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Explanatory Note

This is not strictly a book of science but the hybrid form that is conventionally associated with the term 'nature writing'. There is perhaps more technical natural historical and scientific content than is customary in the format. Yet I have tried to keep jargon to an absolute minimum and provided a brief glossary with fuller explanations for words or concepts that may be unfamiliar to the layperson.

It is typical in scientific books to present, at the first mention of a species of plant or animal, its name in full with initial capitals for the English version. To avoid any disruption to the narrative flow I have generally not followed this rule. Species names are always given in lower case. Only once, in reference to the common swift, in effect the book's central narrative device, have I supplied the corresponding scientific name. However, the full complement of these formal details has been provided for every species mentioned in the text and these are listed in sequence in Appendix I.

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Prologue

Though we have life, it is beyond us. We do not know how we have it, or why. We do not know what is going to happen to it, or to us. It is not predictable, though we can destroy it, we cannot make it. It cannot, except by reduction and the grave risk of damage, be controlled. It is, as Blake said, holy. To think otherwise is to enslave life, and to make, not humanity, but a few humans its predictably inept masters.

Wendell Berry, 'Life is a Miracle: An Essay
Against Modern Superstition'

One Midsummer's Day had its origins fifteen years ago when I started a fresh notebook that includes handwritten reflections upon a range of natural-history and life-science books – from insect pollination and the origins of social wasps, to the physics and chemistry of the Sun's interior. The jottings were a blind pursuit of an unknown outcome, but they are indisputably where my project began. Given that I embarked on the notes in 2007, it means that this has

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become the published work on which I have laboured longest, although I have written others in the interim.

I remain fascinated by the exact origins of books, what determines their format, where the urge to create them arose. My book *Crow Country* (2007) was conceived in a momentary revelation on one autumn evening by the banks of the River Yare in 2001. The development of *One Midsummer's Day* could not have been more different. It has been a process of slow, gentle accretion like the build-up of sediment at the bottom of a stream.

I am intrigued to find that my first notebook was given a working title on its cover: 'Black bird'. A single black bird has indeed become the central motif through which I've told this tale. However, I should add that the project's original germ is not actually present in the final book. The species intended originally in the notebook title was the European common blackbird. In the middle of the project, I enlarged my goal to include both this thrush and the common swift and then, with a final refinement, I switched species to focus only on the latter.

One Midsummer's Day is a development and an intensification of my earlier book about black birds, *Crow Country*. Both start from a position that matters we assume to be everyday and ordinary are, in fact, wonder-filled and extraordinary. What is often most memorable in life are those parts of our experience which were once only subliminal, or taken for granted. Yet these mundane things can ultimately lead to life-changing journeys of discovery.

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Here I have focused on my ever-deepening appreciation that, as far as we know, we live among the greatest event in the universe, partaking of the deepest mysteries and the grandest miracle possibly across 100 billion galaxies. When I use the words 'miracle' and 'mystery' I should add that I intend no role for an omniscient god. I subscribe to the explanation of life's origins and development as defined by science and corroborated daily by the work of tens of thousands of contemporary researchers. The vision offered in this book has been pieced together by the minds of millions of people. It is a prospect of life's inner workings founded upon Charles Darwin's theory of natural selection and there is no place in this evolving whole for a deity.

I use 'miracle' as shorthand only for the astonishingly intricate processes that have resulted, say, in the flight mechanisms of a common swift. In truth, what gave rise to the bird's feathered wings and respiratory system is a step-by-step genetic unfolding that is anything but miraculous and which is entirely susceptible to discovery and understanding. At the same time the story of the making of a swift's wings extends over such an unfathomably long period that we can be forgiven for it seeming miraculous.

The word 'mystery' is, nevertheless, completely apt. Science has revealed so much, but we should recognise the full implications of all our extraordinary discoveries. If there have been breakthroughs – about, say, the behaviour of plasma in the Sun's core, or about the seemingly endless dark hole of where life on Earth first originated – these

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reveal what was unknown until recently, but they also gesture towards what lies about us to be explained. The scientific revelations made by Galileo or Newton have helped shape our understanding of the world, yet neither of these great figures knew anything about the inner workings of a leaf, or the most basic details of bird migration. What we should take from this is not how little *they* knew, but our comparable position relative to future findings.

Newton famously thought about this issue. 'I do not know what I may appear to the world,' he wrote, 'but to myself I seem to have been only like a boy playing on the seashore, and diverting myself in now and then finding a smoother pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me.'¹ Like Newton's life, ours are wrapped in mysteries. I find this comforting and compelling. It is this richness that I have hoped to describe and celebrate in *One Midsummer's Day*. The understanding but also the wondering. In one sense both words converge at the same place, if you take 'understand' to mean 'to stand under', to be in a condition of humility before the subject of your attention. Equally 'wonder' can convey an attitude of reverence as well as one of reflection.

The book is an attempt to capture for the reader as much about life as I can express in a text on the events of a single day as I watch a flock of common swifts. That is the kernel of its ambition. To allow you to imagine both the known parts, but also the vast unknown in which they lie enfolded, and to ask of it all deeper questions.

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PART I

EVENING

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One

The Charred Scream

Attention is the rarest and purest form of generosity.

Simone Weil

It is not enough to believe what you see. You must also understand what you see.

Leonardo da Vinci

I'm seated at the top of our garden, getting some of what I've seen down in my notebook as the Sun sets over the near hill. I don't know why, but time and again I repeat these efforts to capture it all. And in my mind's eye I can still see the birds coming around the sides of the houses, in a loose mob that passes quickly, weaves endlessly, each one across the other's path, so that it is almost impossible to count them. It's a constant factor with common swifts (*Apus apus*): there always appear to be more than there actually are.

Perhaps there are a dozen. Yet such is the enlarged

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effect of each one – the pace of the passage, the intensity of their calls, the confusing power of their collective action – that when they surge as one in and out of view, it has some of the impact of an oncoming charge of hooves, a cannonade of crazy birds trailing fire across the evening sky.

I come out most days in late July to enjoy the spectacle. I find I do it almost despite myself, to allow my words to fly towards them. It is as if all the riveted-in airy freedom and speed of swifts possess a denser mass than the rest of life. The birds draw thoughts and feelings out of us, which stream after them like iron filings to a magnet. I have to pin something on their inexpressible mix of elegance and awkward zaniness. One reflection that arises now is that as they twist and swerve they seem almost to falter and the wings to battle one another, wrestling each other's velocity and direction. You wonder sometimes if this supreme organism could be ripped apart by its own conflicting impulses. Until the whole being reasserts all its anarchic mastery and off it sails.

I come up also as a chance to make a stocktake of the numbers and to prepare myself for August, when the skies fall silent. There will be gorgeous butterflies on our buddleia blooms. There will be queen ants pouring out of the cracks in the garden paths for their nuptial flights, when they will take to the air to breed for the only time in their lives. There will be robins to begin that smoke-twist of early-autumn song. There will be leaves to turn orange or red, and grasses fading down to dun. There will be so

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many things to watch and cherish. But there will be no swifts. Next month I might perhaps come across an occasional late departer, a swift heading south, silently across the landscape, determined to be gone. But by September there will be none.

Nothing in the avian calendar is quite as brief as the swifts' twelve-week season of plenty that begins in early May and ends as July comes to a close.

We in the northern hemisphere see them so little that the swifts' long absence makes our hearts grow fonder, and I cherish them above almost everything in nature. But it is now, just before departure, that I love them most of all. So I come up here as a way of laying down this harvest of swift-memories to tide me over the long swift-winter, until they come once spring returns.

Tonight, the birds are at their peak. The particular display that they enact on evenings like this has a technical name – it's called 'a social screaming' or 'communal screaming display', when swifts whirl and fizz in repeat, centrifugal circuits at anything between 45 and 115 km/h. Why exactly they do it is still not fully understood and, in many ways, the mystery of it is part of its appeal. It seems all the more intoxicating that the birds, which nest in the roofs to our homes all over the world, perform a surging flight in front of millions of us on these summer evenings that we still cannot grasp.

I can tell you, however, that we have long been captivated by it. In the late eighteenth century the English cleric Gilbert White, author of *The Natural History and Antiquities*

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of *Selborne* and an ardent student of swift lives, was inspired to write poetry about his village birds 'coursing round the church'.

To mark the swift in rapid giddy ring
Dash round the steeple, unsubdu'd of wing!¹

The twentieth-century Indian ornithologist Salim Ali referred repeatedly to swift formations that he observed in the Himalaya and elsewhere in the subcontinent and made up a vocabulary for them that you won't find used for any other bird. He called the social screaming parties 'rabblies' or 'balls' and talked of them 'balling' together.² In Africa also ornithologists speak similarly of swift 'circuses' and 'circusing'.³ Anyone who lives within the vast hemisphere-spanning range of swifts will probably have seen and heard them, even if only registering the impact at a subliminal level. In case your own impressions are hazy let me try to anatomise how social screaming displays unfold.

The easy disorder of the disparately moving flock steadily acquires a more formal shape. All the swifts are circulating at random, but amid the bird's customary flight notes, they start to build momentum. This sound, incidentally, is written in the books as *swee-ree* or *swii-srii* which is a moderately accurate phonetic transcription, if totally inadequate to convey the power of the full vocal effect, and I shall return to it a little later.⁴

Perhaps two or three of the birds will start to call more intensely or move with greater coherence. Perhaps the

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colony is highly sensitised and more predisposed in this season to some unknown signal made by one or two of them, and they are all waiting for that release mechanism to trigger the collective response. One bird, then another, then others, and finally all of them, as if pulled by gravity, cohere in an irresistible, directed knot of action.

There's one last detail to add so you get a full sense of them. It is the precise physical shape of a flying swift. If you should ever have the privilege to hold a common swift in your hand then most of it, feather for feather, would seem a modest beast. It is just fifteen centimetres long and plain brown-black but for a tiny oval patch of off-white at the throat. The large, rather bulbous head is smoothly domed with huge eyes of liquid black recessed below prominent brow ridges of hard feathering. The dark beak looks tiny, as do the short dark legs, which are set so far forward on the body that the bird resting on your palm would show needle-sharp claws just a fraction behind the line of the eye.

The one singular and overwhelming detail is the sheer length of the wings, which bend over and around the upperparts and cross at the bird's rear while extending well beyond the tail end. What all these elements go to create is a swift's extraordinary flight silhouette. In the words of Edward Thomas in his poem 'Haymaking':

The swift with wings and tail as sharp and narrow
As if the bow had flown off with the arrow.

It entails a cylindrical body with tapering rear, fused

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at right angles to two outstretched wings which, proportionate to body weight, are longer than those of any other bird. The average individual has wings of 42–49 cm but it weighs just forty grams, the same as four British one-pound coins. With a span of 3.6 metres, the wandering albatross is the bird with the longest wings in the world, but for that species to have the same ratio of weight to wing-length as a common swift it would need an additional 74.4 metres of wing.* The swift's are not only long, they are remarkably narrow and back-swept, so that each bird cuts the air on a slender, double, scimitar span.

In a social screaming display these weaponised shapes blaze together as a black-swarmed meteor in a widening orbit that burns over the houses or between them. In such spells of flowing motion, the wings of many birds are flickering, a kind of air-winnowing action that is beyond the capacity of a human eye to unpick precisely. Otherwise, a swift holds the wings dead still, down from the line of the body at about forty-five degrees, when it planes aloft, as if carving through the air current on twin depended blades. Others, however, in a sort of reverse posture, throw the wings up and out, over themselves, where the pressure forces the spread to even greater tension. The swift swerves as a single curved bow weighted at the mid-point and as they pass you can hear the wind against the wing like air hissing in the fletch of an arrow.

The collective course of the flock might be directed and

* This is based on an average weight for a wandering albatross of 8.8 kg.

The Charred Scream

roughly shared, but within its blurred orbit, the line of any individual is singular. The bird twists and jinks, rises and falls in relation to its own path, but also in relation to neighbours. In fact, one wonders how they do not collide mid-air. Somehow, they never do. The swifts' social screaming displays are both formally structured, but somehow fragmented; and the best that I can suggest is a kind of paradox – *ordered* anarchy or *orderless* unity. The more I watch them, the more ideas and thoughts they seem to hurl out. It is part of the intense and momentary joy of them.

The other element central to their effects is the music produced by social screaming displays because, like the hurtling vision of swifts, it has few equals. It is intriguing to ponder the vocalisations in relation to the emotional impacts of other birds' sounds. The performances of most songbirds – the liquid twittering and sweet notes that make up the conventional dawn chorus – approximate to ideas of human music. They are invariably cheerful, pleasing, sonically beautiful. Then there are the drawn-out, nocturnal moaning notes of owls – and less frequently of wading birds such as curlews – that are filled with entirely other feelings: melancholy, loneliness, alienation. Ducks and geese in flocks produce a hectic, space-evoking dissonant clamour that is suggestive of place and seasonal weather. But swifts yield something different from them all.

There are scores of swift species worldwide and many sound different to the common swift, but vocalisations across the entire family are some variation of high, brittle, enamelled, clicking, chittering or twittered notes. The

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results are unmusical and hard, urgent and shrill to the point sometimes of hysteria.* It is surely this spectral quality in the voice that helps explain a suite of old country names for the British bird: 'devil', 'deviling', 'devil bird', 'swing devil' and 'skeer devil'.⁵ The calls seem otherworldly and utterly inhuman, except in this one sense: they convey the idea of a warm-blooded animal *in extremis*, either under immense pressure or subject to some fierce and overwhelming emotion.

It is not just the swift's vocalisations that have an impact. There is also the extraordinary mechanical noise made sometimes by its wings. It would be interesting to work out which specific plumes create the effect – given that their main flight feathers are so long while the inner ones are comparably short – but birds in a full still-winged surge can produce a plainly audible vibrato thrum. Among the largest and heaviest swifts, such as a species called the brown-backed needletail, the sound is said to resemble the loud twang 'of a harp string'.⁶ All of these bizarre wing sounds may be basic, but they carry a sense of momentum barely under control. It can, at times, evoke notions of danger as in an approaching missile. Occasionally I hear it and duck. Then smile.

The sounds of their voices may be simple, coarse, even

* The closest emotional charge to that of swifts is the noise produced by some seabirds, such as shearwaters and petrels, which are often delivered when they make landfall at their communal nest sites after dusk.

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un-bird-like, but they trigger a complex response in us that, in my case, intensifies as I get older. I'll try to describe it. There is a particular sound sequence included in the performance of the world's most famous songbird, the common nightingale.* It starts as a soft, liquid, almost inaudible *pieuu* note and the bird repeats it at even intervals, building gradually, phrase by phrase, the softness diminishing, and the volume, length and intensity all mounting inexorably.

Frequently this full nightingale motif is no more than a matter of two to three seconds, but an exceptional individual – one that has practised through the long May nights, pouring out its heart for hour upon hour into the darkness – can sustain these accelerando passages for seven, eight, even nine seconds. By the end of those twenty or so repeated, cumulative notes, the suspense is almost overwhelming.

You start to wonder if a nightingale might burst for want of vocal release. Then it comes into its climax and the last short, shattered passage explodes like machine-gun fire. What is central to the impact is the feeling that the bird is filled with a life force that almost breaks its mortal boundary. It is a bird at risk of disintegration. Exceptional

* Despite its singular reputation as one of the ultimate songbirds, there are two species of nightingale. The one everybody thinks of when the name is mentioned is the more widespread and finer vocalist, the common nightingale. The other is the thrush nightingale, which is found further north and east in Europe and Asia.

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ONE MIDSUMMER'S DAY

nightingales achieve the mood every now and then. Swifts seem to create it all the time.

Swifts in social screaming displays don't so much generate sound as immerse you in a kind of audible atmosphere. The other creature I know that can produce the same powerful effect is the cicada in the Greek summer countryside. They are strange, bug-eyed, long-winged insects with an abdomen like an egg halved but coloured grey like the bark of Greece's eternal olive trees, on whose trunks cicadas often set up their singing posts.

The note is a product of the male's abdominal organ, known as a tymbal, which vibrates at 4,500 cycles a second. As the magnesium flare of the Greek Sun fires down on the morning landscape, the cicadas are switched on at its touch. The song lasts all day and each cicada harmonises – if that word could be used for so scissor-grinding a sound – with its abundant neighbours, until they are all united in an incessant, irresistible drone. The rattlesnake's chorus pours forth and intensifies with temperature so that it seems at some point as if oppressive heat is added to the wider effects of the deep, relentless machinery of cicada music. Eventually you have trouble believing that it is produced *only* by insects. It sounds as if the earth itself or the gnarled, iron-hard, kiln-fired olive trees were humming at the Sun. By midday it has acquired a menacing claustrophobic power: you wonder if you could possibly drown in sound.⁷

Swifts too create a music that resembles an irruptive stone-on-steel hiss, or steam bursting from a pressurised

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valve. I have a feeling sometimes that the birds, through hundreds of thousands of years of contact with canyon walls and cliff faces, where they once bred, have learned the comparable impact of their calls upon our hard, asphalt streets and brick-built homes. All the solid surfaces fire back at the swifts an echo of their falling sound and the birds weave in and out of the ricochets, entwining it in fresh volleys, until eventually the clough of air between the houses is overwhelmed with a rebounding spray of scream. In such moments, when whole streets are filled with swifts' spent passion, it immerses the human observer in their reflected feeling. Nothing in summer sounds more glorious, more expressive, of natural life at its fullest.

Even a single bird riding high in the blue above a city skyline, vocalising at leisure, can rise above the volume of traffic and human hubbub below. In a social screaming formation, however, the birds evoke a sense of radioactive life force blended to emotional extremity, either ecstasy or acute pain, and perhaps an overwhelming mix of both. The notion of a life lived at, or beyond, the very limits of containment is the default impression and English writer Ted Hughes in a poem 'Swifts', in which he celebrates the birds' return in mid-May, refers to a dead individual lying in his palm like a 'charred scream'. That metaphysical conflation of supreme physical form and ecstatic sound is the summary impact of swifts in display. As I grow older it increases in meaning and importance.

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ONE MIDSUMMER'S DAY

So tomorrow I plan to come and sit in the garden the live-long day and try to describe the unfolding impact of my swifts. But not just the birds. And not just in a conventional linear description. The book is not intended only as a single-species biography. There have long been many titles of nature writing on bird species and all sorts of other single organisms: otters, badgers, earthworms, snails, beech trees. And on swifts.

The ways in which we think have a propensity to isolate a theme and to draw out and clarify it as an object of attention. The very structure of language lends itself to this, not only to separate the observer from the observed, but the subject itself from other observed parts: the tree from the wood, the bird from its perch.

For me this segmentation, this restricted focus, entails its own deep deficit. The pioneering American environmentalist John Muir famously wrote that 'when we try to pick out anything by itself, we find it hitched to everything else in the Universe'. This articulates the underlying principle on which the book is founded: that to understand any part fully, in the end, one has to comprehend the whole of nature. As we shall see, it takes a whole universe to make just one swift.

It is only when we cease to think of life in linear terms and to conceive of all plants and animals as part of a living whole, that we begin to grasp the manner in which nature truly operates. And to which we ourselves are party. It is this totality that counts. To strive for a sense of completeness requires what I call an 'ecological imagination': a

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capacity to see through the moment and beyond the single organism to the deeper, essential interconnections that function through time and across all life. An aspiration that pervades much of my writing is towards a wider sense of the subject and, in this regard, this is my most ambitious book.

I am also much moved by the words of the astrophysicist and science historian John Gribbin when he points out that:

it is nonsense to try to think of any individual organism in isolation as 'alive'. Isolate a human being, or any other living thing, from its environment, and within a very short time that organism would be dead. The only genuinely living *system* that we know of from our own direct experience is the entire biosphere of the Earth, and it is doubtful whether any single individual organism from that biosphere would continue to 'live', if it were transported to the arid, airless surface of the Moon. You and I depend, literally, for our lives, on our surroundings.⁸

The late Lynn Margulis, evolutionary theorist and proponent-in-chief of symbiosis as the essential element in the development of life, was of similar mind. In her book *The Symbiotic Planet* she observed that, just as life can be viewed only within the context of the whole, we must also see it within its full history:

How does one pinpoint the beginning of a human life? The question is biologically absurd, totally artificial. The

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dating of the 'start of human life' is simply convention. At public lectures I am often asked, 'At what moment does human life begin?' Of course, it began, as all life did, at least 3.5 billion years ago!⁹

Perhaps I have always had a deep feeling for this inter-relationship. I remember, as a child, how I'd inscribe on the first blank page of books an all-embracing statement of connectedness.

- Mark Cocker
- Overbrook
- Lightwood Road
- Buxton
- Derbyshire
- England
- Europe
- The World
- The Universe

Here in a nutshell is my plan for tomorrow. And for this book. A simple, even childlike hope to express it all. And to place my subject in its fullest context – the swifts, this spot, the day, the season, this moment in the turning year – so we can see what makes it possible and how they are all wreathed inextricably together. It explores how 4 billion years of life are entailed in the unfolding of a single day; how it takes a whole universe to make just the one small black bird.

As I sit here on my bench, tomorrow shall we not also

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be on a kind of journey, like the birds themselves? Just as we appreciate how our planet rotates around the Sun, so our solar system orbits our galaxy, the Milky Way, of which it is permanently, irresistibly, a part. Every second it travels 220,000 metres and in an hour we will have traversed 792,000 kilometres. By day's end we will have journeyed more than 19 million kilometres. Throughout all that immense time and space I shall follow my blessed birds until, dark specks lost in a blue-black sky, they will vanish from me like dying stars.

Two

Over Our Heads

Before I finish for the evening I will add some details to my picture of swifts. There is just enough light to write because, as the Sun dies in the west, I can see the Moon rising over the houses beyond the far fields. It is not a full Moon; it is a pot-bellied gibbous orb shedding a blue-white glow with just enough strength to send a shadow from my hand across the page. There is actually a fundamental link between this pale sphere and the swifts. And it would make the basis of a nice riddle: what is the inextricable link between the ancient cold moonshine, 384,000 kilometres above the Earth, and the birds I see circling my garden? I'll come to the answer before I finish.

One of the first things to note about the swift family is that it is among the world's least-known avian groups. A friend, an academic ornithologist in Australia, when he learned that I was writing a book about them, metaphorically shook his head and sucked his teeth, pronouncing them 'totally unstudyable'. It is not because swifts are shy. Nor do they have a particular bias towards difficult

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Over Our Heads

terrain: high mountaintops or over the open oceans (although it is part of their universal symbolism they feed over both of these habitats). In fact, the reverse is the case: swifts nest in some of the major cities of the world, where they hide in full sight, just over our heads.

It is not immediately apparent but that aerial lifestyle places them almost beyond our ken. My guess is that you probably have never seen a swift perched – and I don't mean landed on the ground, but alighted on any physical object. Put up your hand if you have ever viewed a swift sitting on its nest? Or, in Britain, actually seen the physical structure that constitutes a swift nest? Have you ever witnessed a swift drink? Or observed a swift gather nest material, or catch prey? My hunch is that the only thing you have ever noted is a swift perform a single activity. Fly.

All the characteristics, almost everything about their lives and habits, are determined by that one detail. They feed on aerial insects exclusively. Or, to be a little more precise, they eat aerial arthropods, which include some spiders and other soft-bodied insect-sized organisms. In turn, insects actively flying in the lower airspace are themselves dependent on warm air. It is this requirement which accounts for the swifts' own bias towards tropical and subtropical regions of the world.

There are estimated to be approximately a hundred species of swifts worldwide and these are primarily clustered in the middle latitudes of the planet, where warm temperatures occur throughout the year. Swifts are most

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diverse and abundant in Latin America (thirty species), Africa (twenty-four species) and Asia south and east of the Himalaya (twenty-one species). However, a secondary overlay that shapes the family's distribution is a tendency for swift species to occupy very small discrete ranges, which seems odd in a creature that can take the whole heavens as its sphere of operation.

More than a fifth of all swifts – twenty-one species – are distributed in scattered pinpricks of territory. A good number of them are located on the remotest archipelagos across the Pacific Ocean. A classic illustration of the pattern is an almost unknown bird called Mayr's swiftlet which has been recorded on only a handful of occasions in the three islands of New Ireland, and on two of the main islands in the Solomons archipelago Guadalcanal and Bougainville, which all run in an easterly arc off the northern shores of New Guinea. The combined area of these spots is less than that of Wales or the state of New Jersey. The freedom and mobility enjoyed by swifts is partly instrumental in such isolated forms, because once they have arrived in these outermost islands, they remain and breed, detaching from their parent stock until eventually they become biologically distinct.

I should emphasise that, in this context *distinct* means that they breed only with each other and not with other swift populations. For they are anything but *distinctive* to us. Some of the species are so similar to one another that they are virtually impossible to separate without having the bird in hand, or sometimes without taking DNA

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