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Placing the Anthropocene: a day in the life of an enviro-organism

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A turning point in human–environment relations has been signalled by the term Anthropocene. Academic responses to the Anthropocene must acknowledge the unprecedented role of humankind on the planet while avoiding models that dismiss or minimise the agency of non-human actors. They must pay attention to hybridity, materiality, actor-networks and nonrepresentational geographies, and at the same time, they must appreciate posthumanist blurring of ontological divides between the social and the natural, and an ethics of mutual inclusion. One way to meet these varied objectives is by understanding place as an organic whole orchestrated by human and non-human communications, an entity I call an 'enviro-organism'. An account of the enviro-organism proceeds through three phases of the day on a generic, though far from universal, beach. It integrates four goals: to renew understanding of communication as a geographical process, to emphasise scalar ambiguity, to reveal various ways in which communications are embodied and to promote holistic ways of acting and thinking with the world rather than against it. Theoretical foundations in Peircean semiotics, biosemiotics and Jacob von Uexküll's idea of Umwelt permit this sustained focus on communication as a generalised phenomenon linking humans and non-humans in a place.

Key words communication; biosemiotics; place; von Uexküll; Anthropocene; posthumanism

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Introduction

It is early morning and the receding tide has left a line of debris washed up on a beach. A woman out for a run with her dog stops to pick up a shell. This silent moment is full of communication. Communication will be understood here in an unusually broad way, situated in the pervasive act of selection. While the shell's spiral design is the product of natural selection, meaning the survival of the fittest (Darwin 2009 [1859]), its current location in a human hand is the product of aesthetic selection, a culturally-contingent assessment of what constitutes a distinctive shell (Bourdieu 1984); it has been deposited on the beach by mechanical selection whereby waves and currents push certain things shoreward and leave others out at sea (Horn 1992); and it will be given a new home within the jogger's garden on the basis of spatial semiosis governing the selection of what is seen as the proper place for each element of a garden (Peirce 1998).

The first contribution of this essay is to suggest that there is a common thread running through these varied types of selection and the thread is known in human terms as communication. The second goal is to de-objectify the notion of the organism, showing humans and non-humans as subjects. The third goal is to reveal place as made up of bodies communicating in a wide array of different embodied ways. These three goals lead to the most important goal, which is to understand place-based dynamics in a way that responds attentively to the ethical challenges marked by the crises in human–environment relations that are indicated by the term Anthropocene.

Starting with the first of these goals, geographers have individually adopted perspectives on communication that are often quite narrow theoretically, although the discipline as a whole takes a much more ecumenical view of communication (Adams 2009). A more inclusive approach to communication would work against the 'human exception' (Anderson 2014, 13) while contributing to 'posthuman geographies' (Castree and Nash 2006). The key question is how a dynamic and open-ended notion of space (Massey 2005) can stress the communicational ties by which 'every being, as it inhabits the world, gathers it up in its own particular way' (Ingold 2011, 121). Place is constituted in and through communication only because of the hybridity and the more-than-human agency of place's inhabitants (Latour 2005; Lorimer 2007, 912), including non-living matter. As Anderson and Wylie argue, 'matter exists in the *interrogative mode*' (2009, 319; emphasis original). Discussions of the Anthropocene prompt us to take what Yusoff (2013) calls an 'imaginative leap into the inhuman dimensions of subjectivity' (cited in Johnson *et al.* 2014, 454) and this leap interrogates what the world is asking of us and how it is asking. As environmental crises

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'cry out for new ways to imagine our relations to the earth' (Ginn 2013, 433), this reimagining suggests that we must listen more attentively not only to the purposes and intentions of disregarded human groups, but also to non-human communications.

Turning to the second of these goals, the question is how to maintain scalar ambiguity so that rather than essentialise the scale of any place we recognise place as emerging out of dynamic interconnections among different scales (Massey 2005). It helps to view place as an enviro-organism – what Kockelman with similar intent calls an 'envorganism' (2013) and Haraway describes as a 'naturalcultural contact zone' (2008, 7). With respect to Haraway, 'contact zone' understates the intimacy of the relation as well as its liveliness. Kockelman's term is intriguing but cryptic; geographers may find it too elliptical with regard to the environmental side of things. 'Enviro-organism' clarifies the meaning and deliberately resonates with 'microorganism'. Just as our bodies contain and depend symbiotically on trillions of microorganisms (Human Microbiome Project Consortium 2012), we may be similarly integrated into enviro-organisms. As we are beginning to appreciate the indispensable roles played by our own tiny symbionts, we are also beginning to recognise the need to reflect on whether we can evolve beyond our frequently parasitic relations within the ecosystems we inhabit and help to comprise.

Moving to the third goal, bringing 'the body' back into geography is important because it reminds us that we are organisms among organisms. As just indicated, the question at hand is how to include small 'bodies' that circulate around, into and through people, from insects all the way down to microbes and viruses (Shaw *et al*. 2010 2013), as well as respecting the trans-human bodies – enviro-organisms – in which people are mere corpuscles. Our bodies are environments for cells that communicate via chemical messengers such as hormones and neurotransmitters. Meanwhile other chemical messengers such as pheromones circulate among the living things that share places with us (although humans may be unresponsive to this form of communication; Hays 2003). Places are full of bodies (plants, animals and people) that are themselves full of bodies (their own cells and other organisms, harmful and helpful). Enviro-organism is an expanded multi-scale notion of embodiment that directs attention to all sorts of meaningful, communication-laden encounters between objects, creatures and environments, showing the need for human involvement with, as well as detachment from, other bodies (Anderson and Wylie 2009, 318–19; Candea 2010; Despret 2013; Yusoff 2013). An argument could be made that this is the same as viewing place as assemblage (Anderson and McFarlane 2011). However, interest in the communication that orchestrates place goes beyond heterogeneity, provisionality and deterritorialisation – characteristics frequently discussed as the hallmarks of assemblages – to show how communicational processes with many different kinds of communicators function as wholes. Places are wild symphonies of embodied communication affording 'plenty of room for discord, interference and death' (Ginn 2014, 133) and the term enviro-organism signals this shift in perception.

This leads to the final objective, to recuperate holism – an ethical necessity since discussions of the Anthropocene have unsettled both exploitative and custodial ways of rethinking and questioning the human–environment dichotomy (Johnson *et al.* 2014). As Rory Rowan explains, the Anthropocene signals a philosophical event whereby the distinctions 'between the social and the natural, the human and the inhuman [are] muddied by way of their mutually constitutive intrusions' (in Johnson *et al.* 2014, 448–9). To gain an appreciation of the overlaps between human language and non-human signalling mechanisms is an ethically important task because it permits us to listen to the world in ways that, if not new, have largely been forgotten in tandem with the disenchantment of nature (Plumwood 2002). Listening in this way promotes a post-humanist awareness of the planet conducive to multi-species cohabitation, involving practices of detachment as well as attachment (see Ginn 2013). In particular, it addresses the arrival of the Anthropocene with a revived sensitivity to the affinities between human and non-human ways of communicating.

To achieve this goal we drop in on an unnamed and intentionally generic beach drawn from personal experiences in North America, Oceania and Europe. One could find a beach quite similar to the one I describe in many places (e.g. Sanibel Island, Florida, Muizenberg, South Africa or Tasman Bay, New Zealand). Elsewhere, many elements would be different (e.g. Holes Bay, England or Pattaya, Thailand). Even so, 'the beach' is an archetype with some affinity to multiple places, serving much the same role as 'the city' in urban geography – a placeholder for concepts that come fully into focus only when applied in subsequent studies of particular places. From this point of departure we explore communications between humans, animals and non-living things. Place, encountered in this way, troubles the ontological boundaries between the social and the natural, human–human interactions and interactions between non-humans. This logic of communication includes natural meaning (e.g. red skin means sunburn) as much as non-natural, 'intentional' meaning (e.g. red octagon means stop) (Grice 1989). This enviro-organism is a ragged and shifting interface: not only a shore where water meets land, but also a threshold where human symbolic meanings mingle with non-human coordination/selection processes in a single symphony of communications.

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To integrate the four goals within the idealised place we draw on theories of the early 20th-century biologist and cybernetic theorist Jacob von Uexküll, whose idea of *umwelt* (2010 [1934–40]) was subsequently adopted by Martin Heidegger (1962 [1927]). Heideggerian geography became anthropocentric and there was admittedly something deeply compelling about Heidegger's claim that 'We – mankind – are a conversation. The being of men is founded in language' (1965, 277). Still, we cannot turn our back on the conversation of the cosmos. Human 'language games' are rooted in particular forms or ways of life (Wittgenstein 1953, §19) and non-humans have their own ways of life. Recently, geographers have followed von Uexküll's lead (Ginn 2013 2014; Lorimer 2007; Shaw *et al.* 2013; Simonsen 2012), but none have dissected a particular place by systematically considering its communications, both human and non-human. This approach also resonates with Spinoza and Deleuze in its refusal to equate non-human with insensate and accordingly draws on posthumanist engagements with ecology such as biosemiotics (Farina and Belgrano 2006; Shaw *et al*. 2013; Wheeler 2006), Donna Haraway's (2008) history of science and technology, and studies in animal cognition, ethology and ecological psychology (Bekoff 2002; Gibson 1977). Anthropologists have also helped show the way to a more-than-human ontology, as suggested by Paul Kockelman's (2013) philosophical pragmatism and Eduardo Kohn's (2013) effort to elucidate the linkages between our thoughts regarding non-humans and their thoughts about us.

My approach shares certain motivations with studies of hybridity and the recuperation of materiality (Whatmore 2002 2006), actor-network theory (Latour 2005) and non-representational geographies (Thrift 2008), but it is distinct from previous efforts in that it moves beyond the often rather vague notions of connection implicit in these approaches to define connections as specific types of communication. Kohn argues that what humans share with

> other living selves – whether bacterial, floral, fungal, or animal – is the fact that how we represent the world around us is in some way or another constitutive of our being. (2013, 6)

I would take issue with the term 'represent', since not all communication consists of representation, but this argument points us in the right direction. The beach in this story is a place in the geographical and therefore rather complex sense: a dynamic of meaning, social relations and nature (Agnew and Duncan 1989; Sack 1997), but it is equally a place of communication, which is to say it *contains* communications while being at the same time *contained by* communications (Adams 2009). The imagined beach suggests the range and type of communicational linkages that are integral to place while hinging concepts on a setting familiar to many readers.

In an enviro-organism, the thread of connection is best understood as an act or event, which, following the philosopher/logician Charles Sanders Peirce, we can call an interpretant. Interpretant is a capacious term that includes phenomena conventionally described as responses, reactions and interpretations – phenomena achieved not only by people but also by a range of non-humans. It has already been shown that semiotic concepts can be applied to geophysical processes (Couper 2007, 287), the next step is to explore the semiotic processes of the people, animals and bits of matter that simultaneously constitute a single place. The encounter proceeds through three phases – morning, noon and evening. These phases are a narrative device to help tease apart three intertwined stories that can be told about communications-in-place, but they also serve as a reminder of the rhythmic, cyclical qualities of any place.

Morning

We glean our first insight by following the dog we met before. He dashes here and there, circling the runner, sniffing at a pile of driftwood and the remains of a dead fish, then pausing to lift his leg at the base of a fencepost. At the top of this particular wooden post is a 'No Trespassing' sign. The juxtaposition is ironic. Dog urine is a territorial marker, a chemical signature letting other dogs know who has been there (Bekoff 2002, 24; Despret 2013, 66–7). While people depend on visual markers to indicate individual and collective territories (Sack 1986), dogs and many other animals use odour instead (Deleuze and Guattari 1987, 315). The words on a sign and the chemicals in urine express similar intent, but are distinguished by sensory mode (visual vs olfactory), flexibility (the language of a single society vs the language of a species), institutional support (people have economic and legal institutions to back up their territorial claims while animals do not) and novelty (a few hundred years for the English language vs millions of years for the language of pheromones).[1] Of course, this distinction involves subtleties including processes like regimentation via economic, legal or normative sanctioning that help keep the right interpretants aligned with the right signs. Subsuming these particularities within the term 'interpretant' troubles anthropocentric distinctions between our (ostensibly intelligent and versatile) interpretations and their (supposedly unthinking and automatic) responses, and disrupts an anthropocentric mapping of complete passivity onto the non-human and pure volition onto the realm of the human (Despret 2013). Despite the obvious differences between the territorial signs made by the human property owner and the

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passing canine, both create a lasting trace of an agent's presence and both assert power, however fragile and contested, on and in a particular territory. Both help organise what goes on in a place.

The shell mentioned at the outset also makes a territorial claim, or rather it did before its inhabitant died. A carapace of calcium carbonate marks the outer limit of a mollusc's defensible space. The spiral chamber's utility as a home depends on many things: its solidity relative to the teeth of predators, its depth relative to octopus tentacles, its ability to repel limpets and barnacles, its portability relative to the strength of its owner, and so on. Predators learn to pass by shells that are too hard for their teeth/beaks/jaws, generalising from past encounters. Not only is the shell a solid expression of territoriality, it also *announces* that it is solid as a visual symbol. Shells were read by non-humans long before humans existed. A potential predator has read its message when it recognises a shell-bearing creature as too big to deal with, or small enough to eat.

The words 'read' and 'recognise' suggest processes of communication and learning. Research shows that short-term learning (conditioning) and long-term learning (evolution of instinct) interact to produce predator-avoidance behaviours in animals ranging from wallabies to minnows (Ferrari *et al*. 2005; Griffin *et al*. 2001) as well as predatory behaviours in animals ranging from insects to sharks (Drukker *et al.* 2000; Klimley 2003). Marine predators with a taste for shellfish possess innate abilities to recognise what is edible and this long-term (between lifetime) learning is honed by short-term (within lifetime) learning. Feeding involves communications at all time-scales: a language of form and substance, tooth and jaw, the purchase of calcium phosphate (teeth) on calcium carbonate (shell).

Von Uexküll situates this kind of communication not in *the* world but in *a* world or *umwelt* (2010 [1934–40]). Each creature's *umwelt* is its universe, in which it evolves and learns to interpret the signs relevant to its interactions with its environment. An *umwelt* does not wall a creature off from other creatures but rather is a product of countless 'duets'. A spider, for example, incorporates its response to the weight, strength and velocity of a fly as it creates its web because:

> the threads must meet the power of the fly's body moving through the air; the web must fit the fly's body size and shape; the threads must be thin enough to elude the fly's vision. (Ginn 2014, 132)

These traits, built into the web *before* a fly is ensnared, are part of the spider–fly duet. Predator reads prey and prey reads predator, each according to its instincts and learned responses, communicated endlessly by embodied encounters.

In Haraway's words, 'The partners do not precede the meeting; species of all kinds, living and not, are consequent on a subject- and object-shaping dance of encounters' (2008, 4). The instinctual component of this dynamic evolves slowly and frays around the edges, being violated by unusual actions and interactions. These frayings are rare circumstances such as when an animal is particularly hungry and attempts to eat something unusual, or easy prey mutates to become faster or more deceptively coloured. By altering aggregate survival ratios such changes lead to the evolution of new inherited abilities on the part of the predator in its *umwelt* and new readings by the prey in its *umwelt*. Our view of place shifts from spatial containers to a 'multiplicity of trajectories, and thus potentially of voices' (Massey 2005, 55). The human ability to deliberately re-wire neural connections multiplies our trajectories and our voices, but it does not mark a complete break from what was happening before we arrived on the planet. The human *umwelt* (or rather people's diverse umwelts, see the Evening section below) is distinguished primarily by a flexibility that includes spatial and temporal characteristics: the rapid transformation of readings and the ability to craft communications so as to achieve complex, long-distance objectives.

Relations between relations

Can we analyse the processes indicated here – the mollusc secreting its shell, the dog lifting his leg, the property owner posting a 'No Trespassing' sign, the beachcomber reading the sign – as different and yet similar communication processes? We approach an answer to this question if we interpret each interaction in terms of a *relation between relations* (Kockelman 2013). Communication starts when Agent A senses something we can call the Sign Event, S, that is reliably correlated with a particular Object, O. Communication continues with an event Instigation I, by Agent A. What is crucial is that the relation of A to S *implies* the relation of A to I (Figure 1): recognising something as potential prey in a predator *umwelt* implies trying to eat that prey; recognising a scent mark in a dog *umwelt* implies needing to leave one's own scent mark; recognising the sign 'Private Property' in a human *umwelt* implies keeping out or trespassing. The term 'implies' is used here to mean that each of the interpretants *can* follow from the corresponding sign event, given the interests of the agent and the features of the object. There is no dictate that A must interpret S in a particular way or that O is the same for different As. Human beings do not have a monopoly on semiotic freedom (Hoffmeyer 2010) and agent-directed flexibility of interpretation is one reason animals have distinct 'personalities' (Bekoff 2002). A calm dog does not just *behave* differently than an excitable dog; it *reads* its world in a different way, and by acting on its readings it communicates with other beings in a different way.

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The O to S relation implies the O to I relation (see Figure 1). For example, the potency of an animal's scent-mark implies an animal's dominance of a location; the hardness of a shell implies that its contents cannot be treated as prey; the newness of a No Trespassing sign implies that it should be treated as currently in force. In each case, a pair of relations, A–S to A–I, bears a non-arbitrary relationship to a second pair of relations, O–S to O–I. And a particular instigation I_1 (biting, peeing, trespassing) achieved by an agent A_1 to a particular sign S_1 can become a second sign event S_2 in the perceptual range of a different agent A_2. This dynamic of relations between relations leads to the extensive causal chains forming a place. What links the particular (agent, event, object) to the general (place, process, pattern) are the countless moments of translation. These interpretants circulate within and between organisms.

There exist many different agents in the world, but all are busy selecting and being selected. Similarities and differences in how these processes link A–S to A–I and O–S to O–I are key to developing a systematic perspective on how all sorts of human and non-human creatures and other things extend 'the body's circumference … provide mental and physical resources to allow the body to be in the world … add to what and how the body can experience … [and] have their own agency' (Thrift 2008, 239). Selection is the most general process governing everything from sand grains to planets, microbes to human beings, including:

> neurological processes selected for on evolutionary time scales as much as cultural processes selected for on historical time scales as much as personal processes selected for on biographical time scales as much as intersubjective processes selected for on interactional time scales. (Kockelman 2013, 22)

While human communications are special in many respects, the basic ingredients of communication, including selection, are present among agents with very different ways of thinking.

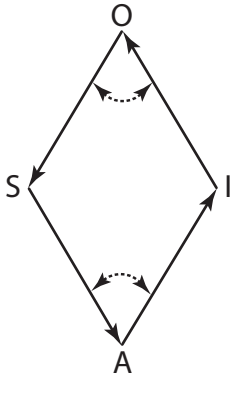

Figure 1 The selecting agent and significant object
Source: Author's illustration, after Kockelman 2013, 17

But what about 'agents' incapable of any kind of thought? The sand gives us a partial answer. This sand has been brought here through a process we might call sieving. Sieving consists of many small 'dumb' processes – the actions of water, wind and geological uplift propelling mineral particles of many different sizes to the ocean, then wave action sifting and sorting the particles by size. The details of the beach creation process are quite complex (Horn 1992), but beaches form when wave action is energetic enough to carry silt and clay particles until they sink farther out from shore while lacking sufficient energy to deposit gravel and large stones on the beach; what accumulates at the shoreline are the mid-sized particles (0.06 mm–2 mm) that we call sand (Buscombe and Masselink 2006, 37). The ocean's relations with the sand involve a familiar set of relations among relations: the purchase of water on sand (A–S) implies that the waves of this area will carry and deposit sand on the beach (A–I). At the same time sand particles are such that water gains purchase on them (O–S) only when its frictional grip is strong enough to carry the particles then release them (O–I) in the 'swash zone' where waves lose energy. The creation of a beach is therefore all about the selection of something by something else.

Following Couper (2007, 289), we could situate sand–water interactions near the bottom of the 'semiotic hierarchy', but this does not mean their communications are irrelevant. If we return to the start of this scene, a woman was running on the beach, but where exactly would she be running? It is much easier to run on the damp sand close to the surf than farther up the beach on the dry sand. Dry sand gives way underfoot, absorbing energy, whereas damp sand provides a more solid purchase which helps if one wants to run. The same principle applies whether we are talking about human feet or dog feet or horse feet. A living creature communicates with the non-living surface underfoot insofar as its feet sense the texture underfoot and the body shifts to gain purchase, remaining balanced and steady. In this way living matter communicates with non-living matter and vice versa. This aspect of communication is present in many different *umwelts*[2] but it differs in form and scale: 'The fine pavement the ant feels while crawling up the flower stem does not exist for the girl's hands [picking the flower] and certainly not for the cow's mouth [eating the flower]' (von Uexküll 2010 [1934–40], 30). Purchase varies depending on the agent. Sand crabs roll about in the waves until the precise moment when the sand in the intertidal zone is fluidised by wave action and they can burrow into the sand (Boyko and Harvey 2009). With legs perfectly suited to digging and senses attuned to the rhythm of the waves, their special purchase on wet

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sand differs from that of human feet – but various inhabitants of the environment communicate with the sand by gaining purchase on it, and the sand in turn offers certain kinds of purchase that are different from clay, silt, rock, and so forth.

Ruddy Turnstones are among the thousands of species that have evolved to fit a niche in the beach environment. As indicated by their name, turnstones have a habit of turning over pebbles. They also probe and dig in the sand with their beaks and 'bulldoze' into algae piles with their bodies (Whitfield 1990). Their objective is to expose and consume small animals such as marine snails, insects and crustaceans. Here we encounter biosemiosis in a wonderfully clear way. No two crabs, insects or molluscs ever meet the bird's eye in exactly the same way. They vary in regard to size and shape, angle, position, lighting conditions, and so forth. So the life of a turnstone depends on selection of food based on generalisation of form: it must be able to read the signs of its prey against a background of sand, seaweed, shore grass, pebbles and driftwood, and must do so quickly enough to catch a meal even as the meal engages in evasive manoeuvres.

The prey animals are engaged in selective processes of biosemiosis as well. To evade turnstones and other threats, insects and crustaceans must be able to pick out the movement of a potential predator from other environmental stimuli and respond by pulling into their shells, digging down, hopping, flying or scuttling away. We might be tempted to put such evasive behaviour into the category of mechanical action, recalling the motion-detecting switches that turn on lights and open doors, and likening evasive manoeuvres to a similar automatic mechanism. But if we think in terms of longer time periods and broader spatial scales we discover the semiotic freedom of animals. Over time each prey species innovates with regard to its ways of responding to signals of predation and modifying the signals of its own presence through camouflage, deception, irritating chemicals, and defensive armour. Behaviours or habits belong to a species' 'ecological psychology' (Gibson 1977) and are its interpretations of an *umwelt*, however slowly they evolve. Changes in responsiveness can of course occur at a much faster rate, for example when an animal is exposed to a new predator (Bekoff 2002, 64–6; Ferrari *et al.* 2005; Griffin *et al.* 2001). But this again suggests that material changes in a place are inextricable from the evolution of the meanings created and perceived, performed and recognised by both human and non-human inhabitants.

Throughout all of this lively activity run the same four elements – agent, object, sign-event and interpretant. A particular *relationship between relationships* – A–S to A–I implying O–S to O–I – typifies these dynamics (Figure 2). It is often helpful to classify these in a continuum from serendipity at the one extreme, to signification at the other extreme, passing through sieving and selection (Kockelman 2013). But serendipity, sieving, selection and signification primarily differ with regard to scalar attributes involving bigger or smaller pieces of space and time, imposed by the observer on the continuous web of interconnection. While 'throwntogetherness' (Massey 2005) implies a certain randomness, these four aspects of the semiotic model suggest more of an order in place, with all of the parts of place speaking to each other, albeit in different languages, and not always intentionally or purposively.

Noon

The sand is scattered with brightly coloured towels. Plastic pails and shovels are piled near the towels. About a hundred people ranging in age from toddlers to grandparents occupy this space: lying on towels, sitting on folding chairs, walking up and down the beach, squatting to work on miniature engineering projects, frolicking in the waves. They are generally keeping their distance from each other, but there is quite a bit of nonverbal communication. We get a better grasp on the peculiarities of human communication in this place by distinguishing between indices, icons and symbols (Peirce 1998).

In the damp sand countless footprints can be seen. Each print communicates that someone passed by, the direction they moved and their size. Furthermore, the spacing of a set of footprints suggests the rate at which the person travelled. Footprints create meaning indexically: they are physical traces of something. Inherent in indexical meaning is a causal connection, and we can therefore say that the index is *motivated* since it bears a non-arbitrary relation to what it is that is meant, like the scent mark left by a passing dog which is a chemical trace of a particular dog or a gull-shaped shadow passing over the sand which is a silhouette of a particular gull. Many indexical communications by humans and non-humans are inadvertent, but people do also create them deliberately, from the hand outlines left by Neolithic people on cave walls to 'selfies' taken with digital cameras at the beach.

The 'No Trespassing' sign mentioned above employs a different mode of communication. To read the words on the sign one must know and apply a chain of arbitrary associations: shape to letter, letter to sound, sound to word, word to concept. The words are not motivated but rather are sets of arbitrary associations making up what Peirce (1998) calls a symbol.[3] A plethora of symbols have a fleeting presence at the beach: newspapers, magazines, books, towel monograms, clothing labels, people chatting, children shouting, a radio programme.

Having identified indexes and symbols, we now turn to the other end of the beach where there is a sign with

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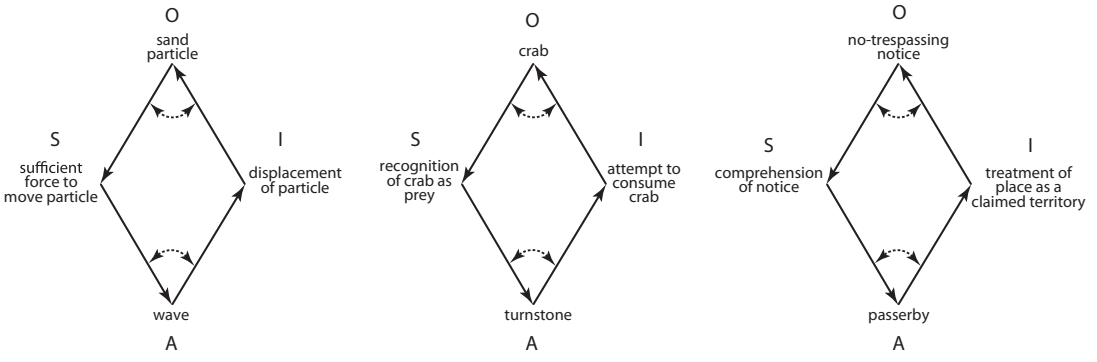

Figure 2 Comparison of three different forms of selection on a generic beach
Source: Author's illustration

the image of a stylised swimmer intersected by a red, diagonal slash. The image of the swimmer is an *icon*, meaning it shares something with what is being represented. The shape of the swimmer represents the swimming body in a way that transcends linguistic differences and speaks to multilingual audiences. Therefore unlike a symbol it is not entirely arbitrary; its meaning is motivated by a similarity of shape. But it differs from the index in that it has no direct causal relationship to what is represented. Furthermore it is generic in the sense that it does not represent a particular swimmer but rather any and all (human) swimmers, and the depicted arm/body position stands for any kind of swimming stroke. Meanwhile, the red diagonal slash juxtaposes a layer of symbolism over the iconographic image of the swimmer as an arbitrary symbol of prohibition.[4] Other icons at this beach can be found marking the restroom doors, the handicapped parking spaces and the interpretive nature exhibit.

The beach, as a constituent element of the human *umwelt*, is therefore defined by the combination of various types of communications, each of which structures relationships between agent, object, sign event and interpretant in particular ways. To carry this argument one step further we can focus our attention more closely on the people on the beach. A swimmer involuntarily communicates that the water is cold by tensing up, shivering and holding himself. The lifeguard deliberately communicates attentiveness by facing the water, staying awake and occasionally blowing her whistle. A child communicates excitement by running on the beach, and if the movement is towards a gull that sends a message to the gull that may cause it to take off into the air. Human bodies on the beach, like non-human bodies, communicate indexically and iconically simply by their presence and movement.

To this embodied communication we can add the specificity of culture. Euro-American culture dictates that people in a beach environment generally avoid speaking to strangers but nonetheless communicate through their appearances. Certain norms accordingly govern beach attire; no one is wearing shiny leather shoes or an evening gown. Female bathers and male bathers wear distinctly different kinds of bathing suits but joggers of both sexes wear t-shirts and baggy shorts. Clothing symbolically shows social roles that are set indexically within a local environment. Terrence Turner (2012) offered the compelling term 'social skin' to indicate the way clothing, hair treatment, skin treatment and adornment articulate key distinctions between self and other, social classes, and impulsive versus socialised aspects of the self. Rules of the social skin dictate that to avoid social censure one cannot dress the same way everywhere, and the social skin has a particular grammar in each place. In this case, like many others, place as a context of communication inflects the content of communication (Adams 2009, 167–213). The bathing suit that was perfectly acceptable at the beach is out of place in the city where different social roles require people to dress in different ways (Mead and Morris 1962). This observation prompts reflection on role-changing, in general.

By bending to pick up a shell, a woman changed both her own role and the shell's role with a single gesture. She ceased to be a jogger and became a beach-comber. The empty shell, which might well have become a home for a fiddler crab, instead became an ornament, destined for a garden where it might shelter a mouse, a spider or a bit of moss. The action of stooping to pick up a shell precipitated shifts in the constitution of multiple signs, in the actions taken in response to those signs by multiple actors and in the roles of those actors. As von Uexküll explains in connection with a stone that is picked up and used as a projectile:

> Neither the shape, nor the weight, nor the other physical and chemical properties of the stone have altered. Its color, its hardness, and its crystal formation have remained the same

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> and yet, a fundamental transformation has taken place: It has changed its meaning. (2010 [1934–40], 27)

Non-humans can also change their own roles, thereby initiating new chains of sign events. Birds suddenly become interested in small sticks and bits of fluff when they are building their nests. The change in bird role indicated by 'nesting' activates a different set of selection criteria, changing the roles of sticks and grass. A hermit crab that feels tight in its shell begins paying attention to slightly larger shells and ultimately selects one as a new domicile. This changes the role of the cast-off and the newly occupied shells and the crab itself, which now 'reads' to other creatures as a bigger animal. Water moving downhill in a river can change roles to become vapour moving upwards through the atmosphere. Storms, floods, landslides and avalanches reveal role-changing actions by non-living things. Humans find such role-changing unsettling, perhaps because people want to have a monopoly on the special kind of agency and autonomy that role-changing seemingly demonstrates.

Of course role-changing has special importance in human society. A person may, for example, take a course and pass an exam in order to achieve lifeguard certification. At this point, she may be hired to work as a lifeguard. Her new role is indicated (iconically, indexically and symbolically) by a special seat, a whistle and a uniform. Upon this transformation of identity, her perception of the beach shifts in a systematic way as she begins to attend to signs of drowning, dangerous surf, shark fins and jellyfish that others might easily disregard. Here an agent learns to read both anthropogenic and 'natural' signs in a particular place, then has a duty to signal their meanings to other agents. This signalling in turn affects others' actions, for example making a parent call a child back from the waves. Humans are unusual in the breadth and distinctiveness of their roles and role-changing behaviour, but the next section shows again that human communication is not as unique as we might assume.

Evening

'You're one lucky dog', says a man to a dog as they walk down the beach. (It is the same dog that started his day with a run on the beach, and his wish to go for a walk, expressed via body language and whining, resulted in two outings today). The dog does not understand these human words, but when he hears 'stay' and 'fetch' he is eager to comply. These words function as commands, linking sound to action in an arbitrary fashion (French dogs learn 'reste' and 'rapporte,' for example). The canine ability to learn simple verbal commands indicates that symbolic communication crosses the line between human and non-human agents.

Mating rituals and threats exchanged between animals are indexical/iconic communications, and it is easier for animals to perceive indexical communication as opposed to symbolic communication (Udell and Wynne 2012), but research on chimpanzees, parrots and dolphins has demonstrated that animal communication skills can be stretched, so to speak, to include surprising amounts of symbolic communication (Fouts and Mills 1997; Pepperberg 2009; Schusterman *et al.* 2013). Despite such interspecies sharing, human words possess a more limited meaning in animal minds than in human minds. The dog can obey the command 'sit', but it cannot contemplate where it might sit, fondly recall places it once sat or make laws regarding who can sit where. Words 'understood' by a dog differ from the same words understood by people in that they are not inferentially articulated, displaceable or self-reflective. Nonetheless, the fact that a dog can learn to respond to verbal commands indicates inter-species symbolic communication that dogs achieve on their own, sometimes intransigent, terms. After the dog's owner extends his agency by teaching the dog to 'fetch', the dog extends his agency by training the nearest human to operate as a stick-throwing device.

Much of the time, animals communicate with humans on their own (indexical/iconic) terms. For example, the jellyfish floating in the surf is left unmolested by the bathers because they have read its message and honour the jellyfish with a particular 'flavour' of detachment (Ginn 2013, 534). Jellyfish can communicate with people using the same (noxious chemical) language they use to communicate with other animals.

This brings us back to animal–animal communication. A few hundred feet down the beach a large group of seagulls is making a racket. Circling, landing and taking off again, they fill the air with cries indicating that a dead fish has washed up on the beach. Avian selection of the visual and olfactory stimuli associated with the dead fish has instigated communication among the gulls via body language and vocalisation. A quiet seagull might have had the fish to itself, but there is an evolutionary benefit in being so bad at keeping a secret. In Kockelman's terminology, each gull 'indexically inherits' the sign from other gulls, benefiting from shared experience:

> With communication of this kind, an individual not only gets eyes in the back of its head, but it also gets legs [or wings in this case] detached from its body. The sensing and instigating agent is extended. (2013, 19)

Like scientists arguing at a conference, birds flocking and making noise distribute knowledge throughout many sensory apparatuses.

At the centre of such processes is the interpretant in its various forms. It can be a movement (flocking, fetching, avoiding a jellyfish), immobility (tensing to spring, freezing to hide, obeying a command to 'stay'), a

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shift in bodily state (excitement, tension, relaxation) and/or a shift in understanding (a person or bird learning how to recognise or catch a crab). Kockelman refers to these four kinds of interpretants as affective, energetic, representational and ultimate (2013, 64–7). Ultimate interpretants are of particular interest. They structure how creatures extract *meaningful* information from their environments and subsequently survive within their *umwelts*: eating, dwelling, avoiding predators and reproducing, but also, through it all, generating meaning for other organisms. Ultimate interpretants are environmental in the sense that they are pervasive and causally linked to actions. They can be both consequences and causes of actions, they affect multiple umwelts and they change/evolve over a time span from a few seconds to millions of years.

At the short end of the temporal scale ultimate interpretants are learned behaviours. Humans excel in this area with an unusually developed capacity to learn and formalised instruction in the form of culture. Together these create a multitude of human *umwelts* rather than a single *umwelt*. There are distinct *umwelts* of different families, professions and nationalities and, within these groupings, different *umwelts* of men and women as well as each person's *umwelt*. In other words, human learning based in symbolic communication leads to specialisation, enculturation and individuation; different people who appear to be on the same beach in effect inhabit different beaches. When the time span for forming ultimate interpretants is on the order of hundreds or thousands of years, ultimate interpretants are instincts (in wild animals) or traits of a particular breed (of domesticates). The beach itself is an ultimate interpretant of all of the geological forces acting on this strip of coastline. Geological sifting, with its temporality extending to millions of years, may seem dumb and blind, but Prigogine counters that: 'Figuratively speaking, matter at equilibrium is "blind", but with the arrow of time, it begins to "see"' (quoted in Massey 2005, 33).

An enviro-organism, then, can be understood as a continuous fabric of meaning constructed across time scales ranging from very short to very long. It is a piling together of affective, energetic, representational and ultimate interpretants such that what happens in a place makes sense (achieves ends) precisely because it helps make sense (create meaning) for the various human and non-human agents in a place. This interpretation of the world is 'one in which semiosis is as embodied and embedded as it is enminded and articulated' (Kockelman 2013, 67). It is one in which the term 'non-representational' (Thrift 2008) characterises the vast majority of communications. Our semiotic freedom, the flexibility of language, allows us to understand the world in different ways but intriguing as this freedom is, it does not place us above or even alongside the rest of creation; we are embedded and awash in it.

The people who visit a beach are knotted together (Haraway 2008, 88) with gulls, dogs, crustaceans, sand and waves in common processes of sieving and selection. The various agents are communicating in different temporal and spatial scales, their bodies converging on the beach while each inhabits a somewhat different world, a semi-permeable bubble. For dogs, with their olfactory sensitivity three or four orders of magnitude more acute than ours, the beach is a kaleidoscope of scents including sunblock, sweat, dead fish, pheromones of other dogs, and many scents too subtle and complex for humans to detect. For a turnstone, the beach is a complex hunting ground where different bits of flotsam harbour different kinds of prey and each stretch of sand bears subtle markings showing where to probe for a meal. Compared with the beaches of animals, the beaches of humans contain less to see, hear and smell, but they are enriched by what Rose calls the 'absence at the heart of the visible' (Rose 2010, 142). A person who sits down on a bench to look at the scenery may find on closer inspection that the bench was installed as a memorial to another visitor who has passed away, and therefore this sitting place symbolises the invisible visitor as much as the visible, past in present, scattering in gathering (Wylie 2009). Human communication extends sensation and action, and hence the self, through space and time (Adams 2005). So thinking of place merely as coming-together or convergence fails to capture a certain slipperiness of place, a 'dis-placing' (Wylie 2010, 146) implicit in the idea of *umwelt*.

Conclusion

A beach understood as an enviro-organism is an environment full of organisms but also a kind of organism in its own right. It is lively, dynamic and provisionally stabilised by internal communications – a symphony of diverse bubble-like, interpenetrating, interdependent *umwelts.* Thinking in this way offers one map of how

> both humans and non-humans ... conduct themselves skilfully in and through their surroundings, deploying capacities of attention and response that have been developmentally embodied through practice and experience. (Massey 2005, 11)

This, in turn, exemplifies Massey's argument that spaces and places are bound to the world rather than bounded off from the world. It also provides a juncture at which to begin addressing the challenges of human–environment relations at a time of multiple crises. The term 'Anthropocene' captures the pressing need for a

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human response to anthropogenic environmental changes, but it may misdirect our attention by reinforcing the idea of separation between human agency and non-human agency. If the term Anthropocene is to serve as a guide it must be, as indicated at the outset, through its potential to promote four goals: a renewed understanding of communication as a geographical process linking across scales and generating scalar ambiguity, where most interactions are embodied communications, and our own communications recuperate holistic ways of acting and thinking with the world rather than against it.

As Kohn argues, 'in the world beyond the human we sometimes find things we feel more comfortable attributing only to ourselves' (2013, 1) and communication is indeed one of those things. However, the categories 'social' and 'natural' depend on 'mutually constitutive intrusions' (Johnson *et al.* 2014, 449) and long-term goals such as sustainability and justice depend on recognising what Haraway calls the 'encounter value' (2008, 46) in communication. Otherwise, our interventions would be too managerial, too much a matter of social engineering, to truly do justice to the trans-human collectives in which we take part. A posthumanist response to the various forms of anthropocentrism and instrumentalism embedded in both scholarly and everyday thought calls for 'a more capacious ethical practice, one that mindfully attends to finding ways of living in a world peopled by other selves' (Kohn 2013, 134). Geographical engagements should therefore build on the longstanding geographical interest in place by emphasising the ubiquity of communication in place, while understanding communication not as a peculiar human technique but rather as a shared legacy – something that is ours only because we have evolved in communication with other inter-communicating entities and substances.

Geographical metaphors of organic integration are not as limiting as they once seemed to be (Buttimer 1982), but we must treat the ubiquitous communications of place and space as holism in multiplicity – *e pluribus unum*. The symphony metaphor is particularly apt here because communicational coherence emerges like a melody line taken up first by the woodwinds, then by the strings and later by the choir. What makes a particular 'melodic phrase' meaningful in a place is its synchronic and diachronic context, what is happening in the present moment as well as what has converged at that place-time from remote spaces and times. We should promote scalar ambiguity, and reflect on the enviro-organisms stretched across the edges of any particular place we have been considering. In this case, examples include: the city and the bay each flanked by the beach and trading people with the beach, the dunes and an estuary each trading sand and organisms with the beach, a larger coastal ecosystem with human and animal users who affect the beach; and the global ecosystem where anthropogenic CO_2 emissions threaten to raise sea level and push the beach inland or submerge it altogether.

While it is useful to note that 'action in actor-networks configures space' (Murdoch 1998, 361), the relations that sustain actor-networks must be clearly understood as *communications* between heterogeneous things. Likewise, while it is helpful to study 'hybrid assemblages' (Thrift 2008, 9) and to link these to Simondon's notion of 'technicity' (1989), the term 'hybrid' and the prefix 'techne' should not predispose us to focus on human technologies to the exclusion of the techniques employed by things like sand, shells, wind and water. Haraway is instructive in this regard, since she notes ecumenically that 'things are material, specific, non-self-identical, and semiotically active' (2008, 250). But we have to remember that the most rapid and disruptive changes affecting most places on earth in the near future will be orchestrated by human communications, and the adverse impacts of these changes can only be mitigated, in the short term, by more (and more sensitive) human communications. So how can we engage in better human communication while remaining open to communications from outside 'the social'?

Two things that we take as hallmarks of humanity are our self-awareness of roles and our protracted efforts to control our roles. Erving Goffman claimed that people are 'practiced in the ways of the stage' (1959, 251) but we cannot redesign the entire stage; consciousness is 'functional, not substantive ... located in the objective world rather than in the brain' (Mead and Morris 1962, 112). If consciousness is constituted pragmatically in settings, and those settings make certain roles available, then the embodied self no less than the communication it produces must respond to a particular place's 'grammar of motives' (Burke 1969). Ecological consciousness therefore must follow a contextual understanding of self-identity, based in not-always-human communications, requiring us to see the foundation of the human self as 'out there' in what we call 'nature' rather than just 'in here' in the mind.

This is what Wendy Wheeler means by 'semiosymbiogenesis' (2006, 134) arguing that we know things not by objectifying them but by learning to understand what they are saying to us – adopting 'trans-species pidgins' (Kohn 2013, 132). Tim Ingold reflects the same interest in calling for an 'animic ontology' (2011, 69), but the notion of enviro-organism gives us a non-mystical alternative based on communication, and shows how to make the animist or pantheist insights of popular pro-environment discourses more academically accessible and useful.

Finally, to accept this heterotopic/heteroglossic viewpoint requires that we take empathy seriously:

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'Rather than being unscientific, empathy becomes a scientific tool, a tool that needs to be shaped, forged, refined and embodied, a tool that attunes bodies' (Despret 2013, 71). Self and other come into contact as parts of a greater whole in 'a space where these two parts may be entangled and exchange/create reciprocal meanings' (Despret 2013, 60). Our role in the enviro-organism is, therefore, to release our attachment to a particular role and listen to other agents with faith that a strategic mix of engagement and detachment will allow us to play in harmony with the rest of the orchestra.

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Notes

1 Arguably pheromones are the earliest languages, being utilised by single-celled creatures, invertebrates and vertebrates.
2 I will use the English form of the plural rather than *Umwelten* in order to avoid confusion.
3 While the 'No Trespassing' sign primarily utilises symbols, its meaning is also indexical since it is *deictic*: its meaning is dependent on location. The sign is saying, in effect, '*here* there is no trespassing'.
4 As indicated in the previous note, the sign's relationship to location also makes it indexical.

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