for a similar reason. Floral heat helps to keep their flight muscles warm, enabling them to stay active longer.

» This is the first case of an insect using a flower to cool off, proving that warmer options aren't always best.

» Blooms have many ways to warm up, from tracking the sun's path across the sky to creating heat through biochemical reactions.

» Flowers sweat to cool off. Some also have petals shaped to partially shade themselves from direct sun.

SOURCE: PLoS ONE, vol 5, e12000 LINK: <http://australianmuseum.net.au/stingless-bee>

**DAVID BRIAN BUTVILL, ZOOLOGIST**

Our *Discoveries* sleuth David writes about science and nature for magazines, radio and tv. He lives in Costa Rica, where he eagerly assists his marine-biologist wife in the field.

DISCOVERIES

Never cross a crow

Do crows have a photographic memory for human faces?

A word to the wise: don't mess with an American crow *Corvus brachyrhynchos*. New research shows that, after a meaningful interaction, these famously crafty little devils do not forget a human face.

Pets and even lab animals have been shown to recognise people with whom they spend a lot of time. But what about those wilder creatures that probably cross paths with the same person only a handful of times in their lives, at the most?

A team of researchers led by John Marzluff from the University of Washington found out the hard way, by studying crows. Donning rubber masks with a range of human faces, they gave small flocks in various Seattle suburbs a serious scare. The scientists sneaked up on the most distracted individual and tossed a net over it. Then they extracted the bird, slipped a sock over its head (to confine it and keep it calm) and fitted it with a leg band – all while its nervous flock-mates watched

from a safe distance. Then the cawing captive was set free.

This ruffled more than a few feathers. For the next three years, affected flocks scolded and mobbed the masked men and women when they visited – even picking them out of a crowd.

In fact, the crows harassed anyone who put the disguises on, no matter his or her height, body shape or style of walking. Yet they ignored these same people, including the real trappers, when they did not use the masks or when they wore slightly different ones. This proved that the birds – abductees and witnesses alike – had memorised the face of each trapper after one brief, albeit dramatic, encounter.

So, American crows can instantly memorise human faces and distinguish Joe from Jim, perhaps forever. Such street-smarts may enable the opportunists to identify foes and friends at a glance, and from a distance.

Indeed, this may be particularly important for an animal that lives in such proximity to humans, a species that is equally likely to toss peanuts as it is to throw stones.

SOURCE: Animal Behaviour vol 79, pp699–707 **LINK:** www.eol.org/pages/1177464



Crows bearing a grudge never forget a face.

BIRD BRAINS

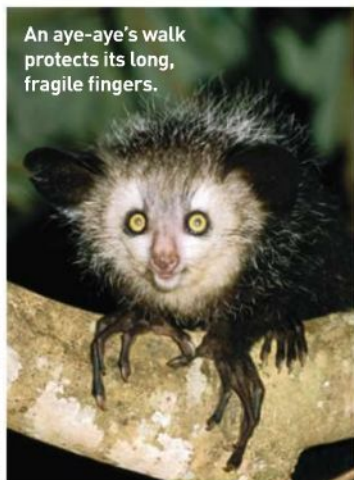
» The crows in the study focused entirely on the human face. They showed little reaction to armbands and hats that trappers also wore. Unlike faces, clothing changes too much to be reliable.

» When a mask was worn upside-down long after the trapping, the birds still identified it by simply inverting their heads.

» Animal behaviourist Konrad Lorenz reported the story of a man who walked in public with a pet crow. Wild crows would attack him, even when his pet bird stayed home.

» A US woman who fed about 40 crows one winter was subsequently stalked by them. They waited outside her home and followed her car to work each day.

William Leaman/Alamy



An aye-aye's walk protects its long, fragile fingers.

Konrad Wothel/Minden/FLPA

Hand care

A primate takes simple steps to protect its paws while travelling.

The aye-aye lemur *Daubentonia madagascariensis*, a tree-living, fox-like primate in Madagascar, has a clever way to hunt insect prey. It taps a claw along a branch, listening for the sound of a hollow dug out by a larva. Then it bites a hole into the bark and fishes out

the grub. An aye-aye's fingers, used for probing the deepest cavities, are absurdly long and thin. How does the animal protect these fragile yet crucial digits as it navigates through tangles of tree branches?

A research group led by Tracy Kivell, from Duke University in North Carolina, filmed captive aye-ayes walking up and down a ramp embedded with pressure sensors. They found that the animals leaned back as they walked, even when descending

headfirst, reducing the load on their hands. They also curled their ungainly fingers off the ground, walking on their palms. The primates rarely planted a thumb for balance and always lifted their paws vertically, as if marching, careful not to roll onto their all-important extremities.

In other words, they minimise the use of their hands for travel, reducing the risk of injury and reserving them for specialised tasks, such as gathering food.

SOURCE: Journal of Experimental Biology, vol 213, pp1549–57 **LINK:** www.edgeofexistence.org/mammals/species_info.php?id=16



BOTSWANA

LAND OF CONTRASTS

From the tranquillity of the Okavango Delta to the stark wilderness of the Kalahari Desert, Botswana's landscape and wildlife have no equal.

AFRICAN WILD DOGS

The wild dog's mottled coat earns it the nickname 'painted hunting dog'.



Northern Botswana is home to African wild dogs. This species is highly endangered, but the country has one of the largest populations in Africa. Packs patrol huge territories, sometimes covering more than 400km² of savannah. The dogs den from July to October, and this is the only sure time for catching a glimpse of them.

BEST PLACES TO SEE:

Chobe, Kwando-Linyanti, Kalahari and Okavango Delta, specifically the Selinda, Kwara and Vumbura concessions.

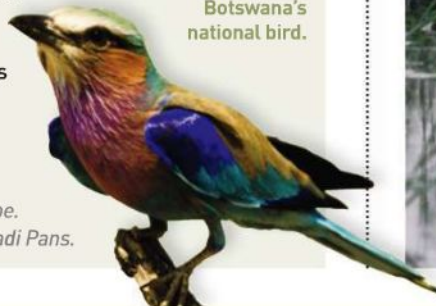
OUTSTANDING BIRDWATCHING

Botswana has a staggering 550 types of bird. Bird-lovers have been known to spot more than 100 different species during a single game drive. Birdwatching is best in the verdant wet season from November to February. At this time, nesting birds look gorgeous in their breeding plumage, and migrants arrive from the north.

BEST PLACES TO SEE BIRDS:

Okavango Delta, Linyanti and Chobe. Breeding flamingos at Makgadikgadi Pans.

The lilac-breasted roller, a rainbow of feathers, is Botswana's national bird.



OKAVANGO DELTA

In north-western Botswana, the Okavango River, flowing from the Angolan highlands, forms 15,000km² of lagoons, swamps and islands before soaking into the sands of the Kalahari. The Okavango is the world's largest inland delta system. Its unique landscape combines mopane woods, acacia forests, floodplains and lagoons and is home to a great wealth of flora and fauna.

SPECIES TO SPOT: Lions, leopards, wild dogs and elephants, plus more than 400 species of birds, including raptors.

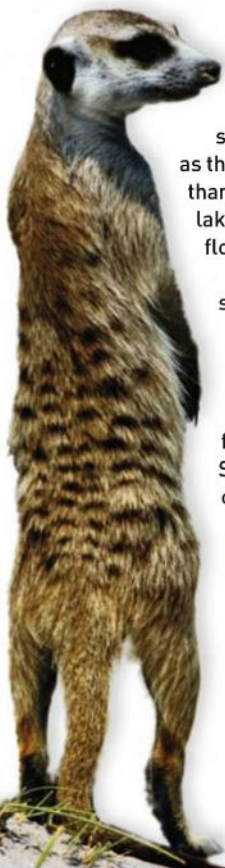


Main picture/David Luck; Elephant/Botswana Tourism; Meerkat/Dawn Parr; Lion/Letaka Safaris



Exploring the Okavango Delta by canoe is a relaxing way to see wildlife.

MAKGADIKGADI PANS



Covering 12,000km², these salt flats are the vestiges of a vast lake that dried up millions of years ago.

In the dry season, the salt crusts stretch in all directions – almost as far as the eye can see. The region receives less than 500mm of rain a year, but strings of lakes cover the flats when the Boteti River floods in the wet season.

The pans' wildlife is rich, but highly seasonal and nomadic. After the rains, plains antelope, zebras and wildebeest gather here in their thousands, providing excellent hunting for large predators. In a good year, greater flamingos crowd the shallow waters of Sua Pan, forming the largest breeding colonies in Africa.

WILDLIFE TO SEE:

Baines baobabs, meerkats, red hartebeest, brown hyenas, greater flamingos and lilac-breasted rollers.

A meerkat band always posts a sentinel to watch for approaching dangers. You'll struggle to sneak up on one.

BLACK-MANED LIONS

A dark mane is a sign of high levels of testosterone, and therefore a black-maned lion is likely to be healthier, stronger and recover faster after injuries. It is not a surprise that lionesses prefer to mate with these virile dark-maned males: any offspring will inherit their father's strength and stand a better chance of survival. While they live all over Africa, black-maned lions are most common in the Kalahari.

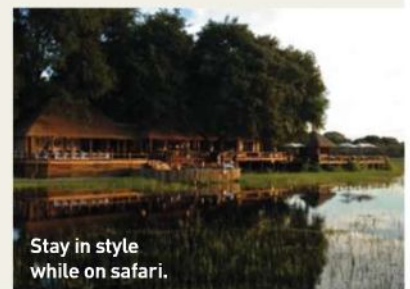
BEST PLACE TO SEE:

Central Kalahari Game Reserve.



WHY VISIT BOTSWANA?

Botswana's safaris are nearly always all-inclusive with game drives, food and drink, accommodation and transfers all part of the price. Accommodation varies from palatial lodges to back-to-basics camps. With no visas needed by UK and other EU citizens, this English-speaking, democratic and peaceful nation has wildlife and landscapes beyond compare. It is simply safari, redefined.



Stay in style while on safari.

For more information, visit www.botswanatourism.org.uk or call 020 7647 1018

botswana
tourism

A camera-trap records a tiger as it patrols the tidal mud of the Sundarbans mangrove forest. The tigers of this region are among the smallest in the world, but have a reputation as man-eaters.



LIVING WITH MAN EATERS


Someone is killed by a tiger every 10 days in the forests of the Sundarbans. **CHRISTINA GREENWOOD** reports on efforts to resolve human-tiger conflict.

Photos by **TIM LAMAN**



THE PHOTOGRAPHER


TIM LAMAN is a field biologist and wildlife photojournalist, and a fellow of the International League of Conservation Photographers.



Four spotted deer – the favourite prey of local tigers – eat fallen leaves as a rhesus monkey scampers overhead.



A leopard cat – tigers aren't the only carnivores in these forests.



The Sundarbans mangroves support a local population of wild boar.

“STOP THE BOAT!” Montu swings the craft round and rams her prow up the bank. Grabbing my stout stick and pepper spray, I jump down into the knee-deep tidal mud and come to an abrupt halt.

A flurry of red fiddler crabs dart into their holes. I peer ahead through the trees for any sign of movement. Adrenaline surges through my veins as images of outstretched claws and all-too-sharp fangs flash through my mind. My stick suddenly feels more like a twig.

If there was a tiger in there, would I even know before it pounced? Could I pull the safety cap off my pepper spray in time, or would panicked fumbblings be the death of me? And would it even work against 120kg of rippling muscle?

After all, this is the fate of about 50 people a year in the Sundarbans region – and I'm no less edible. The difference is that I've *chosen* to enter this mangrove forest, whereas the

desperately poor Bangladeshi villagers who risk everything to search for firewood, fish and honey here have no other option.

Tigers have attacked people in this region for as long as the locals can remember.

Records over the past 100 years or so show an overall decrease in tiger-related deaths, though the underlying reason for this trend is unclear. Even so, Bangladesh remains one of the world's hotspots for human-carnivore conflict, and the issue is at the forefront of tiger conservation here.

TRACKING TIGERS

My legs pull hard against the sucking sludge as I stagger awkwardly towards my target: a set of what appear to be tiger tracks ('pugmarks') leading up the bank and disappearing among the spiky mangrove

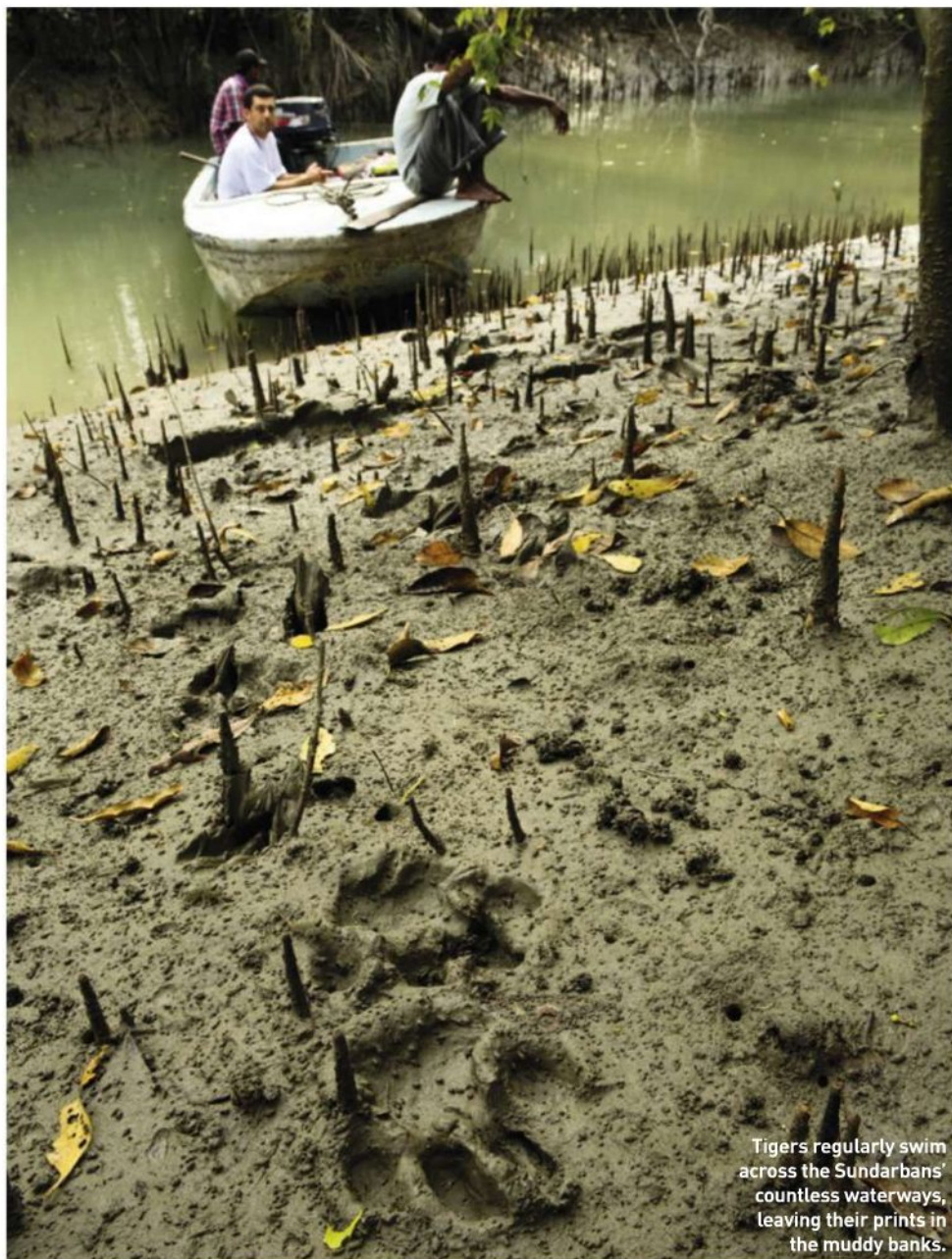
roots jutting from the forest floor. I'm with a team from the Bangladesh Forest Department, the Zoological Society of London and the Wildlife Trust of Bangladesh, and we're undertaking our biennial survey of the area's tigers.

Tigers are almost impossible to see in the dense undergrowth, but they need to swim between the mangrove islands to patrol their territories, and so can't avoid leaving pugmarks in the muddy canal banks. We count these to work out tiger densities across the forest and measure how the population is faring.

"Tiger tracks!" I yell to Alam, who is sitting in the boat. Beaming broadly, he notes down the precise GPS location. Alam has been with the Sundarbans Tiger Project since its inception in 2005. Though in his early

DID YOU KNOW?

New data suggests that the Sundarbans supports 32 tigers per 100km² – the highest tiger density known. Next in the list is Chitwan NP in Nepal, with 18 tigers per 100km².



Tigers regularly swim across the Sundarbans' countless waterways, leaving their prints in the muddy banks.

THE TIGER RESPONSE TEAM

A job with the Sundarbans tiger response team could be one of the most dangerous in conservation.

Team members are tasked with retrieving people's bodies from the jaws of tigers. The cats usually drag their victims into the forest, so the group is at hand to help relatives recover the remains so that a proper burial can take place. One person is killed by tigers every 7–10 days in the Sundarbans, so the team is constantly operational. It regularly patrols high-risk areas, warning forest workers to stay away to avoid incidents in the first place. Members also provide first aid and transport injured survivors to hospital, a trip that might otherwise take several days in the villagers' small, hand-paddled boats.



Goni, leader of the tiger response team, pictured on duty.

Goni & Alam: Adam Barlow ZSL & WTB

twenties, he looks no older than 16. But four years ago he lost his older brother to a tiger, and his slight frame now shoulders the responsibility of providing for his sibling's widow and child, as well as the rest of his family. Nevertheless, he is still determined to help conserve these dangerous cats.

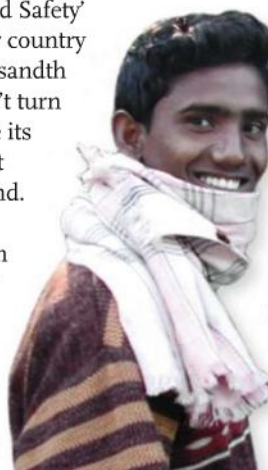
Like most victims, Alam's brother was killed while working inside the mangroves. The majority of attacks occur when

fishermen leave their boats and step onto the canal bank at the forest edge. This thought lingers as I stand here. On the canal bank. At the forest edge.

STAYING OUT OF TROUBLE

I run through the 'Health and Safety' guidance for walking in tiger country for what seems like the thousandth time: "If a tiger appears, don't turn and run – that will just make its pursuit instinct kick in and it will be on you in a millisecond. Always face the tiger. Stand firm. Make lots of noise, then slowly back away. Don't ever turn your back on the cat."

Alam works for the Sundarbans Tiger Project, risking his life to help villagers and tigers coexist.



Most tiger attacks occur on the canal bank at the forest edge. This thought lingers as I stand here. On the canal bank. At the forest edge.

If you follow these simple rules, the tiger will hopefully decide that it's not worth its while to attack. *Hopefully.* But why do some tigers hunt people anyway? What makes a big cat become a man-eater?

I comfort myself with the knowledge that several thousand workers are in this huge forest at any one time, so given the number of fatalities each year, the chance of me meeting my maker is slim. In fact, with unpublished research putting the number of tigers in the Sundarbans at 335–500, you might expect many more attacks. But, like most other animals, the vast majority of tigers have a well-deserved fear of the world's top predator: us.

Tigers generally melt into the forest when they hear people approaching. If pushed, they will

defend themselves (a case in point being when a cornered tigress protects her cubs). But this is very much the exception, and it is pretty unfair to call a tigress doing her maternal duty a 'man-eater'.

Yet, in the Sundarbans, there are also cases of unprovoked attacks; instances where fishermen have been noisily chopping wood for 20 minutes when, out of the blue, a tiger turns up and attacks someone. If this wasn't bad enough, the cat might then go on to eat the body. This is the nightmare scenario: a tiger actively hunting people.

The tiger might then go on to eat the body. This is the nightmare scenario: a tiger actively hunting people.

Nobody knows for sure why this happens, though there is a lot of speculation. Some believe it is due to a shortage of natural prey, but there are enough deer in the forest, and too few people are killed for these cats to be living on human flesh alone. Others think that the trouble-makers are old or injured individuals that are unable to catch their normal quarry, but young and fit animals can also display this behaviour. Another, more chilling, idea pervades – that certain rogue tigers acquire a taste for human flesh.

LIVING DANGEROUSLY

We could spend a lot of time and money attempting to work out what causes a tiger to hunt people, but there's a high chance that any findings would be inconclusive. Also, some of the necessary experiments would be unethical, to put it mildly – after all, how do you go about testing whether a tiger prefers human flesh?

Meanwhile, the people of the Sundarbans don't have the luxury of time: as each week passes, someone else dies. So, to begin with, our project's aim is simply to alleviate the immediate human misery.

We have established a boat-based tiger response team (see box, p49) led by Goni, a small but extremely brave local villager. One of his unit's more harrowing tasks is to help relatives to recover the bodies of tiger victims – literally to take food from wild tigers that no longer fear humans. The Bangladeshi religion requires that a burial ritual is held within 24 hours of death, which is what drives mourners to take the serious risk of searching the dense forest for their loved ones. At least Goni's team can make that task less dangerous.

Members also collect as much information ►

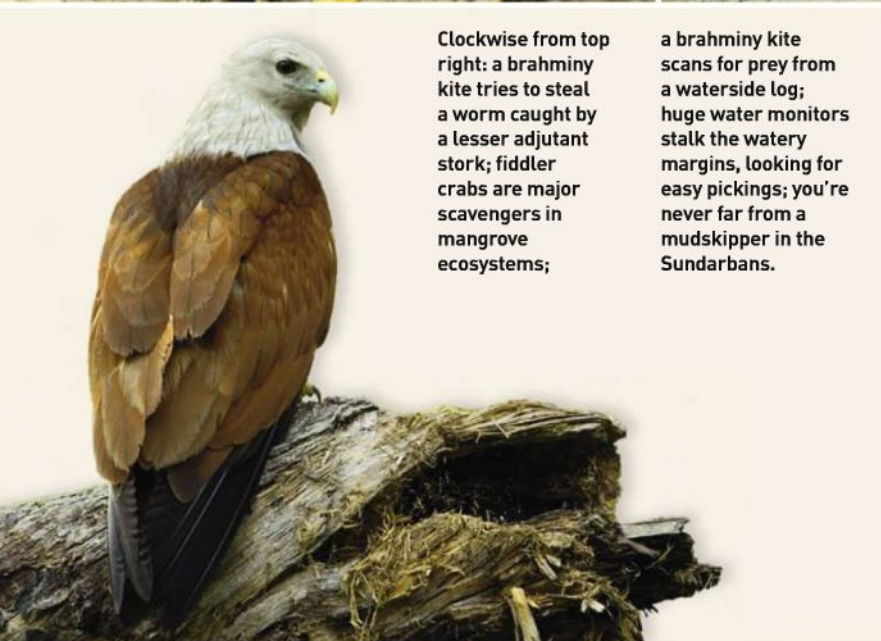


The mangroves of the Sundarbans are excellent tiger habitat, though the dense foliage and the cats' superb camouflage make them hard to spot. This female has been radio-collared by the project.



WILDLIFE OF THE SUNDARBANS

Few ecosystems can withstand daily inundation by the tides and yearly cyclones, but the mangroves and their rich variety of species are adapted to cope with these challenging conditions.



Clockwise from top right: a brahminy kite tries to steal a worm caught by a lesser adjutant stork; fiddler crabs are major scavengers in mangrove ecosystems;

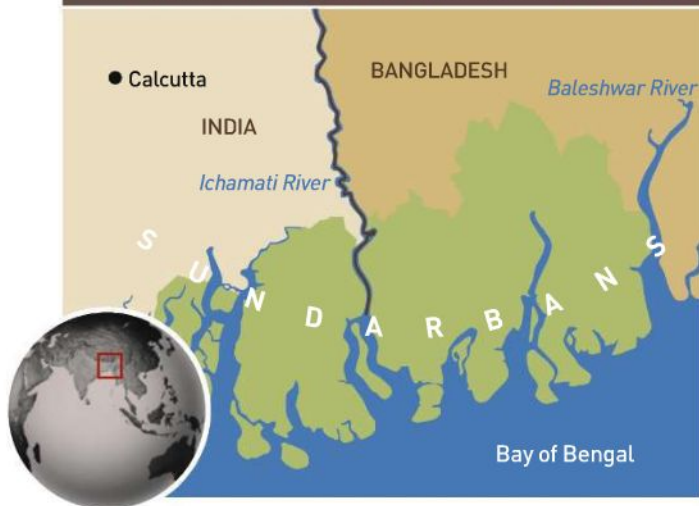
a brahminy kite scans for prey from a waterside log; huge water monitors stalk the watery margins, looking for easy pickings; you're never far from a mudskipper in the Sundarbans.





Sunset over the Sundarbans, which could be home to more than 10 per cent of the tigers left in the wild.

THE SUNDARBANS: A TIGER STRONGHOLD



- The Sundarbans is one of the largest mangrove forests in the world, and the only one home to tigers.
- It is a vast area that spans Bangladesh (6,000km²) and India (4,000km²), forming part of the delta created by the Ganges, Meghna and Brahmaputra rivers.
- The forest provides vital benefits to the ecosystem, including cyclone protection and coastal stabilisation against a rise in sea level.

about every incident as possible, to help piece together patterns of tiger behaviour that might produce a solution to the problem. For instance, if many attacks occur in the same area, they could be the work of a single individual. In such a situation, we might be able to save lives by restricting access to its territory and fitting the cat with a tracking collar to monitor its location.

A FUTURE WITH TIGERS?

As I follow my tiger prints, there is no mistake: they are definitely fresh. I squelch backwards to the waiting boat, facing the forest so as not to let my guard down.

I strain my eyes and ears for signs of

The prints I am following are definitely fresh. I squelch backwards to the boat, facing the forest.

company, my heart leaping when a branch snaps. The mudskippers blink up at me nervously, and a startled brahminy kite launches itself, screaming, into the air. I make it back to the boat, feeling relieved as I pull myself up on deck. Soon we are chugging off up the canal. I look over my

shoulder, hoping to glimpse a magnificent orange and black-striped creature looking back at me. No luck this time.

As we motor along, I look down at the clouds of sediment churned up by the current. I find myself wondering if people and tigers might, one day, live in harmony in this wild and beautiful place.

Incidents where a tiger is acting in self-defence are difficult to prevent, and we only become aware of a 'man-eater' after it has made at least one kill. Moreover, we can't prevent people from visiting the forest, since their livelihoods depend on it. So there will always be conflict – our mission is to minimise it by any means possible.

My thoughts are interrupted by a shout from Alam: he has spotted what looks like another set of tiger tracks. "It's my turn!" he calls, and leaps onto the bank to investigate.

● While this article was in preparation, Goni pulled his brother-in-law's body from the forest after he, too, was killed by a tiger.

HOW TO HELP

To find out more about the Sundarbans Tiger Project, visit www.sundarbantigerproject.info and www.zsl.org/bangladesh



THE EXPERT

CHRISTINA GREENWOOD works for the Zoological Society of London and Wildlife Trust of Bangladesh, and runs the Sundarbans Tiger Project.

A history of the WORLD in 100 NATURAL OBJECTS

An epic BBC Radio 4 series broadcast throughout 2010 has discussed the importance of 100 man-made objects from around the globe. The chosen artefacts are all interesting in themselves, but also illustrate different aspects of human history in a wider context. *BBC Wildlife* asked **PAT MORRIS** to compile his own selection of 100 *natural* objects, each of which has a wider significance than just its immediate appearance. From cow pats to coconuts, they tell a fascinating story about our evolving relationship with the natural world.



01 HUMAN BRAIN

Nothing has had a greater impact on the natural world than the human brain. It evolved from a simpler primate brain, enabling us to use rational thought to organise our lives, defend ourselves against predators and avoid danger. It meant that we did not need to evolve physical defences such as large claws or teeth.

The human brain has millions of nerve cells, linking sensory organs to our limb and body muscles, and it processes data at high speed to instruct our bodies what to do. The brain is also capable of abstract thought and controls speech and writing, sophisticated forms of communication that make it possible for us to change the world – and even destroy it or visit other planets. No other animal ever did that.

1, 3 & 9: Doring Kindersley; 2: Pictorial Press/Alamy; 5: Shutterstock; 4: Science Photo Library/Alamy



02 ARTHROPOD EXOSKELETON

Arthropods (insects, spiders, crustaceans and their relatives) have become highly successful. Some are very numerous, but none is very big. Yet science-fiction films often depict giant creepy-crawlies conquering our world. It's impossible! Arthropods have an external skeleton and must moult it to grow, so are weak and immobilised until a larger one forms and hardens. In other words, they cannot get bigger than the maximum survivable size without a skeleton, and, as a result, the largest spiders and insects weigh less than a small rat.



03 BALEEN PLATE

Whales in the suborder Mysticeti have 100 or so of these tough but flexible structures hanging from their upper jaws. They scoop up massive mouthfuls of seawater, then use their tongues to force it out through the baleen plates, trapping plankton. Thus, the world's largest animals have no need for the teeth so characteristic of most other mammals.

Baleen was highly valued for providing 'springy' support in all kinds of goods, from umbrella stays to corsets. It fetched high prices, contributing to the growth of a huge whaling industry. However, by the early 20th century (due in part to the invention of plastics) it was no longer the most valuable product of the whale harvest, but a waste product instead.

04 AMMONITE FOSSIL

Ammonites were once among the most abundant of all marine creatures. They inhabited the last chamber of their coiled shells, the other chambers providing buoyancy as they drifted on the current to catch fish. Today, their fossils are found worldwide, reflecting their great success as a group of animals.

Ammonites survived for tens of millions of years, yet they all died out 65 million years ago. How could such a widespread group suddenly go extinct? Many scientists think that it was due to a meteor colliding with the Earth. Maybe we should take the ammonites' fate more seriously: their intricate fossilised shells are a reminder that it might just happen again.



05 CHICKEN'S EGG

Domestication of the Indian junglefowl has led to this species becoming the world's most numerous, useful and abused bird. It can convert grains and debris into valuable eggs and meat, but industrial chicken production has given rise to a major debate about animal welfare standards.



06 ROOT NODULE

Bacteria in the nodules on the roots of clover and other 'legumes' take nitrogen from the air and enrich the soil. These plants have long been grown as a simple way to boost crop yields.

07 SCALLOP SHELL

Coastal peoples have eaten marine molluscs for millennia, but nowadays the scallop shell also stands as a reminder of how easily scallop-dredging fleets can destroy seabed ecosystems.

08 YEAST

Saccharomyces cerevisiae has played a vital part in human history: it reacts with starches and sugars to produce carbon dioxide and alcohol, a process harnessed to make bread and alcoholic drinks. The many other uses of yeast now extend to the manufacture of biofuels.

09 PEARL

Pearls form when bivalve molluscs deposit shell-lining material around an irritant 'seed' in their shell. Carl Linnaeus was the first to explain this process, using European freshwater mussels, and in the 1750s he proved that it could be stimulated artificially. The subsequent history of pearl cultivation reveals our unrivalled ability to tinker with natural processes as we see fit.



10 SEABIRD GUANO

Peru's mid-19th century golden age, the 'Guano Era', was built almost entirely on the profits from dealing in dung. This smelly natural resource consisted of seabird droppings harvested at coastal breeding colonies and then shipped abroad as fertiliser.

11 LOAF OF BREAD

Bread made from wheat, a selectively bred member of the grass family first cultivated up to 10,000 years ago, is one of the most important human foods. To produce it, we have replaced forests and wetlands with enormous wheatfields of little use to wildlife.



12 ICE CRYSTAL

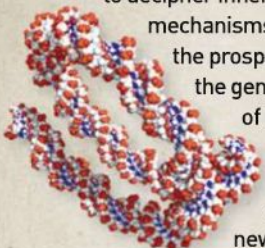
The unique physical properties of H₂O are both creative and destructive. Water expands as it freezes, and when plant fluids freeze they burst cell walls, which is why frosts kill the majority of plants. Expansion also results in a lower density, so ice floats, enabling fish to survive the winter unscathed.

13 MAHOGANY

The many tropical tree species loosely referred to as 'mahogany' have very hard wood that resists wear and decay, making it ideal for carving and construction work. Our insatiable demand for tropical hardwoods has been a major cause of rainforest destruction.

14 DNA

The discovery, in the 1950s, of the double helix structure of DNA chains has enabled us to decipher inheritance mechanisms, while offering the prospect of modifying the genetic composition of living things. One day we may even create entirely new organisms.



15 TREE RING

Since tree rings are the physical embodiment of patterns of growth, they allow the dating of both living trees and the timber in buildings. The rings in the trunks of bristlecone pines in California reveal some of these trees to be over 5,000 years old – the oldest plants alive today.

16 THE HOLE IN MY JUMPER

This natural object, or rather its absence, is the work of the clothes moth larva, one of the few animals able to digest keratin, the protein from which wool, feathers and fur are made.



17 COCONUT

The coconut palm has one of the largest seeds in the plant kingdom. It is encased in a hard shell, surrounded by a dense, fibrous husk 2–3cm thick. These coatings protect the living tissue from damage by seawater, enabling the coconut to be dispersed by ocean currents – it is one of the few seeds to be distributed in this way. Coconuts can be washed ashore almost anywhere, even on British coasts, but they can germinate only on beaches within the tropics.

Historically, the coconut palm has been a major economic resource, especially on low-lying sandy islands where little else grows. It has enabled us to inhabit the remotest tropical islands. Without the coconut, our early colonisation of the tropical oceans would have been much less successful.



19 ON THE ORIGIN OF SPECIES

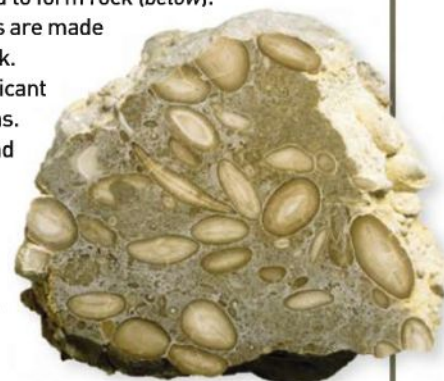
After many years gathering evidence, Charles Darwin finally published his ideas in this seminal work in 1859. He offered a powerful explanation for the diversity of life, based on natural selection encouraging progressive change among populations of variable individuals. Though Darwin was unaware of the genetic mechanisms that make evolution possible, *Origin* became one of the key catalysts driving biologists' thinking.

It might seem misleading to include *Origin*, a human artefact, in our list of natural objects. But, like all books, it is printed on paper, a product derived from cellulose. It thus reminds us of the important role that this plant fibre has had in shaping human thought.

18 FORAM

Foram is the shortened name for a foraminiferan, a tiny protozoan. Foraminiferans float in the marine plankton and their shells come in many shapes; for example, they may resemble tiny molluscs or bean pods. When the animals die, their perforated shells sink to the seabed. Forams were so abundant about 100 million years ago that their remains built up in thick layers, which later became compressed to form rock (*below*). England's chalk hills are made of foraminiferan rock.

Forams are significant for two other reasons. Their distribution and composition give us clues about past climates, and, together with other planktonic deposits, they are a major component of oil.



20 MALARIA MOSQUITO PROBOSCIS

As it draws blood through its proboscis, the female *Anopheles* mosquito transmits the malarial parasite *Plasmodium*, which is one of the biggest killers of humans, responsible for widespread suffering throughout the tropics.

The parasite multiplies inside its human host, causing lethargy and periodic severe fevers. The involvement of mosquitoes in its transmission was suspected even by the ancient Greeks, but the life-cycle of *Plasmodium* was not unravelled until the 1940s. Though subsequent control of *Anopheles* mosquitoes has been effective, there is still no cure for malaria.



22 SUGAR CANE

Originally a native of tropical Asia, this giant grass reaches 6m tall and is now grown in more than 100 countries. Crushing the stems yields sugars used in food flavouring and preservation and

the manufacture of alcohol; the waste fibre is used to make cardboard and paper and as fuel. Harvesting was formerly by hand – an arduous, labour-intensive task for which slaves were taken from Africa to manage the sugar plantations of the Americas.



21 ACORN

From tiny acorns great oak trees grow, and from them magnificent warships were built. These 'Wooden Walls of Old England' helped to repel invading forces for centuries. English naval vessels made from oak also explored and conquered the world, helping to maintain links with the Empire until steel ships replaced them.

On land, oak timbers were the main building material for thousands of years. The wood also made excellent charcoal, fuelling the glass and metal-smelting industries.



23 ELEPHANT TUSK

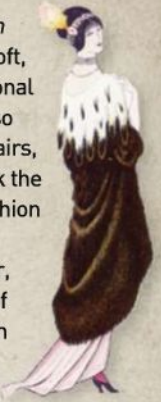
An elephant's tusks are enlarged second incisors in its upper jaw, and those of the adult male African elephant are the biggest teeth of any living mammal. Like all mammalian teeth, they consist mostly of a creamy white substance called dentine. Elephant tusk dentine – ivory – is easily carved and so has been highly prized throughout history. Before the invention of plastics, it was widely used to make relatively utilitarian objects such as knife handles, as well as ornamental items. Trade in this 'white gold' went hand in hand with European exploration of the African interior, and the collapse in elephant numbers due to poaching has become one of the great environmental tragedies of recent times.

24 LEECH SUCKER

Leeches secrete an anticoagulant through their sucker-like mouths to keep their hosts' wounds open while they feed. They were heavily collected for medicinal use in the belief that bloodletting would cure various ailments, and are still deployed in certain specialised surgical procedures.

25 MINK COAT

Not only does *Mustela vison* possess a dense layer of soft, fine underfur with exceptional insulating properties, it also has long, lustrous guard hairs, making the American mink the species of choice in the fashion industry. In addition to the ethical issue of wearing fur, there is also the problem of mink farm escapees, which disrupt ecosystems where they are not native.



26 SIGESBECKIA

A 'founding father' of ecology and modern taxonomy, Carl Linnaeus, named this genus of insignificant, weedy plants after one of his enemies, Johann Siegesbeck. His system of binomial nomenclature remains in use today.

27 STUFFED BIRD

Millions of birds were collected and stuffed to display in Victorian and Edwardian homes. Contrary to popular belief, taxidermy may not in itself have been a threat to the populations of most bird species.



28 GARDEN PEAS

By propagating pea plants, Gregor Johann Mendel discovered that the inheritance of particular traits follows predictable patterns. This enabled him to formulate a set of rules that became the basis for the modern science of genetics.

29 ICEBERG

Fragments of the polar ice caps, icebergs were once seen purely as a menace to shipping, but today they have morphed into highly visible icons of global warming. Will melting glaciers and ice caps release huge amounts of trapped water, raising sea levels far enough to obliterate low-lying countries? We simply don't know.

30 WILLOW TREE

Wood from English willows, fashioned into cricket bats, is still handled every week by people in former British colonies. It is a symbol of the lasting impact of transferring British culture overseas to the largest empire the world has ever seen.

31 BANANA

Originally from New Guinea, the banana is cultivated across the tropics. The fruit we eat nowadays has been bred to contain no viable seeds, so depends on human assistance for dispersal.

32 TADPOLE SHRIMP

This freshwater crustacean is a 'living fossil', and has changed little in at least 100 million years. The adults die when their shallow pools dry up, but their eggs remain viable for many years. The eggs have minimal respiration, challenging our perception of what life is.

33 WATER HYACINTH

Thick, choking mats of this South American plant can now be seen floating on lakes and waterways in subtropical regions around the world – a notorious example of the damage that invasive plants can wreak in new areas.

34 PLATYPUS BEAK

When a specimen of this beaked marsupial first reached England in 1799 it was dismissed as a prank. But the platypus drew attention to the extraordinary species to be found in Australia, and posed questions about how and why they were there. The search for answers helped us to understand evolution, plate tectonics and continental drift.

35 AYAHUASCA

This South American vine is the active ingredient in a psychedelic brew taken by Amazonian tribes during spiritual rituals. Like all hallucinogens, it warps our view of the world (apparently).

36 SNAKE HIND LIMB

The presence of 'pointless' vestigial structures such as the hind limb bones in snakes is powerful evidence of evolution.

37 EGG OF THE GREAT AUK

The female great auk laid a single, very large egg. The advantage? A big egg produced a big chick that could go to sea soon after hatching, thereby avoiding land predators. However, this biological benefit was to seal the species' fate.

Great auks were once widespread across the North Atlantic, but, being flightless, they were restricted to nesting on low ledges, which people found easy to reach. The auk colonies were raided for centuries by mariners and fishermen, and vast numbers of the meaty birds were taken for food and fishing bait. Unfortunately, the great auk's single-egg strategy could not compensate for such sustained losses, and the species became extinct when the last individual was shot on the island of Eldey, Iceland, in 1844.

38 SHEEP INCISOR

It was the teeth of sheep as much as the crude tools of Neolithic man that began the deforestation of Britain. Sheep only have incisors on the lower jaw, which bite against a toothless pad above. This arrangement enables them to crop plants close to the ground, transforming the landscape with every nibble. Flocks of sheep suppress the growth of trees and have created open habitats, such as the English South Downs, providing ideal conditions for orchids and many other species. But without a foundation of tree roots, grazed land is at risk of erosion.

39 TOMATO

Originally a New World crop, the tomato reached Europe only in 1530, but *Lycopersicon esculentum* is now one of the most ubiquitous cultivated plant species. As well as being a hugely versatile food, it is a good candidate for genetic manipulation. One day, a GM strain of tomato may contain the genes for medicines, produced in the fruits as they grow. This could provide an inexpensive alternative to current drug production techniques, though one fraught with pitfalls, too.

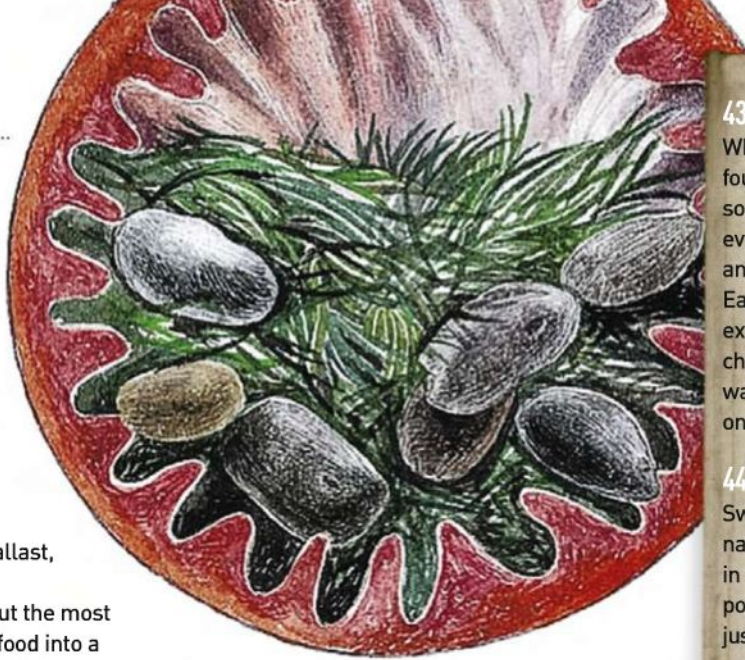


40 GASTROLITH

Crocodiles are renowned for their appetite for flesh, but they also swallow stones. Once these have been ingested, they become known as gastroliths.

Gastroliths have been found in the stomachs of dinosaurs, the crocodiles' long-lost cousins, and are a prominent part of the fossil record. Theories abound as to their purpose: could they be intestinal cleaners, or act as ballast, helping bulky animals to dive underwater? We don't know, but the most likely role is to grind up food into a

digestible paste, in much the same way that birds swallow small stones and grit to help digestion. Like birds, crocodiles can't chew, so they bolt down chunks of flesh whole. But humans, like many other mammals, swing our jaws from side to side, grinding and slicing food before swallowing. Without our articulated jaws, we, too, might have to serve up stones with dinner.



41 EAR OF WHEAT

Plant seeds contain a store of carbohydrate to fuel the growing shoot when it germinates, and this compact energy source is equally good at fuelling the metabolic processes of animals, including us. Early humans gathered wild grass seeds to eat before having the idea of planting them to grow what they needed, where it was wanted.

There was a hurdle to overcome: the ears of wild grasses 'shatter' when ripe, spilling their seeds. So the first farmers instead selected plants that tended to hold onto their seeds. This may be a disastrous trait for a wild species, but it has ensured that the descendants of the oldest cultivated wheat plants now grow around the world.

42 TERMITE MOUND

In dry parts of the world, termites are the main consumers of dead plant material, fulfilling a crucial role in the ecosystem. Each colony builds a mound from soil particles cemented together with the insects' own saliva. A mound may be several metres high and weigh a tonne, and makes an imposing fortress for the termites. But, inside, they were at risk from overheating. To compensate, they developed air-conditioning systems of chimneys and cooling chambers long before humans figured out how to ventilate their own dwellings. Today, architects are even looking to their insect counterparts to find new ways of designing self-ventilating buildings.



43 FOSSIL HYENA TOOTH

When fossilised hyena teeth were found in Britain in the 1820s, some people saw them as evidence that Noah's flood wiped animals from entire regions of the Earth. Later, a more plausible explanation, involving climate change and a much older planet, was to be an important influence on Darwin during his travels.

44 LOCUST MANDIBLES

Swarms of locusts are a force of nature that can devastate crops in minutes. This destruction is powered by a multitude of mouths just a few millimetres wide.

45 DEAD CORAL

Coral reefs are the skeletal remains of countless generations of soft, gelatinous polyps, so these tiny animals are, in a sense, ultimately responsible for thousands of wrecked ships and lost lives. On the other hand, barrier reefs also act as nurseries for fish and protect shores from the fury of the sea.



46 FROG'S LEG

Frog's legs have long been key experimental tools in research into the function of muscles and their associated nerves.

47 WOODWORM INFESTATION

The wood-boring larva of the deathwatch beetle, otherwise known as a woodworm, naturally assists the breakdown of dead trees. In building or furniture timbers, however, its activities can be disastrous.

48 FRUIT FLY EYE

Studies of the inheritance of eye colour in *Drosophila* fruit flies have led to major breakthroughs in our understanding of genetics.

49 ELEPHANT MOLAR

The grinding surface on elephant teeth is quite coarse, so food is not shredded finely and entire seeds can pass through their guts unscathed. Elephant dung thus contains a host of readily recognisable plant material and helps many tree species to disperse.





50 HONEYBEE POLLEN SAC

The hind legs of honeybees (and their relatives, such as bumblebees) have a flat, polished area surrounded by spiky hairs for carrying pollen efficiently. Called a pollen sac or corbicula, it is the insect equivalent of a shopping bag and, without it, many crops would go unpollinated.

51 LATEX

We have harvested latex from the *Hevea brasiliensis* tree since prehistoric times. It can be treated by smoke to create rubber, a material that literally makes the modern world go round. In 1876, rubber tree seeds were smuggled out of Brazil to establish rival plantations in south-east Asia – an early example of biotheft.

52 BIRD'S WING

In cross-section, a bird's wing has curved surfaces, so that air flows faster over the top than under the bottom, creating lift. This design, known as an aerofoil, has never been bettered, and it continues to keep our aircraft in the skies.

53 DROMEDARY HOOF

The broad hooves of camels enable them to walk on soft sand where horses and vehicles cannot go. These hardy (if bad-tempered) mammals made it possible for us to explore the world's deserts.

54 SHARK TOOTH

Sharks have no bones, only cartilage, but their teeth are among the hardest substances in the animal kingdom. Added to this, big species have jaw muscles that can deliver a bite force of several tonnes. Small wonder that sharks frighten and fascinate us.



55 MUREX SHELL

This spiky-shelled marine mollusc secretes a milky substance that turns purple on contact with air, forming an intense dye worth more than its weight in silver to the ancient Greeks and Romans. Purple remains the colour of royalty and aristocracy.

56 COTTON

One of the most valuable natural fibres in human history, cotton has clothed us for about 8,000 years.



57 CUP OF TEA

Tea is an infusion made from the dried and powdered young leaves of *Camellia sinensis*. This shrub grows where annual rainfall exceeds 75cm, often at relatively high altitudes in the tropics. In a natural state, it will form small trees, but it is normally pruned to help with the harvesting of the leaves and branch tips.

Tea drinking was considered to be beneficial to health but also became a social activity, and from about 1800 it formed the basis of a major trade between India and Britain. Enormous areas here and in other parts of the British empire were given over to tea cultivation, creating a distinctive landscape largely devoid of wildlife.

58 EGRET PLUME

In the late 19th century, the long, wispy feathers sported by egrets during the breeding season became highly sought-after for ornamenting fashionable ladies' hats. Confusingly referred to as 'osprey' in the millinery trade, these plumes were imported to the auction houses of London, Paris and New York in huge quantities every season. The wholesale plunder devastated egret colonies, but contributed to a pivotal moment in the history of conservation.

In Britain, campaigns to abolish the trade, initially led by a group of women who pledged not to wear feathers, resulted in the foundation of the Society for the Protection of Birds (now the RSPB) in 1889.



59 GRASS TUSOCK

Unlike most plants, grasses grow from the base, allowing herbivores (and lawn mowers) to repeatedly remove their above-ground leaves without killing the plants. Grasses can thus thrive where other plants are suppressed or destroyed by grazing pressure.

These areas – grasslands – have been a major wildlife habitat since grasses first evolved, in the Miocene epoch some 20 million years ago. Meanwhile, smaller areas of grass have become one of the most versatile landscaping and sporting surfaces, a status unlikely to be lost any time soon, despite the invention of synthetic turf.



60 PEACOCK TAIL FEATHER

The 'eyed' feathers of male peacocks are fanned out in an extravagant display to impress females. This conspicuous courtship behaviour, which is often accompanied by cries, has stimulated endless discussion about, and research into, the nature and consequences of sexual selection in animals. The national bird of India, the peafowl was imported to Europe as an ornamental bird and culinary novelty in the Middle Ages, and a peacock logo was adopted by US tv network NBC for its first colour transmissions in 1956.



61 SHIPWORM

A shipworm is actually a bivalve mollusc with twin shells that form 'jaws' that rasp their way into mangrove roots and ship timbers. Its body is shaped like a long bag, within which the wood paste is digested, and is too big to fit within the paired shells, but the animal is protected by the walls of its tunnel. High densities of these burrows, each up to 1cm wide, are disastrous for wooden ships, whose timbers become severely weakened, resulting in leaks or even collapse. This was long a problem in tropical seas, until hulls were protected with paints and copper cladding.

62 LUMP OF COAL

Coal is the compressed and fossilised remains of ancient fern-like plants that lived in the warm swamps of the Carboniferous epoch. These plants trapped the energy of the sun, which can be liberated by combustion; the ancient coal forests thus fuelled the Industrial Revolution 300 million years later. Mining this valuable commodity had major environmental effects, burning it created pollution that killed many people each year as a result of lung disease, and the soot discoloured whole cities and encouraged industrial melanism in peppered moths. Coal is still the main source of energy for generating electricity worldwide.



63 WATER FLEA

This superabundant member of the freshwater zooplankton, also known as daphnia, uses bristles on its legs to trap algae for food. It is the main natural mechanism for removing algae from rivers, lakes and drinking water. Without it, algal blooms form, and we have to filter water by artificial means.

64 HORSESHOE CRAB BLOOD

Little different from their fossils of 400 million years ago, horseshoe crabs have blue, copper-based blood that gels when it comes into contact with bacteria or toxins. The compound responsible is extracted so that medical drugs can be checked for contamination.

65 CETACEAN EAR

The heavy ear bulla ('hearing chamber') of cetaceans is part of a specialised auditory system that equips them with underwater echolocation and complex sounds for social communication. Our own version, sonar, is used to navigate, survey the seabed and locate fish.

66 RICE

This cereal grain feeds half of the world's human population. Its cultivation creates enormous areas of semi-aquatic habitat in tropical as well as subtropical countries.



67 INSECT-DAMAGED LEAF

Many insects eat leaves, harming crops and garden plants. In the 1950s, chlorinated hydrocarbon insecticides were widely deployed to combat this threat, but the chemicals proved to be cumulative and harmful to entire ecosystems, and have now been withdrawn.

68 FISH OTOLITH

Otoliths (literally 'ear stones') are calcareous lumps in the middle ear of fish that assist underwater hearing. As they develop, they form annual growth lines that can be used to tell the age of a fish. This allows us to understand the age structure of fish populations – vital information that can be used to manage fisheries sustainably.

69 SNAKE VENOM

Snakebite is a major cause of death: 421,000 people a year are envenomed, of which 20,000 die, according to a 2008 survey.

70 TIGER CLAW

It is easy to forget that tigers were still abundant in relatively recent times (especially in India). Their claws have always been a threat to villagers in forest areas, and though the cats are rarer now, they remain a danger as human settlements encroach further into their habitat.

71 OCTOPUS EYE

A prime example of convergent evolution, the octopus eye evolved separately from the human eye, but in many ways is very similar. It also reminds us of the intelligence of these cephalopods: research into their brain function has helped us to understand our own.



72 GLOW-WORM LIGHT ORGAN

Female glow-worms emit a bright light to attract males, without wasting The enzymes involved are controlled by genes that can be inserted into other organisms – a useful tool for genetic research.

73 COWRIE SHELL

A variety of natural objects have been used by humans as a form of currency, and cowrie shells were legal tender in West Africa for centuries. The main species involved was *Cypraea moneta*

74 TIKTAALIK ROSAEA

So-called 'missing links' help us to unlock the mystery of the origins of life. *Tiktaalik*, dubbed the 'fishapod', is one of the most significant: it lived 375 million years ago and is the earliest four-limbed animal known.

75 FUNGAL HYPHA

Fungi possess dense masses of these thread-like structures, enabling them to spread, and play a vital role as decomposers.

76 MOTH ANTENNA

A moth's feathery antennae can probably detect single scent molecules. Perhaps this extreme sensitivity could be duplicated

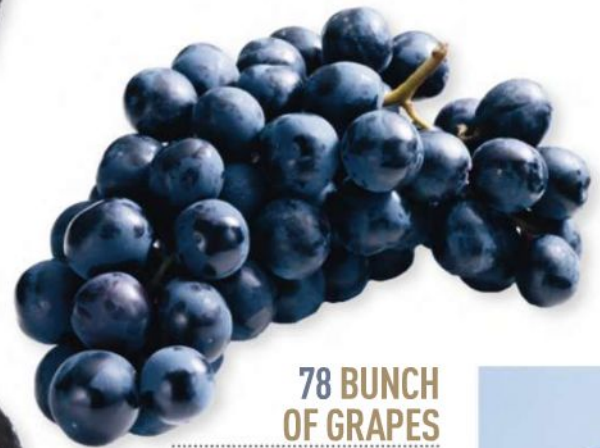
artificially to create devices able to detect drugs, explosives or food contaminants?



77 HORSE HOOF

Horses were among the earliest mammals to be domesticated. Their muscle power made possible physical feats that were beyond us – they could pull heavy loads or carry people for long distances, for instance. Horses were also useful during times of war and down mines. But their hooves were only suitable for walking on grass and soft earth: hard surfaces caused excessive wear and damage to their legs.

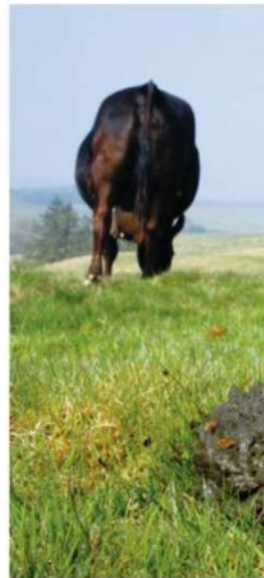
The fitting of metal shoes ensured that the horse's talents could be used more widely, particularly on stony ground and city streets. This enhancement of the hoof meant that horses could travel long distances on roads, either being ridden or pulling stagecoaches and wagons. Fitting and replacing horseshoes is now seen as a specialised craft, but it was a significant industry for centuries.



78 BUNCH OF GRAPES

Vines have been grown for wine making since ancient times – grapes arguably occupy a more significant place in human cultural life than any other fruit.

Viniculture originated in the eastern Mediterranean but is now a major global industry, transforming habitats and landscapes, particularly where terracing is needed for drainage.



79 SALTED COD

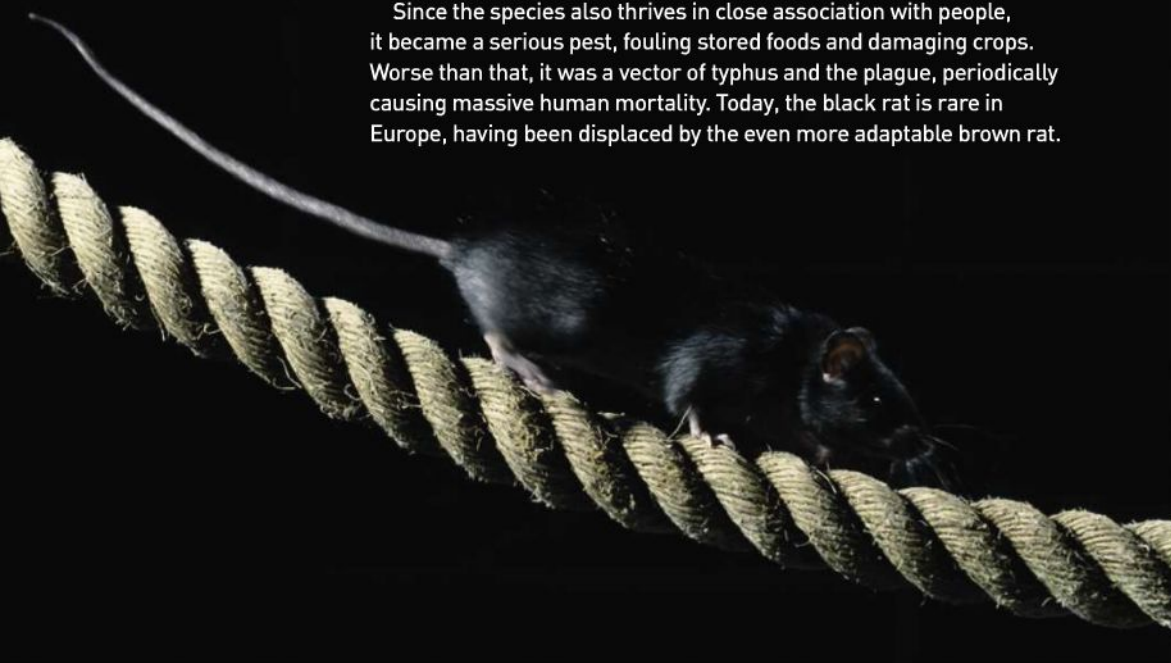
The Atlantic cod is a hugely fecund fish, with adult females laying millions of eggs each season. Despite the vulnerability of their tiny planktonic larvae, enough survive to continue the species, and it was once said that you could walk across the sea on the backs of the fish. A valuable cod fishery developed in the 20th century, with much of the catch ending up as salted cod, but overharvesting led to fierce competition for the dwindling stocks, and to economic and political conflicts dubbed 'Cod Wars'.



80 PAWS OF A BLACK RAT

The black rat is an extremely agile creature and, using its paws to grip ropes, it climbed easily onto countless moored boats and was thus transported around the world, hidden among the cargo. For this reason, it is often called the ship rat. Originally from India, the rodent steadily increased its range, reaching Britain by Roman times.

Since the species also thrives in close association with people, it became a serious pest, fouling stored foods and damaging crops. Worse than that, it was a vector of typhus and the plague, periodically causing massive human mortality. Today, the black rat is rare in Europe, having been displaced by the even more adaptable brown rat.



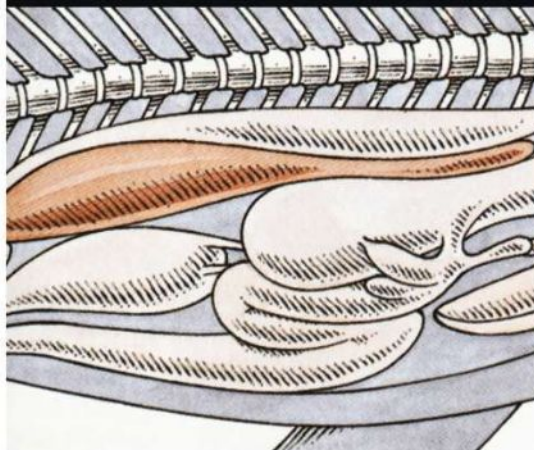
81 COW PAT

A cow's faecal matter is a soft paste lacking recognisable plant remains, which reflects the efficiency of a ruminant's digestion. Mammals cannot normally digest cellulose – the main component of plant tissues – but in their enlarged stomach ruminants have a partnership with microbes that are capable of secreting the necessary enzymes. This enables cattle, sheep and goats to feed on grass and coarse vegetation, turning it into useful animal products. Humans have transported domesticated ruminants around the world, often with a severe impact on indigenous wildlife. The dung is normally removed by specialist invertebrates, helping to recycle nutrients back to living plants.

82 FISH SWIM BLADDER

The swim bladder forms an air-filled bag inside the body of many types of bony fish. It provides buoyancy, which some fish regulate by gulping air into it; others use a special secretory organ to adjust its volume and the degree of buoyancy it provides. Careful control of the swim bladder enables many fish to 'hover' in mid-water.

The ecological significance of this organ is that it means bony fish can be distributed throughout a three-dimensional environment, without them having to expend energy fighting the effects of gravity. These fish can therefore access more sources of food and be more numerous and widespread than would be possible if they all had to live on the bottom. The swim bladder has an impact on fishing fleets, too: they can harvest at all depths.



83 VAMPIRE BAT TOOTH

Vampire bats have fewer teeth than their relatives since they do not need to chew their food. Instead, their sharp incisors inflict a wound from which they lap up blood. This may transmit rabies, a deadly danger in many parts of Central and South America.

84 RHINO HORN

This horn is used in some traditional medicines, but it is made of keratin (the same indestructible protein as hair), so humans cannot digest it. Any health benefits must therefore be imaginary.



85 IGUANODON

Dinosaurs from the Jurassic and Cretaceous, such as *Iguanodon*, the first 'terrible lizard' to be named, have come to epitomise extinct species that came to the end of the road. We tend to forget that they were dominant for 100 million years, longer than we may yet manage.

86 CAT'S EYE

Many nocturnal mammals have a reflective layer in their retina called the tapetum, which greatly enhances night vision. This makes their eyes appear to light up when illuminated. Copying the principle, roads have lines of artificial cat's eyes to guide traffic in the dark.

87 ELECTRIC RAY

Electric organs appear to have developed in at least six different evolutionary lines of fish, with the electric ray being the best-known living species to possess them. To our ancestors, this fish must have seemed to have magical powers.

88 NUTMEG

Nutmeg is native to the Banda Islands in Indonesia, and was a major driver of the spice trade between the Far East and Europe. It is now grown in many tropical countries.



89 AMBERGRIS

Sperm whales secrete this waxy substance in their stomachs, possibly to help sharp objects pass through their digestive system. Lumps of it harvested on the coast were used in perfumery.

90 CUTTLEFISH BONE

Well-known to millions of caged birds around the world, cuttlefish bone is a chambered, gas-filled shell, made of crystalline calcium carbonate. It allows the cuttlefish to sink or float with little energy expenditure. Discovering how the bones functioned provided insights into the buoyancy mechanisms of other species.

91 ELEPHANT BIRD'S EGG

This extinct Madagascan bird laid the world's largest eggs, which were the size of a bucket! One study has found eggshells in the remains of human fires, suggesting that they provided food for our ancestors. They must have made quite an omelette.

92 TILTED GRAVESTONE

Constant burrowing by earthworms causes heavy objects such as memorials to sink into the ground, reminding us that worms aerate soil, improve drainage and assist decomposition.

93 AVIAN SKELETON

Birds have hollow bones, which dramatically reduce their weight. To compensate, the thin bone walls are supported by bony struts placed where maximum stresses occur in flight. This enables birds to exploit a three-dimensional environment and travel long distances.

94 CRAB LEG JOINT

The tubular exoskeletons of arthropods such as crabs offer great strength and protection, but are difficult to articulate at the joints. Suits of armour were cumbersome in a similar way.

95 HEDGEHOG SPINE

The 5,000 spines on an adult hedgehog have evolved to provide protection from most predators, but squashed bodies remind us of the hazards that roads create for wildlife.

96 GECKO'S FOOT

A gecko's ability to run upside-down across a ceiling would make even Spider-Man jealous. The secret is that its soles are covered with microscopic hairs, creating a powerful attractive force.



97 FUR SEAL PELT

Fur seals, like sea otters, inhabit the cold waters of the North Pacific, their bodies insulated by a dense layer of underfur with longer 'guard' hairs over the top. These valuable pelts enticed Russian entrepreneurs to travel from their own coasts to California.

Captain Cook discovered the lucrative trade in the 18th century, prompting massive exploitation of these mammals, nearly causing their extinction. In 1911, legal protection was extended to fur seals and sea otters, the first legislation to protect marine mammals.

99 SILKWORM COCOON

The fine threads that form these cocoons protect the pupa inside while the larva (the 'silkworm' – a caterpillar about 10cm long) changes into a moth. The moth uses enzymes to dissolve an escape hole, but must be killed before it does so if the cocoon is to be used by humans. Silkworms were first kept in China more than 2,000 years ago, and are still the only truly domesticated species of arthropod. They were selectively bred to



produce larger cocoons made of a thin, strong single filament that could be unwound and woven into fine cloth. For centuries, the Chinese kept this a secret, but the silk trade stimulated contact with the West, and silkworm eggs were smuggled into Europe in the sixth century AD. Today, artificial fibres are often used instead of natural silk.

100 DOG FOOTPRINT

Dogs were the first mammals to be domesticated. They are social animals that accept leadership by a dominant pack member, and a pup brought up by humans is generally obedient to its 'master', though it does depend on the level of training given. Over thousands of years, dogs have become an extension of ourselves, helping farmers to herd their sheep, blind people to stay mobile and hypothermic skiers to return to their chalets.



98 BAMBOO STEM

Bamboos are giant grasses that grow rapidly to more than 20m tall. Their light but strong, tubular stems are an important construction material, especially in Asia, where they are used for pipes, poles, furniture and house-building. Bamboo has also been used as a writing surface since ancient times, which explains why many Asian languages are written in columns rather than rows.



THE EXPERT

PAT MORRIS

is a former senior lecturer in zoology at the University of London and an expert on small mammals, especially hedgehogs and dormice.

A HISTORY OF THE WORLD IN 100 OBJECTS finished its marathon run on 22 October, but every episode is available as a free download from the BBC: www.bbc.co.uk/ahistoryoftheworld

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WHAT DO YOU THINK?

Did Pat get it right? What natural objects would you have chosen to symbolise our changing relationship with the world? Are there any items in your house that you would like to tell us about? Write to us at the address on p5, or email wildlifeletters@bbcmagazines.co.uk

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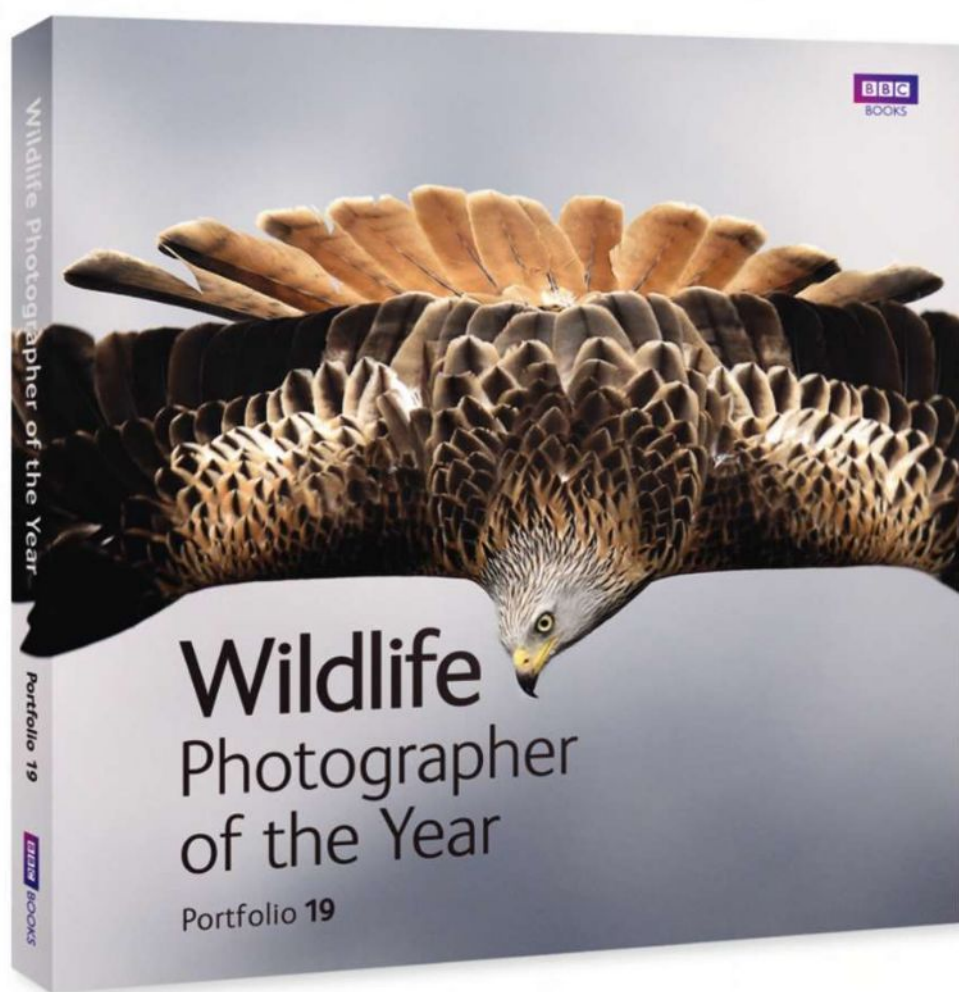
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The hunter OF SUBURBIA

Ground-breaking new research is following domestic cats to find out what impact these predators are having on our wildlife. **JAMES FAIR** investigates.

Photos by **STEVE ORINO**

This is Bonnie, one of 250 pets monitored as part of a long-term study into the hunting habits of domestic cats.



Researcher Rebecca Thomas attaches a GPS tracking collar to Clyde, one of her study subjects.

THERE IS SOMETHING about the feline form that is innately beautiful to the human eye, as cameraman Gordon Buchanan observed on the BBC's recent *Lost Land of the Tiger* series while staring through his lens at the languid, liquid shape of a leopard cat. "Whether it's a cat this size or a tiger, they're just perfect," he murmured.

It's true. As my partner and I watched the programme, she turned to look at the equally gorgeous and highly evolved carnivore curled up on the sofa next to us, head hidden under a furry paw, butterscotch belly exposed as if waiting to be tickled. "You're a hunter, too," Louise cooed with palpable satisfaction.

The extent to which Esme qualifies as a 'hunter' is a matter of sometimes bitter dispute in our household. She hasn't brought in any prey items for the best part of two-and-a-half years, and all anecdotal

evidence suggests that she spends the nights fast asleep on the sofa or on our bed.

Nevertheless, Louise likes to imagine Esme as a fierce and skilful predator, dispatching woodmice, voles and rabbits in the wilder corners of our country garden. Even if this were true (and I don't believe it is), she is a well-fed tabby who has the luxury of being able to hunt as a leisure pursuit, rather than because she really needs to. She is the feline equivalent of a big-game trophy hunter who wants a buffalo head for his Appalachian log cabin back home.

KILLERS IN OUR MIDST?

I think Louise is fairly typical of how many British people view their pets. We love the idea of a killer in our midst, whatever the toll on our native wildlife. That impact has been much discussed in conservation circles over the past decade, certainly since a report published by the Mammal Society in 2003 concluded that British cats had taken an estimated 92 million prey items over a five-month period.

When the researchers factored in kills that had not been 'returned' (brought back to the cat's owner), it was extrapolated that the overall tally could be as high as 275 million individual animals every year. ►

Our pet cat is a well-fed tabby who has the luxury of being able to hunt as a leisure pursuit.

Bonnie on the prowl in Reading. The new research following this town's domestic cats may suggest that British moggies kill fewer animals than previously thought.



It is a figure that is widely accepted, and quoted by many organisations including the RSPB, the British Trust for Ornithology (BTO) and the Bat Conservation Trust.

Now new research, due to be published next year, is taking a closer look at what our domestic cats are up to. Rebecca Thomas, a PhD student in environmental biology at the University of Reading, persuaded 210 people in the town (and their 250 cats) to take part in a study in which they kept a 'prey diary' of exactly what Tibbles and co brought in over a two-year period (see box, p72).

One of the study's aims was to generate data for every season and for more than one year, as opposed to just a few months, so that Rebecca could make a more accurate estimate of how many individual animals cats were killing.

Cat owners in the study kept a diary of prey their pets brought home. Woodmice were the most frequent victims.



REVISED FIGURES

With the fieldwork complete, several things have become clear. By including prey returns over the winter months, when catches are reduced, the study has produced an average number of kills per cat that is lower than that normally quoted.

Rebecca found that each cat returned an average of 4.39 animals a year, which, if true for the UK's estimated 10.3 million cats, would result in a kill total of 45.22 million mammals, birds and amphibians.

But you also have to factor in the kills that are *not* returned, something that is yet to be properly investigated. One study estimated a 'return rate' of 30 per cent, but that was based on data from only 11 cats. Still,

using this figure as a starting point, you arrive at a killing spree of 150 million animals. It's a lot – but much less than 275 million.

DID YOU KNOW?

Cats' skill as pest controllers has long been exploited – the champion British 'mouser' was a male tabby in a Lancashire factory, which killed more than 22,000 mice in 23 years.

Rebecca is uncomfortable with this sort of extrapolation, partly because we have no idea if the 30 per cent figure is accurate or not. "And you can't really compare urban and suburban cats with rural ones," she adds.

"People will extrapolate and that's fine, but *I* won't."

And the overall figure is relatively unimportant, as one of the authors of the original 2003 report, Robbie McDonald, points out. "A cat population of millions, multiplied by any number of wild animals caught, will result in an impressively large headline tally, and whether this is 100 or 200 million is rather immaterial. The issue, in conservation terms, is calculating the impact, which is a notoriously difficult problem."

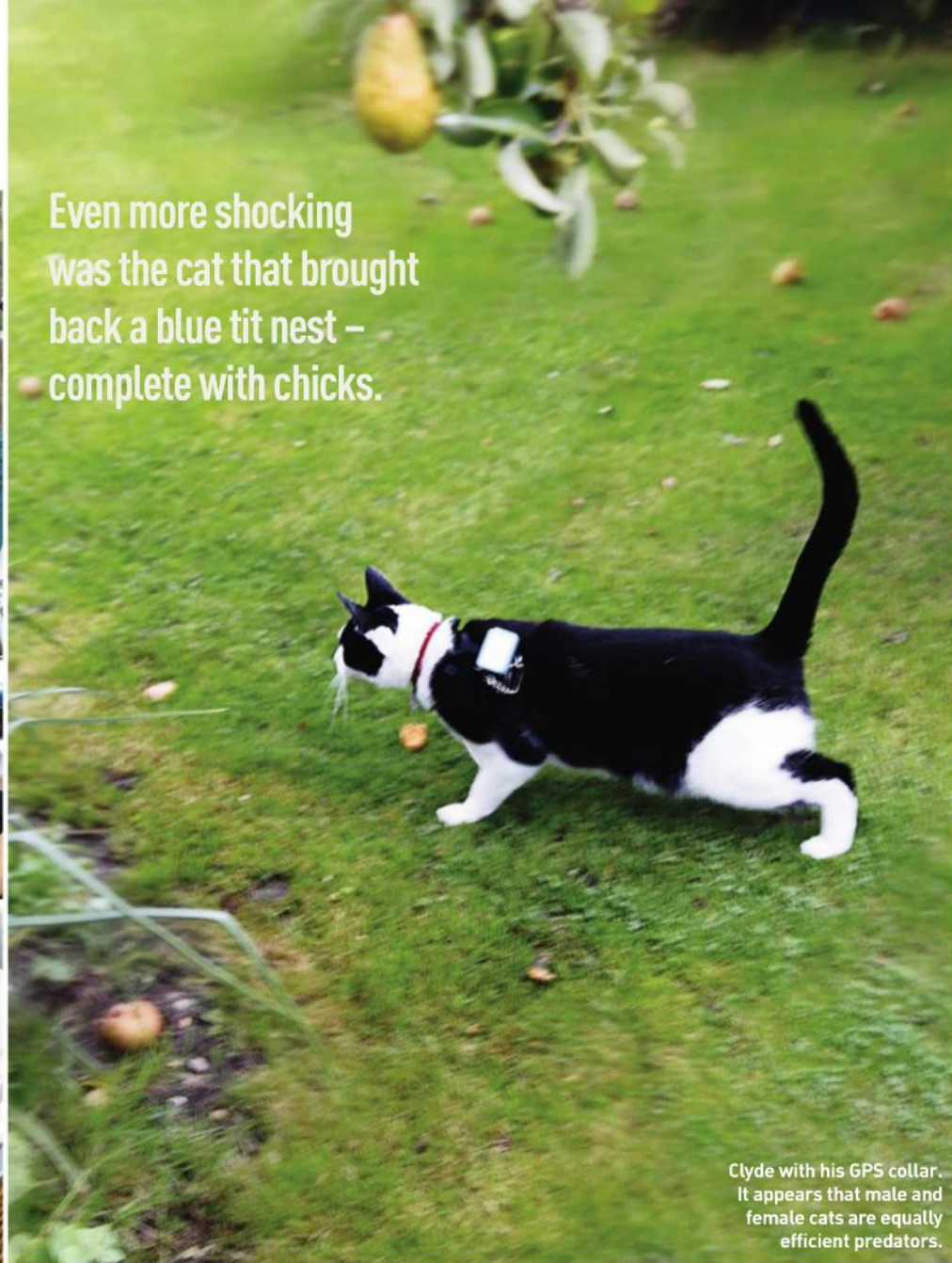
Leaving that aside, what else has Rebecca discovered? She was surprised by the sheer number of birds that some of her cats were catching, particularly during the cold winter of 2009/10. "One cat that lived beside a woodland brought in a blue tit every single



Rebecca plotted the movements of each cat to build up a map of its home range.



Each dot on the map represents a location 'fix' from the cat's GPS tracker.



Clyde with his GPS collar. It appears that male and female cats are equally efficient predators.

day for a fortnight." Additional kills may have been occurring because birds visiting feeders provided easy pickings.

Even more shocking were the terrible trio that between them brought back a weasel, three miraculously intact woodpigeon eggs and a blue tit nest – complete with chicks.

ALPHA MALES

Rebecca's other findings are also intriguing. There wasn't much difference between males and females in terms of hunting success, she says, but there was great variation between males. In other words, there were some true alpha males – and some utterly useless ones.

There are many more factors to consider, too. The sub-lethal 'fear effect', for example, may mean that anxiety of being preyed on will affect a species at a population level more than predation itself. If a robin is afraid of the local tabby stalking his patch, he will be less likely to visit the ground to feed, possibly affecting his fitness and breeding success.

On the other hand, it may be that cats are simply targeting the sick and injured, much

CLYDE'S MOVEMENTS

Clyde was one of 20 cats that Rebecca followed using GPS tracking devices.



1 Home patch

As expected, Clyde spends most of his time in his owner's and neighbours' gardens.

2 Furthest point

Clyde is happy to travel quite long distances.

3 Crossing roads

That Clyde is prepared to cross busy main roads may not come as welcome news to his loving owners.

4 Hunting territory

This green triangle is an area of rough grassland that Rebecca thinks Clyde may be using for hunting.



Clyde poses for our photographer with one of his latest 'returns' – a woodmouse.

CAT PREDATION: THE FACTS

Here are a few feline facts to put the Reading research into context.

The most recent estimate for the number of cats in the UK is 10.3 million. Just over a quarter of households have at least one cat, and cat ownership is higher among people educated to degree level.

The research carried out by Rebecca Thomas in Reading involved 250 cats from 210 households for four six-week periods in both 2008 and 2009. The most commonly caught prey items are listed below. Woodmice accounted for 43 per cent of all animals returned to their owners.

THE TOP 10 CAT 'KILLS'

- 1 Woodmouse
- 2 Brown rat
- 3 Robin
- 4 Blackbird
- 5 Bank vole
- 6 Common shrew
- 7 Woodpigeon
- 8 Blue tit
- 9 Great tit
- 10 Dunnock



There's no doubt that domestic cats highlight the UK's contradictory attitudes to wildlife.

as lions take out lame wildebeest in the Serengeti. And consider that our native fauna evolved to live alongside *Felis silvestris*, the wild ancestor of the domestic cat.

REDUCING PREDATION

Does any of this matter? No political party will ever legislate to curb cat ownership on the basis of their impact on rodents, birds and frogs. And we already know some of the chief ways in which cat predation can be reduced – not allowing your cat out at night is one simple thing anyone can do.

The BTO's Mike Toms says that there are probably other things, too. What if we were able to position our birdfeeders or manage our gardens in such a way that we reduced the threat that cats pose to wildlife? Would it be better, for example, to eliminate dense foliage where robins like to forage but which cats prefer for hunting? "You can't stop people from owning cats," says Mike, "but you can improve the outlook for their prey."

We might also think about whether we should help those species that are more vulnerable than others. House sparrows have suffered huge declines in recent decades, especially in cities (see News, p39). As Rebecca says, "I'm not sure that cats are reducing population levels, but they may be adding to problems that already exist." For a group of sparrows in an urban area, a high density of cats could be the final claw.

There's no doubt, too, that domestic cats highlight the UK's contradictory attitudes to wildlife. If a cat comes back with a mouse, many people will think that's okay, but if it's a bird, they will feel that their trusted pet has broken an unwritten rule.

Rebecca agrees: "People love birds, but are more uncomfortable with little furry creatures. They don't like the idea of robins being eaten by cats, but they're not so worried about rats, and this taints their view of mice and voles."

The whole cat predation issue is highly charged, Mike observes. "If you just look at the ecology, however, then you're talking about a predator that is living in very high densities and not limited by food supply. If that were true of any other species, there would be an outcry."

When I started researching this article, I assumed that the problem of cat predation of wildlife was a preoccupation that could

be traced back, at most, about 30 years. The earliest peer-reviewed study I can find dates from 1978, while a widely cited paper from 1987 looked at the killing habits of 70 cats in a Bedfordshire village. They were major predators of house sparrows, it concluded.

A PERENNIAL PROBLEM

Then I remembered something from my childhood, a poem by Edward Thomas, who died at the Battle of Arras in 1917. The poem's three short stanzas describe the life of an unloved stray that took its toll on blackbirds, thrushes and nightingales. Thomas concludes:

*"I loathed and hated her for this;
One speckle on a thrush's breast
Was worth a million such; and yet
She lived long, till God gave her rest."*

Apart from the fact that cats are unlikely to take many nightingales these days, it seems that not much has changed in the best part of 100 years.

TELL US WHAT YOU THINK

» Is your moggy harmless or a killer? Are cats a menace to your local wildlife? And what is the most unusual prey item your pet has brought home?

» Share your experiences with other readers by writing to wildlifeletters@bbcmagazines.com



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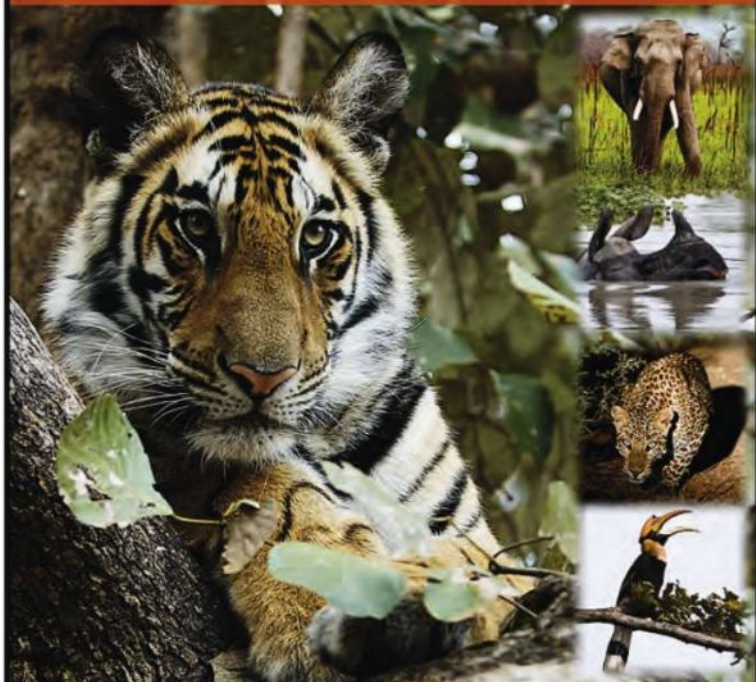
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Calling all artists

Our competition for natural-history artists just gets better and better.

This wonderful study of a pair of playful tigers bowled over our panel of judges with its energy and optimism, and won young Essex-based artist Natalie Mascall the prestigious title of *BBC Wildlife Artist of the Year 2010*.

All 13 category winners – the cream of more than 500 entries from around the world – had great impact, character or atmosphere, and made a stunning display at the Marwell International Wildlife Art Society exhibition in August.

All of the winners, runners-up and commended artworks can still be enjoyed on our website – find them at www.bbcwildlifemagazine.com/gallery/wildlife-artist-year-2010-results-gallery – so why not have a look? You might be inspired to enter this year.

THE CATEGORIES

- » British Mammals (behaviour and portraits)
- » British Birds (behaviour and portraits)
- » All Other Wildlife (behaviour and portraits, in the UK and worldwide)
- » The Wonder of Plants (British and worldwide)
- » Beneath the Water (marine and fresh water)
- » Animals in their Environment (British and worldwide)
- » World Mammals (behaviour and portraits)
- » World Birds (behaviour and portraits)
- » Black and White Nature (pencil, lino cuts, etchings, wood block etc)
- » Visions of Nature (innovative, creative impressions of wildlife)
- » Frozen Planet (please note: entries must feature animal life)
- » Endangered Species (entries must feature species listed by the IUCN as 'Endangered' or 'Critically Endangered')
- » International Artists – a category judged digitally, exclusively for artists outside of the UK. This is to save our international entrants the great costs of sending artwork to the UK.

Natalie Mascall/nataliemascall.co.uk



MEET THE JUDGES



PIP MCGARRY

The founder and chairman of the Marwell International Wildlife Art Society (MIWAS), Pip has been a highly successful professional wildlife artist for many years.



SOPHIE STAFFORD

Sophie is the editor of *BBC Wildlife* and works closely with many artists and illustrators. She says, "I was delighted to give one of last year's winners a regular slot in the magazine."



CHRIS BREEN

Chris founded and now manages *Wildlife Worldwide*. Conservation is one of its top priorities, and Chris says that "working with wildlife artists helps us to achieve this goal".



CHRIS ROSE

An internationally acclaimed wildlife artist, Chris is best known for his bird paintings. He is a leading member and secretary of the Society of Wildlife Artists (SWLA).



IAN LANGFORD

Ian started his collection of wildlife art with a painting of goldeneyes aged 14. He has gone on to publish a series of 22 wildlife art books that reflect his wide-ranging tastes.



WIN

a trip to see
orangutans in Sabah,
Borneo, PLUS the
exhibition of
your art



A baby orangutan hones its climbing skills in the forests of Sabah.



Last year's winner Natalie Mascal admires her winning picture with judge Chris Breen.

Jonathan Pointer/pointer-wildlife-art.co.uk

THE PRIZES

» WIN A TRIP TO SABAH, BORNEO, IN SEARCH OF ORANGUTANS

The overall winner will receive a holiday to Borneo organised by Wildlife Worldwide and the Sabah Tourism Board. Discover the finest wildlife the region has to offer, from orangutans to proboscis monkeys, and explore its amazing diversity of habitats. The wildlife viewing is second-to-none, and combines well-laid-out trails and high canopies with comfortable accommodation to ensure that you have an unforgettable experience. Plus, you'll learn about key conservation projects and the area's unique cultures and traditions.

To find out more call 845 130 6982 or see www.wildlifeworldwide.com



» SEE YOUR ART EXHIBITED AT MARWELL INTERNATIONAL WILDLIFE ART SOCIETY

All of the category winners will be exhibited at the prestigious annual exhibition of the Marwell International Wildlife Art Society in August 2011, in a special display alongside 200 other artists and sculptors. The awards ceremony will take place on the opening night of the exhibition. www.miwas.co.uk

» The overall winner will also be displayed at *The Natural Eye*, the 48th annual exhibition of the Society of Wildlife Artists at the Mall Galleries, London, 26 October–6 November 2011. The winner will be able to meet fellow artists at the private view.

www.swla.co.uk

» HAVE YOUR ART PUBLISHED IN BBC WILDLIFE MAGAZINE AND ONLINE

All of the category winners will be published in the August 2011 issue of *BBC Wildlife* (on sale 7 July). The winners, runners-up and commendeds will also be published in an online gallery at www.bbcwildlifemagazine.com/competitions

HOW TO ENTER

It's easy to enter (and free!). Just read the rules (below) then visit our website and follow the simple step-by-step instructions. These will help you to fill in the entry form and upload jpgs of your artworks. Entries must be received by **28 February 2011**. Good luck!

THE RULES

- 1 Entries** The competition is open to all artists aged 18 or over, amateur or professional, other than employees of BBC Worldwide, Bristol Magazines Ltd and Wildlife Worldwide, and their immediate families.
- 2** Maximum eight entries per person.
- 3** No artwork may be entered in more than one category.
- 4** The artwork must not have won a prize in any other competition anywhere in the world, or been published by a third party.
- 5** The artwork must have been created in the past year and be your original work.
- 6** You must be the sole author and owner of the copyright of all artwork entered, OR if your work is copied from a photograph(s) that is/are not your own, you must have sole permission in writing from the copyright owner to use his/her work. Copies of published photographs or paintings are not eligible. Source material or proof of permission to use must be made available on request by the judges.

BBC Wildlife does not accept any liability in the publication of unlawfully reproduced art.

7 Artwork must feature wildlife – birds, mammals, waterlife, invertebrates and plants – in a natural or captive environment.

8 Computer-generated artworks will not be accepted.

9 The artwork must be two-dimensional only. Diptychs, triptychs and box canvases are not admissible.

10 For exhibiting at MIWAS, the outer edges of framed artwork must not exceed 44 inches in any direction; actual artwork should not exceed 40 inches in any direction.

11 Artists living outside the UK must enter the International Artists category and no other so that all judging is fair. Any artworks entered in the wrong category will be moved by the judges.

12 To enter, the artwork must be uploaded to our website at www.bbcwildlifemagazine.com.

com by the closing date of **28 February 2011**.

Artwork should be submitted as jpgs. Each jpg should be a 300dpi, 1MB file with the category, your name and the subject in the title (in this order). All entries must be accompanied by an online entry form.

13 No allowances will be made for poorly scanned entries. BBC Worldwide takes no responsibility for corrupted or late entries. Scans of artwork will not be returned.

14 Email addresses may be used by BBC Worldwide for marketing, unless you opt out. For conditions, see p109.

15 Copyright The entry of any artwork to the competition constitutes a grant to BBC Worldwide of the non-exclusive right to reproduce it for any purpose in connection with the competition at any time in any media.

16 The winners consent to the use of their artwork, name and/or photograph in any publicity carried out by BBC Worldwide, without further compensation.

17 The judging The artwork will be judged

by an independent panel appointed by BBC Wildlife. We reserve the right to change the advertised judges.

18 The judges' decision on all matters relating to the competition is final. No correspondence will be entered into.

19 BBC Wildlife reserves the right to withhold prizes if, in the opinion of the judges, the quality of entries falls below the standard required.

20 The first round of judging will take place in March. The best images in each category will be shortlisted for the final round of judging in May. Successful entrants will be notified by 30 April 2011.

21 Artwork must be framed and delivered to the final judging. The category winners and overall winner will be selected from this shortlist.

22 Category winners may be stored by the organisers until exhibited; unsuccessful entrants will need to remove their art.

23 The prizes The category winners will be published in the August 2011 issue of

BBC Wildlife and displayed at the MIWAS exhibition in August 2011. The runners-up and commended artworks will also be published on our website from 7 July.

24 The overall BBC Wildlife Artist of the Year wins a place for one person to Sabah, Borneo, including flights, transfers, accommodation and wildlife viewing. Extras such as air taxes and local park fees to be paid by the prizewinner. There are no holiday or cash alternatives. The prize cannot be transferred. Subject to availability. Excludes peak holiday dates (such as Christmas and Chinese New Year).

25 Wildlife Worldwide (tel: 0845 130 6982) reserves the right to substitute another holiday in the event of unavailability, for whatever reason, of the advertised trip.

26 The overall winning picture will be displayed at the Society of Wildlife Artists' annual exhibition at the Mall Galleries, London, 26 October–6 November 2011. If unsold it should be collected on Thursday 10 November.



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Your Q&A...

Send us your wildlife questions – our experts have all the answers.

OUR EXPERTS

MIKE TOMS

Mike is head of garden ecology at the British Trust for Ornithology. He has also written and co-written several books, including *BTO Garden Birds and Wildlife*.



BRETT WESTWOOD

One of the BBC Natural History Unit's leading naturalists, Brett is a radio presenter and writes books on wildlife and our Highlights section (see p6).



RICHARD JONES

Richard has been fascinated by insects since childhood. A former president of the British Entomological Society, he now works as a surveyor and writer.



KATHY WILDEN

Kathy is strategy director and expedition leader of Biosphere Expeditions, which takes groups of volunteers to study wildlife at Amazonian clay licks.



MATT DOGGETT

Matt has a PhD in marine biology and has worked in tropical and temperate seas. He undertakes marine surveys and wildlife photography and is a Sea Search diver.



WE'D LOVE TO HEAR FROM YOU

SEND YOUR QUESTIONS TO

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wildquestions
@bbcmagazines.com

We are very sorry, but due to the high volume of questions we receive, we are not able to acknowledge or answer any personally.

Winter guests

I saw blackcaps in my garden last winter, but all of my bird guides say that they are summer visitors from Africa. What is going on?

Jeremy Loftus London

Blackcaps using garden feeding stations is a new phenomenon. The BTO's Garden BirdWatch scheme has recently revealed a peak in visits during the winter, a pattern of behaviour that contradicts our perception of the blackcap as a summer migrant to patches of scrubby woodland.

Data from bird ringing supports the view that breeding blackcaps are summer visitors that head for North Africa in autumn. Most of the blackcaps from central Europe also migrate south, but some take a more westerly route and end up in southern Britain by winter.

Until fairly recently, the numbers arriving here were only small. However, with a run of mild winters and more people providing suitable foods for them, these robust warblers are faring much better.

German research has revealed that blackcaps wintering here return to their breeding grounds



A female blackcap perches on a cluster of holly berries. But will she still be here for Christmas?

in central Europe earlier than those travelling from further south. The British birds bag the best territories and have greater breeding success. The effect of this advantage is that the number of blackcaps migrating here in autumn has increased markedly, an example of evolution in action.

The question is, will the birds

visiting Britain in summer become year-round residents?

Mike Toms BTO

DID YOU KNOW?

Blackcaps have been able to adapt to wintering here thanks to their rather catholic tastes. They eat fat, peanut cake, cheese and even meat offered on bird tables.

Galling galls?

What are these swellings on our allium? They appear to have stunted the plant's growth. Peter and Lucy Smallbones
Via email

These beautiful mauve swellings nestling among the flowers of your garden allium look remarkably like galls, structures induced in plants by a variety of invertebrates. Examples include the familiar marble galls on oak twigs, which

are created by a minute wasp that uses the gall to protect its larvae.

However, I consulted Margaret Redfern, an authority on plant galls and author of a forthcoming Collins New Naturalist volume on the subject, and she reports that these are not galls at all, but bulbils.

Many allium species produce bulbils on their flowerheads as reproductive devices. The crow garlic, very common in the UK, often dispenses with flowers

altogether, producing heads of bulbils, which fall to the ground and sprout into new plants.

Brett Westwood Naturalist



Bulbils crowd out

David Chapman/NHPA

Lucy Smallbones

Four wings good, two wings better

Why do flies have only two wings, while many other insects have four?

Thomas Bridle Via email

An early insect ancestor with only two wings obviously did well enough to give rise to an entire order, with a quarter-of-a-million fly species at the last estimate.

In fact, flies (making up the order Diptera, from 'di-*ptera*', meaning 'two wings') do have four wings, but the hind pair are reduced to tiny balancing skittle-shaped knobs, called halteres, which oscillate at the same speed, but flex in the opposite direction to the main wings in flight.

The halteres act like an aircraft's inertial navigation system – their direction of swing changes according to shifts in the insect's orientation in the air.

Two wings are easier to control and more responsive to manoeuvre than four, and two-wingedness is a more

A two-winged hoverfly and four-winged butterfly put their differences aside.



advanced evolutionary state than the four wings of dragonflies, lacewings and termites. Indeed, many four-winged insects, such as butterflies, bees and wasps, latch their front and back wings together to create single aerofoils to improve their flight abilities.

Of course, not all insects have wings; they have evolved to live without them many times over. All fleas are wingless – they jump around instead – and there are wingless species of moths (female vapourers), beetles (female glow-worms), wasps (female velvet ants) and ants (all the workers).

Aphids alternate between wingless and winged generations, and the lacewing species *Pseuda diptera* can have either two or four wings. However, it is no coincidence that flies, the most agile of airborne insects, are named after the act of flying itself.

Richard Jones Entomologist

DID YOU KNOW?

Strepsiptera is a small order of tiny two-winged insects, separate from flies. The wingless females spend their lives inside the body of a larger insect. Only the males fly free, albeit for a short time – they have no mouths to eat with.

Michael Grant/Alamy

Macaws dine out at a clay lick in Peru.



Earth-eaters of the Amazon

I've heard that parrots lick the mud banks at the side of the Amazon. Is this true and, if so, why do they do it?

Aimée Matthews Llantwit Major

Many animals supplement their diet with clay, but the Amazon is the only place where parrots – more precisely, fruit-eating macaws – are known to do so.

There are several theories as to why the macaws here eat clay. An oft-cited favourite is that the clay is used as a detox. Macaws specialise in eating unripe fruit, which normally contains a higher level of toxins than ripe ones. (The poisons are there to deter animals from eating a fruit before the seeds inside are ready to germinate.)

Macaws tend to gather at specific 'clay lick' sites, known locally as *collpas*. Mammals, such as peccaries, monkeys and brocket deer, are also frequent visitors to *collpas*, presumably for the same reason as the birds.

The detox theory suggests that the tiny grains of soil in the clays at a *collpa* bind with toxins in an animal's gut, helping to flush them out of its body. However, the most recent research shows that the soil at a *collpa* is no more chemically active than the clays elsewhere along the bank, though it does contain higher levels of salt. This suggests that the clay-eaters are compensating for a lack of sodium in their diet.

The wildlife-rich *collpas* are a major draw for nature-lovers in the upper Amazon, and there are several ongoing studies into how the sites can be used sustainably as tourist attractions.

Kathy Wilden Biosphere Expeditions

STRANGE BUT TRUE...

Star performer

THE FREAKISH, TENTACLED

snout of the star-nosed mole *Condylura cristata* may look funny, but it's nothing to laugh at. It could be the most skilled sniffer under the sun – even when underwater.

The mole, a hamster-sized inhabitant of North American wetlands, is nearly blind. But what it lacks in vision, it more than makes up for in feeling, so to speak.

Its nose is used more as a super-sensitive spare paw with 22 toes. Packed with over 25,000 sensory receptors, the pea-sized organ is extremely perceptive. The mole can identify anything it touches seven times faster than a person can blink.

This makes the mole's star nose a formidable hunting tool. The animal sweeps it back and forth along the ground like a metal detector, looking for worms and other treasures.

It scans so quickly, and its feelers are so responsive, that the whole process – from



Whether sniffing the air or water, few snouts match the abilities of a star-nosed mole's.

detecting to devouring prey – takes just one-fifth of a second, making the mole the fastest-foraging mammal in the world.

But the animal has another trick up its trunk. The mole can track the scent of prey underwater, like an aquatic bloodhound. It blows a bubble out of each nostril. Odour molecules cross from the water into the air pocket, which the mole then sucks back in for a whiff. In this way, it sniffs out dinner in a pond as efficiently as a mouse or rat does on land. Oh, the sweet smell of evolutionary success. **David Butvill**

FAST FOOD

» The star-nosed mole can scan a dozen potential meals every second. Its snout is six times more sensitive than a person's fingertips.

» The mole's tiny front teeth act like a pair of tweezers, plucking food from the mud and soil.

» In a study testing the mole's foraging speed, it found and consumed eight different prey items in under two seconds.

» The mole decides if something is edible or not within 25 milliseconds – about the speed limit of a neuron. Biologically, it cannot get any faster.

» The snout's star of 'fingers' may also help it to manipulate prey.

QUICKFIRE

Why do ladybirds always have spots rather than stripes or other patterns?

Tina Anderson, Hull

The answer is contrast. The insects' strong warning colours signal their foul taste. Though some ladybirds have patterns verging on checks and streaks, a spot is the simplest pattern for them to develop. Spots occur throughout all animal groups, from freckles to a full dapple. All it requires are central points creating the pigment, and these are usually fixed at the embryo stage under genetic control.

Richard Jones Entomologist



A jackdaw in magpie's clothing?

Is this bird a hybrid magpie-jackdaw or the result of a genetic variation in jackdaws?

Chris Rigby, Via email

This is a jackdaw with a plumage abnormality known as partial leucism. Some of the pigment cells within the feathers are unable to produce the pigments. Leucism is often confused with albinism, but there is a clear difference: it affects all pigment types, whereas albinism only has an impact on melanin production.

Mike Toms BTO

I found what looked like a leech in my pond pump. Will it bite?

Bernard Minns, Wells

Leeches are worms with a large sucker at the rear and a smaller one at the front. They are found in water across the British Isles. Contrary to popular belief, they are not all bloodsuckers. The medicinal leech *Hirudo medicinalis* is the only British species big enough to bite us. Others attack birds, snails and crustaceans.

Tony Cook Malacologist

Beach blob

I photographed this object on a beach in Mozambique. It appeared to unfold as the tide came in. Is it a plant?

Susan Francis Malvern

This dreadful-looking green blob is a sea hare, a type of marine mollusc belonging to the family Aplysiidae. Underwater, it exhibits a far more elegant and frilly appearance. Long rhinophores (scent organs) extend from its rounded body making it resemble a huddled rabbit or hare, explaining how the creature got its name.

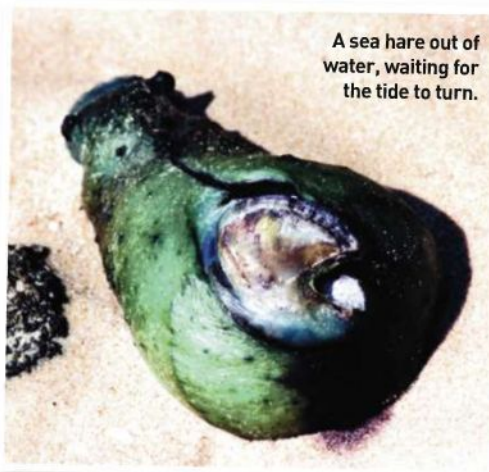
Sea hares feed on algae, moving slowly both above and below the low-water mark. This one has been left high and dry as the tide

receded. Its body has contracted as much as possible to minimise water loss. On scorching hot days, a sea hare runs the risk of being slowly cooked to death on the exposed shore if it cannot find a shady refuge. Some species such as the eye-catching, spotted sea hare *Aplysia dactylomela* avoid this risk altogether by being active only at night.

Sea hares are large snails with a delicate shell beneath their skin. *Aplysia punctata* lives in UK seas and may grow to 20cm in length. It ranges from olive green to purple – the exact

colour varies according to the mollusc's diet of red, brown or green seaweeds. Its pinkish eggs are laid underwater in tangled masses, which each contain up to 20 million eggs.

Matt Doggett Marine biologist



A sea hare out of water, waiting for the tide to turn.



IPPL

Gibbons are the forgotten ape, sadly much neglected in favour of their 'great' cousins and yet gibbons are amazing creatures. They are known for their spectacular swings and leaps; they are also talented singers. You can adopt a gibbon at IPPL's sanctuary for £24 a year. Adoption includes a photo and profile, a personalised certificate, an IPPL window sticker and newsletters three times a year.

www.adoptagibbon.org

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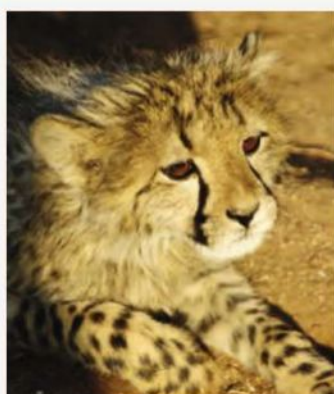


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marwell.org.uk/adopt

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www.cheetah.org.uk/bbc

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CHRISTMAS ANIMAL ADOPTIONS

What will you give your loved ones this Christmas? Why not adopt an animal for them? This way, you can help to support a worthwhile cause and give your nearest and dearest a gift that lasts.



WWT BIRD ADOPTION

The Wildfowl & Wetlands Trust is one of the world's largest and most respected wetland conservation organisations working globally to safeguard and improve wetlands for wildlife and people. Why not give your loved ones a bird adoption this Christmas and help protect the future of globally threatened species? Adoptable species include: flamingo, swan, crane, nene or mallard.

www.wwt.org.uk/adoption

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DURRELL

Durrell Wildlife Conservation Trust's animals are ambassadors for their 'relatives' worldwide, highlighting the plight of their species in the wild. By studying their needs and with breeding programmes, we can help save them from extinction. An ideal Christmas gift is an animal adoption, from just £3 a month you can choose from a selection of loveable creatures like Bandro the Alaotran gentle lemur.

www.durrell.org/adopt

☎ 01534 860015.



MARE AND FOAL SANCTUARY

As winter draws closer we are all faced with that sinking feeling – the dreaded Christmas shopping. This year give yourself a break, stop horsing around on the high street and head to our online shop. You will find a selection of distinctive and unique Christmas gifts for all the family, from colourful calendars of our horses to cute cuddly toy bears.

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wwf.org.uk/bbc
☎ 01483 426333



Image courtesy of Marwell Wildlife



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NATURE TALES: ENCOUNTERS WITH BRITAIN'S WILDLIFE

Compiled by Michael Allen and
Sonya Patel Ellis

Elliott & Thompson, 288pp, £18.99
ISBN 9781904027942 (hbk)

An inspired anthology
of the best writing
from centuries of
encounters with
British wildlife.



Nature writing is tricky to define. Sometimes it appears as scientific observation; a good example in this superb compilation is Charles Darwin's work on the importance of earthworms. Other writers are adept at using personal experience to reflect on our place

in the world, such as *BBC Wildlife's* columnist Richard Mabey. But the common thread appears to be the desire to share the wonder and mystery of nature.

Nature Tales covers every angle. All of the greats are here, from John Aubrey's extraordinary observations of 17th-century Wiltshire through Gilbert White to George Montagu (of harrier fame), Henry Williamson, Gavin Maxwell and regular contributors to this very magazine – Paul Evans, Mark Cocker and Dominic Couzens. The only shocker is the lack of women.

The range is huge – from *Times* commentator Simon Barnes' contemplation of a hoverfly and realisation that nature gives a more satisfying high than LSD,

which reveals more about man than insect, to David Lack's notes on nestbuilding swifts, in which we get no sense of the author except as a meticulous observer. The tales are loosely grouped by habitat, so you have to dip in to find every gem.

My favourites are by the 19th-century naturalist Richard Jefferies; his enchanting (but sometimes melancholic) prose shows why we need nature in our lives. A perfect Christmas gift.

Verdict ★★★★★

Fergus Collins Editor,
Countryfile Magazine

BBC WILDLIFE SHOP

Reader price £15.99. Subscriber
price £14.99. Code W1110/01

DAVID ATTENBOROUGH'S FIRST LIFE

By Matt Kaplan and Josh Young

Collins, 288pp, £24.99

ISBN 9780007365241 (hbk)

This lavish tie-in to
a new BBC series
takes a look back
at the beginnings
of life on Earth.



Sir David Attenborough's writing style, like his presenting, is deceptively simple. His classic books, such as *Life on Earth* (1979) and *The Living Planet* (1984), educate and enthrall, and remain some of the best introductions to ecology ever published.

This attractively produced



THE WINTER HARE

Andrew Haslen

When his dogs brought home a young hare one day, artist Andrew Haslen was given unprecedented access to one of his favourite subjects. He raised the leveret, recording its development in a variety of media – first pencil sketches, then watercolours, oils and linocuts – until returning it to the wild a year later. The result is this beautiful and intimate collection of paintings and drawings: truly a book to treasure.

BBC WILDLIFE SHOP

RRP £37.99. Reader price £35.99. Subscriber price £32.99. Code W1110/04

volume, billed as a “journey back in time” to the beginning of life on Earth, is bound to fly off the shelves at Christmas. But since the world of fossils is one of David’s lifelong passions, it’s a shame that his contribution is limited to a six-page introduction.

Still, Matt Kaplan is a great storyteller, too – his text is authoritative, engaging and witty, and the accompanying digital reconstructions of early species and habitats are stunning.

Verdict ★★★★★

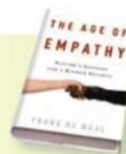
Ben Hoare Features editor,
BBC Wildlife

BBC WILDLIFE SHOP

Reader price £21.99. Subscriber price £19.99. Code W1110/02

BOOK OF THE MONTH

It's good to be nice



THE AGE OF EMPATHY

By Frans de Waal

Souvenir Press, 304pp, £18.99

ISBN 9780285638907 (hbk)

Is the milk of human kindness shared by the animal world?

Is it a sign of weakness to show pity? If nature is red in tooth and claw, how did humans evolve to be, well, humane? And are conscious acts of kindness unique to us? In his latest book, primatologist Frans de Waal seeks to answer these questions while exploring how long empathy has been a part of human (and proto-human) nature, and whether the time is right for a new, more compassionate society.

The author has an engaging style, weaving personal anecdotes with historical events convincingly. He draws on his

experience as a European living in America, plus hard-won knowledge from a lifetime spent studying apes and monkeys. While the differences between species are always interesting, it is the behaviour patterns we share with our zoological next of kin that are most enlightening.

If extending the hand of kindness is a trait shared by non-human primates, did we inherit it – along with a sense of fairness – from our common ancestor? We will never know for sure, but this thought-provoking work helps us to get in touch with our inner bonobo.

Verdict ★★★★★

Ian Redmond Ambassador, UNEP
Convention on Migratory Species

BBC WILDLIFE SHOP

Reader price £16.99. Subscriber price £15.99. Code W1110/03



NATURE CRIME: HOW WE'RE GETTING CONSERVATION WRONG

By Rosaleen Duffy

Yale, 258pp, £24.99

ISBN 9780300154344 (hbk)



The perpetrators of the worst crimes against wildlife might not be the usual suspects.

It is increasingly fashionable to suggest that the culprits behind the worst crimes against nature are actually the conservationists themselves. Rosaleen Duffy is the latest to make this accusation as she investigates the big issues – illegal trade; poaching for ivory, tiger bone and rhino horn; tourism around flagship species; and the flexible scruples of NGOs.

Conservationists emerge as a neo-colonial force, whose inappropriate western values place the interests of animals above those of humans. They marginalise local communities, removing them from traditional landscapes and resources to create wildlife reserves.

They protect man-eating tigers and man-squashing elephants, but ban compensatory trade in those animals or even most means of self-defence. Finally, they encourage the transfer of wealth from poor to rich through tourism, as the profits are made by western-owned lodges and the losses are sustained by the local environment and its inhabitants.

Conservation, she concludes, is perpetrating grave injustices. Correcting these might conscript indigenous people to the cause. The ongoing decline of rhinos, tigers and elephants shows that these animals badly need new friends. You may not agree with all of this – I rather hope you don't – but you should read this book.

Verdict ★★★★★

Stephen Mills Naturalist

BBC WILDLIFE SHOP

Reader price £22.99. Subscriber price £20.99. Code W1110/05



Elsa, pictured here with Joy Adamson, became everyone's favourite lioness.

WILDLIFE HIGHLIGHTS: 21 OCT – 18 NOV

BIRDS BRITANNIA:

GARDEN BIRDS

BBC FOUR (CHECK RT)

Birds are an integral part of British life. This four-part series traces this special relationship back through the centuries. It begins with garden birds. Our ancestors would be amazed that we spend £200 million every year on feeding species that they used to eat. Attitudes began to change when social upheavals forced people into towns. This separation from nature inspired the creation of tree-filled parks and a fashion for keeping songbirds in cages. The history is fascinating, and with contributions from Sir David Attenborough, Bill Oddie and Tony Soper, we get expert insights into our relationships with these feathered friends today. The subsequent episodes focus on seabirds, waterbirds and birds of the countryside. (For more cultural curiosities see our feature 'The Brits and their birds', Autumn.)

The blue tit is one of our best-loved garden birds.



Genevieve Leaper/rspb-images.com

PICK OF THE MONTH

Of lions and legacies

NATURAL WORLD: ELSA – THE LIONESS THAT CHANGED THE WORLD

BBC2, CHECK RADIO TIMES FOR DETAILS

Joy Adamson's landmark book, *Born Free*, was published 50 years ago and left a legacy that is both celebrated and controversial. This programme explores the lives of Joy and her husband George (including their violent deaths, which were caused not by lions as some mistakenly believe, but by humans). Their dedication changed the world's perception of these big cats, but raised difficult questions about how close conservationists should get to animals.

While working as a game warden in Meru National Park, Kenya, George Adamson's life changed forever in 1956 when he shot a lioness dead and kept one of her orphaned cubs. Joy developed an astonishingly close bond with Elsa, as the cub became known, illustrated by footage of the lioness behaving like a massive, affectionate tabby. The resulting book was Joy's rose-tinted take on their lives and became a bestseller. The outside world was fascinated by their relationship, which continued even after Elsa returned to the wild. But the truth, as this programme shows, was a little less romantic.

Elsa has heart-warming original footage of George

and Joy in the bush, and clips of another adult lion, Christian, that was raised in a London flat and rehabilitated into the wild by George.

George dedicated the rest of his life to lions, and became the first conservationist to return a pride to the wild. But, when one of his favourite felines killed someone, George had to shoot him. The act lost the Adamsons a lot of support; people wondered whether the animals had really benefited from such a close relationship with humans. Though, as George wrote, "No lion is completely reliable, but are many human beings either?"

Virginia McKenna, star of the 1966 movie *Born Free*, makes some poignant contributions; she and her co-star/husband Bill Travers became committed conservationists as a result of the film, ultimately creating the Born Free Foundation. Meanwhile, Sir David Attenborough appears in both present-day and 1961 incarnations, providing hilarious anecdotes about his experiences with the Adamsons.

Human impact on the lion, as George predicted, has been catastrophic, which makes his pioneering work all the more important. Today, the population is one-tenth of what it was in 1966, when these big cats were actually considered vermin. It's crisis time.

Rachel Ashton

NATURAL WORLD: THE DOLPHINS OF SHARK BAY

BBC2 (CHECK RT)

Janet Mann has studied the bottlenose dolphins of Shark Bay, Western Australia, for 23 years – especially Puck, the 33-year-old pregnant female starring in this programme. The drama centres on the threat posed to Puck's family by tiger sharks; constant reminders maintain tension amid extensive explorations of dolphin behaviour. It's easy to take all the underwater footage for granted, but an add-on at the end reveals how challenging the programme was to make. (For the full story, see our feature at www.bbcwildlifemagazine.com/animals/amazing-bottlenose-dolphins-shark-bay.)

Due to last-minute schedule changes, BBC Wildlife regrets that we cannot guarantee the accuracy of transmission information. Please check Radio Times magazine or www.radiotimes.com for channel listings.

Confessions of a tour guide

You may visit exotic destinations to see the wildlife, but it's the antics of your fellow travellers that will make the trip memorable, writes Hilary Bradt.

I NEVER MEANT to become a tour leader. It only happened because, in the mid-1970s, after writing a book on trekking in the Andes and then founding (also accidentally) Bradt Travel Guides, I contacted a fledgling company in California. They were pioneers in adventure travel, so perhaps I could work as their consultant?

They weren't keen, but did admit that they needed tour leaders, so would I be interested? Of course I said yes. To be paid to travel to some of my favourite parts of the world, and comfortably too, seemed like a dream come true.

I started by leading treks in Peru and Bolivia, and graduated

to natural-history tours of the Amazon, Kenya and Madagascar. My job, I soon realised, was to give the clients the impression that they were having an adventure, while making damn sure that they didn't.

But the problem with the developing world is that it throws up challenges that test even the most sunny-natured.

Noël Coward wrote:

*"Travel they say improves the mind,
An irritating platitude
Which frankly, entre nous,
Is very far from true...
Why do the wrong people travel
When the right people stay back home?"*

Artwork by Martin O'Neill/cutout.co.uk. Lyrics copyright the owner





Like most animal-lovers, Hilary (left) adores lemurs, but people on her trips to Madagascar (below) haven't always shared her enthusiasm.



I'm not thinking just about the moaners and arguers here, but the people who would stand out as completely bonkers in any environment, let alone the remote wildernesses of Africa or the frigid heights of the Andes.

Take Martha, who somehow made her way to Madagascar, where she wandered through a thief-infested market with her handbag open, and screamed "Get this monkey off me!" when a lemur jumped on her shoulder in Berenty.

Then there was the woman who passed out if anyone smoked within about 10m of her – smoking is the favourite pastime of most people in the developing world – and the chap

with a physical disability who signed up for an extreme adventure itinerary.

But you need the disastrous trips to put the good times into focus. When the group gels, there is no better way of travelling. Sharing the discovery of a rare animal, exulting in a gorgeous view or telling tall tales and falling about with laughter will all happen if you're lucky, and are guaranteed to make you feel

There are people who would stand out as bonkers in any environment, let alone Africa or the Andes.

on top of the world.

I have a rich bank of such memories: in Madagascar, the glimpse of a tiny mouse lemur dozing in tangled vegetation, the discovery of a twig-mimic snake and sharing the thrill of the indri's song. Then, from Ecuador's Amazon region, there's the view of an ocelot stretched out on the limb of a tree overhanging the river.

In fact, that trip went very wrong at the end, but the group sailed through the challenges with beaming smiles. I still have the letter one 76-year-old sent me

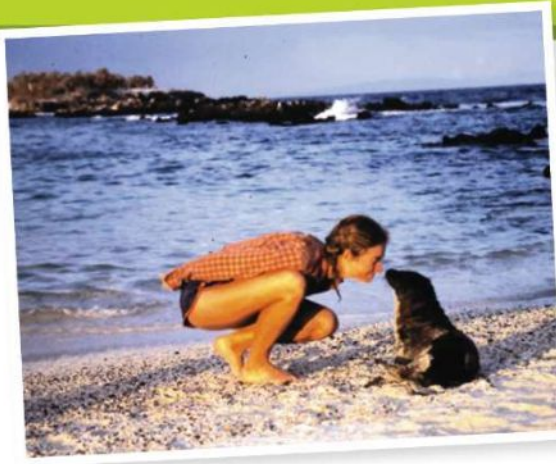
afterwards: "Dear Hilary, I love ya. I loved staying in the whorehouse in Lago Agrio. When are we going to travel together again?"

So, yes, there have been wonderful holidays when the right people travelled to the right places, or – even better – when the wrong people travelled to the right places and were transformed. But when the wrong people travel to the wrong places (for them), and those wrong places throw up all the disasters they can muster... oh, you wish you'd stayed at home.

In the 1980s, I led several trips to Peru and the Galápagos Islands. Nothing ever went wrong. Or not seriously wrong. ►



You really can't go too wrong in the Galápagos Islands, though kissing the sealions isn't necessarily advised.



Altitude sickness in Cusco and seasickness in the Galápagos were par for the course, but in general those two places knew what tourists wanted and came up with the goods: Inca ruins and blue-footed boobies.

Mind you, I do remember one rather embarrassing moment on a trip to Cusco, when we were returning to the hotel from our tour of Sacsayhuamán, the extraordinary ruins above the city. I was holding forth about Inca stonemasons when someone tapped my shoulder.

"Just a minute, let me finish," I responded, a bit irritably. "But it's Mary, she's running behind the bus. You left her behind!"

The person I remember most

vividly on one of these trips was Joyce. She was tiny, rotund and in her mid-seventies. Recently widowed, this was her first big trip as her husband hadn't been interested in travel. At the start of the journey she handed me a note: "If I should die on this holiday, I would like to be buried in South America according to local custom."

It is either a demonstration of my callousness, or how well we got to know each other, that I took her to the Inca museum to look at the mummies and decide which position she favoured.

The Galápagos delivered its usual gifts: dancing blue-footed boobies, cavorting sealions, sleek penguins, sanguine marine iguanas and phlegmatic giant tortoises. And beaches of the finest white sand.

On Bartolomé Island, there's

an isolated beach that, back then, was seldom visited. It was one of those hot, still days that makes swimming

irresistible. But Joyce couldn't swim and hadn't brought a swimsuit. When I suggested skinny-dipping, egged on by her new friends, she was dubious. Nobody, not even her husband, had seen her naked in daylight.

But if anything proves that travel does, indeed, broaden the mind, it's this: Joyce, eyes closed and wearing nothing but a beatific smile, holding hands with two women as we bounced her over the waves like a child.

THE WRONG PEOPLE IN THE RIGHT PLACE

You can't get much righter than a safari in Kenya. Even rather silly people, such as the woman who only wanted to see sheep or the man who told his video camera "Here is the king of the jungle", tame down nicely when parked next to a family of

cheetahs or a herd of elephants. Except, that is, for Tom.

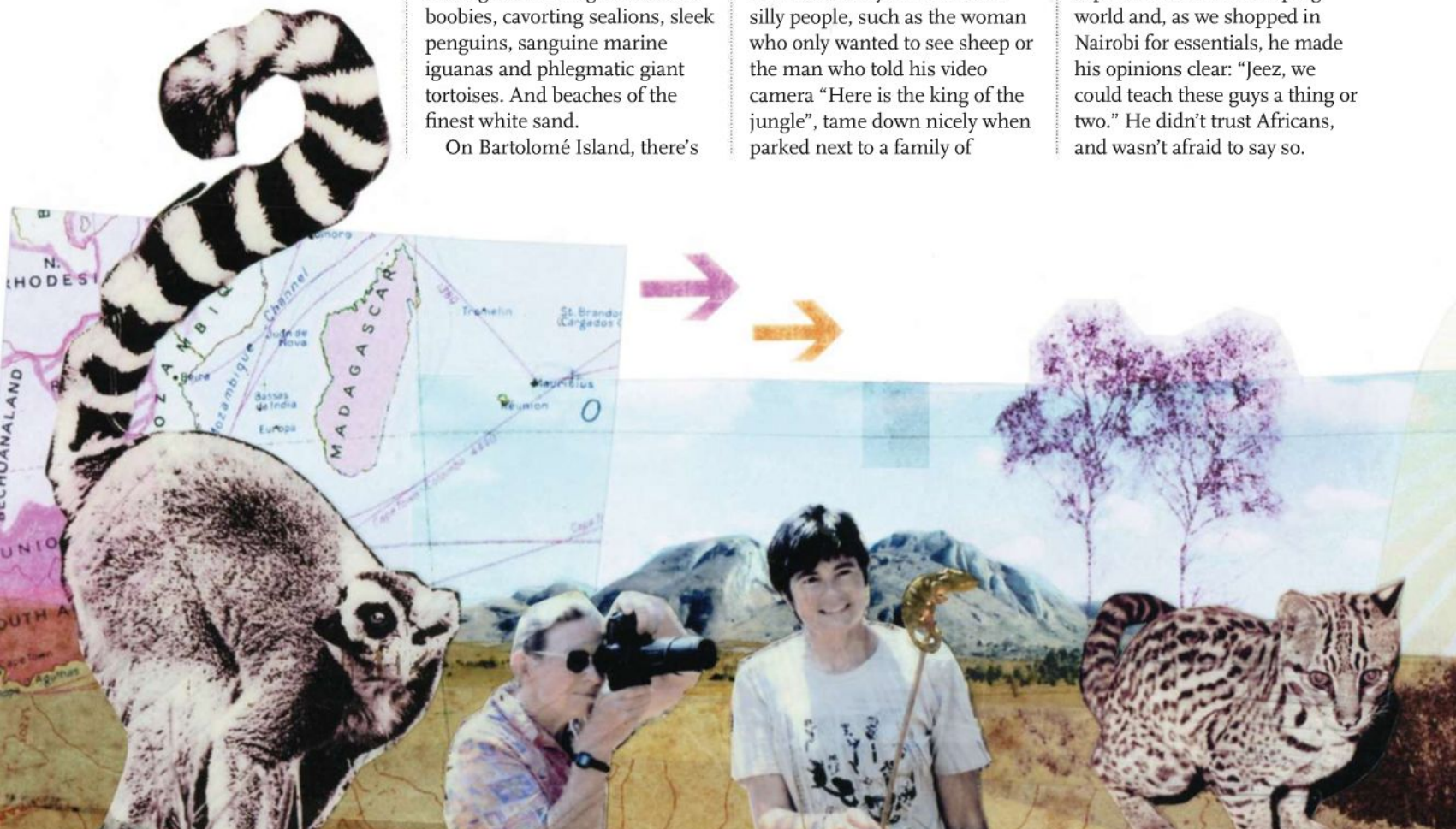
I had met most of the group at Nairobi Airport, but one was missing. Then I recognised the luggage label on a bag carried by an elderly man who seemed intent on avoiding my eye. I stepped into his path and smiled. "Are you Tom?"

He stopped abruptly. "Yeah?"

"I'm Hilary Bradt, your leader," I explained.

Tom's jaw dropped. "But I thought you were a man!" he exclaimed. Then: "Well, I hope you know how to use a gun."

Tom admitted that he hadn't got round to reading the details of the trip. He just thought that it would be interesting to see Africa as he enjoyed hunting in the USA. This was his first experience of the developing world and, as we shopped in Nairobi for essentials, he made his opinions clear: "Jeez, we could teach these guys a thing or two." He didn't trust Africans, and wasn't afraid to say so.



On the game drives, I learned that Tom didn't have a camera and wasn't interested in watching animals.

Once we started out on the game drives, I learned that Tom didn't have a camera and wasn't interested in watching animals. So I put him in the front with Jim, our driver and guide, a Kikuyu tribesman in his fifties who'd met enough tourists to be unfazed by anything that Tom might say.

He called him *mzee*, an expression of respect for an older person, and gradually they began to chat. For the first time in Tom's life, he forgot about race and colour and talked to the man. They exchanged stories about their homes, their wives and their kids.

I remember one day in the Masai Mara when the two men

were so engrossed comparing the state school system in New York with that of Kenya that the rest of us had to ask Jim to start his engine and move on. The two cheetahs we'd been watching were long gone. None of us minded, though.

THE UNHAPPY TRAVELLER

I had similar misgivings about June when I met her at the airport in Madagascar. She was so overweight that she had difficulty getting on and off the bus or walking more than a short distance, and she showed no interest in talking to anyone during the three-day drive to the south of the island. She also exhibited an intriguing variety of tics and grunts. She remained on the bus during excursions and refused to join the group for meals, preferring to work her way through the boxes of chocolates she'd brought with her. She was not a happy traveller and there was nothing I could do about it.

Then we reached Berenty. In ►

HILARY'S TOP 10 DESTINATIONS

Here are my favourites among the places I've been lucky enough to visit.

- 1 Madagascar**
Lemurs may be the main attraction, but it's the sheer surprise and weirdness of the endemic flora and fauna that are so thrilling.
- 2 The Galápagos Islands**
To be able to approach within 1m of an animal such as a land iguana (right) is always exciting. Add an underwater experience with penguins and fur seals and you have the perfect wildlife holiday.
- 3 The Falkland Islands**
Here you can see five species of penguin without stepping on snow, and learn fascinating social history.
- 4 Patagonia**
Shared between Chile and Argentina, the wonderful scenery of Patagonia teems with unusual wildlife: rheas, guanacos, elephant seals and penguins.
- 5 The Llanos**
Venezuela's wetlands – you will find capybaras, caymans and an extraordinary variety of waterbirds within one small area.
- 6 Samburu National Reserve**
Unlike the better-known reserves



Andy Rouse/naturepic.com

in the south of Kenya, this is where you'll see Grevy's zebras, reticulated giraffes and gerenuks.

- 7 Rwanda**
The ideal destination for mountain gorillas, golden monkeys and chimpanzees.
- 8 Namibia**
Few wildlife experiences beat Etosha waterholes in the dry season.
- 9 Ethiopia**
A different face of Africa: geladas, walia ibex and eye-popping scenery and people.
- 10 Queensland**
Try Australia to see rainforest and extraordinary birds in comfort.



those days, the ring-tailed lemurs were accustomed to being fed by tourists, and there was usually a troop hanging around waiting for the next tour group. Not today, however, so I suggested that we take a short walk in the forest where we would be sure to find some. June was furious – she had no intention of walking anywhere – but, undeterred, we left her in a deck chair, sulkily tucking into another box of chocolates.

In the forest, the sifakas danced and a parade of ring-tails filed past with their babies on their backs. I felt sad for June, but on our return an extraordinary sight greeted us: June wreathed in smiles and covered in lemurs. “These are my buddies,” she said, grunting vigorously. Then I understood. To a ring-tailed lemur a grunt means “Hello, I’m your friend” and June’s grunts, so

The group stayed in a warehouse where the loo was out of use – a monkey was chained to the seat.

inappropriate for human communication, had drawn the lemurs to her.

The transformation was remarkable. She stopped complaining, became interested in Madagascar’s conservation issues and made a large donation to a lemur project. She returned to Washington in a state of elation that lasted for months.

THE WRONG PEOPLE IN THE WRONG PLACE

It’s rare for the majority of a group to be the wrong people, but this happened in Bolivia when I was new to leading tours.

Tourists, tour leader and Toyota Land Cruiser survive a trip to the Bolivian boondocks (not to mention a ramshackle ferry).



I wasn’t too worried when I saw that the group was composed of nine women and one man, because women often seem more willing to put up with hardship than men, and we were about to undertake a new trek that I knew would be challenging.

I became more concerned, however, when I learned that seven of the women had picked that particular trek because they were militant feminists who wouldn’t tolerate a male leader. Then, the other two women confessed that they had signed up hoping for romance and the solitary man, Charles, eventually confided in me that he was a cocaine addict and looking for a ready supply of coca leaves.

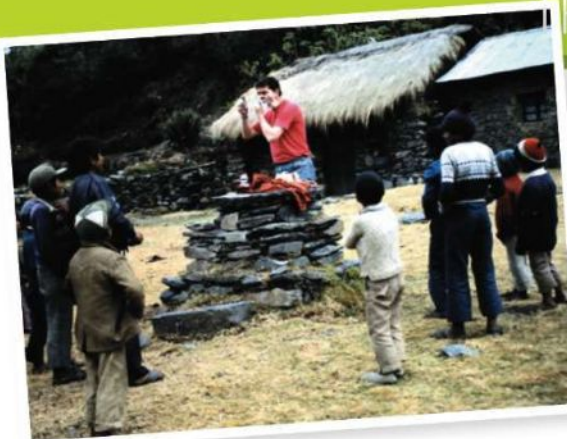
The trek was an unmitigated disaster. Our guide, a French mountaineer called Jean-Paul,

told me that he hated Americans and hated women; the muleteers muttered that they hated Jean-Paul because he didn’t pay them enough; and the feminists said that they hated me because I had allowed a journalist to join us, and despised the ‘normal women’ who were competing for Jean-Paul’s attention (his dislike of Americans didn’t prevent him from having sex with them). And they all hated the Andes. The only exception was Charles, who walked in a cloud of euphoria, chewing his coca leaves.

The trek itself was far from trouble-free. The muleteers sold our food to the communities along the way; the unfit women

Photos provided by Hilary Bradt





Another close shave for a member of a wildlife tour, as the locals in Bolivia look on.

walked too slowly for us to reach the planned camping sites, so there was nowhere to put up the tents; and I lost four of my group overnight. They ended up sleeping in a village school, following which one of the feminists threatened to emasculate Jean-Paul with her Swiss Army knife.

And that was just the early stages. I then learned that there'd been a military coup, so there would be no bus to retrieve us at the end of our journey; torrential rain delayed the arrival of the mules with our luggage; and I had to accommodate the soaked and fuming group in a mining-town whorehouse where the only loo was out of use because a monkey was chained to the seat.

It is, perhaps, no surprise that several of my clients sued the company for mental anguish.

Madagascar is my favourite

place in the world, and these days it dishes out superb holidays. But in the 1980s and 90s, every trip I led seemed to end in disaster. For some reason, the dottiest people signed up for tours of the island, and even sensible folk became a little unhinged trying to cope with it.

MADAGASCAR MADNESS

There was Maria who, halfway through the trip, suddenly decided that her parents were going to die because her tarot cards had predicted a long journey followed by death. After nearly flying home to be with them before their impending demise, she decided to stay and spent the rest of the trip seeking out village astrologers for advice about the future – and sunbathing topless, to the delight of local fishermen. The natural world was a constant surprise to

her. "Is that a reptile?" she asked when I showed her a scorpion.

Sometimes, however, you do end up with people who rise to the challenges posed by travel in countries with (relatively) lowly infrastructure. On a trip to Ankarana Reserve to see lemurs, I'd been told by the guide, Hubert, that the walk to the campsite was just 1km. I advised the group to expect a half-hour walk and pack accordingly. This was one of the driest parts of Madagascar, I added.

We arrived in torrential rain to find four sodden porters and a charming guide called Angelique, who said that it was actually a 14km walk. Hubert bargained him down to 7km (it turned out to be about 10km). We arrived well after dark, with one client threatening to faint from

exhaustion and a couple of birdwatchers missing altogether.

Two search parties eventually found our birders huddled together with a porter under a banyan tree, twittering with excitement about the scops owl they thought they'd heard.

Then Jo, the oldest in the group, tripped and sliced her shin to the bone. Luckily, four of the five doctors on the trip rushed to help (Jo was the fifth).

But that was the only bad day. The rest of the trip was full of lemurs, bathing in cool rivers and incredible rock formations.

And that sums up tour leading. It can be the best of times and the worst of times. Leading a bunch of strangers through some of the world's most challenging environments is never going to be easy, but it's given me plenty of memorable experiences to reflect on in my old age.

Some names have been changed



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For just a few dollars more, why not consider an excursion to the Desierto de Tabernas?

EUROPEAN VACATIONS ALMERÍA

Spanish steppe

Desert specialists and waterbirds abound in the parched south-east of Spain, writes **James Parry**.

Why is Almería special?

Almería is one of the driest parts of Europe, with rain falling only six days a year on average. Summer temperatures soar and it is often windy, making the environment appear utterly inhospitable. In fact, the landscape supports a unique variety of animals and plants, with many endemics and other species having their only stronghold in mainland Europe here.

Where should I go?

For desert wildlife, head to the Desierto de Tabernas, once the film location for Spaghetti Westerns. This dramatic area is scoured by deep gullies – *ramblas* – that were gouged out by erosion, and harbour wildlife-rich stands of tamarisk and oleander shrubs.

To the south-east runs the Sierra Alhamilla, a mountainous ridge with olive groves and tracts of steppe. On the coast is Cabo de

Gata, a natural park with salt pans and lagoons teeming with winter birdlife, as well as botanically rich sand dunes and 100m-high cliffs.

When is the best time to visit?

Avoid summer, when temperatures regularly top 40°C. Spring and autumn are always good, and the cooler conditions mean that some flowering plants are at their best towards the end of the year. Coastal lagoons, such as the one at the mouth of the Rambla de Morales, are great for passage waders and wildfowl such as white-headed ducks. Mild winters mean that reptiles and mammals such as the Algerian hedgehog remain active throughout the year.

What can I expect to see?

The open steppes are great for stone curlews, black-bellied sandgrouse and the enigmatic Dupont's lark, which is most likely

to be seen or heard in old sisal plantations. Look out for black wheatears and blue rock thrushes on slopes and cliffs, and check the skyline for raptors such as Bonelli's eagles. Listen out, too, for the bugling call of trumpeter finches flying overhead. Coastal marshes and salt pans such as the Salinas del Cabo de Gata hold good numbers of flamingos, avocets, black-winged stilts and many species of duck.

TOP SPECIES TO SEE



Desert birds such as the **TRUMPETER FINCH** thrive in the arid conditions of south-east Spain.



With larger ears and a paler body, the **ALGERIAN HEDGEHOG** is distinct from its European cousin.



Coastal lagoons are home to the **WHITE-HEADED DUCK**, which is increasing in numbers in Almería.

Oliver Smart/Alamy

Luis Casiano/SpecialistStock

Mike Lane/NHPA

Is it just birds, then?

No, reptiles are abundant and include many species of lizard. More than 1,000 plant species have been recorded at Cabo de Gata, including mainland Europe's only native palm, the dwarf fan palm. In early winter, look out for the majestic spikes of sea squill, as well as crocuses and narcissi, which create drifts of colour across the parched plains and stony hillsides.

NOW YOU DO IT

GETTING THERE

» By air to Almería (served by airlines such as EasyJet, Iberia and Ryanair), and then by car. Public transport is limited. San José is a good base.

LOCAL INFORMATION

- » Information centre at Las Amoladeras – the surrounding area is rich in wildlife.
- » Waymarked trails on the coast in Cabo de Gata park, where many of the local plant specialities occur.
- » The Tabernas area is generally open access, but the terrain is rough and, if it rains, flash floods are possible in the ramblas.



WEBSITES AND BOOKS

- » www.andalucia.com
- » www.iberianwildlife.com for more information and organised tours.
- » *Wild Spain* by Teresa Farino (RRP £29.99, ISBN 9781847731265; buy on p84, quoting code W1110/10).



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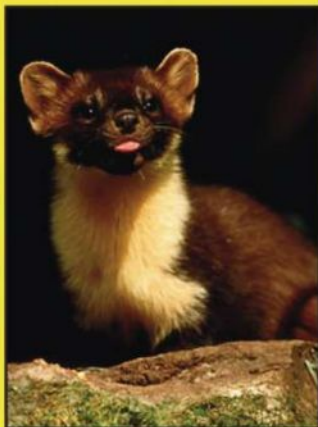
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Out and about...

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How to enjoy birding



DAVID LINDO
The One Show's 'Urban Birder' explains how you can enjoy birdwatching the easy way

SO, YOU'VE LEARNED the basics about British birds and know where your local patch is, how to use your binoculars and the correct birding lingo. But now you want to spread your wings and go birding overseas.

Cheap air travel has been a brilliant development for birders, and while none of us can ignore the issue of climate change, there is also the argument that wildlife tourism can give rare birds and their habitats an economic value.

THIS MONTH: BIRDING ABROAD

My first adventures abroad were with my family as a teenager or with mates on holidays where the birds took second place. It might be that you are planning a trip with friends or relatives who are less interested in birding, but you should still take your bins.

My advice is to plan the odd excursion, but also establish a local patch close to your hotel that you can visit each morning, even if it's in a city. Often there will be little information available on the species that you are likely to encounter, and you truly become a pioneer.

Don't forget to do your research, of course, or you may miss the most amazing oases. If you're in a hot or tropical climate, remember that birding in the middle of the day may be uncomfortable and will probably be pointless.

On a dedicated birding trip, you could find yourself racing around the country 'ticking' species by the bucket-load. This may not be to everyone's taste – personally, I'd rather have a slower pace and a bit of culture thrown in, too.

If you do decide to go 'solo', take extra care when you do your research. It's all too easy to

be travelling in a relatively safe region and accidentally cross an invisible border into bandit country or a conflict zone. This is when it pays to have a local guide.

One time in Jamaica, I was in a taxi when I saw a wader by the roadside. I got out for a look and it

turned out to be a solitary sandpiper, a lifer for me at the time. Thrilled, I started to wander into the forest, only to be warned by my driver that it wasn't safe.

So, always hang out with someone who knows the areas you're visiting, or only go to nature reserves or botanical gardens. Don't wield expensive kit in inappropriate areas and respect the locals. Have a good holiday!

NEXT MONTH

David's 10 best birdwatching moments.

TOP TIP

Visit lesser-known birding hotspots to try to find unexpected species. You may even discover hitherto-unknown populations.

How to help bumblebees

Our furry pollinators need all the support they can get, so here's something you can do to lend a hand.

» With winter almost upon us, you might think that helping bumblebees would be the last thing on your mind. » But new research by scientists from the Biotechnology and Biological Sciences Research Council (BBSRC) has recently been published that could influence your gardening plans for 2011.

» Studies of the foraging patterns of bumblebees on snapdragon plants have shown that they prefer red flowers and blooms with stripes along their veins to pink or white ones.

» It is also worth noting that bumblebees are the main pollinators of snapdragons (because the weight of the bee is needed to open the closed flower), emphasising the value of this nectar source to them.

» Don't sow your snapdragons until early March (they will flower from late June until the end of September), but you could start thinking about where you are going to put them. And don't forget: think red and think stripes.

GARDENING ADVICE

How and when to sow snapdragons:
www.sarahraven.com/learn/articles/snapdragons



Premaphotos/Alamy

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Of course, you'll want your bins and scopes, but try not to look too much like Johnny Foreigner when you go birding overseas.

Dean Eades

Understand mammal behaviour: Stoats



STEVE HARRIS
Bristol University's
mammalogist on how
to read body language

As the vegetation dies back in November, it's a good time to look out for stoats. The moult into their winter coats is well advanced by now, so in northern areas many will already be white, making them conspicuous in snow-free areas.

Stoats eat 25 per cent of their body weight a day, so they spend a lot of time hunting. Their long thin shape enables them to pursue prey above and below ground, but your best chance of seeing one is in rough grassland, around rabbit warrens or near wood piles.

FAST AND FURIOUS Stoats hunt small mammals opportunistically, moving rapidly and investigating all possible hiding places. Speed enables them to take prey by surprise (and makes it hard for bigger predators and birds of prey to catch them). The senses of smell and hearing are most important when hunting

in dense cover. Once located, their victims are generally caught in a couple of bounds; stoats may wrap their bodies around large mice or small rats to subdue them.

RISKY BUSINESS Rabbits are hunted, too, but are several times the weight of a stoat and

dangerous to tackle. Stoats approach rabbits cautiously, stopping and standing up on their hind legs to judge distances. They use cover to get close and judge their final dash carefully to ensure that they maximise the surprise to the rabbit and minimise the chance of injury to themselves.

COVER UP Once they have made a kill, stoats quickly drag larger prey into cover to avoid attracting the attention of other predators. The remains of the carcass will be cached for future use, either under dense vegetation or loosely buried under a log or rock.

NEXT MONTH

Muntjac deer in winter.



Stoats hunt rabbits stealthily to reduce the risk of injuring themselves.

Weather watch: November



ROSS REYNOLDS
The University of
Reading meteorologist
on how to read weather

ANTICYCLONES (areas of high pressure) often bring clear skies, light winds and damp air, which, with autumn's rapidly shortening days, can lead to fog.

THIS MONTH: RADIATION FOG

Fog is created by cooling air that is sufficiently damp that water droplets condense out of it at the Earth's surface. In autumn, this happens more frequently because the ground is getting colder so the

air at or just above the surface chills the most and produces fog.

Such 'radiation' fog tends to occur in valleys or depressions where the damp, chilled air settles, and will persist through daylight hours if particularly thick. In hilly areas, it is often the case that someone higher up can look down at the top of the fog that is trapped in the valleys.

Fog provides water in forests, both as a source for trees through their leaves and down their trunks, and also through 'fog drip' from leaves onto the forest floor.

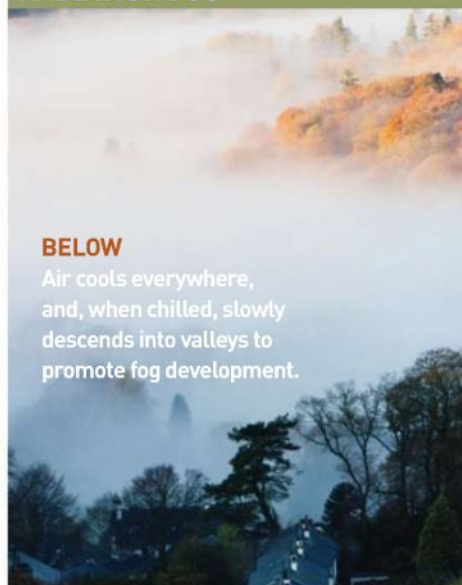
Thick fog will, of course, make wildlife watching harder, but some rich habitats are dependent on the moisture it carries. The profusion of mosses and lichens on trees in broadleaved forests in regions such as Wales, for example, thrive in part because of the fog that blankets them from time to time.

Coastal fogs, in contrast, are generated by damp air flowing towards land over a cold sea. They occur more frequently in spring and summer, and only penetrate a few kilometres inland.

TOP FACT

» In Chile's Atacama Desert, one of the world's driest places, many plants survive purely on the coastal fogs that characterise the region.

HOW TO RECOGNISE RADIATION FOG



BELOW

Air cools everywhere, and, when chilled, slowly descends into valleys to promote fog development.



The hairs on a stoat's tail 'fluff up' into a 'bottlebrush' when it is excited by the thrill of the chase – here, one wraps its body around a mouse to subdue it.



ABOVE
Above the fog top, the air temperature increases with height, trapping the fog under this 'inversion'.

Ashley Cooper/Alamy

How to find wild food



MILES IRVING
The forager explains how to find food in the countryside

If it's not too cold, there are plenty of fungi to gather. If it is, the first frosts enhance some of the remaining wild fruits. Rosehips and wild service berries are softer and richer after frost, and sloes less astringent. Many edible wild leaves are very hardy, and chickweed, bittercress and dandelions will survive under snow if the temperature has not dropped below about -1°C .

NOVEMBER IS less overwhelming for foragers than September and October, but wild foods still abound in our countryside if you know where to look.

NOVEMBER: SEA BEET *BETA VULGARIS*

Found mostly on seashores or close to sea walls, sea beet grows to about 1m tall.

FLOWERS

Flowers are small, yellow and fleshy; they only appear between July and September.



LEAVES

Variable, ranging from oblong to heart- or diamond-shaped.

This month's plant, sea beet, also grows well throughout most of the winter, except during long periods of heavy snow. Found in abundance around much of the British coastline, it is the wild ancestor of several commercially grown crops. If you taste the root, you will note its sweetness – both sugar beet and beetroot are derived from it.

Some wild plants even have purple on their leaves and roots, the beginnings of the characteristic hue that was selectively bred into beetroot. Swiss, ruby and every other kind of chard were also bred from sea beet, and it's probably best to consider it as a kind of wild chard.

Smaller leaves can be boiled, steamed or fried whole, but larger ones should have their stalks removed. These should be cooked separately (for example in a vegetable gratin) because they take much longer to be ready than the leaves themselves.

Cook the leaves briefly, so that they retain most of their texture, and perhaps try adding a few fried shallots and a little cream for a really luxurious finishing touch. Sea beet makes a good, earthy accompaniment to any kind of meat, fish or shellfish.

NEXT MONTH

How to find and prepare bittercress.

Ethical Christmas gift ideas

Stuck for ideas of what to buy for your loved ones this Christmas? Why not buy them something different that makes a difference to the world? Here are a few ideas.



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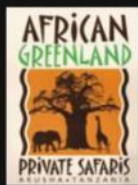
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RECKLESS REFORESTATION

October's Letter of the Month called for the reforestation of Britain's uplands. But more than 90 per cent of the world's heather moorland is found in the British Isles. It is a far rarer habitat than the temperate woodland with which your correspondent would have it replaced.

It provides nesting sites for skylarks, little owls and a host of other groundnesting birds. Far from being "of little value for recreation, food production or anything else", our uplands provide grazing for sheep (the greenest and most sustainable of all livestock).

Their huge recreational value is best demonstrated by the economic devastation that befell upland villages when the fells were closed during the foot and

mouth epidemic. So far as carbon capture is concerned, sphagnum moss, and the peat bogs that it creates, is one of the most efficient of all carbon sinks.

It might be interesting to re-establish the Caledonian Forest on a small area of the Highlands, but that would not bring back water voles, as your correspondent hopes. They are not being killed by habitat destruction, but by feral mink.

Owen Wells

Chair, Friends of Ilkley Moor

HONESTY AND PHOTOGRAPHY

I loved the photo of the kestrel attempting to bully a barn owl into dropping its catch (October). But on closer inspection I wondered if maybe it was a composite image. If it is, it would surely be appropriate for *BBC*

READER LETTER OF THE MONTH

Claire and the whale

I am a marine biologist, and 10 years ago I was in the Arctic conducting research on minke whales – they were washing up onto the ice apparently bored with life. Believe it or not, we concluded that they were suffering from depression.

So a whole team of us began pushing the whales back into the water while giving them a pep talk. Someone claimed that he often got a positive reaction when he sang Bob Marley to them!

One day, a colleague noticed a particularly large whale beached on the ice well away from the others. But the moment the two of us reached him the ice we were standing on broke away and we all drifted off into the sea.

We found – unbelievably – that

we had faulty radios, and our flares failed in the cold. And though we had mobile phones, coverage was not what it is today.

Sadly, without the tools to lever the whale back into the water or even the space to push it, the animal died. Two hours later, we were still adrift at sea and nobody even knew we were missing.

We had no choice but to take it in turns to climb inside the whale's mouth for warmth. The rancid smell of its breath was something that no human should ever have to experience (bizarrely, it's a bit like boiled Marmite).

We were rescued six hours later, both suffering from mild hypothermia.

Claire Griffin Via email

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The Letter of the Month wins a pair of HI-TEC V-Lite Fasthike waterproof boots, worth £50 and perfect for hiking. They're available in sizes 7–13 for men and 4–8 for women. For more information, visit www.hi-tec.com/uk



Art gecko



Alan Mould/www.cikpic.com/amould

Wildlife to say so in the credit. But if genuine, it's amazing – all credit to the photographer.

Pauline Butcher

Via email

BBC Wildlife editor **SOPHIE STAFFORD** replies:

Rest assured that, to our knowledge, every photograph we publish is a true and honest representation of nature, unless we say otherwise in the picture credit or caption. The photographer, Mark Hancox, has assured me that this was exactly what he saw, and more shots of the fight can be enjoyed at www.markhancoxbirdphotography.co.uk

CHOICE WORDS

In the October issue, there are two separate comments about

'raising the bar' in the *Wildlife* Photographer of the Year competition. Bearing in mind the sensitive subject of last year's winning image – of a wolf leaping a gate – that was later disqualified for being a captive animal model, was this an unfortunate choice of words or a deliberate example of irony?

Richard Stewart

Ipswich

BIRD'S THE WORD

I enjoyed David Lindo's piece on birding jargon (October). Unlike him, I *have* actually heard a great crested grebe called a 'GCG' in the field. I have always assumed that the use of initials originated in written notes.

I was reminded of a day out birdwatching with friends at Dungeness, when someone

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PHOTO CONTEST



As we went to press, *Dusk dust* by Anthony Catt was the most popular image in our September photo contest with an impressive 174 votes. You have until 31 October to vote and change the winner. Our October contest is all about Africa, and some great photos have already been uploaded. Check them out!

PHOTO GALLERIES



Our new website also has exclusive photo galleries, such as this stunning orangutan portfolio in support of the Orangutan Foundation! And new ones are going up all the time.

OTHER STUFF

» There are now 10 Photo Masterclasses online to help you improve your photography.

» Dominic Couzens' popular Bird Diary column can be enjoyed all over again online.

» Some of our best features from the past few issues can be read online now, too.

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exclaimed, "CP!" There was a pause, then someone else ventured "Caspian plover?", unable to think of anything else the speaker could be referring to. "No," the man replied, pointing to a plant in front of us, "sea pea!"

Derek Smith
Surrey

MORNING VISITORS

In August, I visited Portuairk, Ardnamurchan. One morning, I opened my caravan door to find two pine martens not more than a few metres away. They shinned up a post onto a bird table, where they munched on the nuts and bread I had put out earlier. As long as I stayed still they took no notice of me. Unfortunately, though I took several photos, they all came out too dark. Reading the comments in the van's guest book, it became clear that there have been numerous sightings of pine martens in the area.

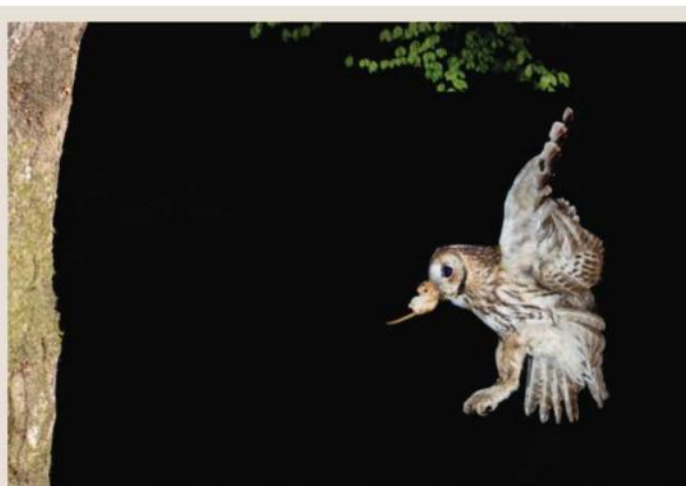
Peter Phillips
Via email

PIGEON FANCIERS

I loved Steve Harris' article on pigeons ('Flying rat or urban hero?' Autumn). At the Horniman Museum in Forest Hill, London, there is still an antiquated display of fancy pigeon breeds. It was to this that I looked when someone once showed me a tub of 'tumbler' pâté. Tumblers, it turns out, are birds bred to be unable to fly properly, which instead perform a series of flip-flop head-over-heels manoeuvres when they try to take off. Personally, I love the taste of pigeon, and I think you should have finished the article with a nice recipe or two.

Richard Jones
Via email

I can't tell you how pleased I was to read Steve Harris' article about pigeons. Though the majority of people will say that they like wildlife, animals somehow become pests in need of poisoning, shooting or trapping in very cruel ways if they so much as think about eating our food or behaving in ways we don't like or understand. Foxes, badgers, deer, rabbits, pigeons,



AN UNUSUAL SNACK

These two pictures show the same tawny owl bringing prey to its young. In one photo, it has a woodmouse in its beak – a regular meal – in the other a dormouse. Tawnies have been

known to predate dormice, but the Forestry Commission weren't aware that this rare species was found in this wood. I do not know if it has ever been photographed before.
Dale Sutton Battle, East Sussex

rats, mice, squirrels and stoats, to name but a few, have all earned someone's hatred at some time.

V Booth
Via email

I very much enjoyed your feature on pigeons. Older generations who remember our huge debt to this humble bird are now passing on and, without their support, it could soon be in danger of ending up on the Red List, joining other once-common urban species, such as starlings, sparrows and swifts.

Recently, pigeons delivered a video file to a rural British farm faster than their slow broadband connection could download it, and an article in the press warned of the vulnerability of the nation's high-tech infrastructure.

Apparently, a burst of electromagnetism from a solar flare could paralyse every computer in the country.

Would we not then be wise to continue looking after our pigeons, if only because we may need them again one day? The Queen still keeps a flock, so we would be in respectable company.

Alison Hunt
Manchester

'Flying rat or urban hero?' did not answer some common questions. First, do pigeons pose a serious health threat to humans? Are they, their droppings, their nests or their parasites sources of disease?

Second, are they safe to eat? All of my veterinarian friends say that they are full of heavy metals and salmonella. One carnivore says

nonsense – since the end of leaded petrol, there is no heavy-metal contamination. Pigeons eat human food scraps. Salmonella is no more common in them than in barnyard (not factory) chickens.

Here in Munich, I see an old lady in the park feeding pigeons, and occasionally deftly grabbing one and putting it in her purse. She has been doing it for 10 years and appears healthy.

Tom Batot Frazier
Via email

Author STEVE HARRIS replies: The most comprehensive review of all known cases of disease transmission to humans concluded that the health risk posed by feral pigeons is very low, even for people whose work brings them into close contact with nesting sites.

The danger from consuming them is probably also low; traditionally, it is the squabs that have been eaten, and these have

had little time to accumulate heavy metals or other contaminants.

WHAT KILLED THE SEALS?

In News (October) you described the shocking wounds found recently on seals around the British coast. *Nature Shock: The seal ripper*, which was broadcast on 28 September on Five, could shed some light on this issue.

The programme found that similar injuries had also been sustained by grey seals on Sable Island, Canada. Their skins had been ripped off in a perfect corkscrew, the wounds clean-edged, as though made with a knife. After eliminating the usual predators, boat propellers were also discounted as the area is a no-boating zone.

Meanwhile, in Svalbard, researchers were surprised to discover that the practically blind Greenland shark is capable of hunting and catching live prey, leaving clean-edged cuts, though not corkscrew lacerations. The

sharks also live in the shallow waters around Sable Island.

Then a dead seal washed up that had been fitted with a tracking device. Its wound began at its neck and continued under the tracker. This makes it a tear. The collagen fibres in a seal's skin and blubber wrap around its body at a 45° angle. So, after the initial cut, the tear travels along the path of least resistance, causing the strange spiral cut.

I wonder if Greenland sharks can be found in UK waters.

Daniel Long
Via email

Editor SOPHIE STAFFORD

responds: We are currently investigating this story. Watch our website for an update.

ARE YOU A WINNER?

» **WHAT ON EARTH?** The picture in the Autumn issue showed a water avens *Geum rivale*. Anne Wright from Kelso, Roxburghshire, wins a year's subscription to *BBC Wildlife*.

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FREEZE FRAME



BRIGHT EYES, FLUFFY TAILS

Every year we stay in our house in the French Pyrenees where we are ignored by the resident edible dormice. My children have forbidden me from attempting to discourage the furry menaces from disturbing my sleep with their noisy nocturnal business, as they consider us guests in *their* house. But after many 3am awakenings, I have begun to wonder just how edible they are! **Nigel Bamford** Brighton



TAKE OFF!

I photographed this seven-spot ladybird in my garden. Much of my macro photography focuses on ladybirds, though it usually takes me ages and many missed shots to get one good picture. But I managed this one the first time I tried. **Aimee Gould** Macclesfield



JUNGLE BATH

My wife and I honeymooned in Bandhavgarh, India. On an elephant, we followed this female tiger to a stream in the jungle, where she lay in the water, completely oblivious to us. We were lucky enough to watch her for five magical minutes. **Steven Wood** Essex



My mum has created a wildlife pond in our garden. I was out weeding one day when I glimpsed this frog. **Leah-Marie** Via email



ROADSIDE WILDLIFE-SPOTTING

In Canada's Banff and Jasper National Parks, we were lucky to see both grizzly and black bears. This grizzly emerged from the trees, strolled across the road in front of our car and started feeding on the kerbside buffalo berry bushes. **Phil Baker** Eastbourne



COOLING OFF

I took this photo while visiting Surrey's British Wildlife Centre, often the easiest way to see some of our native mammals. On the hottest day of the year, this otter came out of his pool to look at us, then returned to gambolling in the water. **Sarah Dowling** Via email



I took this image of a coral fungus sprouting through the moss in our local woods on my mobile phone. Isn't technology wonderful? **Paul Bateson**



I saw this vole on its back by the side of a path. Considering the pink on its belly, I wonder if I interrupted it in the act of giving birth. **Paul Bateson**

TOP
SHOT



EDITOR'S PHOTO OF THE MONTH

THE EARLY BIRD...

This wild owl – something of a celebrity among photographers – was hunting over scrubland next to Cresswell Pond in Northumberland. After a night of torrential rain, it dawned on me that when the downpour stopped, the owl would be hungry. Before it got light, I jumped in my jeep and headed out. I was right, and saw the bird hunting after only five minutes. I climbed onto a dry-stone wall to get level with it for an in-flight shot, and was very happy with the result. **Terry Cavern** Via email

WIN, WIN, WIN

Terry receives a *Taiga* waterproof fleece from Páramo (worth £140) and a Nikwax waterproof care kit. This much-loved, cosy, highly water-repellent jacket is excellent for travelling due to its generous pockets and Directionality, which continues to wick water away even in high humidity, so you stay dry and comfy. Ethically manufactured, it comes in a range of colours and sizes. www.naturallyparamo.co.uk



HEDGEHOG HEAVEN

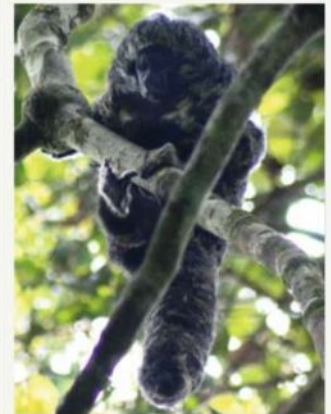
It was truly a privilege to watch this determined hedgehog trot about in our back garden, gathering up twigs, grass and leaves, then carry them to the place where it had chosen to build its nest. All told, I think it was well worth getting up at 6am and sitting out in the cold dressed in my pyjamas! I'm just pleased to know that our garden is wildlife-friendly and a fit place for a hog home. **Beth Arkwright** Via email



CURIOUS CUB

The Arctic is full of surprises during its short intense summer. It was after midnight when I took this photo, and the low sun transformed the tundra near Barrow on Alaska's North Slope. A few metres ahead of me, an Arctic fox cub appeared. I approached it cautiously, keeping the sun directly behind me. The cub seemed curious – perhaps he had never encountered a human before. **Ronan Dugan** Via email

HOT SHOTS



Walking in Manú National Park, Peru, I heard a noise above me. It could mean only one thing – monkeys. A monk saki to be precise. It stopped and came down to get a closer look, shook the branches in an attempt to frighten me off, then retreated back up the tree.

Tania Taylor Via email



We visited De Kelders on South Africa's Western Cape – the whale-watching capital of the world! On the boat we got close to some southern right whales. This one was rolling over and over, having fun.

Sue Watson Via email



Reading your caracal article (Autumn) reminded me of my first caracal, spotted in Addo Elephant National Park, South Africa. This shy cat's striking coloration and long pointed ears were a treat to see. It proved to be as exhilarating to watch as any of Africa's more commonly celebrated cats.

James Gagg Exeter

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POLITICAL PANDA

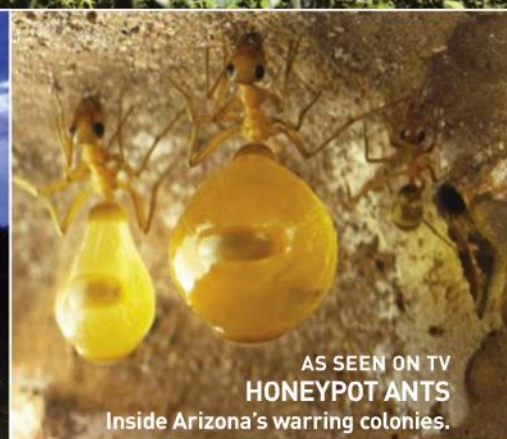
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DECEMBER ISSUE ON SALE 10 NOVEMBER

Scrounge lizards

Tony would have made a pact with the devil to get to Round Island, but the objects of his desire proved to be no angels.



TONY JONES
Ecologist
Mauritius

"I'LL GIVE YOU three reasons why you will never get to Round Island," said Owen Griffiths, the renowned conservationist and our host in Mauritius. "First," he explained, "the island has been closed to visitors since 1976, and even the American ambassador was refused access just a few months ago.

"Second, the only way to get there is aboard the military helicopter, which only flies out every few weeks. You guys go home in three days. And third, tomorrow is a national holiday in Mauritius. We'll never get hold of anyone in time to arrange it."

"But can we still try?" I asked, ever hopeful.



"We can, but your chances are slim to none," came the pessimistic reply.

Once home to the ill-fated dodo, Mauritius and its native wildlife are of particular interest to ecologists all over the world, and we were no exception. Jim Pether, Bill Love and I had all worked with reptiles for most of our lives, and we were desperate to explore Round Island, home to some of the most alluring cold-blooded species on Earth.

The line-up includes the world's largest day gecko, a rare egg-laying boa (most give birth

"I'd pick that bag up; you're about to lose your lunch." Bill watched a Telfair's skink make off with one of his biscuits.

animals scurrying around on the ground.

I counted about 30: they had long, slender tails and darted here and there, unafraid of the approaching humans. My mind whirled: a rat infestation would be an ecological disaster, and Round Island appeared to be teeming with them!

It wasn't until we neared the shack that I realised the beasts were not rats, but Telfair's skinks. They were everywhere, both inside and out, writhing and crawling over every surface in the cabin, under the chairs, tables and the decking.

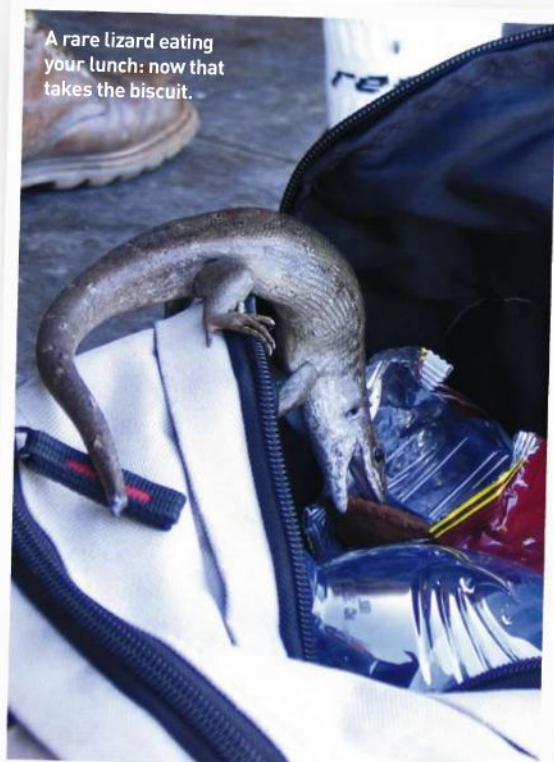
Stepping into the shack, we placed our feet carefully for fear of treading on one of these valuable lizards. "I know they're rare, but they really are a pain in the backside sometimes," said one of the researchers. "And I'd pick that bag up off the floor if I were you; you're about to lose your lunch." Bill turned around just in time to see a skink making off with one of his biscuits.

DURING THE FEW short hours we spent on Round Island, we were besieged by Telfair's skinks. We had to move around gingerly to avoid falling over them, and our initial bewilderment and wonder were quickly replaced by a ridiculous amusement and then a guilty frustration as they began to get on our nerves, too.

Even our attempts to photograph the Round Island boa were hampered by the infernal things, which ran into the frame and climbed across our laps while we tried to compose our shots.

Telling the story now, I feel a little sheepish that I was irritated by one of the rarest reptiles on the planet. Indeed, sitting at my desk, I long for an opportunity to return to watch those marauding gangs, which have beaten the odds by continuing to survive.

Because it is worth remembering that, though they are abundant on Round Island, it measures just 2.6km² and this is the only place on Earth where Telfair's skink is found.



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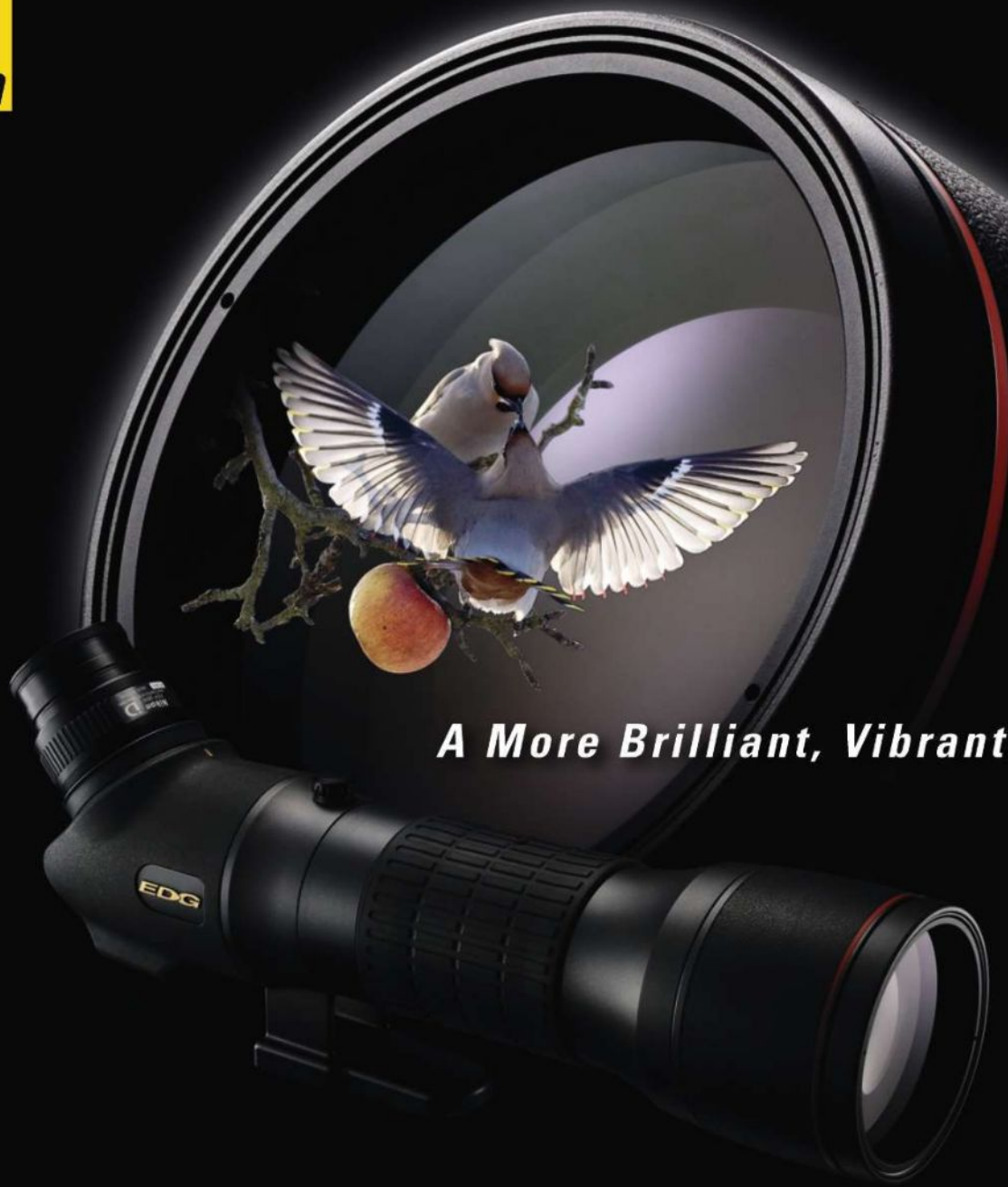
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