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Introduction

The premise of this book is that we humans are losing our capacity to communicate and socialise beyond the human. This is in part because we are annihilating our cohabitants on this planet, but this book is not about that, or at least not directly. What concerns us is that too often we think that we do not communicate beyond our species, and that we cannot—that we do not share common languages and cultures with the world we inhabit—and so our aim is to profile how in fact we do so, and why this matters for our capacity to live well both with the non-human natures with which our lives and futures are entwined, and with each other. Just who this 'we' is also matters, as none of this is common to us all. Yet shared attention to interspecies communication, interspecies languages and indeed to interspecies cultures is crucial in order to contemplate together the sorts of action and power that are needed to secure life on a shared planet, in what we shall be proposing as a political naturekind.

The world is a communicative place entwining us with animals, plants, fungi and bacteria; but how to understand this? Many peoples allow that waters, rocks and winds can enter these conversations too, but should this be marginalised as quaint belief, or rather made central as a source of inspiration, acknowledging the many ways of knowing and being across a 'pluriverse'; the many worlds within a world?[1] This chatter and its signifying sounds, scents, touches and glances has been attenuated in the humanities as in the sciences. Those who speak about and research ecosystems, for example, capture how 'organisms' and the non-living world interact as a system, and admit that biotic and abiotic components are linked together through nutrient cycles and energy flows, but all too frequently ignore communication or envisage it as similarly functional, without 'meaning'. If there is life in ecosystems, it is almost zombified life. A forest becomes a sort of complex automaton; a massive 'Heath Robinson' machine into which the sun shines and rain pours, and out of which timber, carbon, biodiversity and other 'ecosystem services' flow. A sea becomes a marine system in which we might lament the decline of fish stocks and the choking by plastic bags, but this is a pollution that interrupts

nutrient flows and poisons water to limit productivity, not one that interrupts communication and kills meaningful life. A world of conversations is erased in just the same way as sentience in animals is denied by the idea of 'instinct', and in plants by the idea of 'tropism'. Since the Enlightenment, anyone who craves to foreground meaning in conversations that extend with life beyond the human, and to find meaning immersed in landscapes, has easily and endlessly been dismissed as romantic; as adhering to something unscientific—beyond science; and as forlorn and kooky, succumbing to anthropomorphic self-delusion in face of Enlightenment rationality. In this book, we turn that science and its logics onto itself to allow more meaningful communication back in.

The last few decades have witnessed major advances in biology, ecology and the technologies for their study, precipitating what some now cast as a biological revolution, transforming understandings of animal and plant communication. This now unveils not just communicative capabilities and sophisticated signalling, but more 'linguistic' dimensions to life beyond the human. It reveals, too, that all life is cultural, because social learning conveys different ways of being down generations of the same species: from whales to fruit flies; from sage brush to slime.[2] For many biologists, 'culture' now supplements genetics as a 'second inheritance system'.[3] Evidence of emotional and moral intelligence is now being found across the animal world.[4] Hitherto unimagined connectivities are becoming apparent, between trees, plants and fungi, and wider life.[5] All this is being achieved with fast-developing theories of cognition and of communication as signalling—but without a theory of meaning.

Meanwhile equal advances over the last century in understanding human culture, linguistics and communication have been made across the human social sciences, especially in *anthro*pology. Theorising meaning is central to these, with attention to the study of meaning in sign systems more generally ('semiotics') and in language ('semantics'). The scope and ambition of these advances have, however, been restricted to the human world, on the presumption that humans are qualitatively different from the rest of life in terms of modes of communication, language and culture. This human exceptionalism has supposed that what we theorise for 'us' in relation to meaning has little bearing on understanding non-human nature and peoples' communicative encounters with it. Yet the new biology now reveals that this supposition can no longer hold. The aim of this book is to unshackle the 'social' science of meaning from its assumptions of human exceptionalism and expand its scope, showing its significance for social and cultural worlds beyond the human and for interspecies conversations and culture. What can a theory of meaning born of the social sciences offer to the study of linguistic and cultural lives beyond the human at the frontiers of biology?

Others share this agenda. A discipline has emerged that is concerned with precisely this—with theorising the making of meaning (semiosis) beyond the human—identifying itself as 'biosemiotics'. The trouble, as we outline in the next chapter, is that this discipline's edifice of reasoning is entirely premised on human exceptionalism, presuming that only humans 'have language', and that only humans 'have culture'—just at the time when many biologists are showing linguistic qualities in non-human communication, and the centrality of social learning and culture across the living world. To understand the exchange of meaning beyond the human, the discipline of biosemiotics has thus constrained itself to focus on supposedly 'non-linguistic' (or 'prelinguistic') ways of exchanging meaning. The discipline that aims to provide a theory of meaning-making beyond the human thus has one theory for humans and another that embraces the rest; one for 'us' and another for 'them'. By showing why such human exceptionalism is wrong, we can help refocus biosemiotics on insights from human linguistics and semiotics from which until now it has set itself apart. By pursuing an argument that the study of human meaning-making need not be so restricted to humans, we hope to develop and provide useful theoretical insights both for biologists and for social scientists, and indeed for all those humans whose social worlds have become so restricted to themselves, so isolated, so separated from more entangled, more-than-human life.

Darwinian evolution provides one theory for all. Yet both the social and natural sciences continue to make assumptions of categorical separation in the field of communication, language and culture, retaining a pre-Darwinian distinction, usually supposing that such separation is self-evident, empirically supported and a product of that very evolution. Such confidence now rings hollow, not least since findings have emerged that fruit flies have different cultures, that bees teach each other skills, that cockroaches easily learn to distinguish one person from another and that trees warn others to prepare for pestilence. The making and exchange of meaning is central to all life. It is life. How does it work? This somewhat experimental book attempts to develop and deliver a new paradigm for communication across 'naturekind', the term we choose to capture the communities and cultures through which humans are inescapably interconnected with wider life.[6] If it does not succeed entirely, it should at least lay out firmer analytical terrain for others.

Communication Beyond the Human

Our inspiration in developing this book was initially the strangely titled *How Forests Think*. In this work, anthropologist Eduardo Kohn reminds us that language of the sort that linguists study is just a tiny dimension of communication, even though philosophers and theologians have attributed to it enough

substance to separate humans from the rest. He makes the simple point that if we paid more attention to the non-linguistic modes of communication that we share with plants and animals, then we would make better headway in appreciating how all life is embroiled in a complex unfolding of meanings.[7] As Kohn observes, for too long the study of communication has focused on what differentiates humans from other beings, not on what unites us: that is, shared ways of otherwise conveying meaning. Kohn's insight is that we cannot focus only on the linguistic abilities of particular species, including our own, if we are to consider communication across species.

The agenda is powerful in intent but more problematic in substance. Kohn had turned for his inspiration to a tradition of semiotics that was developed by a nineteenth-century American philosopher, Charles Peirce, who allowed that although meaning can be conveyed through symbolic forms of communication (classically those in language in which the meaning of signs is arbitrary and depends on convention), meaning could also be conveyed in what he and followers identify as 'non-linguistic' or 'prelinguistic' signs. Whereas in symbolic communication all signs carry arbitrary meaning, and users thus depend on knowing how to encipher and decipher their code, non-linguistic signs are envisaged as conveying meaning more directly, without recourse to such code, whether though their iconic relations (in which something conveys meaning through its similarity, as a portrait links to a person) or their indexical relations (in which something conveys meaning directly, as smoke links to fire).

As this tradition appears to allow meaning to be communicated without recourse to preestablished codes, and to communicate in the more subliminal, experiential ways that music or cinematic imagery might be thought to evoke, it allowed analysts of communication in such media to stray from theories that treat all communication as in some way language. Peirce's hypothesis was equally attractive to those who studied how meanings are conveyed beyond the human, in particular Thomas Sebeok and his followers, who developed the discipline of biosemiotics on the same assumption: that meanings could be conveyed in prelinguistic ways, avoiding pre-established codes.[8]

Those studying biosemiotics were drawn to this agenda in light of their comprehensive readings of twentieth-century biology, from which they concluded that only humans 'have language' (in ways that we shall discuss later, in more detail) or 'have culture', and thus inferred that the study of biosemiotics beyond the human could not be rooted in the study of human linguistics and linguistic-inspired semiotics. Since then, however, the digital revolution and the methodological revolution in biology that it has enabled have challenged this reasoning, and so much so, we shall argue, that appeals to non-linguistic signs and the making of meaning entirely independent of symbolic orders can be called into question.

Whereas Kohn wanted us to focus on the non-linguistic signing that he considered would be shared with wider nature, we are going to suggest what amounts to the opposite view: that there is no end to language and that there is no such thing as entirely non-linguistic signing in the making of meaning. It is to things linguistic that we must look to see what we share with wider nature, after all, not to things prelinguistic. This, however, forces us to reconsider what language looks like, and how to study it.

Our way forward will be to clean up and repurpose a rusty old theoretical tradition rooted in the structural analysis of language developed by Ferdinand de Saussure more than a century ago that most of us had shelved in the archive of the history of ideas. From the 1950s it was developed by Roland Barthes and others in the structural semiotics they applied to film and media studies, and by Claude Lévi-Strauss and followers in the structural anthropology they used to study (human) society. In this book, we question whether their approaches should have been limited, as they were, to human communication, and what they might offer if we apply them to the making of meaning across naturekind. By overcoming what we suggest have been missed opportunities to integrate insights from structural social science traditions, we forge a 'structural biosemiotics' that can provide a unified paradigm for understanding meaning-making across naturekind. This draws back into focus ways of knowing, being and theorising that have hitherto been marginalised—whether in Indigenous societies or, indeed, in the disqualified everyday experiences of all.

Ecological Connection in More-than-Human Worlds

The context that makes such an exploration important is the imperative for ecological connection in current worlds. New generations are expressing a palpable desire to 'reconnect with nature'. The urge towards immersion in forests, seas and wildernesses has given rise to industries. Health services have adopted 'green prescriptions' for both physical and mental health. It is not just city dwellers and parents with children who pace park paths knowing the importance of 'connection', without quite knowing what this might be, and who return home exercised and exhausted, perhaps, but somehow unfulfilled. Is this desire something instinctual in us, as some have argued: an innate human urge to 'connect' with other living beings and the assemblages of nature, an urge now characterised as 'biophilia'? Others argue that connection is missing in industrialised, urbanised ways of life, and needs to be rebuilt—through 'rewilding' ourselves and our ways of being. Connection, thus viewed, is a vital counter to the forms of separation and violence that are devastating non-human life on the planet we all share.[9]

But what is this thing, 'connection', and how should we understand it? To connect in this way is to appreciate and take part in the chatter and conversations going on in non-human natures, through which they are alive, and lively. It is to make and experience meaning from seas, mountains and woodlands. It is to admit relationships beyond the human back into communicative socialising and communities. It is not that humankind is separate from nature, needing to reconnect, but that we are all, already and always, part of naturekind. The problem is less about releasing an innate, inner biophilia, or about reconnecting, than about understanding and appreciating the inevitable myriad ways humans are already connected, while learning from those, including Indigenous peoples, for whom such interconnection has never been in doubt. The premise of this book is that ecological chatter has always been fundamental to everyone's life, and the to and fro of our friendships and enmities, struggles and relaxation. The dissatisfaction that some feel as 'disconnection' is, then, a discomfort at the shrinking of more-than-human gossip; the shrinking of social worlds as people annihilate their companions or come to live, produce and consume in ways that seem more separate from them. A desire for connection generates a modern myth that palliates those who think the problem lies within themselves, to be solved by a stroll in the park or hike in the wilderness, and not in the structural and discursive forces that produce separation and exploit, destroy and divide humans from wider life on a shared planet.

To the twentieth century problem of the colour line we must thus add the twenty-first century problem of the nature line. To racism and social discrimination we must add speciesism and anthropocentrism. And these are interconnected, inasmuch as worldviews that separate humans from non-human nature, placing them in a hierarchy, are bound up with those that consider some humans inferior ('less human') than others.[10] Entire research, educational and religious structures have worked powerfully to draw a line, separate and divorce humans from nature, and the so-called 'humanities' and 'social' sciences from more-than-human weddedness. The foundational assumptions of twentieth-century sociology, anthropology, economics and politics presuppose that the rest of life lies outside the human social order, to be studied as the stuff of zoology, botany, ecology and ethology. The 'environmental humanities' and 'environmental social sciences' that cross over the divide are still niche, inhabiting that tiny overlap in a Venn diagram, swamped by all that is left out. To speak of naturekind is to undermine the foundations of powerful institutional edifices; but can we not speak of it, nevertheless? What gives it substance? What weapons can be wielded in its cause?

Many authors across the environmental humanities and social sciences discern the same problems as we do and prescribe related, but different, medication to integrate the study of human worlds with those of other species; but

few grapple with communication, and of those that do, very few with biosemiotics. In many ways this broad issue is as old as academia itself, dating from Pythagoras's school, which conceived of the animal and human worlds as inseparable, was concerned that human beings might be reborn in other animal life forms (in the tradition of metempsychosis) and eaten, and so promoted vegetarian lifestyles.[11] In early modern times, the French philosopher Michel de Montaigne allowed that all species might have their own languages and societies and castigated humans for their vanity in ever thinking otherwise.[12] Early in the Enlightenment, Baruch Spinoza dissolved distinctions between people and things animate, discerning the vital forces inhering in all.[13] In the nineteenth century, anthropologist Lewis Henry Morgan railed against the concept of 'instinct', as it erased the calculative capacities of animals, reducing them to living meat.[14] More recently, feminist science studies scholar Donna Haraway extended the emotive nature of human kinship, whether in love or grief, to her dog companions and a full spectrum of 'critters', undermining the foundational distinction between human society and other life, and thereby severing the Gordian knot that bound up all 'social' sciences together as separate from the rest of the life sciences.[15] Yet for Pythagoras, the issue was reincarnation across species, not communication. Montaigne acknowledged the languages of different species, but not communication between them. Spinoza focused on the inherent powers at work in encounters and alliances beyond the human, not their communicative qualities. Morgan recaptured the calculative intelligence he thought God had instilled in all species, but ignored their communication. Haraway recaptured the affection and sociality across species, but did not probe the processes of communication on which they might be predicated.

More recently, many authors in the social sciences and humanities have been drawing on this same genealogy to conceive of human worlds as part of wider living and non-living worlds. They question the validity of fundamental boundaries between humans and non-humans, and probe how these have been constructed. Along the way they have coined new terms and phrases that attempt to dissolve the boundaries in both science and the society and life it studies, albeit from their own, rather different, interests and angles. Thus Bruno Latour and colleagues have encouraged thinking and practice around actor-networks of human and non-human 'actants' (although not 'communicants') in integrated 'nature-cultures'.[16] Donna Haraway conceptualised the human and non-human as inextricably linked, making kin through networked, 'tentacular' practices (tentacles but not tongues and multimodal equivalents).[17] Deleuze and Guattari theorise 'assemblages' and rhizome-like connectivity (but not communicativity) across human and non-human life.[18] Anthropologist Tim Ingold describes 'meshworks' of dwelling (but not the

chatter between dwellers).[19] Political theorist Jane Bennett assembled rubbish and chemical effluents together with the people, animals and plants entangled with it, exploring them together as 'vibrant matter', doing away with foundational boundaries between the living and non-living (but underplaying the communicative nature of such vibrancy).[20] In the 'cosmopolitics' of philosopher Isabelle Stengers, a multitude of beings—human and non-human, living and non-living—form a collective society (but little related to things linguistic).[21] And in the philosophical works of Karen Barad these entanglements extend inside human and non-human bodies too, in what she terms 'intra-action' (but not intra-semiosis).[22] Each of these writers offers theoretical insights that extend the social beyond the human; but the contribution of each can be inflected further by focused attention to communication.

More generally, anthropologists have pioneered 'multispecies' ethnographies that attend to human–non-human relations and the varied ways these are conceptualised and experienced across the world,[23] in works sometimes characterised as 'post-human' or as concerning social relations 'beyond the human'. Examples focus on social relations between people and various kinds of life and things, from horses and birds to mushrooms and mountains,[24] in settings that range from oceans and mangroves to high-tech urban and industrial landscapes.[25] Geographers and cultural theorists similarly grapple with such 'more-than-human' or 'post-human' relations—with wildlife, with disease, with urban environments, and much more.[26] Historians document past understandings of the natural world as being so vital and alive that animals such as pigs and weevils could be prosecuted in court. Several Indigenous scholars and philosophers have been pioneering these traditions, raising voices and developing critical theories from worlds that never posited the kind of human–non-human boundaries and hierarchies that have for so long dominated scientific canons.[27] They identify and condemn the subjugation—albeit only partial—of these ways of knowing as a feature of imperialism and colonialism.[28] The works of such authors mesh with the direct self-expression and claims of self-identified Indigenous peoples and local communities, enunciated in social movements that manifest themselves, often exuberantly, at global encounters. They mesh, too, with a flourishing worldwide popular environmental literature, fiction and arts practice indicative of a veritable zeitgeist, thriving in media and exhibitions. Our concern is to probe more systematically the communicative dimensions, specifically, of the more-than-human entanglements addressed in these traditions.

A few works have done just this, crossing social and biological science boundaries to focus explicitly on trans-species communication, and, with the same intent as ourselves, to theorise communication beyond the human. The present volume is a contribution to an emerging dialogue, aimed at

securing further its analytical foundations. Anthropologist and natural historian Gregory Bateson was prescient in probing multisensory messaging across species, but drew distinctions between linguistic and prelinguistic communication that we will call into question.[29] Vinciane Despret's 'philosophical ethology' also attends in detail to the everyday multisensory ways by which humans and other animals communicate in co-becoming, but considers human linguistic and semiotic concepts as overly anthropocentric—as human-derived concepts that undermine her project of allowing non-human animals to reveal their agency and be interesting on their own terms.[30] Philosopher Eva Meijer, writing on 'when animals speak' and looking 'toward an interspecies democracy',[31] describes all interspecies communication as 'language', yet without directly addressing semiotic theory. Only a few authors have engaged explicitly with debates on communication beyond the human that are unfolding in the discipline of biosemiotics. One is anthropologist Eduardo Kohn, as previously indicated, and another is philosopher Dominique Lestel, whose agenda is to 'think together' human and animal societies, urging study of the complexities of trans-species communication and 'hybrid communities'.[32] While Kohn focused on so-called prelinguistic communication as uniting all life, Lestel, in his pioneering synthesis of biological and anthropological approaches dating from 1998, argues, as we do, that 'culture' must be conceived of as a semiotic phenomenon in animals as in humans; since then he has been probing eco-semiotics and 'hybrid human/animal communities of shared meaning, interests, and affects'.[33] Our structural-biosemiotic paradigm shares, advances and provides further analytical grounding for this broad agenda, urging, in the light of new developments in biology, that the principles developed in structural semiotics be extended from human life to all life. 'Language' as usually conceived—as a human thing centred in speech and writing—thus comes to be construed as a small subset of much larger communicative and cognitive orders extending across multispecies worlds; that is, across naturekind.

Researching Communication Beyond the Human

In this book, then, we probe wider communication through debates that have been had about how human languages convey meaning and about how human social orders are communicative orders. We take these out into naturekind, investigating communication amongst a wide range of animals, plants, microorganisms and the ecological assemblages they comprise and inhabit. Our focus is less on how non-human beings communicate amongst themselves (although we do consider this), and more on how humans join this chatter; on conversations between humans and non-humans, both in the more dyadic relations that people establish with non-human companions, and in the wider

assemblages in which all live together. Expanding theories of semiosis from human language and culture to consider these beyond the human might be construed as 'anthropocentric', but so might the critique of it, presuming things linguistic to be only human.

It takes time to develop communication with other beings, as a Saami reindeer herder theorised for the TV camera:

> I was out herding with one of the elders. We came to a river we had to cross which was running high so he said to his lead reindeer, 'Let's go.' He said it a few times and then they went across. He told me we should talk to the reindeer. 'They understand,' he said. But now in this motorised age, people are in such a rush. They don't have time to talk to the reindeer.[34]

Cognitive and communicative framings develop as part of the flow of life and relationships, of doing things together. It takes time to listen to the reindeer, but not just time, as how communication develops depends on the river crossings and how they go. A good crossing, and both sides learn something about the gestures, the pulls, the sounds that helped. A falling-in or a near miss might bring different signals—those of fear or relief, perhaps. But something is learned, and both reindeer and herders change, if subtly. Communication thus develops—emerges—through activities, practices, actions, events, as do the connections so forged. Who has the time to codevelop such communication across species? Many who live with companion animals are aware of this problem, and regret they are too busy to develop communication potential with them, distracted by the rush of work and activity. Yet people do develop such languages when lives and livelihoods depend on it—when they depend on those reindeer, on cavalry horses, on sheepdogs who communicate with sheep better than human farmers do; on the elephants who built the ancient cities of Cambodia.

If this is the case, then it might not be philosophers and linguists who will guide the way into understanding communication beyond the human, especially not those with disciplinary archaeologies rooted in a radical conceptual separation of humans from non-humans. Nor can our methods rely on the repertoire honed by biologists and ecologists—hypothesis-driven experiments and observations, refined by technologies, applied in the physically or conceptually controlled settings of labs and fieldsites. Equally we cannot rely on the conventional methodological repertoire of (human) structural anthropology and semiotics, with its interviews and observations by an external researcher.

Instead we must turn to those whose everyday worlds extend beyond the human realm; to the experiences and insights of those actually living and communicating with non-human natures. In many ways, they must be our

teachers. Methods are needed to enable their perspectives and experiences to shape the research, and to apprehend the complex webs of meanings and practices that emerge through more-than-human life. Such methods fall within what has come to be called 'multispecies ethnography', a methodological repertoire that takes the principles and practices of the anthropological stock-in-trade of ethnography, with its emphasis on careful, detailed listening and (participant) observation, into worlds beyond the human. It becomes important to participate in encounters across species, listen to accounts of them and discuss soundscapes and scentscapes, and more, using an array of multisensory approaches.[35] The multispecies ethnographies we carry out ourselves and draw from others in this book make use of, and contribute to, this expanding methodological repertoire.

Since we argue that communicative encounters beyond the human are part of everyone's everyday lives, everywhere, our foci and sites could be infinite. Those we have selected illustrate a range of kinds of human–non-human communicative interaction: with particular animals—chickens, horses, bees and bats; with trees and plants; and with assemblages of living and non-living entities—forests, seas, soils and cities. For each, we draw on ethnographic studies from a range of different locations. Some are auto-ethnographic, drawing on our own encounters beyond the human in the United Kingdom; some derive from our earlier work as anthropologists in West Africa, which we now revisit and re-view through a multispecies communicative lens; and some is from the work of other ethnographers, accessed through their published and online works. The scope thus extends from the South Downs of Sussex in the UK to the mountains of Peru and Guatemala; from North American woodlands to Pacific seascapes, from homesteads in the rural Philippines to rooftops in urban Pakistan, New York, and beyond.

Communication and Power in and for Naturekind

The way we treat the world around us in farming, fishing, industry, construction or everyday life alters how we think about it. Equally, the way we think about 'nature' alters how we treat it—our relations of care and respect, of extraction and pollution, or of disregard or neglect. Questioning human exceptionalism on the basis of the evidence generated by the biological revolution is thus not simply an academic question, as there are much wider interests and issues at stake with which these findings and interpretations are entangled. Whilst engagement with questions of language beyond the human is prompted in part by the new biology, it necessarily raises political, economic and juridical questions, as it alters whether we conceive wider life to be a resource, like iron ore or timber, or our kin, as part of our own social and cultural order.

Thus whilst this book addresses contradictions that are now emergent from laboratories and scientific fieldsites and develops a paradigm that can resolve them, it has far wider implications for existing economic and political orders and the way these treat the more-than-human world. Since these are the same consumptive orders that now threaten life on our shared planet, a science that reframes language and culture also opens up—and gives impetus to—the prospect of a new environmental politics: what we must call a 'political naturekind'.

One way of appreciating how ideas about 'nature' relate to wider economic and political practice and experience is to recognise a series of interlocking separations that underpin and help reproduce current human exceptionalism, whether experiential and spatial, economic, or conceptual. Firstly, we can speak of the extinction of experience of more-than-human worlds, whether linked to their annihilation, spatial segregation or conceptual separation (human exceptionalism). Many human social worlds have already experienced environmental apocalypse—in the collapse of biodiversity, in the impacts of climate change, in the devastation of landscapes and waterscapes. For many more, this is to come. Economic forces precipitate destruction, with non-humans exterminated, incarcerated, exploited or commoditised to serve the modern human industries feeding unrestrained consumptive desires. The extinction of experience is linked not only to this absolute decline, but also to a decoupling of modern lives from the variety involved in direct experience beyond the human. Modern livelihoods are increasingly divorced from, not wedded to, non-human natures, given the urbanisation, industrialisation and agrarian mechanisation that attenuate any enduring form of everyday encounter with them. The economic forces that alienate people from the land also produce radical inequalities of multispecies encounter, whereby for many the costs in time and money reduce opportunities for the more-than-human sociability on which the lives of the marginalised once so heavily depended. Not everyone can afford to keep pet animals or travel to wildlife-rich places;[36] though to be sure there exist too counter-tendencies to the above generalisations, whether it be marginalised migrants turning to picking matsutake mushrooms in Oregon, or impoverished urbanites finding solace, in spite of all, in blasted late-industrial cityscapes.[37]

It is not just that in industrialised worlds people no longer live lives in such close connection with non-human natures. They may be actively kept away, as conservation policies divorce people from lands and seas set aside in the name of 'nature', weighing heavily on those displaced whether by national policy or the economic accumulation of conservation territory by elites. Ideas and practices that associate 'nature' with a pristine, unpeopled wilderness, or that attempt to 'wild' and 'rewild' places by letting nature 'take its course', can similarly instantiate separations of humans from nature.

As politico-economic forces drive loss of experience of mutual interdependence this in turn becomes an integral driver of extinction itself, because without such experience, decline may be neither noticed nor much cared about. Marine scientists have coined the term 'shifting baseline syndrome' to capture the realisation of specialists that new-generation scientists grounded their understanding of 'normality' (of the quality and variety of marine life) on their experiences early in their own careers, failing to perceive the degree to which their baseline in this respect is already impoverished as compared with the generation before. As this process has continued for generation upon generation, it is shocking now to read documented evidence of the extent of more-than-human life in antiquity.[38] As biologist Carl Safina puts it, '[a]nimals, plants, habitats and human cultures vanish [. . .]. Even the memories of them are disappearing.'[39] The decoupling of lives from non-human natures amplifies this shifting baseline of experience.

Economic separations are furthered by conceptions of living beings as 'natural resources', reducing life to things that exist for instrumental human use and justifying domination over them. Conceiving of more-than-human life through the lens of its 'species' and 'species diversity' can play into such economic separations: it is too easy to view an individual creature, an elephant or a jaguar perhaps, simply through the lens of its 'species', as if one individual is just like another—an exemplar of the species, each as substitutable for another as knives and forks in a table set; as for any mass-produced commodity. This deferment of individual life to the species is ever more prevalent as species become commodities in approaches that trust that in trading nature we can save it: in emergent policies and applications such as biodiversity credit markets, natural capital accounting and nature-based financial and business tools, within the wider field of capitalist conservation. Biodiversity 'offsetting', for instance, licences the killing of newts in one place, so long as other newts are invested in somewhere else. Actual life, in such thinking, does not matter: only 'species' or 'units of biodiversity'. It is as if someone could substitute a lost friend by meeting another of 'their culture'; or as if someone could kill their companion cat before a holiday only to buy a new one on return, if it were cost efficient. The reduction of trees and forest patches to 'carbon' in carbon accounting—a commodity to be exchanged in carbon and offset markets—follows a similar economic logic, with a similar effect. In such a conceptualisation something is ruptured, and it is that something which we probe in this book; it is something communicative, and it is real. It is why we don't keep trading in our pets—it is at the heart of affection. Whilst species characteristics surely shape communicative encounters and possibilities, and while those interested in these encounters talk of 'interspecies' interactions and communication, as we will also do sometimes in this book, we also need to

acknowledge relations and communications that are more personal and inter-individual.

To the ecological, economic and political forces that cascade together to support human exceptionalism can be added religious ones that foster worldviews founded on human exceptionality and the ability to conceive of social and cultural worlds as exclusively human. Again, such worldviews unleash people from any limits to the kinds of human expansion and the restraint that comes from respect.[40] Conceptual separations are upheld, too, by the institutionalisation of international scientific disciplines that have historical genealogies rooted in theological presupposition: the disciplines shaping research which divide so-called 'natural' science disciplines of biology, ecology, botany and so on from the sociology, anthropology, political science and economics that study human-only society and culture. The upholding of problematic conceptual separations extends to those authoritative philosophies of mind and consciousness that draw hard distinctions between these and the 'body' or the 'subconscious', finding in them the locale of reason, self or soul. Such claims carry weight even though the language, communication and culture they draw on even to express their concepts inevitably transcend 'mind' so conceived, and even though so much of our experience and what we communicate with each other, and more widely, is embodied, unintentional, subliminal and 'subconscious'. The analysis of communication should not be confused with theories of mind. When it is, the particular exceptionalities of the human mind are extended to become the basis for a more general exceptionalism, overlooking how all beings have their own exceptionalities.

These forces of separation—economic, spatial, conceptual—thus interlock, sometimes in a veritable cascade that has been permissive of the destruction of worlds in which people and non-human natures thrive together; even of ecocide. The new findings emerging from the biological sciences are therefore revolutionary not only in a methodological sense, emerging from the technological revolution, but also in the politico-economic sense of revolution, by necessitating the paradigmatic reframing that we conduct here, which disrupts this cascade. Our reframing aligns with a rather different cascade of concepts, experience, ethics, and economy, focused not on human–nature separation, but on inseparable entanglements, connections, mutual interdependence and care. The concept of 'naturekind' carries, appropriately, a double meaning, connoting also living with kindness (itself etymologically linked to 'kin-ness') towards the more-than-human world of which all are a part, aligning with concepts and ethics of care,[41] and those seeking to understand and advocate for them. Living well together will be impossible without a greater degree of affection, conviviality and care, to drive political engagement; affection that is itself a product of sociality beyond the human.

Our particular contribution here is a focus on communication, and a structural analysis of it. To build this agenda, the next chapter develops a new paradigm for communication across naturekind based on structural biosemiotics, which we then ground and elaborate in subsequent chapters. Chapter 2 thus brings into dialogue the biological evidence for linguistic communication and cultural practice across naturekind, with insights about these phenomena from structural anthropology and social semiotics, taking these beyond their human-exceptionalist origins in a discussion that for a few pages is necessarily conceptually dense. The chapter thus lays out the fundamental theoretical contribution of the book. The following chapters bring the arguments outlined to life, probing communication beyond the human in everyday settings across the world. From chapters 3 to 7 the focus is on companionship and the dyadic communication that humans codevelop with particular beings—whether in cohabiting and spending time together, work, sport, or a host of other activities and interactions. We move from chickens to horses, plants, bees and bats. Then from chapters 8 to 11 the focus is on wider assemblages of humans and non-humans, living and non-living things. Here there are multiple ongoing conversations between animals, plants and their surroundings, and as humans enter or hack into them, they enter lively, communicative worlds, with many significances for all parties. Our chapters here consider how this happens in forests, seas, soils and cities. Each chapter tells particular stories about how communication interacts with connection and emotion in entangled lives, how this challenges the separations that dominate in science, policy and politics, and the implications for pressing questions concerning environment and health.

In the final chapter, we show how a focus on communication brings into sharper resolution what is at stake in some of the most intense discussions of our era about planetary predicaments and futures. We sum up what previous chapters have shown about communication beyond the human and its implications. We show how theory and practice in environmental politics, too, has been dominated by a focus on the only-human, limiting strategies for a more recoverable earth, or transformations towards greater mutual flourishing. We offer a new theorisation of a political naturekind, involving communication beyond the human as deliberative environmental politics, and considering how non-human beings and assemblages might 'speak for themselves' in political processes, not just be spoken for. And we show how appreciating communication beyond the human can contribute to more hopeful narratives, caring relations and forms of recovery in which all life might thrive together; a politics of and for naturekind.

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