

Animals and Humans, Thinking and Nature¹

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Abstract

Studies that compare human and animal behaviour suspend prejudices about mind, body and their relation, by approaching thinking in terms of behaviour. Yet comparative approaches typically engage another prejudice, motivated by human social and bodily experience: taking the lone animal as the unit of comparison. This prejudice informs Heidegger's and Merleau-Ponty's comparative studies, and conceals something important: that animals moving as a group in an environment can develop new sorts of "sense." The study of animal group-life thus suggests a new way of thinking about the creation of sense, about the body, the brain, and the relation between thinking and nature.

We are a strange kind of animal. We have bodies like other animal bodies, and move like them. Our stories tell of these human-animal affinities, we speak of animals as totems or familiars, and we elucidate principles of the cosmos or society in terms of animal behaviour.² Yet, in telling, speaking and elucidating—indeed in building and thinking—we find ourselves estranged from the animals.

A recurrent effort of Western philosophy and science is to elucidate our strangeness within the genus "animal," e.g., to differentiate us as the rational animal, the legal animal, the questioning animal, or a meaning creating animal. Yet in this very effort our philosophy and science repeatedly put us altogether beyond the animal, in virtue of a mind that would have no need of an animal body. We know that minds are an evolution of animal bodies; and as William James (1950, 138) points out, minds evolved to *do* something, they are efficacious. Despite this, we are repeatedly asked to think of our mind as a computational or other process that could be abstracted from the efficacy of an animal body. We are to imagine that a brain in a vat (not an animal-body 'vat,' mind

you) could think. We are to imagine a human mind ‘uploaded’ into a robot body that was never born and shall never die; or a human mind ‘downloaded’ into a vast holographic memory.

The themes of mind, body and animals link in what I call comparative approaches to mind, approaches that explore the relation between thinking and the body through a comparison of humans and animals. This paper arrives at conceptual results about thinking, the body and nature by studying a prejudice in the usual comparison of humans and animals. In the first part I show how prejudices faced in overcoming mind-body dualism motivate comparative approaches. Heidegger (1995) and Merleau-Ponty (1965) adopt comparative approaches in *Fundamental Concepts of Metaphysics* and *The Structure of Behaviour*, books that characterize our thinking-being through an existential-phenomenological comparison of human and animal behaviour. In part two I show that Heidegger’s and Merleau-Ponty’s comparative approaches are nonetheless marred by another prejudice, which I call the prejudice of the lone animal. Despite their aim of avoiding artificial construction of the phenomena, both philosophers analyze the behaviour of *lone* animals, whereas animal life is pervasively a group phenomenon. In part three I show how animals appear as doing something much closer to being-in-the-world, or even thinking, if we study animals living and moving together—albeit their ‘being-in-the-world’ has a different temporal dimension than ours. In part four I wrest a general insight from these results, about distributed animal movement as creative. I then suggest how we might reconceive our bodies and brains as akin to a pack of animals roped into an internal environment.

Behind this paper is a point urged by Renaud Barbaras (1999), namely that the task of “naturalizing” a phenomenological account of mind would require a new way of thinking about nature as phenomenal, rather than a reduction of phenomena to nature as the physicist conceives it.³ In pursuit of this point, the paper engages in conceptual exploration, in the spirit of Merleau-Ponty’s (1982, 183) exhortation that “If we begin our search for truth with an eye for conclusions, there is no more philosophy.” I am trying to see what happens if we go all the way with turning to the animals for a way of thinking mind—and nature—anew.

1) Thinking as Animal

If mind and body are one, then thinking is a matter of the whole body in its world. Consider a sailing ship: it goes nowhere without sails, but we would be fools to think that sails—on their own—make the ship go. Sails are nothing without masts, yards and booms to hold them, a hull to float them, a rudder to steer the hull, and wind to catch the sails. Compare the typical approach to mind: mind doesn’t go anywhere without a brain; thinking correlates with neurons firing, as in a complex cognitive device; therefore the brain—on its own—is the engine of thinking. Implicit in this conclusion are the following abstractions and errors: that a brain could live to think without a skull-bearing body to guard it; that there would be things to think about absent the brain’s part in a moving body sensitive to things; that a brain cut from the winds of the world could blow itself out of its doldrums into thinking; that thinking needn’t catch hold of language, writing and communication.

Whence such abstractions and errors? Especially after Descartes, we are prejudiced in conceiving thinking as individual, self-contained and abstract. So we attack dualism

by attaching mind to the only organ that could plausibly yield abstraction, namely the brain conceived as akin to a human-made symbol processing or cognitive device.⁴ We thus engage another prejudice, viz. analyzing natural phenomena on the model of human-made mechanisms, and a related prejudice of artificially isolating natural phenomena from their contexts. Perhaps the prejudice underlying all of these is a refusal to conceive thinking as *animal*, as an activity of an animal, an activity that is fundamentally animate in character.⁵ Our tradition teaches that human thinking is unlike any other animal activity, and the fact that we can experience thinking as a private, quiet affair encourages thinking the tradition is right. So thinking has a dignity that could be found only in a most un-animal part of the body, namely a brain dignified by functioning like a human-made machine.

To overcome this set of abstractions and errors we would have to dump our traditional prejudices overboard and chart a new course. We should make a fresh start, beginning with the hypothesis that human thinking is an activity of a body, abandoning dualism altogether so that we do not presuppose what either mind or body are, or force them into a conceptual slots specified by the sorts of mechanism we can construct or the sorts of process we are good at analyzing. We should then ask what thinking is *qua* such an animal activity.⁶ On this course, the best approach is comparative: asking how human thinking as animal activity differs from or overlaps with other animal activity. Why is the comparative approach best? To begin with a prejudice is to coin a conceptual model that specifies a spectrum of variability in which we then try to slot natural diversity. In contrast, a comparative project begins by studying nature's own variability, and then

seeks insight into a conceptual model that articulates the unity and diversity of natural variability.

Two illustrations: 1) Colour has been a notoriously difficult philosophical topic, mostly because the traditional prejudice of the subject-object distinction forces colour into either subjective or objective slots, which leads to inherent difficulties. In contrast, Evan Thompson's comparative approach begins with a study of creatures whose eye pigmentation yields very different colour spaces (Thompson 1995; Thompson, Palacios, and Varela 1992). This enables a fresh start that reconceives colour in terms of a 'problem' that is 'solved' in different ways in different animal bodies. In turn, this shows that colour is neither objective nor subjective, but is an ecological, evolutionary relation between organisms and environments. 2) We engineer machines, and it is easy to imagine how the engineer's mindset would set up slots that prejudice analyses of animal walking. Robert Full and Claire Farley (2000) instead compare the movements of a diverse set of actual walking, hopping and creeping creatures, thus gaining an insight into natural 'engineering.' They discovered that in all these creatures legs work as springy organs over which animal bodies hurtle. This enables a fresh start in the analysis of walking.

Comparative approaches help us do good phenomenology. Instead of beginning with our prejudices, we try to attend to the way that nature has prejudiced itself in evolving living differences.

In *The Fundamental Concepts of Metaphysics* Heidegger takes a comparative approach to metaphysical questions partly for this reason. Having deduced the phenomenon of "world," from a long but not at all boring study of boredom, he turns to

the question of what “world” is for Dasein. The question would be begged if we started from the traditional prejudices (e.g., that the distinctiveness of “world” stems from our rationality). Instead, Heidegger lets the existing difference between human and animal ‘worlds’ *tell him* what “world” is; he tries to figure out what we mean when we say Dasein is in the world by contrasting this claim with the claim that the animal is world impoverished. Even though Heidegger would not pose his question in terms of mind, or thinking, but in terms of Dasein, what he has to say will help us with the philosophy of mind (as, e.g., Olafson (1987) and Dreyfus (1992) have shown). Significantly for us, his comparison turns on a study of *behaviour*—perhaps the closest Heidegger gets to direct study of the body.

On the other hand, Merleau-Ponty’s explicit topic in *The Structure of Behaviour* is the relation between consciousness and nature. He pursues this relation by first of all turning to behaviour as a phenomenon in which consciousness and nature, body and mind, are inseparable. Having given a conceptual analysis of behaviour, he then takes a comparative approach that distinguishes the vital order from the human order in terms of differences in structures of behaviour within these two phenomenal orders—and since he really doesn’t talk about plants his comparison is of human and animal orders.

As Heidegger points out, such a comparative approach immediately sinks in methodological difficulties. The most pressing is this: philosophical or scientific comparison of human and animal phenomena already presupposes a pre-philosophical, pre-scientific distinction between humans and animals, some way of picking out the human from the animal. The circle is unavoidable, and there is no use bemoaning it. To even raise the question of the difference between the human and animal is already, as it

were, to perform a pre-philosophical sense of that distinction. Raising the question differentiates us as the animal who cares to speak about our difference from other animals. More, our pursuit of the question presupposes our ability to transpose ourselves into the 'world' of the animal—which is to say it presupposes Dasein's being-in-the-world *qua* accessibility to other beings.

We could follow Heidegger's path and resign ourselves to a certain amount of question begging that stems from the very structure of our questioning. But if we worry our way into these Heideggerian depths, an important question that need not be begged, a question that we can pursue, gets concealed, namely: granted a sense of what animals are, what should we be studying when we study animal behaviour? In taking a comparative approach to mind, it appears obvious to us that humanly mindful behaviour is the behaviour of a single body, so we compare single human bodies to single animal bodies. More, it appears obvious to us that animals, especially 'lower' animals, do not 'think' in the way that we do; if they did, our comparison would not yield an answer to our problem as we posed it. In other words, the usual comparative approach is prejudiced by studying the behaviour of the lone animal, and by the anticipation that animals do not 'think' like us. I want to show how these two prejudices intertwine in a way that conceals something important about animals, and thence about us.

2) The Prejudice of the Lone Animal

Why is that philosophers and scientists, when comparing human and animal cognitive ability, typically compare *a* human with *an* animal, rather than *humans* and *animals* as groups? Whither this prejudice of the lone animal? I am going to pursue this question in relation to the work of Heidegger and Merleau-Ponty because they are philosophers who

should know better than to fall for prejudices, especially since they are taking a comparative approach precisely to escape traditional prejudices.

To emphasize what is at stake here, I want to say a bit more about Heidegger and Merleau-Ponty, and their sensitive ways of avoiding other prejudices. In their comparative approaches, both philosophers turn to thinkers such as Uexküll and Goldstein, thinkers who analyze organisms in terms of overall behaviour rather than as biophysical systems. Drawing on these resources and their observations, Heidegger and Merleau-Ponty insist that the unit of analysis is not the human or animal organism as a closed system, rather organisms and humans are correlative to and inseparable from the surround in which they live. Merleau-Ponty is most sensitive on this point, arguing that the animal as object of laboratory experiments is an artifact, a preparation, a being that is very distant from the animal in its own environment, to the extent that conclusions extrapolated from testing the animal in the lab have very remote bearing on the animal in the wild. Both philosophers are strikingly insightful in their refusal to separate animals from their environments, an insight that will be developed, later on, in ecological and autopoietic conceptions of organisms (cf. Gibson 1966; Varela 1991).

So it is quite striking when these philosophers focus on *individual* animals: as if an animal embedded in its environment were not embedded in relations with other animals!

In more detail, Heidegger says that we live in the world, whereas an animal is world impoverished. While our being in the world depends on being-with one another (*mitsein*) (since, e.g., our being, Dasein, is interpretation, etc.), and the human term of Heidegger's comparison is thus collective or plural⁷, Heidegger contrasts our sort of being with what we would find, say, in the behaviour of an *individual* bee or lizard. Merleau-Ponty says

that the human order is distinctive in establishing significances through the cultural creation of language and tools that invest the world with new and ambiguous meanings. While a primate sometimes uses a stick as a tool, it only does so, Merleau-Ponty argues, if the stick is so placed as to fall in line with the animal's behavioural explorations. Even when the animal uses the stick as a tool, the stick is treated all and only as a tool, whereas for a human the stick at once and ambiguously has the meaning of stick and tool. For both Heidegger and Merleau-Ponty the crucial point is that human life inherently involves an *as* relation: we relate to things in the world *as* this or that, we can create new meanings and behaviours by reinterpreting what things figure *as*, so for us things have variable or ambiguous meanings that need to be negotiated. We thus have a special sort of distance or separation from things around us. We aren't in the world in the same way the animal is, because we have to make something of the world, whereas for an animal things are already laid out. And for us this making something of the world has to do with language and interpretation, with the collective being of human beings.

Heidegger and Merleau-Ponty are making an important point that is in many ways right. But there is something wrongheaded about a comparison that puts a necessarily intersubjective human world on one side, and the behaviour of a lone animal on the other. The problem is not that the comparison is unfair because humans overwhelm or outfox the lone animal—although this is an issue. The problem is that the lone animal is an abstraction. Merleau-Ponty and Heidegger would not even dream of decoupling an animal from its environment, or decoupling humans from one another, but in their analyses they seem to decouple animals from their congeners, and take the *individual* animal-environment couple as their unit of analysis. While sensitive to other prejudices

of our tradition, they fall into what I call the prejudice of the lone animal, that is, characterizing animal behavioural capacities through studies of *individual* animals, rather than groups.

Even if I am mistaken about Heidegger and Merleau-Ponty, it is quite evident that comparative approaches in science and philosophy often repeat this prejudice of studying lone animals.⁸ But we need to draw a distinction between two divergent yet intersecting axes of human-animal comparison. I call these the political and the psychological, in honour of the works in which Aristotle marks out these axes. In the *Politics* (bk. 1, ch. 1), Aristotle argues that bees and other gregarious creatures communicate, but that only humans speak about the good. This does compare humans and animals as groups, and that is because the underlying aim is distinguishing human and animal society, rather than humans and animals as such. This sort of comparison on the political axis recurs in observations that, e.g., humans are different than animals because we lie to one another, wage war, institute traditions, have funeral rites. (But maybe some primates or cetaceans lie, wage war, or have behavioural and even linguistic traditions—it depends on what we mean by these terms. (Cf. Whiten and Byrne 1988; Rendell and Whitehead 2001))

On the other hand, in Aristotle's *On the Soul* (bk. 2, ch. 3) the comparison is drawn in terms of faculties whose locus is *individual* humans and animals: human soul has noetic as well as sentient and nutritive capacities, in comparison with animal soul that is merely sentient. This facultative comparison becomes ever more prominent with materialism and the rise of the mind-body problem, with the accomplishments of modern biology, psychology and neuroscience, in short with a science and philosophy that grasps the biological organism as the unit of life and attempts to understand human differentia as

capacities of the animal *Homo sapiens*. In any case, this psychological axis is our main concern, given our starting point in questions about mind and body. (Of course, if I am right that the lone animal is a prejudice, then the two axes of contrast are far more convergent than we might have thought.)

Empirical observation gives us good reason to think that the lone animal is, in psychological comparisons, as much an abstraction and artifact as Merleau-Ponty's laboratory organism. The pervasive form of animal life is that of the flock, herd, pack, hive, nest, shoal, colony—we have a swarm of words for designating the group-life of animals. Animals live as group-beings.

Of course, counter-examples creep up right away. Some animals do not seem to explicitly coordinate their behaviours, they don't visibly flock, herd, or manifest a group-life. Nonetheless, they live in populations that collectively transform ecological niches in ways that implicate their lives in one another's behaviour, e.g., caterpillars on a tree, sea-urchins grazing a lagoon, cockroaches scavenging. Evidence for the interlocking of such animals's behaviours is that they are susceptible of group control by human "wranglers" who figure out how to "wrangle" them as a group (e.g., when it comes time to make a horror movie in which the human is overrun by herds of cockroaches, or to shoot the television commercial in which caterpillars make a bee-line for a cellular phone, etc.).

The most prominent exceptions to animal group-life are not creepy, but big-bodied hunters: lions, tigers and bears. But such animals first of all have to break from the pride or pack, and then make company with prey, and compete with peers. Even the "lone wolf" is not really alone. Again, we might find exceptions in castaways left behind in migrations; or in animals cast out of groups that have social rankings and roles, such as

primates or elephants. But the castaways are hobbled, and the castouts often shadow the periphery of their group. These are cases of dysfunctional group-life rather than an absence of group-life. (We would also have to talk about pets, who seem to live in isolation from other animals, but complications are rife. First, pets obviously live in groups with humans. Second, because of their domestic formation and intimacy with humans they do not seem to be the right sort of animal to draw on in a comparison of humans and animal. In any case, any one who has taken a dog for a walk in the park knows dogs aren't loners.)

These points about animals should not surprise us, since animals are born of other animals and live by eating other animals or plants. Animal bodies, in other words, are constituted by an incompleteness.⁹ This is why Aristotle (*On the Soul* bk. 2, ch. 4) insisted that the reality of animals is not in the individual but in the species' cycle of birth, death and reproduction; why Bergson (1998) argued that biological individuality is a tendency rather than a fully accomplished state; why philosophers of biology (Sober 1994; Sterelny and Griffiths 1999; also see Gould 2002) recurrently question the unit of evolution and tilt between taking individual organisms and populations as the "real thing" that evolves, and why philosophers of immanence (DeLanda 2002) insist on the priority of populations over individuals.

Conceptually and empirically, the lone animal is an abstraction or construction. You find them in zoos or houses but not in nature, except in death, decimation or extinction. Given that animals are born from one another, live together and very often do things together, isn't the attempt to distinguish humans from animals through focus on individual behaviour as misguided as trying to distinguishing a gas from a liquid by

looking at just one molecule, or distinguishing one melody from another by sounding just one note? Can the fact that an animal can biologically survive on its own—and here we'd have to note that to get it to do that you typically have to cage it—warrant an analysis of them as loners? No, that is an abstract and poor way of thinking. So why does the prejudice of the lone animal haunt our philosophy? Why do we think this way?

The answer is that it is a human way of thinking. Pre-philosophical attitudes inherent in human life shape philosophical thinking. If we import these attitudes into philosophy, they can motivate philosophical prejudice. Phenomenology dwells on this problem, as do thinkers such as Dewey (1958) and Bergson (1998; 2002), who are helpful in linking such prejudices to evolutionary and social motives. Bergson (2002), e.g., notes that our biologically and pragmatically motivated attunement to handling discrete and solid objects inclines us to model all processes as the interaction of discrete solids; but when we uncritically carry that model over into philosophy, it motivates a prejudice that betrays the continuous becoming in which things arise. Similarly, I link the prejudice of the lone animal to two motives of human life, one appearing on the political axis of human-animal comparison, the other on the psychological axis.

On the political axis, we can observe that humans experience a strange kind of loneliness. This experience of loneliness is—quite paradoxically—well motivated by our social being: the misery of loneliness is useful in driving us to the social. Other animals would seem to experience this kind of loneliness; e.g., we often hear reports of isolated animals, especially primates, whales and dolphins, who appear to die from loneliness. Human political-social being, however, motivates a further kind of loneliness, since it demands that we take responsibility for ourselves, make up our own minds, listen to an

inner *daimon* instead of running with the pack. Where the use of loneliness in other animals is its being a non-viable lack that drives animals together, we can seemingly deal with or create ‘viable,’ socially useful forms of loneliness, e.g., in being or claiming to be off in our books, in our hermitages, in our minds. While Aristotle urges that the isolate man is a god or a beast, human society, in good and bad ways, often enjoins, enables or makes use of beastly or divine loneliness. This aspect of human political being can motivate or make plausible a prejudiced world view in which we take animals to be political loners like ourselves—forgetting that our political or intellectual loneliness is in fact an abstraction and depends upon the *polis*.

On the psychological axis of human-animal comparison (remembering that “psychology” is here being used in Aristotle’s sense), our concern is the animating principles that hold animals together as having animate capacities. On this axis we can detect a motive for the prejudice of the lone animal first by studying a disparity between our concept of bodily individuality and our experience of it, second by identifying a motive of that disparity. I am going to pursue this disparity within the framework of biology, since this will also help with larger conceptual points.

In recent years biologists have tried to give a rigorous evolutionary account of biological individuality and sexual reproduction. The underlying conceptual problem is deeper than it seems on first glance. After all, as Bergson (1998) observed, it would be possible, and in some sense plausible, to look at a tree and see a bunch of living plants stuck on the end of nearly-dead wood, to see a tree as we would see a coral reef; and anybody whose garden has been besieged by a lilac knows that *a* lilac keeps on turning into new trees. In the first case, why should we say there is *one* tree, rather than a colony

of organisms growing on the skeletal remains of previous generations? In the second case, why should we say there is *one* tree, rather than a family of them? What is that makes a bunch of cells count as *one* being? The problem is more striking when we turn to animals like ourselves: Why do I or any other animal count as *one* being, rather than a bunch of loosely knit cells or parts, or as an offshoot biologically continuous with my parents? While animal behaviour and growth give us ready phenomenological experience of animal individuality, careful consideration shows that it is difficult, on the level of biological analysis, to answer the question of animal individuality without begging it.

The embryologist Leo Buss (1987) has proposed a controversial yet well received and intriguing answer to this question, one in which individuality and reproduction co-evolve. In his account, an animal that we perceive as individual is really to be understood as an ongoing result of a conflict between competing cells lines, and individuality can take quite different forms across different genera. Further, body cells of individual animals are ‘programmed’ to die, and in evolutionary terms this is understood as an imperative of the species built into the individual (“die so your that decrepit cells won’t mess up the gene pool, die to make way for others”). Conversely, in animals, non-genetic factors contributed by the female parent are crucial to embryogenesis and the developed body-plan of the individual. Put together, these points reveal that the temporal and spatial finitude that mark the biological individual, death and development, is mediated by the species, and that the individual is the ongoing result of a conflict within the evolutionary and reproductive process of the species. Individuality is not an immediate possession of an individual organism.

This conceptual point bolsters the empirical observations made above.

Individuality is not given in our body all at once as complete, a point that comes to the fore in immunological contexts, in reproduction and in sexuality.¹⁰ Non-individuality is the original condition of organic being, in the way that Heidegger and Merleau-Ponty tell us that intersubjectivity is the original condition of human being. And then we would have to say the following, seemingly paradoxical thing: that the non-individuality of animals is manifest precisely through their apparent individuality, since their individuality is in fact a phenomenon of biological and behavioural interdependence. The phenomenon of animal group-life manifests the paradox of an individuality that could never be complete. (I leave it to the reader to reflect on the parallel between the paradox of individuality, and the paradox of loneliness.)

If, conceptually, individuality is inherently incomplete, not the possession of an individual, why have we, for so long, thought otherwise, thought that an animal is, in its very own being, unproblematically one integral thing that stops at the skin? In dealing with this sort of question, Buss points out a prejudice in prior accounts: taking as paradigmatic organisms in which there is a strict separation between germ and somatic cell lines (which is not true, e.g., in some organisms that bud) and that have a single body plan from birth (*vs.* organisms like caterpillars or jellyfish that change body plans as they grow). These prejudices and their tributaries can be traced to various moments in the history of evolutionary theory, especially the germ theory of August Weisman (1893). But really the prejudice amounts to this: taking the reproductive cycle of animals *like ourselves* as paradigmatic of reproduction in all organisms, as if all animals are like us or those animals most familiar to us, i.e. vertebrates. (Also: taking *animal* reproduction (*vs.*

plant reproduction) as paradigmatic of reproduction in general, a prejudice not at all surprising given that animals better exemplify the lineages and sexual divisions that preoccupy traditional views of reproduction; the traditional fables and totems bear upon foxes, lions and bees, not pennyworts or seaslugs—let alone slime molds.) To put it bluntly, Buss suggests we have misconceived the evolution of individuality and sexuality because we have traditionally and prejudicially conceived other organisms on the model of our own living organism—which turns out to be peculiar amidst other organisms.

On the psychological axis, *the sort of body that we humans have and experience has prejudiced our biological thinking*. Putting aside Buss's evolutionary biology, we can see how our experience, on psychological and political axes, generally motivates the prejudice of the lone animal. We, more than other animals, live apparently solitary lives and are taught to experience, at least in modern Western society, our organism as a self-contained pragmatic-cognitive unit. Our everyday experience of the lived body is of something that stops at the skin. Because we can lead an isolate "life of the mind" we are inclined to think of animal life as an isolate affair. It is no wonder that the lone scholar is inclined to the study of the lone animal. Or rather, that the Western lone scholar is so inclined. As Frans de Waal (2001, 2003) shows, the history of primatology suggests sharp differences between Euro-American and Japanese attitudes to primates, with the former inclined to study *individual* primates as interchangeable and *anonymous*, and the latter inclined to study *groups* of primates as *named* individuals.¹¹

As is well known, Heidegger, Merleau-Ponty and phenomenology generally show that our bodies and lives are not isolate affairs. So why should we extend a prejudicially isolate view of life to animals, unless we have (prejudicially) presumed that animals, in

contrast to humans, do not have a group-life? The points discussed above, if not our commitment to phenomenology, suggest that we had best throw the prejudice of the lone animal overboard, if only to see what results. In urging this I am not saying that Heidegger's and Merleau-Ponty's results are utterly wrong, indeed, there is something to be learned from those results *qua* comparisons of individuals. I am saying their results are incomplete, one sided, and that we shall miss something important if we stick with the prejudice. So we must ask: What happens when we compare humans and animals by studying group behaviour?

3) Minding the Animals

In *The Fundamental Concepts of Metaphysics*, §59, Heidegger studies bees. He cites an experiment in which a bee with a severed abdomen endlessly sucks honey from a bowl. In contrast, an unmutated bee sucks honey until its abdomen is full and then flies back to the hive. On Heidegger's understanding, the observation of the mutilated bee shows that an unmutated bee does not "recognize the presence of surplus honey." (242) That is, a bee does not recognize presence, does not recognize an environmental configuration *as* something over and above an immediately captivating interaction. With Merleau-Ponty's and Goldstein's help we could say instead that a mutilated bee is a bee only for the experimenter who "prepares" it, that it is no longer really a bee, that it can't behave toward the bowl in a bee-like manner because it has lost its belly. We might also say that the full belly of the (unmutated) bee flying away from the scent of the bowl is an animal recognition of surplus honey. Instead of manifesting recognition in language or individual behaviour, this is a recognition of surplus in a kind of movement to be read against the overall movements of the hive. A mutilated bee can't show this kind of

recognition. But then again, a human who has lost the feeling of pain may lose the ability to show, in individual behaviour, recognition of dangerous things in hand, yet recognition of danger can nonetheless be read in the individual's behaviour in virtue of fellows alongside who help point out the danger.

Heidegger also argues that bees do not recognize flowers as such. Why? Each bee, according to his evidence, is imprinted on just one type of flower. A bee imprinted on clover will just land on clover, a bee imprinted on honeysuckle will just land on honeysuckle. In this case we are talking about real bees, not laboratory preparations. It does seem that a clover-fixated bee is incapable of recognizing clover *as* something more than an immediately captivating interaction, *as* a flower. But what if we talked about *bees* rather than *a* bee? Presumably a hive of bees transported into a new floral region, or living in a region where the flora slowly or suddenly changes, would gather nectar from whatever flora happen to be around. Perhaps many individual bees would never make the shift, but if no bees in the hive made the shift, the hive would surely die out. So a hive of bees animally treats flowers *as* flowers, or at least *as* 'nectar source,' for the hive as a whole sucks up whatever has nectar in it. A bee may be captivated (to use Heidegger's word) by just one type of interaction with the environment, by what we recognize as just one type of flower, but a hive of bees cannot be so captivated, they animally recognize nectar sources in a general way, indeed recognize novel things such as honey bowls and trashed soda-pop cans as nectar sources. Absent that, hives would die out and evolution would be impossible.

Indeed, if animals are coupled with environments, and environments change, an animal captivated by a static feature of the environment is dead or short lived—which is

perfectly possible. But for life to evolve, *groups* of animals *must* be flexible in their animal recognition of the environment. So Heidegger is right only if he is thinking of the isolate or mutilated bee, and the isolate bee is, animally speaking, a mutilated bee, as Aristotle's isolate man is a beast. Evolution entails group non-captivation, mutability of behaviour across a group. Below we will see how this can be so, how a group can be flexible, where an individual is not.

To get there, let us turn from bees to dogs. Kym Maclaren has drawn the following point about dogs from the work of Gregory Bateson:

Gregory Bateson has argued that the rituals, for instance, that two dogs enact in meeting and greeting each other are not instinctual in the sense of being pre-programmed and automatic. The rituals are rather a matter of the two dogs *expressively and intercorporeally determining the situation, and working out a shared world*. Animals, Bateson asserts, cannot use negations. They cannot say "I will not bite." What they do, instead, is they act out a kind of *reductio ad absurdum*: they *play* at biting and fighting, for instance, in order to reveal to each other that "it is biting that I am not doing." In this way, they "discover or rediscover friendship." Through an intercorporeal dance, they bring to expression a situation in which each is confirmed as the friend of the other.¹²

Dogs are instinctually related to other dogs as potential threats. In individual dog-bodies this is shown by familiar expressive behaviour studied by Darwin: baring of teeth, attacking, etc., to assert dominance; slinking and so on to show submission. If we only looked at individual dogs, we would think they are merely captivated by other dogs, either dominating or submitting to them, in the way that bees, according to Heidegger, are captivated by flowers. We would think an individual dog incapable of recognizing another dog *as* something beyond a captivating threat. But when we turn to *dogs*, Maclaren's analysis of Bateson reveals something beyond instinctual behaviour.

The crucial point is that to show that "it is biting that I am not doing," the dog must *perform biting*, whilst not actually biting. Performing biting that is not biting thus entails something like a behavioural "as," doing something that is not what it appears to be. But this behavioural "as" requires another dog *not* to bite, and this means a dog who does not

bite back. In this behavioural complex biting appears as something other than a captivating dictate of instinct: the dogs behaviourally recognize biting as ‘doing’ ‘friendship.’ They likewise recognize each other’s bodies as something more than a captivating pole of a dominate-or-submit instinct, they behaviourally recognize in each other a dominating body (a biting-fighting body) that is behaving *as not* dominating. The dogs see one another, are captivated by and lope toward the distant foe, ready to attack; but their individual lines of captivation couple and swing into an “intercorporeal dance,” a circle and tumble of play-biting. The mutual captivation of biting paradoxically negates the captivation of biting, in the behaviour: “it is biting that I am not doing.”

An individual dog or bee is what John Russon (1994) has called a “hermeneutical machine.”¹³ It interprets the environment according to instinctive imperatives. What we have just seen is that when canine “hermeneutical machines” work together they can transcend instinctive imperatives.

I will now develop a general conceptual account of this phenomenon by drawing an analogy with music. There is an extraordinary difference between words listed together in a dictionary list, and words hanging together in a sentence. Similarly, there is an extraordinary difference between the list of notes an instrument (or set of instruments) can produce, and notes hanging together in a melody. Hearing words as a sentence or notes as a melody means intuiting an overall sense in virtue of which parts are not merely items in a list, but are intimately interrelated in a manner transformative of the sense of each part, as indicative of a sense of the whole.¹⁴ Producing a sentence or melody would seem to require an intuition of this sort of sense, as would changing the sentence or melody that one is producing. In what follows I want to show how animal groups can,

because of their moving, interactive structure, as it were develop changing melodic senses without individual members of the group having explicit intuitions of this sense.

In this way animal groups can transcend the instincts of individual animals.

So let us think of an individual animal as a sort of ecological instrument that resonates its environment so as to play a limited set of notes. An individual bee can sound the note “clover-nectar-source” or “hive,” but an individual bee cannot substitute other notes that have a related tonal character, or recognize its one note *as* something more, in virtue of its relation to that general tonal character. An individual dog can sound the notes “dominate” or “submit,” but cannot recognize that there is a tonal opposition between these two notes, which suggests a resolution in another sort of note that transforms both.

In other words, at a given time, an individual animal is resonantly captivated by the environment and sounds just one note. The individual animal is like a person who can play a couple of notes but has no idea that notes are not singular but hang together harmonically, melodically and rhythmically. Back to bees and dogs: The individual bee is like a person who can sound the middle-A on a piano, but cannot notice that an A on a trumpet or in another piano register is an A as well. The hive of bees, in contrast, is like a person captivated by a melody with an A in it, but at least capable of playing variations on A (“go to honeysuckle for nectar!” is a variation on “go to clover for nectar!”). The individual dog is like a person who can play two notes of a chord, but cannot hear them as a chord, because a solo dog-body can only play one note at a time. The dog-duo is like two such people who, when playing their notes together, hear a chord for the first time, and in the beats of the chord hear its resolution in a transformation of the chordal tension

(the individual lines of “domination” vs. “submission” resolve in the circle-dance of “this domination is not domination”). Individual animals may be locked into rote environmental resonations, sounding a fixed repertoire of notes; but groups of animals can implicitly perform variations, chordal resolutions, or melodies in a sort of collective melodic reading of the environment.

Now let us turn to a hungry pack of wild dogs hunting a rabbit in a forest. They work as a group, trying to hound the rabbit down, surround it, or corner it in an impassable ravine. They exhibit remarkably co-ordinated skills, moving together in anticipation of the rabbit’s movements. But suppose the rabbit escapes, bursting out of the forest into a parking lot. Perhaps we see the following. Where before the dogs used trees as cover or barriers to trap the rabbit, here they try to use lightposts, where before they had tried to drive the rabbit toward rock and earth barriers, here they drive the rabbit toward the odd car parked in the lot. But perhaps the lightposts are too sparse and skinny, and cars have hiding spots beneath, from which the rabbit must be rooted. Forest movements do not work here. So the dogs start moving in a different way, driving the rabbit into the open but encircling it from afar, taking advantage of the long distance visibility found in blank parking lots but not in forests. Eventually, their dog-bodies stand to one another and to the rabbit as a circle of no escape, a sort of two-way canine panopticon, in which the rabbit runs back and forth until exhausted.¹⁵

To be sure, these dogs remain individually captivated by rabbit chasing instincts. They sound their usual dog-notes. But they act on these instincts as a pack. So each dog’s instinct is mediated by the every other dog’s instinct, by a pack-movement of dogs interacting with a shifting environment, in relation to a rabbit. Different individual dogs

sound different notes at different moments because of their differing locations in the terrain. Further, each dog's chase has a different temporal and rhythmic contour (because each dog must chase ahead of the rabbit, along the rabbit's trajectory, and each dog will see a different trajectory; more, each dog's momentum constrains its possibility of initiating or changing movement and thence its rhythm of movement¹⁶). So instead of riffing through the limited set of notes specified by individual canine instincts, dogs are sounding notes diversified by spatial distributions and temporal lags, yet linked in one pack performance. Because the dogs are moving together, they cannot just sound their notes, their notes get caught in differences with other notes. A sort of improvisation is going on. The improvisation isn't governed by self-consciously constructed rules of music-making, but by the way differences insert themselves in instinctual dog-rabbit captivity, when a rabbit ropes dogs together and drags them dispersively through a landscape. Were we to invoke a model of human machinic music-making, we might think of the dogs as record-player needles moving resonantly over the terrain, and the rabbit as a sort of lapine-DJ who scratches the needles in different directions so they keep lagging out of sync. When we get to the parking lot, the records change; the dogs first attempt their usual sort of improvisatory routine, they try to play the parking lot *as* familiar forest terrain; but then the very different temporal contour that comes from the visibility and thence long distance coordination of playing this smoothly open terrain, gets their notes to fall together in a different way. A new melody comes together, sounding a death knell for the rabbit.

On this analysis, there is a sort of creativity or generality that erupts in animal behaviour when their bodies couple. Such coupling, which is necessarily spread out,

introduces spatially and temporally distributed differences into a network of coupled instincts. An individual animal is exquisitely evolved to resonate a limited set of notes in its environment, and so it seems captivated with its environment. But when the animal couples with others, its environmental resonance is broken because it is no longer acting on its own, it is resonating to other locations in terrain and moments in time, it gets caught in a larger melodic. Where an individual animal is captivated with a few resonant notes, group animal movement can break this resonance up and read a new melodic in collective environmental interactions. Without our having to say that animals explicitly know how to or aim at doing what they are doing, animals, in their collective movement can enact something like the transition between sounding isolate notes and linking notes in a musical system. That is, animals can do something that amounts to ‘reading’ a new *sense* of their environment. Conceptually, the interesting thing is that this sense results from a coupling of individual animal-environment resonances, a coupling that results in frictions and lags, and thence in a breakage of those otherwise captivating resonances.

Sense as it were arises from a ‘dance’ that couples animals together in relation to one another and their environment, over spatio-temporal difference. I use the word “dance” to draw a link between the above analysis—which is driven by philosophical-conceptual concerns—and a research program recently proposed by scientists studying ape language. In a controversial target article by in *Behavioral and Brain Sciences* Shanker and King (2002) report on and urge a paradigm shift in ape language research: from conceiving ape language according to a transmission metaphor, in which language is transmission of information from one individual to another, to conceiving it in terms of

a “dance metaphor,” in which linguistic communication is a joint product of rhythmic interaction between moving partners. As Johnson (2001) suggests, such a view of primate cognition as a “distributed” phenomenon is part of a paradigm shift that also impacts the study of human cognition, one in which behaviour is no longer taken as the basis for inference to invisible mental events, but in which communicative interaction—joint animal movement—is itself taken as a directly observable cognitive event.¹⁷ In this paradigm shift, we could say, thinking isn’t (just) “in the head,” it is also there in movement that crosses individuals.

We can head toward a different point about thinking by returning briefly to what Merleau-Ponty says about primates, in order to reconsider traditional human-animal comparisons. Merleau-Ponty argues that while *a* primate will take up a stick in line with its behaviour and use it as a tool, the stick is all and only a tool, whereas humans search out sticks and recognize them at once *as* stick and *as* tool. But let us think about *primates* working together. They will sometimes lend a hand to one another. Primate Alice can’t reach something, but primate Barney across the way can, and pushes the thing to primate Alice. *Primates use one another’s body as tools in collective behaviour*—in the way that the dogs effectively use one another’s body as tools in rabbit hunts. To give this phenomenon a handy name, I’ll call it “tooling up others.” When we use sticks as tools, the thing that is being turned into a tool is inanimate matter. But perhaps primates are geared to group life, and when taking up sticks, they are treating the stick as an honorary “hand of another” that is being “tooled up.” Aristotle (*On the Soul* 432a1) notes that the hand is the instrument that employs instruments (the organ of organs), but it could be that for other primates what we call a “tool” figures as an extra hand that lends a

hand to a primate's hand. So perhaps the primate's behavioural divergence from human tool use stems from the fact that sticks do not in fact "tool up" like a primate body does—sticks are not really animate helping hands. Tools contrived from inanimate matter are our human way of equipping ourselves for "loner-being"; if you want to dig a big hole, you either get a bunch of other people together, or build a backhoe, and we now incline toward the latter. But if we abandon our tool-centric and lone-body prejudiced way of looking at things, we might find that the original of the tool is not the stick, but the other's hand, and thence have to reinterpret, e.g., Merleau-Ponty's data. This would give us a different comparison of the human and animal. Perhaps the difference between primates and ourselves is not that we take something *as* something, and they do not, but that primates are animists, and expect things themselves to animate themselves *as* something.

In any case, animals acting and doing things together perhaps do something more like human thinking than we would have thought. The break-up of captivating resonances in group behaviour drives animals through seemingly creative interpretations of their environment. No doubt we should think this is different from what we find in human thinking behaviour, or Dasein's being-in-the-world. We might want to report this difference in terms of self-consciousness, or language, etc., but this would probably get us caught in the problems we have been trying to avoid. The analysis so far suggests a different way of describing the difference between animal behaviour and human thinking behaviour. (1) What human thinking achieves in short and individual time scales—creative interpretations of the world, taking something *as* something—groups of animals achieve over longer time scales. These can be time scales of the group (the dogs figuring

out how to hunt rabbits in parking lots), of generations of groups (snow monkeys learning how to wash their food and teaching the behaviour to subsequent generations), of species (bees evolving to harvest whatever sort of flower might be around). (2) A human can do individually what might otherwise take a *group* of animals. But a human can only do the latter after learning, from other humans, language and ‘how to think.’ This suggests a connection between points (1) and (2) in the case of human beings: we learn how to carry out what would otherwise take a group of animals, and learn how to do this quickly and in an individual way, only by learning and language that connect us with the longer time of individual development and human history. It is as if the human can approximate to an isolate thinker because the differences we found distributed across a group of animals and the terrain it inhabits get harboured in a language that we contract in our bodies.

4) Animal Nature

The above analysis tried to avoid the usual prejudices that haunt comparisons of humans and animals and the study of mind: taking the lone animal as the unit of behaviour, modelling natural phenomena on human built machines, etc. But the result of the analysis isn’t merely negative and critical. It suggests a powerful principle of ‘natural engineering’: that new senses can arise when a pack of animals runs around or interacts in a diversified setting, thus diversifying instinctual processes. Our usual approach to minds, brains and bodies is to model them along the lines of human-engineered machines, that neatly sub-divide functions within an architectonic structure; and this structure specifies a closed, over and done with individuality of the system. Why not instead think of brains and bodies as akin to a pack of animals?

When we turn to the body, e.g., to Buss' concept of its individuality, we do not so much find a closed individual organized from the top down and the bottom up to fit together, we find a bunch of different cell lines roped together from the start so as to form an internal environment in which tensions engender diversification. Lynn Margulis (1981; 1992) has shown that eukaryotic cells (the more complex cell type that is the building block of multicellular creatures like ourselves) are in fact the endosymbiotic result of various different prokaryotic cells (the simpler cell type that constitutes, e.g., single celled bacteria) invading one another and sticking it out for the long run. The immunologists teach us that the immune system is a bunch of cellular networks creeping through the interstices of the body and interacting with one another to learn how to fight invaders (Tauber 1991; Cohen 2000). And John Russon (1997) has given a persuasive philosophical account of the organs of the body as living through an harmonious tension with one another. Why not, then, think of the body as a pack of animals that have roped themselves into an internal environment? This isn't meant to be taken in a completely literal sense, since this animal pack cannot split up. The point is rather to provoke a different concept of what a body is, especially to get us to think to of the body's way of making sense of the world not as organized top down by a central organization scheme or information processor, but as running laterally through tensions across the body, as arising from breakages that arise when different organs with their own animal directions are roped together in a collective resonance with the world. Think of finding your foot tapping to music when you were preoccupied with something else. Or, watch a judge's hand creeping over the arm of his chair in Francesco Rosi's film *Illustrious Corpses*, as if an animal trying to escape the rest of the body; or, watch Charlotte

Rampling's face continually and most enigmatically transform itself in François Ozon's film *Under the Sand*. In these phenomena we at once encounter a body in which parts seem like animals darting in different directions, yet move in a complex that continually reanimates the sense of the whole.

The case is perhaps more compelling when it comes to the brain. In several places, Daniel Dennett attacks the notion of the "finish line of consciousness," that is, he attacks the notion that there is some central place in the brain or point in time where "it all comes together" and consciousness happens. In doing so he also attacks (or at least should attack) the application of human engineering principles to analysis of the brain (Dennett 1991; Dennett and Kinsbourne 1992). Investigators like Varela (1999) would seem to agree that there is no finish line. Dennett's initial aim is critical and negative: the brain is not like a desktop computer's CPU, in which a central clock coordinates computation such that in a given moment we can decisively say that the overall result of computation is here and now contained in the CPU's central register; there is no central clock in the brain, no temporally or spatially centralized organizing-architectonic structure. This clears the way for a new way of thinking the brain, which in Dennett's case unfortunately repeats the problem of modelling it on human-built machines. But I suspect there is a stronger point to be learned from Dennett: the sort of brain that we have *could not do the sort of work that it does if it were centrally organized*; it depends on being uncoordinated, on neurons firing on their own, yet doing work, because they are roped together through interactions that stretch across space and lag in time. This sort of claim is supported by analyses such as Skarda and Freeman's (1987) which shows that making sense of smells, e.g., depends on chaotic processes that could not be centrally organized. The brain, we

might be able to argue, needs the sort of distributed dynamic that we find across a pack of animals. Only here the pack of neural animals is roped into thinking not by itself chasing rabbits, etc., but by being part of a body that does chase rabbits through the landscape, or pet them—or have Peter Rabbit stories read to it. And of course the neural network model conceives brains in something like this way, with the crucial difference that it takes the basic structure of networking as fixed and hierarchical, i.e., as un-animal.

At this point the evolutionary scientist may think my conceptual provocations so outrageous as to be cast in the fires of nonsense. In response I shall invoke a typical strategy of evolutionary analysis, one I might otherwise criticise. The strategy is simple: noting that in nature we often find ‘solutions’ repeated. A pack of animals working together is effective in creating new senses for survival. Why evolve a biological version of a digital computer, etc., if a pack principle is effective in creating sense? And here we should remember that human brains have evolved to run in packs too.

I started out by noting how our tradition has taken it as obvious that other animals cannot think. So it was presumed that thinking could not be found in anything animal—Descartes’s move. So we first of all put thinking in a disembodied mind. Then, when we found dualism incoherent, and tried to put thinking back in the body, we modelled it in terms of something as un-animal as possible, namely human-made symbol processing machines, with their centralized and architectonic structure.

Here I have headed in the opposite direction, suggesting that we find a conceptual model for the brainy-body in the sense creating movement of a pack of animals. Indeed, if we look at recent neurological results, the brain looks more like a pack of animals than we would have thought. Elkhonon Goldberg and an increasing number of neurologists

emphasize the astounding plasticity of the brain: Goldberg (2001) discusses how different lobes of the brain will move over one another; others show how the brain reorganizes after damage; neurogenesis is now an accepted fact; and it seems that dendritic spines, and thence synapses, can change their shape in a matter of minutes (cf. Klintsova and Greenough 1999; Gage 2003; Holloway 2003). It seems to me that the brain is in fact *the most animal* part of our body. All the other organs keep rebuilding themselves along the same lines, whereas the brain, according to recent results, keeps changing its internal configuration. The next closest thing to this animality in the body is perhaps the immune system, with its massive distribution of recursively interacting cells, which has notably been described as a cognitive system; or the darting eyes and the incredible horde of muscles, mostly free floating from bone, that make up the face (cf. Cole 1999), which, together with the hand (which Kant called the outer brain of man), is the outward face of cognition. Instead of thinking of the brain as the endpoint of a control system, perhaps we should think of faces, hands, legs and brain as a multiplex group of animals roped alongside one another in one resonating relationship with the world, in which the part of brainy animality is to turn toward the inner environment of the body, and the part of the face, hands and legs is to be the outer face of this inner environment.

These conceptual provocations about brains and bodies suggest something important for thinking about the relation between thinking and nature. Instead of boiling thinking down into a human-type machine realized in cells rather than silicon, we can perhaps find a continuity between thinking and nature through the animals as collectively finding sense in moving through their environment, with ever more breakages and ruptures, ever more individuality and internality of sense, developing as animals,

eventually human animals, couple together and break into one another's captivity with the environment. Perhaps animal coupling is the key to decaptivation, which allows for the creation of sense.

In this case we should study the animals some more, and study the body in a new light, but also turn back to think about the role of group, animal movement in human evolution and society, perhaps even to the evolution of neurons. (What were these strange cells before they evolved into neurons? Could they be an outgrowth of something as animally recognitive as the immune system?) But a new question would then arise: what is it about nature that allows for these animal-environment, and animal-animal couplings, that calls things out of themselves and draws them into resonances to the point of breakage?

Notes

¹ This paper grew out of reflecting on a conjunction of papers on the theme of life presented at the 28th annual meeting of the Merleau-Ponty circle, University of Western Ontario, 2003, namely: Kym Maclaren, "Life is Inherently Expressive"; Ted Toadvine, "Life's Refrain: Expression without Organisms"; Brett Buchanan, "Some huge animal whose organs our bodies would be": Merleau-Ponty and Heidegger on animal life"; David Farrell Krell, "Daimonic Flesh; Merleau-Ponty, Heidegger, and a Possible Ontology of Nature"; Renaud Barbaras, "The Phenomenology of Life as a path to Ontology." The theme of prejudices in Russon (2003) and Maxine Sheets-Johnstone's ongoing analysis of movement, esp. in Sheets-Johnstone (1999) are crucial to the development of the paper. Thanks especially are due to Kym Maclaren for listening to these ideas in development, to thoughts along the way, and for her comments on the initial version of this paper.

² See, e.g., Guss (1985). Also see the discussion of humans and animals in Latour (1987).

³ Also see Barbaras' paper cited in note 1.

⁴ By "recognitive device" I here mean devices such as neural networks that, through a longitudinal interactive process (training), arrive at a state in which the device responds to a complex sets of inputs in a way that, for the human observer at least, counts as recognizing generality, e.g., outputting the word "cat" when presented with a whole host of very different pictures of cats. This is in (at least apparent) contrast to symbol processing devices that work with symbols and algorithms pre-established by researchers.

⁵ On this issue, see Sheets-Johnstone (1999).

⁶ In fact, integrating human thinking with nature in an evolutionary perspective would demand nothing less, as James and Dewey would note. If thinking evolves, then it is a way of living in the world, it is what I am calling animal.

⁷ Neither of these concepts (“collective,” “plural”) is accurate here.

⁸ In science, there is some movement away from this prejudice, cf. e.g., Shanker and King (2002) and Johnson (2001), discussed below. In philosophy, Bergson is perhaps an exception. In both *Creative Evolution* and *Two Sources of Morality and Religion* he often compares humans to insect and animal groups; yet he does not see, as I argue below, that animal groups can transcend instinct.

⁹ Cf. the theme of the self-transcending body, developed in Russon (2003).

¹⁰ This formulation is inspired by the discussion of sexuality and the prejudice of presence in Russon (2003).

¹¹ It should be added that these differences are not merely culturally driven but are also driven by a history of scientific practice, e.g., the American tendency to work in the lab (where you put individual animals in cages and in front of testing apparatus) and the Japanese tendency to work in the field (where you observe, and feed, groups of animals). On this sort of issue, also see Geison and Laubichler (2001).

¹² Kym Maclaren, “Life is Inherently Expressive,” *Life: the 28th Annual Meeting of the Merleau-Ponty Circle*, University of Western Ontario, 2003. The reference is to Bateson’s “Metalogue: What is an Instinct?” Bateson (1972). Note that Bateson is not using “world” in the Heideggerian sense, which does not rule out the possibility that animals might have, according to Bateson, something like a Heideggerian world.

¹³ Russon (1994).

¹⁴ The formulating of these points about sentential and musical sense is drawn from private communication with John Russon.

¹⁵ It could be argued that this parking-lot behaviour is an outgrowth of the behaviour that dogs might exhibit chasing a rabbit in an open field. But a closely cropped open field is likely as much of a human artifact as a parking lot, and still affords more hiding for a rabbit, and different purchase for rabbit and dog zigging and zagging; and an overgrown wild field, is an altogether different matter. In any case, we would still have to ask how dog packs learn to hunt in new environments as they migrate or humans encroach, and conceptually this would lead to results about dog-pack behaviour similar to the ones here derived.

¹⁶ On this crucial issue of relative timing in predator-prey chases, see Alexander (2002).

¹⁷ This material came to my attention after submission of this article.

References

- Alexander, R. M. 2002. *Principles of Animal Locomotion*. Princeton, N.J.: Princeton University Press.
- Barbaras, R. 1999. The movement of the living as the originary foundation of perceptual intentionality. In: J. Petitot, F. J. Varela, B. Pachoud and J.-M. Roy (eds), *Naturalizing Phenomenology: Issues in Contemporary Phenomenology and Cognitive Science*, pp. 525-538. Stanford: Stanford University Press.
- Bateson, G. 1972. *Steps to an Ecology of Mind*. New York: Ballantine Books.
- Bergson, H. 1998. *Creative Evolution*. Translated by A. Mitchell. Mineola, N.Y.: Dover.
- . 2002. *The Creative Mind: An Introduction to Metaphysics*. Translated by M. L. Andison. New York: Citadel Press.
- Buss, L. W. 1987. *The Evolution of Individuality*. Princeton: Princeton University Press.
- Cohen, I. R. 2000. Discrimination and dialogue in the immune system. *Immunology* 12:215-219.
- Cole, J. 1999. *About Face*. Cambridge, Mass.: MIT Press.

- de Waal, F. 2001. *The Ape and the Sushi Master: Cultural Reflections of a Primatologist*. New York: Basic Books.
- . Silent Invasion: Imanishi's primatology and cultural bias in science. *Animal Cognition* 6:293-299.
- DeLanda, M. 2002. *Intensive Science and Virtual Philosophy*. London: Continuum.
- Dennett, D. 1991. *Consciousness Explained*. Boston: Back Bay Books/Little, Brown and Company.
- Dennett, D., and Kinsbourne, M. 1992. Time and the observer: the where and when of consciousness in the brain. *Behavioral and Brain Sciences* 15:183-247.
- Dewey, J. 1958. *Experience and Nature*. New York: Dover Publications.
- Dreyfus, H. L. 1992. *What Computers Still Can't Do : A Critique of Artificial Reason*. Cambridge, Mass.: MIT Press.
- Full, R. J., and Farley, C. T. 2000. Musculoskeletal dynamics in rhythmic systems: A comparative approach to legged locomotion. In: J. M. Winters and P. E. Crago (eds), *Biomechanics and Neural Control of Posture and Movement*, pp. 192-205: Springer Verlag.
- Gage, F. H. 2003. Brain, Repair Yourself. *Scientific American* 288, September, 47-53.
- Geison, G. L., and Laubichler, M. D. 2001. The varied lives of organisms: Variation in the historiography of the biological sciences. *Studies in History and Philosophy of Biological and Biomedical Sciences* 32 (1):1-29.
- Gibson, J. J. 1966. *The Senses Considered as Perceptual Systems*. Boston: Houghton Mifflin.
- Goldberg, E. 2001. *The Executive Brain: Frontal Lobes and the Civilized Mind*. Oxford: Oxford University Press.
- Gould, S. J. 2002. *The Structure of Evolutionary Theory*. Cambridge, Mass.: The Belknap Press of Harvard University Press.
- Guss, D. M. 1985. *The Language of the Birds: Tales, Texts, & Poems of Interspecies Communication*. San Francisco: North Point Press.
- Heidegger, M. 1995. *The Fundamental Concepts of Metaphysics: World, Finitude, Solitude*. Translated by W. McNeill and N. Walker. Bloomington: Indiana University Press.
- Holloway, M. 2003. The mutable brain. *Scientific American* 288, September, 79-85.
- James, W. 1950. *The Principles of Psychology*. Vol. 1. New York: Dover Publications.
- Johnson, C. M. 2001. Distributed primate cognition: A review. *Animal Cognition* 4:167-183.
- Klntsova, A. Y., and Greenough, W. T. 1999. Synaptic plasticity in cortical systems. *Current Opinion in Neurobiology* 9:203-208.

- Latour, B. 1987. *Science In Action: How To Follow Scientists and Engineers Through Society*. Cambridge, Mass.: Harvard University Press.
- Margulis, L. 1981. *Symbiosis in Cell Evolution: Life and its Environment on the Early Earth*. San Francisco: W.H. Freeman and Company.
- . 1992. Symbiosis theory: Cells as microbial communities. In: L. Margulis and L. Olendzenski (eds), *Environmental Evolution: Effects of the Origin and Evolution of Life on Planet Earth*, pp. Cambridge, Mass.: MIT Press.
- Merleau-Ponty, M. 1965. *The Structure of Behaviour*. Translated by A. L. Fisher. London: Methuen.
- . 1982. Bergson in the making. In: *Signs*, pp. 182-191. Evanston, IL: Northwestern University Press.
- Olafson, F. A. 1987. *Heidegger and the Philosophy of Mind*. New Haven: Yale University Press.
- Rendell, L., and Whitehead, H. 2001. Culture in whales and dolphins. *Behavioral and Brain Sciences* 24:309-382.
- Russon, J. 1994. Embodiment and responsibility: Merleau-Ponty and the ontology of nature. *Man and World* 27:291-308.
- . 1997. *The Self and its Body in Hegel's Phenomenology of Spirit*. Toronto: University of Toronto Press.
- . 2003. *Human Experience: Philosophy, Neurosis, and the Elements of Everyday Life*. Albany: State University of New York Press.
- Shanker, S. G., and King, B. J. 2002. The emergence of a new paradigm in ape language research. *Behavioral and Brain Sciences* 25:605-656.
- Sheets-Johnstone, M. 1999. *The Primacy of Movement*. Amsterdam: John Benjamins Publishing Company.
- Skarda, C. A., and Freeman, W. J. 1987. How brains make chaos in order to make sense of the world. *Behavioral and Brain Sciences* 10:161-195.
- Sober, E. 1994. *Conceptual Issues in Evolutionary Biology*. 2nd ed. Cambridge, Mass.: MIT Press.
- Sterelny, K., and Griffiths, P. E. 1999. *Sex and Death: An Introduction to Philosophy of Biology*. Chicago: University of Chicago Press.
- Tauber, A. I., (ed) 1991. *Organism and the Origins of Self*. Vol. 129, *Boston Studies in the Philosophy of Science*. Dordrecht, Netherlands: Kluwer.
- Thompson, E. 1995. *Colour Vision: A Study in Cognitive Science and the Philosophy of Perception*. London: Routledge.
- Thompson, E., Palacios, A., and Varela, F. J. 1992. Ways of coloring: Comparative color vision as a case study for cognitive science. *Behavioral and Brain Sciences* 15:1-74.

- Varela, F. J. 1991. Organism: A meshwork of selfless selves. In: A. I. Tauber (ed), *Organism and the Origins of Self*, pp. 79-107. Dordrecht, Netherlands: Kluwer.
- . 1999. The specious present: A neurophenomenology of time consciousness. In: J. Petitot, F. J. Varela, B. Pachoud and J.-M. Roy (eds), *Naturalizing Phenomenology: Issues in Contemporary Phenomenology and Cognitive Science*, pp. 266-314. Stanford: Stanford University Press.
- Weisman, A. 1893. *The Germ-Plasm: A Theory of Heredity*. Translated by W. N. Parker and H. Rönfeldt. London: Walter Scott.
- Whiten, A., and Byrne, R. W. 1988. Tactical deception in primates. *Behavioral and Brain Sciences* 11:233-273.