

REBIRDING

Rewilding Britain and its Birds

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Taming Britain

The retreat of the giants

*Everywhere on earth, living systems have been radically altered
by the loss of great beasts.*

—George Monbiot¹

The travellers had staggered for days across a sea of rocks. Ahead, at last, lay prospect. A sea of grasses rose, by inches alone, from the wound-eating water and the jagged coastal spikes. The new sun was raw on their backs. The dawn light washed the land ahead with an orange glow. A plain. Filled with possibility. A new life.

A wide-eyed harem of horses jumped from the water's edge as the travellers waded, foot-wrecked, ashore. The frost blinked, deep, in the grass. Strange trunk-bearing antelopes with curly pink horns burst away from the travellers with nasal grumbles. Waifs in the frost, demoiselle cranes bugled with alarm, skipping away across the glinting steppe. But the giants simply stood. Tusks arched beside their heads, southern mammoths, lords of this polar Serengeti, had come to the coast to feed. Woolly rhinoceros with their two horns – one huge, one giant – twinkled indifferent, the frost wedged deep in their shaggy coats.

The travellers watched this parade of formidable wool – and towering mountains of meat. All the giants saw, though, were small bedraggled mammals, walking on just one pair of their legs. An inconsequence, a hairy wreck, smaller even than the horses that grazed in their own shadows. These sodden intruders were no cave lions.

Our travellers, in turn, may have felt wonder at what they saw. They may have admired the beauty of the giants: their granite massivity, the sculptured shine of their horns – the tallest shapes for miles around on Norfolk's coast. But the travellers would also have seen opportunity. It would soon be time to feed. Now it was time to move.

Scimitar cats, the size of small horses, would soon be following the giants,

but our smaller travellers would be far easier prey. Deep-set eyes and heavy brows set hard against the odds, the travellers continued ashore. That night, home would be hard won. Who knew what lurked in those coastal caves? Had the travellers shared plans, shared fear, shared excitement at the bounty of food before their eyes, it would not have been in words we understand today. This was almost 900,000 years ago. These travellers, our ancestors, were, as far as we know, some of the first colonists of the British Isles.

The story of changing Britain, of taming ecosystems, of wildlife decline, began even in these early hours. In this chapter, we'll explore how Britain's original ecosystems shaped the evolution of its wildlife. We'll travel forwards through time to the Industrial Revolution, learning how we tamed Britain and made it our own. The changing fortunes of British birds, in this book, begin with the story of us.

In the modern world, the habitat of birds such as corn buntings has changed so frequently that conservation often seeks to preserve the corn, forgetting the dynamic ecosystems in which the birds evolved. But understanding the original habitats of our vanishing birds; of our lost ecosystems and their forgotten animal architects, is essential to any vision of restoring Britain's nature in generations to come.

Rather than cling to the hedgerows of forty years ago, or the hay meadows of a century ago, we need some idea of what 'natural' looked like. We need to see how 'natural' changed over time. And to restore Britain's wildlife for good, we need to take a far longer, wider, wilder view.

A land of giants

In 2013, on the shores of Happisburgh in Norfolk, rough seas eroded the sandy beach. Scientists scrambled to photograph something amazing – the earliest hominid footprints outside of Africa, perfectly preserved in the mud below. These footprints, almost 900,000 years old, revealed that an early hominid, *Homo antecessor*, had set foot in Britain far earlier than anyone had thought.² Hours later, the footprints were washed away forever.

The period in which our ancestors arrived was the Pleistocene.³ In a time-frame of hundreds of thousands of years, the Pleistocene was an age of extremes – of shifting warm and cold, of giant beasts. Glacial and interglacial periods would transform the character of the British landscape several times, before we arrived at our modern temperate climate.

Our pioneers had walked across land to an island yet to be: an island connected to Europe. Norfolk's climate, at that time, had warmer summers but much harsher winters than today. Our ancestors were dwarfs in a land

of giants. Woolly rhinoceros, giant elk and southern mammoth, casting their shadows over saiga antelope and wild horses, would have been the least of their concerns in a landscape perhaps most similar to the steppes of Mongolia today.⁴

Male sabre-toothed cats weighed up to 400 kilograms.⁵ Cave lions, an extinct, larger subspecies of the African lion,⁶ are known to have crunched their way through less-than-cuddly cave bear cubs.⁷ The fossil record suggests these giant cats, like our ancestors, loved a good cave to call home. The early human inhabitants of Britain, no doubt, had regular tenancy issues on their hairy hands.

Very early on, our ancestors would get to work hunting down the giants around them. Further excavations at Happisburgh reveal that flint hunting weapons were crafted as early as 830,000 years ago.⁸ At least 400,000 years ago, early humans learned to hunt and kill straight-tusked elephants with wooden spears.⁹ Pristine habitats are shaped by giant animals, as can be seen in the national parks of such countries as Tanzania, Botswana and Zambia to this day. Removing giant stewards profoundly changes the richness of a habitat. Habitat change in Britain has been going on a very long time.

Early birds

Although we have lost our landscapes shaped by giants, Britain's caves provide fascinating opportunities for time travel to our own Serengeti past. Developments in our birdlife, too, are reflected in the fossils unearthed in our caves. Thanks to decades of work by ornithologists and palaeontologists, we have some idea of the early birds that sang as our ancestors struggled to survive. *The History of British Birds*, by the late Derek Yalden and Umberto Albarella, provides a brilliant account of our winged fossil record.¹⁰

Pre-dating hominid arrival was an English albatross, *Diomedea anglica*, gracing our oceans 3 million years ago. It is one of the earliest modern bird fossils, unearthed from three sites on the Suffolk coast. An extinct relation of the short-tailed albatross, a graceful wanderer of today's Pacific, these giants once set out on five-year flights from Britain – bidding farewell to lifelong mates on a coastline still prized for its birds today.

Overseas, in Tanzania's Olduvai Gorge, lie fossils of birds such as corncrakes and whimbrels, which spend the winter in Africa but breed in Eurasia. These date back 1.9 million years. This suggests that the Palearctic migration, whereby birds fly from Africa to breed in Europe, was already under way at this time. The inspiring journey of travellers like swallows, seeking the comfort of the British summer, goes back a long time indeed.¹¹

As archaeologists have dug backwards through time, fossils have revealed to us more about our forgotten polar Serengeti. These records include brown bears, wolverine, reindeer and steppe lemming, and a now-extinct western partridge that scuttled across our polar steppe up to 125,000 years ago. In the Cresswell Caves of Derbyshire lie the bones of demoiselle cranes. We might imagine these elegant but feisty birds chasing off a nosy mammoth calf.

Our interglacial periods, less famous in schoolbooks than our ice ages, were enormous in duration. Fossils of Cory's shearwaters, now a Mediterranean seabird, have been found in caves on the Gower peninsula of south Wales, hinting at the warmth of these periods when the ice cap was far to the north. In these warmer times, freezing steppes gave way to fertile wooded grasslands, perhaps most similar to those of the Serengeti, Okavango floodplain or Luangwa river valley today.

Enormous cave hyenas, now extinct, became our commonest large predators.¹² Straight-tusked elephants and hippopotamuses grazed the fertile wooded plains of the Thames valley.¹³ Beds of elephant bones from human hunts, uncovered in Essex, take us back to a time when we were harvesting the giants around us. Yet the fossils show that alongside our elephants dabbled humble gadwall and other ducks. We often forget that our birds evolved in the wake of landscape managers far larger than those of today.

The warm-era fossil record of Port Eynon cave, in Gower, is filled not only with the bones of cave hyenas, but familiar Welsh birds – skylarks, swallows, starlings and red kites. These are birds of spacious grasslands and scattered trees: habitats consistent with the action of giants. Elephants and rhinos maintain rich open grasslands with stands of trees. Skylarks and starlings, it would seem, took only much later to the human grasslands of the farm. And as we will see later in this chapter, almost all British land birds are best adapted to a mosaic of trees and open land: a mosaic that pre-dates any kind of human farmland.

Between 13,000 and 10,800 years ago, the British landscape plunged into transition, moving from polar steppe towards a warmer climate. The cave of Soldier's Hole, in Cheddar, Somerset, contains the fossils of ptarmigan, but also black grouse and hazel grouse. Such fossils reveal the changing nature of our mountain tops over time: from arctic wilderness towards a wooded world.

The trees surged back. The fossil record corroborates the suggestion of climatologists that as the climate warmed, Britain moved first towards a 'taiga' landscape, rich in willow and birch. The last records of hawk owls and pine grosbeaks, now found in similar landscapes in northern Scandinavia, date from this time. The diminutive hazel grouse also vanished too early for hunting alone to account for its decline, which may also have been due to our taiga woodlands changing naturally in their composition over time.

The fossil record at this time reveals other exciting birds – but none more so than the eagle owl. The last proven fossil of this giant owl comes from Demen's Dale, in Derbyshire, 10,000 years ago. But eagle owls are not tied to the taiga zone. They thrive across Europe, nesting, often, in caves. If not driven out by a changing climate, was this goshawk-killing giant our earliest avian adversary? Was it hunted from our cave homes – too furious to tolerate, too huge to elude our detection?

And why were so many birds found in caves at all? Some, like swallows, would have nested in them. Others may have been washed in by tides, or been brought in by ravens – or by that common giant of the skies; those white-tailed eagles that nested in our caves.

The great extinction

What happened around the end of the last glacial period, 13,000 to 8,000 years ago, was a shocking loss of large animals that played out across the temperate world. The Quaternary extinctions were the most extreme loss of the planet's wildlife since the disappearance of the dinosaurs. In a relatively short space of time, North America lost its four-tonne giant ground sloths, its giant armadillos and its mastodons. And similar losses occurred in Britain. Woolly mammoths held on here until 14,000 years ago.¹⁴ Their cave lion hunters vanished at a similar time.¹⁵ The bones of woolly rhinoceros were still being used for painting by our ancestors at Cresswell 15,000 years ago, but these grazers had vanished before 10,000 years ago.¹⁶ Their sabre-toothed predators vanished around the same time.¹⁷ Giant elk died out in the British Isles around 9,000 years ago – on the Isle of Man.

Climate change and the 'overkill hypothesis' – the notion that we hunted too many of the giants for them to survive – have long vied as explanations for this extraordinary loss. Why did whole ecosystems vanish, in ecological terms, overnight? There are, in my view, severe flaws in the theory that climate change alone drove such giants to extinction.

Our climate was certainly warming at this time, and the land was becoming more wooded. But megafauna shape the conditions in which trees grow, as surely as human foresters today. Large herbivores do not live within grasslands like the Serengeti: they create them. If our giant herds had been healthy, they might well have been able to survive the changing climate, as they had survived a changing climate many times before. But by the time the last ice age came to an end we had harvested these slow-breeding animals, in confined areas, for hundreds of thousands of years.

Straight-tusked elephants vanished from the Iberian peninsula long before

their cold-adapted cousins, the mammoths and woolly rhinos, around 30,000 years ago.¹⁸ There is no climatic reason why a temperate-zone woodland elephant would go extinct – but hunting pressure is well documented in the fossil mountains of their bones found across Europe. Modern times remind us that when humans wish to slay giants – today, for ivory – those giants stand little chance.

In Eurasia, it is also significant that the largest species vanished far earlier than their peers. Mammoths survived worldwide until 4,500 years ago, on Russia's Wrangel Island. Woolly rhinoceroses were, however, better suited to the modern taiga climate. They survived long after the end of glaciation, but, with their populations fragmented and vulnerable, they perhaps could not survive us. To this day, however, smaller animals of the same habitat as the rhino – reindeer, muskox and bison – have all survived. In Europe, the giants were the first to fall.

On visiting some of the most pristine national parks in southern Africa, it is hard not to feel a terrible sense of loss in seeing how our own continent would once have looked. There is a bittersweet thrill in walking beside improbably large animals, many of whose futures now seem every bit as certain as that of the last British mammoths. What would many of us not give to travel back in time, and teach our own ancestors to cherish the giants who once shaped a world far richer than any we can now imagine?

Island nation

During the last ice age, sea levels were 127 metres lower than they are today.¹⁹ Stunted oceans revealed land bridges that allowed humans to return to Britain time and again. For much of history, Britain's human colonists had, as palaeontologist Mark White puts it, 'a very short record of residency'. Extreme ice ages drove us out of Britain no fewer than eight times.²⁰

At the end of glaciation, Britain was becoming isolated from Europe as sea levels rose. An estimated 5,000 hunter-gatherers had established here, having, it is thought, followed migrating herds of mammoth and reindeer back across Doggerland, the land bridge that joined northern Europe to the British Isles.²¹

Then, 8,200 years ago in Norway, a tract of continental shelf the size of Iceland plunged into the sea. The largest known landslide in history, the 'Storegga Slides', triggered a series of colossal tsunamis.²² The marshes of northeast Scotland vanished. Land bridges further south sank below the sea. Any of our ancestors puzzling over the tide, and how it worked, would have been crushed by ten-metre waves.²³ Our isolation was completed with improbable speed. Britain became an island – for good.²⁴ The creation of our

island consolidated two factors – isolation and human activity – that shape the fortunes of British wildlife to this day.

With the giants gone, our ecosystems would have changed forever. Recent studies show that today's rhinos are apex ecosystem engineers, keeping open short grasslands.²⁵ Elephants trample trees and shrubs, maintaining space, yet simultaneously transport the seeds of the very largest and most valuable trees in their dung; planting as they go. This may seem academic now, yet the song of the corn bunting and the turtle dove would have evolved alongside the activities of grassland giants.

These links between our past and the birds we see today are everywhere. The next time you watch a bird foraging in disturbed earth, call to mind what would have created that disturbance in the first place. From the wallowing of elephants and rhinos to the digging of wild boars, disturbance has shaped the ecology of Britain's wildlife as much as any other force.

The grazing mosaic

After the ice age, it is always said forests recolonized Europe. In fact, trees recolonized Europe.

—Frans Vera²⁶

The establishment of our temperate climate began as the glaciers vanished, so the early Holocene, dating from 12,000 years ago, is now most ecologists' benchmark of 'natural'. It is to the assemblage of animals at this time we must turn to discover how the landscape would have looked.

In recent decades, the long-standing theory that Britain was covered in dense forest – a habitat most ecologists point out is species-poor – has given way to the better-supported and infinitely more logical idea that Britain was a wooded mosaic, dominated by a contest between trees and animals. This seemingly 'historical' point actually affects any kind of vision for the future of Britain's nature: what our landscapes should look like and how our birds could prosper. So it's worth pausing to take a look around at the last of Natural Britain.

Detailed analysis of Britain's commonest trees has shown that since the Pleistocene these were sunlight-loving oak, birch, hazel, willow, alder and hawthorn. The record gets more interesting when you look at the insects, too. The widely accepted theory is that trees with the most associated insect species were, naturally, our commonest trees in recent times.²⁷ In 1960, the biologist Sir Thomas Southwood documented the number of insects dependent on different species of native tree. Topping the chart was oak – Britain's cathedral of life. It was followed by willow, birch, hawthorn and blackthorn. Then came poplar, apple, pine, alder, elm and hazel. All of these species are those best adapted to

light – to wood-pastures, wetlands, marginal habitats or grasslands. Not one of them is adapted to thrive in dense forest.

These top insect trees tell us much about our natural ecosystem. Hawthorn's insect diversity attests to a strong presence in the ecosystem, and it remains vital for many 'scrubland' birds. Crab apples are characteristic of wood-pastures like the New Forest, where free-roaming herbivory is still in play. Old cider orchards with domesticated apple trees form invaluable habitats for birds, in part because birds have adapted to live around wild wood-pasture apples for a very long time.

Most of our woodland birds are dependent on oaks – yet not a single bird craves shade-loving lime. In order of falling insect diversity, beech, ash, spruce, lime, hornbeam, larch and fir are our poorest trees for insects. Removing shade-loving hornbeam, ash or lime, in fact, has relatively little impact on British wildlife. Removing light-loving trees, from oak to willow or apple, precipitates its decline, as we'll explore in Chapter Three.

The studies of Dr Keith Alexander have revealed that the commonest beetles in the early Holocene were those requiring open-grown trees.²⁸ Fossil records of two such beetles, still around today, are of those that require large-trunked oaks. If they are to reach the girth necessary to hold decaying hardwood over time, such trees require sunlight. Alexander's breakdown of the beetle fossil record shows that, in the early Holocene, 28% of Britain's beetle fauna were grassland and scrub species, 13% were arboreal (open or closed woodland), and 47% relied on wood decay (wood-pasture and open woodland). Whilst Britain was filled with diverse trees, in various formations, the beetle record suggests that our woodlands were spacious and open.

At the University of Oxford, Dr Mike Allen, studying Stonehenge snails, was always presented with the 'fact' that Salisbury Plain must once have lain below dense woodlands.²⁹ His snail fossils, however, did not agree. Early Holocene snails from this area were species adapted to open grasslands, with fruit trees and scrub. This, in turn, is consistent with the sustained impact of nomadic grazing herds. Allen theorised it was the abundance of large herbivores, doing the nibbling, which in turn had drawn early human hunters to Salisbury Plain in such abundance.

A range of other animal groups hint strongly that our island's natural biome was once a maze of shifting, broken habitats, with trees, scrublands and grasslands all in play, side by side. Almost all of Britain's 'woodland' butterflies, whether the blackthorn-specialist black hairstreak, the willow-loving purple emperor or the many butterflies adapted to areas of broken space in our forests, from chequered skippers to wood whites, attest to the diverse mosaic in which they evolved. Hairstreaks thrive between oaks, scrub and grasslands. Many fritillaries thrive in sunlit glades. Few, if any, British butterflies, can survive

in dense-canopy forest. Many of our butterflies, like most of our birds, are best adapted for a dual existence. The black-veined white (extinct in Britain since the 1920s) devours fruit trees as a caterpillar but as an adult competes fiercely over thistles in meadows. The large tortoiseshell (also lost) eats elm and willow species as a caterpillar, but the adults are drawn to dung, fallen fruit and open glades. Others, such as the large and mazarine blues, were adapted to low-intensity grazing, which alone can create the anthill-rich grasslands they require. It is also illuminating how disturbed open ground is perhaps the single most important habitat for the survival of most of Britain's wildflowers, too.

Bats reveal an equally clear picture of the early Holocene landscape. Of the eighteen British species, most are adapted to mosaics of trees and grassland. The noctule lives in ancient rotting trees but hunts dung beetles in grasslands. The horseshoe bats thrive in pastures, scrub and open trees. Almost all our bat species are reliant on broken landscapes, rich in open-grown dead trees, scrublands and grasslands alive with beetles and moths.

At King's College in London, Dr Francis Rose spent four decades studying woodland lichens in places such as the New Forest.³⁰ He found that whilst hardly any lichen, moss or liverwort species lived within dense stands of trees, almost all of them thrived in sunlight – along the edges of glades, or growing on the forest's pasture trees. Rose also noticed that ancient fen plants, like butterwort, were vanishing in wood-pastures in Norfolk as traditional grazing was abandoned. This suggested that these plants had originally evolved alongside wild grazing animals.

The chaos animals

The reason for spacious grasslands and scrublands in a wooded land comes down to the simple fact that Britain's trees did not grow uncontested. A vanished array of large herbivores shaped the formation of our habitats. Whilst the grasslands may not have been as large as they were under the stewardship of the giants, trees would still have been required to fight against wild grazers in a way similar to that still visible in the intact wooded ecosystems of southern Africa or India. These forgotten architects answer the question as to why almost all of Britain's wildlife thrives best in mixed mosaic habitats.

Aurochs, wild cattle, existed in Britain in ever-diminishing numbers until their extinction here over 3,000 years ago.³¹ Today, you have to watch the actions of the Indian gaur cattle, in woodland, to appreciate how aurochs once shaped the land, though ancient wood-pastures in places like Romania's Letea forest, with its primitive-breed cattle, can still give us some idea.

Cattle break and debark trees, effectively coppicing and opening wooded habitats – but at the same time, they carry thousands of plant seeds in their

dung, and also on their hoofs, thereby transporting and planting diverse flora. Cattle munch on bushes such as hawthorn, which, growing to resist their nibbling, put out long thorns and become scrub fortresses – used by a huge array of insects and birds. Cattle, however, are mainly grazing animals, and they maintain open glades. The scale of such grasslands depends on grazing preference. Rich dung dropped by cattle promotes teeming invertebrates, including dung beetle communities. You have only to watch a flock of yellow wagtails follow cattle in a coastal Norfolk field, or a shrike foraging for beetles in a Polish meadow beside a small herd, to gain some glimpse of our birds' ancestral dependence on the actions of cattle.

The rewilding studies of Frans Vera, in the Netherlands, and Charles Burrell, in Sussex, have shown that where small cattle herds roam wild, oak trees do not grow in 'forests' but must fight their way through thorn scrub if they are to survive. This is one of the most compelling reasons why a closed-canopy forest cannot form. It can only do so, indeed, if wild cattle are taken out of the picture.

Bison, like aurochs, were the creators of diverse grasslands. Fossils in Doggerland suggest bison certainly came very close to Britain,³² and these were, most probably, native animals too. Our fossil record is fascinating, but it is no more than a glimpse. As is often said about British bison, absence of proof is not proof of absence. Not only do bison love wallowing, creating rich areas for plants to prosper, but they also smash through aspiring trees, debarking them as they go, creating broken or open habitats in the process. Open areas of soil left in a bison's wake allow flowers and grasses to regenerate.

Tarpan, wild horses, were another keystone grazer. At a species level, wild horses have never gone extinct. Tarpan were the European subspecies of wild horse: the other, the takhi or Przewalski's horse, is very much alive on the steppes of Mongolia, and has since been reintroduced to grasslands in Europe. Most British tarpan, however, appear to have vanished by the early Holocene.³³

The role of horses in our wooded ecosystem is dismissed by some on the basis that horses are 'steppe' animals. The idea that this extinction was climate-led, however, relies to the misconception that forests push the horses out, and disregards the fact that herbivores do not live in grasslands – but create them. Horses were hunted with specialist spears in Europe at least 400,000 years ago.³⁴ By their apparent extinction in Britain, around 8,000 years ago, numbers would have been tiny, isolated on our newborn island.

Dutch ecologist and historian Henri Kerkdijk-Otten has also pointed out that horses reflect the ecotypes they inhabit.³⁵ Rather than there being one distinct wild horse species in Europe, he argues that European horses, like zebras, inherently adapted different traits. A steppe-dwelling horse, for example, evolves different characteristics to a forest-edge species. He argues

that wild horses in Europe survive. Primitive breeds, never domesticated, he argues, *are* wild horses. We've just labelled and contained them differently from other wild animals.

Fossils of horses have been known from Exmoor for 50,000 years, and wild horses were noted there in Domesday Book. Whilst Exmoor ponies are assumed to be feral, their physiology is ancient, with eyelids adapted to withstand the harshness of driving rain. Horses, like Africa's zebras, are hugely adaptable. And there is no compelling evidence that they would not, if left alone by our ancestors, have continued to shape the British ecosystem, as the varied zebras of Africa shape its woodlands to this day.

Wild boars are disruptive ecosystem JCBs. They upturn and root around, creating areas of disturbed ground where seeds take root. Watch a house martin gathering mud for its nest, a grey partridge foraging for food, or a robin following your garden hoe, and the role of the boar becomes apparent. Boars reveal and aerate the soil. A range of British plants, insects and birds are highly evolved to thrive in disturbed ground, and with the megafauna gone, the role of boars would have become even more important.

Beavers break, fell and coppice trees. This action creates rich areas of scrub, and dammed areas that retain water and promote wetlands. Beavers do not live passively in wetlands. They create and manage them.

The final set of 'gardening' animals in the early Holocene consisted of four specialist browsing animals. Browsers, unlike grazers, chop and trim rather than plucking, targeting young vegetation: flowers, buds and shoots. Unchecked by predators, such animals can increase in numbers and stunt vegetation. Kept in balance, they never linger in one place for long. Red deer are preferentially browsers of wetlands and open woodland. Roe deer are specialists of denser wooded areas. Elk (moose) are strongly associated with willows and birches. Their current distribution in Europe suggests that British uplands and large fenlands may once have provided such forage in abundance. Elk were hunted out around 3,000 years ago.³⁶ Reindeer, often said to have vanished from Britain as the temperatures rose, were still being hunted in the boglands of the Flow Country, in Caithness, as late as the ninth century.³⁷

In opposition to these many grazers, diggers, choppers and browsers, which in their different ways compete against tree formation, Britain had three apex predators in the early Holocene: lynx, wolves and brown bears.

Lynx are specialist hunters of roe deer, and the only predator tied to denser woodland, the habitat of their prey. Looking at some of the last areas lynx were present in Britain, such as the Lake District, gives us some insight into the places where our densest woodlands may have grown. The steep slopes

of Britain, particularly in the west, would, logically, have hosted its densest woodlands: enchanted rainforests of dripping limes and tufty-eared lynx in the shade. Steep uplands create conditions where trees, rather than large herbivores, are most likely to flourish, and thus form closed-canopy woodlands over time.

Unlike the lynx, our two other lost predators, often ascribed to Britain's 'forest' past – wolves and brown bears – are not actually forest animals, but are, again, adapted to thrive in a mixed landscape.

Brown bears require huge volumes of berries and fruits, which grow on sunlight-loving trees, and thrive around wetlands rich in fish. A bear's ecosystem role involves a lot of tree planting, as the seeds of the fruit it has eaten pass through its gut. Recent camera-trapping from Belarus has proven that bears also 'manage' a range of other animals, including juicy wild boar piglets.

Wolves hunt semi-open landscapes for prey. They effectively plant trees by scattering nervous herds of deer and elk. With the 'fear factor' in play, browsing animals do not linger long enough to browse down vegetation. In moving around a landscape, they defecate seeds and plant trees. Since the return of wolves to Yellowstone, millions of new aspens have sprung up.

Those keen for the return of predators understandably place emphasis on these animals as the prime architects of a landscape. Predators like wolves, however, are limited to their dens for much of the year. Herbivores roam. Serengeti studies show that only a quarter of wildebeest are killed by predators such as lions: the rest, by starvation. Wolves help an ecosystem greatly, yet it is the guild of herbivores that are the foremost agents of diversity. Our largest animals would once have had the largest impact on our landscapes.

If you are an avid watcher of wildlife documentaries, when were you last shown an elephant penned in by trees that had grown up so fast it wasn't able to move its trunk out of the way in time? Trees grow more slowly than herbivores move. Trees cannot 'swallow' animals – but dense forests *do* grow once pristine herds diminish, as has been seen in Africa when elephant herds are poached out of existence.

This perhaps is why the incorrect baseline of a dense forest, a habitat inhospitable for most wildlife, has become the 'wilderness' to which we are supposed to return. The argument of succession is correct: trees grow over time. What it ignores is the other half of an ecosystem: the opposing force of animals. Britain's pollen record shows increases in shade-loving hornbeams and limes after the retreat of the ice. In the dense Atlantic rainforests of western England and Wales, a wetter, warmer climate would have helped such tree species. But shade is also what happens when you remove the architects of spacious habitats.

Britain's landscape managers had been harvested, with ever-greater intensity, over many thousands of years – up until the point of extinction. And the more players you take out of the game, the poorer your landscape becomes. The more stewards you remove, the less diverse the picture gets.

Natural Britain: the bird's-eye view

Conservation should be based on practical observation rather than unstable theory.

—Oliver Rackham³⁸

Britain's birds are the final piece of the puzzle in unravelling how wild Britain once looked. They corroborate the story of the plants, the trees, the bats and the butterflies, the bears and the wolves, the grazing animals, the browsing animals, the fungi and the lichens, the beetles and the snails, in revealing a mosaic world of infinite variety – a wilderness of woodland, scrubland, grassland and floodplains. Virtually all of our birds evolved in disrupted, chaotic, dynamic mosaics for maybe a million years or more, under the regimes of large herbivores. And to this day they remain true to such a broken, jumbled and chaotic world.

Of around twenty species adapted best to truly open grasslands,³⁹ some – such as the skylark, great bustard or quail – have no requirement for trees at all. Other species are best adapted to floodplain grasslands that grow across the season, concealing vulnerable young birds as they do so. In this category, the corncrake, redshank, black-tailed godwit, ruff, yellow wagtail and greylag goose can all be found to thrive where these original habitats remain in Europe. Other species appear adapted to very short, tussocky pastures in harsher, rockier areas – perhaps once stewarded by wild horses. The chough and wheatear, both foraging in our coastal lawns, are two such species. In Mongolia, where wild horses remain, both can be watched following in their footsteps and feeding on 'horse lawns'.

Around fifteen of our current or recently lost breeding birds specialise in scrub-grasslands, where thorny bushes meet rich open sward.⁴⁰ A vanishing habitat in most of Britain, this is what we might term a classic 'Serengeti', with isolated stands of thorny scrub. Red-backed shrikes, skewering dung beetles in grassland but nesting in dense thorns, are characteristic of such places, as are grassland-breeding cuckoos, watching their pipit hosts from stands of bushes. Where dense thorn stands meet disturbed soils, a range of what are now called 'farmland' birds thrive – turtle doves, tree sparrows, linnets and grey partridges. Familiar blackbirds, song thrushes and dunnocks are all, in

fact, birds that thrive where scrub joins open pasture. As with our long-lost river valleys, we cannot find true scrub-grasslands growing as once they did, but a quick look at areas of southern Africa will reveal seed-eating finches, shrikes, cuckoos and magpie species all sharing such a habitat. It is the ancient loss of free-roaming herbivores in our own country that has led us to forget such places, and consign so many birds to dependence on the hedgerow – and the farm.

Scrubland, often tidied and removed from our countryside today, accounts for at least twenty specialist birds.⁴¹ At each stage of succession, new specialists emerge. Most of these birds are small passerines, which rely heavily on song to communicate in a complex world of layered shade. Where scrub bursts through grassland, you have whitethroats; where young trees burst through scrub, grasshopper warblers. Dense thorn castles, admitting little light, are the haunt of lesser whitethroats and nightingales. Thick bushes like willow or hazel, aspiring towards tree height, hold willow warblers, garden warblers and blackcaps. At the most advanced, rotten end of the scrubland spectrum, hazel-led habitats with dense webs of branches are the haunt of marsh tits. The most rotten of elder, birch and willow scrub, often associated with standing water, becomes the paradise of the willow tit. Scrubland is often misunderstood. We are told that it naturally gives way to woodland unless pruned back. But with aurochs and tarpan in the ecological game, it would have been pruned relentlessly, with far more ferocity than a forester today. This scrub-animal contest would have created a rich mosaic – brimming with subterfuge and song.

We also find a great array of birds best adapted to open wooded grasslands.⁴² Here, in fact, we find most of our birds of prey, just as you might in the ecosystems of southern Africa. Our cornerstone scavengers – white-tailed eagles, red kites and ravens – find most food in grassland but nest in large trees or recesses in cliffs. Likewise, a whole suite of smaller predators, not suited to competition with woodland goshawks, thrive by nesting in mature tree stands but hunting open habitats – barn owl, hobby, kestrel, sparrowhawk and buzzard. In rougher grassland habitats, hawthorn or pine stands provide nest sites for the elusive long-eared owl; in Scandinavia, wherever such places are present, they form the preferred nest site of the merlin. Two species, rook and stock dove, specialise in finding food in disturbed ground but nest in older trees, whilst two more tree-nesters, jackdaw and carrion crow, often find food, and nesting material, on the backs of herbivores in open lands.

Some of the richest habitats for birds are those where mere islands of trees lie in open habitats. These habitats are not ‘degraded’, and indeed can be seen in their wild form across Scandinavia, where elk browse. For example,

windswept bogs or grasslands with stands of birch are the prime haunt of the black grouse, a bird clearly evolved in a world where wind, water and wild ungulates contested the growth of trees. Birches and rowans provide the black grouse with food in the winter, but a rich variety of grasses and flowers provide food for its chicks, as well as nesting cover. Woodlarks, tree pipits and nightjars all thrive best where heavily disturbed grasslands meet stands of trees, where these birds sing. All of these are birds of landscape chaos – where disturbance would have kept the trees in check.

Of all wooded habitats, wood-pastures – spacious stands of trees – are by far the richest for birds. At least thirty of our birds are best adapted to thrive in oak-dominated wood-pastures,⁴³ yet only a handful of these migrate, so to speak, into denser canopy forests. Six are pasture-feeders, nesting in mature trees, often in tree hollows, but finding food on the ground: wryneck, green woodpecker, mistle thrush, starling, redstart and robin. All of these attest to the power of herbivory in maintaining open lawns around ancient trees. Four of our birds are specifically oak-evolved, leading lives based around the bounty of these trees: blue tit, great tit, nuthatch and jay – the latter capable of planting entire oak woodlands through dropping acorns. Favouring glades and open space, where it can intercept flying insects, is the spotted flycatcher, whilst the tawny owl favours old-growth cavities for nesting but rarely hunts in dense woodland. Two species, goldcrest and coal tit, are more adapted to a life in pine and yew, both conifers that would have grown naturally within our woodlands. Decay in our trees adds three further species – the great spotted woodpecker, the deadwood-specialist lesser spotted woodpecker, and our long-forgotten old-growth tree cavity nester: the swift. Then there are species that use wooded mosaics at a much wider scale. Goshawks and honey-buzzards nest in dense stands of trees but find much of their food in clearings, particularly honey-buzzards, which need wet clearings rich in frogs. Woodcock nest below trees but ‘rode’, or display, over large clearings like strange squeaking bats. Colonies of hawfinches favour extensive woodlands with plenty of light-loving fruit trees like cherry, but come autumn, shift their attention to different woodlands, with more hornbeam or beech mast.

In northern Britain, where pine and birch woodlands would once have been more dominant, broken wood-pastures, not dense forests, remain the richest habitat for birds. Pine, birch and aspen pastures are a prime habitat for redpolls, siskins and crossbills. Very mature, spacious Scots pine forests are preferred by the parrot crossbill, whilst the capercaillie broods in bilberry but the males lek in open clearings with a preference for stands of dead trees. Crested tits, too, prefer the oldest and more open stands of pine. Green

sandpipers, perhaps once more common when the Caledonian woodlands were larger, use old thrush nests in trees to lay their eggs in, yet spend much of their time foraging in open wetland bogs. Yet again, we find remarkably few birds, or indeed other animals, with a craving for canopy forest. Indeed, of all our birds, only three actively favour closed canopies. The wood warbler prefers a dense canopy, in which it sings, above a browsed forest floor with some brambles, in which it nests. Golden orioles spend entire lives in dense treetops, favouring, in western Europe, poplar, and in eastern Europe, oak. Pied flycatchers, too, appear to shun the woodland edge. But these are the exceptions to the rule, and all remain heavily dependent on oak – a tree that grows best under sunlight.

Such tenacious attention to what is ‘natural’ might seem a little dull. But later on, when we consider how best to rewild our wonderful island, remembering what we have lost could not be more important. Muddled ecological thinking still peddles the idea that dense rainforests, growing from coast to coast, were our ‘natural’ biome. Yet, at every turn, the natural world begs to differ. Today, the wild stewards gone, we painstakingly ascribe many of our endangered species to dozens of man-made habitats, none of which, in truth, they evolved in or require. But even now, mammals and moths, butterflies and bats, and most of all our birds, point us to the wilder world where they once lived – and remind us of the variety of landscapes once crafted by wild animals, whose numbers, size and majesty we have entirely forgotten today.

Very British pelicans

In the early Holocene, distinct wetlands existed in huge areas, where the most influential agents in the landscape were not animals but rivers. It is estimated that wetlands of one sort and another covered 20% of the British land mass.⁴⁴ Yet in spite of this, even more birds show signs of being adapted to our dynamic wetlands than to our once-dominant wood-pastures.⁴⁵

The largest of our wetlands lay in the Great Fens of Cambridgeshire, the Avalon marshes of Somerset, the Humberland marshes of Yorkshire and Lincolnshire, and the mosslands of Cheshire and Lancashire. In Britain, we can hardly imagine the scale of these places or the exuberant chaos of areas where rivers are in charge. The Danube Delta in Romania, the Biebrza Marshes in Poland and the Pripyat valley in Belarus are the best examples left in Europe of the kind of vast wet wilderness that once existed on our island too.

Fossils preserve well in peat, and so the bird fossil record for our wetlands is a good one. We know that our two largest wetlands, Avalon and the Great Fens, were the haunt of Dalmatian pelicans, which then bred across northwest

Europe. In Glastonbury, their bones date from 700 BCE, and as late as Roman times these curly-headed fish hoovers still floated over Somerset's marshes. Excavations at Glastonbury reveal that cranes and white-tailed eagles were also widespread, as we find them in Polish river valleys today. Wild mute swans graced our waterways prior to their domestication later.⁴⁶ Fenland once covered 8%, or 8,400 square kilometres, of Britain.⁴⁷

Looking at pristine river valleys in far eastern Europe, it is likely that our fenlands were once a system of gradients, where different volumes of water, at different times of year, delivered different habitats and birds. Within one untamed river system in eastern Poland, for example, you can still find shallow grazing marshes with yellow wagtails, herb meadows with corncrakes, shallow water with black terns, sedge fens with spotted crakes, damp grasslands with ruff, beaver-coppiced woods with willow tits, pockets of reeds with bitterns, and oxbows with colonies of grebes. Every configuration of 'wet' thrives side by side.

This, in all probability, is what our fenlands looked like in their original state. They were vast and unwieldy – a freestyled world of beavers and pelicans: self-governing, soggy and wild.

The softly wooded hills

The height of Britain's natural treeline is a contested subject, but the best-acknowledged example can be found at Creag Fiaclach, in the Cairngorms. Here, at 640 metres, or 2,100 feet, stunted Scots pine and juniper fade away, at last, into windswept heather. But the height of a tree-line is no constant matter. Orkney's, for example, lies at zero metres. Here, the wind crafts the island's vegetation and 'above the tree-line' birds, such as curlews, begin at sea level instead. If we set fixed rules for our ecology, we underestimate the range of natural forces in play – such as wind, flood, grazing animals and land gradient – and the variety these factors would have created in our landscape.

Looking at southern Scandinavia, it is likely that our uplands were soft-gradient habitats, whose degree of woodland was shaped by many factors. Elk in Scandinavia contest the growth of willows, keeping the open moors we are sometimes told only gamekeepers provide. Wild horses in Mongolia prove themselves capable stewards of upland birch woods. Where such forces lessen, trees surge back, with juniper a characteristic species of the tree-line: the last tree to give in.

It is such a gradient, and the processes that create it, that we have lost in our uplands for thousands of years. The restoration of our lifeless hills, recreating natural ecosystems in place of the farming of grouse, deer, sheep and spruce, will be explored at length later in this book.

Clearing the land

The Neolithic, 6,000 to 4,500 years ago, was when we settled down. Hunter nomads, who had followed mobile prey into Britain, moved into settled communities, whose lives were based around static livestock and crops.⁴⁸ This was perhaps the biggest single change in human history.

Decreases in the elm pollen record suggest that our prehistoric ancestors were clearing trees very early on in the Neolithic.⁴⁹ Five thousand years ago, stone axes were being chiselled out of flint: axe industries formed at places like Langdale in the Lake District.⁵⁰ Four and a half thousand years ago, we took up the bronze axe – and, by Roman times, our native 60% of woodland had been reduced to 15%,⁵¹ and our aurochs and elk were long forgotten. In reality, then, a complete ecosystem has not been seen in the British Isles for at least 3,000 years – including horses, even longer again. And that is, in itself, quite a thought.

With our woodlands vanishing, this paved the way for the isolation and hunting of our predators in the more treeless centuries to come. Four thousand years ago, brown bears wandered on Dartmoor. One, we know, was turned into a pelt and buried with a princess.⁵² The princess belonged to a local tribe of the time. The bear, in the wrong place at the wrong time, was less able to thrive in a world without trees. A bear wandering a wooded valley is a quiet prospect. A bear wandering a Celtic field is a source of attention.

The haunting expanse of northern Dartmoor seems as wild and ancient as it gets. Yet our ancestors, long ago, cleared the upper reaches of its woodlands with fire. The peat in Dartmoor's wild bogs is the result of acidic soils, which in turn arose from humans burning away the trees.⁵³ Dartmoor may haunt us with its wildness, but it is as tamed as anywhere in Britain: a windswept brownfield site.

By 1000 CE, brown bears vanished from Scotland. Manuscripts suggest lynx may have persisted in the Lake District until 700 CE, with fossils from North Yorkshire around the year 600.⁵⁴ The last wolf officially fell dead in Perthshire in 1680, but wolves have become world experts at eluding humankind, and were reported from Scotland until well into the eighteenth century. We are often told that each of these animals was killed, but for lynx in particular this would seem improbable, and there are few records of this in folklore. Harvest a fragmented woodland of its roe deer and you effectively starve a lynx population. On the other hand, there are accounts that entire forests were burned down in Scotland to remove just a handful of wolves.

Bronze Age clearances, continuing into Roman times and beyond, would however have led to an new increase in grassland birds – the corn buntings and skylarks whose fields we worry about today. Bird fossils from the Roman

period abound with the remains of grey partridges, house sparrows and barn owls, but are for the most part devoid of woodland birds.

In removing most of the woodlands of Britain, we shifted and affected many of our birds. But if you disrupt a grazing mosaic, dependent on disruption, with new domestic animals in tiny herds, you can, accidentally, continue to support quite a lot of the original birds. And the Bronze Age put in place an agricultural life-support system that would sustain a lot of British species for thousands of years.

The windmill's tale

Some 3,300 years ago, people settled in the Fens. Remains at Flag Fen, near Peterborough, reveal how they built walkways through the reeds. Boardwalks, which now take us to bird hides, once helped our ancestors expand their mastery of Britain, float above the water, and hunt effectively.

By 43 CE, Dalmatian pelicans had probably deserted Britain. Some may have abandoned their colonies as humans moved in, but cut marks on bones prove that our pelicans were eaten too.⁵⁵ Fenland as a whole remained the last area of Britain to be conquered by William, after his arrival in 1066. It wasn't until the 1100s that the monks of Sawtry began to cut draining dykes, in a time when eels were still so common they were used as currency. By the 1200s, the monks of Woodwalton Fen were draining land to graze sheep in summer.

And then, in 1630, the 'gentleman adventurers' arrived. 'Adventurer' at the time meant investor. These investors were funding the drainage of the fens. Over the next seventy years, engineers working for the Earl of Bedford constructed the Bedford Rivers, which drained huge areas of fenland north into the Wash.⁵⁶

From 1685, an unfamiliar silhouette loomed over the marshes. It struck fear into the hearts of local people, who had lived off the fens by wildfowling and fishing for many centuries. The windmill wrought as much destruction in a century as 10,000 bronze axes. Most beavers vanished by the Middle Ages, drained from their homes and hunted intensively for their fur and glandular oil. Cranes had been deemed the 'noblest quarry' for centuries. Anecdotes tell of King John killing up to nine cranes in a day with his gyrfalcon, in Lincolnshire, in 1212. In 1465, the Archbishop of York excelled himself, serving 204 cranes at a banquet he hosted.⁵⁷ It is believed cranes vanished from England by 1542. Harvesting cranes for sport was their demise, but even at this early time, birds, like beavers, were also being drained out of Britain. Other species such as the night heron (or "brewer"), as well as little egrets (both served regularly amongst the London game dealers of the sixteenth century) appear to have vanished by the seventeenth century too.

Hunted out

White storks are famous for building huge nests on village houses across the older countryside of Europe, and feeding in the meadows around. In Sussex, the village of Storrington was known, in 1086, as Estorchestone and, by 1185, as Storketon, meaning a ‘homestead with storks.’⁵⁸ Various old tavern names around the country also suggest the presence of storks within villages, depicting them on their signs. Surprisingly little trace can be found of the charismatic white stork’s departure from our lives, but in the sixteenth century, long after the last documented pair famously nested on Edinburgh’s St Giles’ cathedral, storks were still fetching big money – up to 48 old pence per bird – in the London game markets. Unlike in many other countries, such as Spain or Poland, they too would soon vanish from our rural village lives. And the giant-slaying would soon be taken to an entirely different level.

The archaeological record reveals that in Roman times white-tailed eagles were the dominant giant of lowland skies: soaring from Southwark in London, then a vast marsh, to Avalon in Somerset, the fens of Cambridgeshire and the Humber estuary.⁵⁹ In all, 1,500 years ago, up to 1,400 pairs of white-tailed eagles and 1,500 pairs of golden eagles are thought to have blackened Britain’s skies.⁶⁰ But what would follow over the coming centuries was as extraordinary as it was wasteful.

In 1532, the Preservation of Grain Act provided the ultimate ‘shoot to kill’ licence for an assault on our nation’s wildlife. Bounties were put on the heads of a range of species, very few of which were actually damaging to local stocks of grain. Wildcat bounties in England and Wales were fixed at one penny. In the seventeenth century alone, 5,000 bounties were paid out for decapitated cats. The Scottish wildcat was not Scottish once, but lithely hunted all the parishes of our island.⁶¹ Hedgehogs were prized at four pennies, in the belief they sucked milk from cows at night. In the seventeenth and eighteenth centuries, over half a million hedgehog bounties were paid out. Pennies were paid for the heads of ravens and red kites. Polecats, pine martens and badgers were hunted down. Other birds, from shags to choughs, which had centuries earlier been celebrated on coats of arms, were killed for purely superstitious reasons.

As late as the seventeenth century, golden eagles were still nesting, at least, in Derbyshire’s Derwent valley and in Snowdonia, and in North Yorkshire they hung on until the 1790s.⁶² Analysis of earlier records suggest this was just the remnant of a thriving upland population, soaring across southern Britain.⁶³ By 1800, eagles had vanished from these last strongholds too.

White-tailed eagles had once been deeply ingrained in our folklore.

Hundreds of place names in lowland England, unsuitable for upland golden eagles, bear the place-name ‘earn’. The tombs of Isbister, on Orkney, contain hundreds of eagle bones, which must have held significance for the Iron Age people of the time. With their ability to carry off sickly lambs, these eagles would now become public enemy number one. By 1625, bounties on Orkney rewarded anyone who killed an erne with eight pence. By 1774, this bounty had risen to half a crown. The Lake District became the last stronghold of the eagle in southern Britain. Here, meticulous accounts, written by Crossthwaite’s church wardens, reveal the organised level of their destruction. In 1713, John Jackson took ‘an old eagle’; Edward Birket, ‘a young eagle’. In 1719, John Jackson took another ‘old eagle’: clearly he’d found his niche. By 1794, the last breeding pair of white-tailed eagles in England was gone.

Few today are aware of this extraordinarily destructive period in our history – and for anyone with the stomach for more, *Silent Fields*, by Roger Lovegrove, is a fascinating read.⁶⁴ This was a purge few other countries carried out to quite such a degree. Indeed, by the time Victorian hunters started killing mammals and birds of prey on their shooting estates, they were merely hunting the relics of what were already severely depleted populations.

Almost all of this destruction was *cultural* in its ferocity – and worst of all, we so nearly took a different route. In earlier centuries, kites and ravens were respected for providing what we might now call ecosystem services. Goshawks were revered for their hunting prowess. Choughs were admired by the Cornish, with a legend told that King Arthur turned into a chough after he died. But then something changed in us. We turned these species into enemies – and wiped most of them out.

A new settlement

With Britain tamed by the early Middle Ages and our avian giants driven into pockets of Scotland or exterminated completely, did the rest of our birds vanish as well? Strangely, they did not. This, in part, is because the mammal herbivores had been replaced with another, equally disruptive mammal – ourselves.

In place of aurochs-grazed pastures, we put to work tiny groups of cattle and pigs as woodland stewards. In place of wild wood-pastures, we planted orchards. An organic orchard holds twice as many earthworms per square metre as dense woodland.⁶⁵ If you were a blackbird or any other pasture-feeding species, you were winning. Birds that evolved in scrub-grasslands, whether red-backed shrikes or turtle doves, thrive under extensive grazing. If you were a shrike on lightly grazed common land, you were winning. Coppicing woodlands, as the late Oliver Rackham observed, recreates the

tree-breaking actions of cattle and bison. If you were a nightingale, you were winning.

In place of grazing animals, men burning charcoal made clearings in our woodlands. If you were a nightjar or woodlark, you were winning. Hay meadows grow, over decades, to hold up to 400 species of wild flower, and insect densities that can rival those of natural grasslands, and traditionally these were rarely drained. If you were a species of floodplains or wet meadows, like the corncrake – you were winning.

As our lightly farmed grasslands gave many British birds a new lease of life, our stewardship of the pasture-woodlands continued as well. In 1066, William I, having conquered, wanted somewhere to hunt. He saw a large tract of agriculturally poor land west of Southampton and pounced. Here, in exchange for his new subjects' right to graze livestock, William secured the right to hunt. As is typical of many of the best conservation successes, our last true woodland mosaic, the New Forest, was safeguarded entirely by accident. Across Britain there came to be many hunting areas, 'forests' and parkland estates, that influential landowners accidentally protected for future birds to enjoy, deploying grazing animals to preserve some of the lost richness of our original landscapes.

For centuries, by creating an earthy grazing mosaic of their own, with a scattering of light-loving trees, early farmers accidentally ensured that the majority of birds did not face extinction. Many species would rely on these fragile, proxy ecosystems for centuries to come. Then – we would take them away. And that brings us to the story of John Clare.