DISCUSSION ARTICLE

Cats and categories — reply to Teubert

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This paper is a response to the discussion article in *Language and Dialogue 3:2* by Wolfgang Teubert, "Was there a cat in the garden? Knowledge between discourse and the monadic self." Teubert deals there with a number of themes, including a discussion of some philosophical issues raised by Roy Harris and Martin Heidegger. In my response, I am less concerned with those aspects of the article than with the claims made by Teubert about the contrasts between humans and other animals. I respond to Teubert's position on the status and origins of categories of animals from a realist perspective, with reference to evidence from the natural sciences and anthropology. I suggest that Teubert's thesis rests on a number of errors, including an over-estimation of the power of discourse, an under-estimation of the range of sensory and semiotic perception available to different kinds of creatures, and a lack of attention to contemporary developments in relevant ethological research.

Keywords: realism, ethology, taxonomies, semiotics, discursive reductionism

1. Introduction

In a lively and engaging article in this journal, Teubert develops his thesis that "there is no interpretable experience without participation in discourse." For him, discourse seems to wield an almost absolute power, so that the experiences of all except the most unusual human beings (such as feral children raised outside human communities) are inevitably "adulterated" by the "categories of the kind that languages offer." Thus, for Teubert, "the discursive construction of the category 'cat' is prior to any cat experience" (p. 273).

I am one of a group of researchers currently compiling an extensive corpus of texts, from a wide range of sources, in order to investigate empirically the ways in which non-human animals — including cats — are represented in contemporary

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British English.[1] Our data is primarily linguistic, comprising examples of discourse about animals found in news texts, wildlife broadcasts, social media, academic journal articles and so on. However, the research is also interdisciplinary, bringing us into dialogue with people who work with animals, who study them and who report on their behaviour. It is from this perspective, as a discourse analyst with a particular interest in language about animals, that I take this opportunity to engage with the ontological and epistemological claims made by Teubert about language, human beings — and cats.

The first part of the paper responds directly to Teubert's position on the status and origins of categories of animals, with reference to evidence from the natural sciences and anthropology, while in the second part I put forward some alternatives, with reference to realist theory and to some issues arising from our current research project.

2. The material world

I assume that Teubert, like me, all our fellow human beings and the cats and other creatures with which we share the planet, takes a physical form. Indeed, I know that he does, because I have sat beside him in meetings, and shared a beer with him in the staff bar. Teubert could not have written his article, could not actually continue to exist at all, unless the physical entity labelled discursively as 'Wolfgang Teubert' had access (just like me and my cat) to oxygen, water and sustenance.

This is the first point of disagreement between us. Long before there were any human beings to reflect on their experiences, to represent them symbolically in language, and to reflect on those reflections in journal articles about the nature of discourse, there were creatures, land which they traversed, and material they consumed. Like Teubert, I recognise that the development of language in the human species represents an extremely significant shift in the capacities of sentient organisms to communicate about their experiences (among other things — see below), but I cannot share his reduction of what human beings can know to the limits of the discursive realm. Teubert would presumably insist that the beers we drank are only beer because that is what, collectively, our discourse community has decided they are, and that the qualities that make these 'beer' and not 'tea' or 'bleach' are not inherent properties of these liquids themselves, but characteristics derived entirely from discourse. Now, as Teubert and I would agree, my cat is not a participant in any discourse community at all, and, with the discursive medium

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completely closed to her, she has not been acculturated into calling different liquids by different names. And yet this cat, like every other member of her species, routinely, predictably and invariably ingests some liquids, such as those we would call 'water' and 'milk', and equally reliably abstains from others that she may occasionally come across, such as the coffee in a cup left within her reach. I see nothing in Teubert's argument to refute the following proposition: the reason that this cat, like other cats the world over, selects and consumes some liquids available in her environment and ignores others is because she is a particular kind of organism, and continues to be such whatever I or any other human being, or discourse community, may think or say. Current research into the capacities of living creatures suggests that most are equipped with mental 'tools' for processing information about objects, number and space — information associated with the statistical regularities of the world. Over millions of years, billions of individuals belonging to millions of species "have survived and passed down the relevant genetic material for [the] adaptive mechanisms" (Hauser 2000, 232) that enable them to maximise their chances of finding food and mates and avoiding predators. Human beings may accomplish a lot more than these basic prerequisites of existence, but we share with our fellow creatures the needs and means to engage in them.

3. Classifying species

Teubert would have us believe that my phrase "every … member of her species" conceals a set of assumptions based solely on discursive conventions. He reports that there is disagreement among biologists as to whether the domestic cat and the feral cat are one species or two, and seems to infer from this that such classifications are entirely 'cultural constructs'. However, there are several misunderstandings here.

Firstly, Teubert seems confused about the classification of creatures as 'domestic', 'feral' or 'wild'. Cats in the former two categories are usually considered to be the same species, and as Bradshaw et al. (1999, 273) observe, "[t]he so-called domestic cat occupies a unique position within the truly domestic animals since it freely interbreeds with feral populations, and there is considerable gene flow in both directions." 'Wild' refers to the species *Felis silvestris*/*Felis silvestris silvestris*, and the main reason that researchers are concerned about the distinction or overlap between wild and domestic (or feral) cats is that the former are threatened, as a separate species, partly by hybridisation with the latter (Oliveira et al. 2008). The debate about the extent to which these creatures should be classified separately is in part a debate about how extensive this interbreeding has become, and not a confusion on the biologists' part about which creatures belong to which species.

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Secondly, taxonomies continue to be refined, and there are continuing developments in understanding the composition of different kinds of organism; in other words human knowledge of natural phenomena is corrigible. However, this does not mean that the categories into which creatures are classified have no validity outside the discourse in which they are expressed; nor does it imply that any classification system is as good as any other. Of course the project of classifying species is not without its difficulties, as I consider further below, but this does not justify the outright rejection of any link between labels and the creatures they denote.

Thirdly, the very existence of 'domestic' cats is the result of human actions and interests, and there is strong evidence available about the evolutionary processes which have led to divergence and also convergence of categories of creatures classified as 'wild' and 'non-wild' cats (Yamaguchi et al 2004). When any particular creature from either of these groups breeds with another, it is not participating in the socio-cultural human practice of differentiating between 'wild' and 'not-wild'. It is participating in a process — breeding with another cat — which does not require discursive resources. The cat will identify another cat with which to breed, without benefit of human labels; it will not select a creature of some other species (elephant, dolphin, squirrel or human) with which to mate and reproduce. This observation is strong evidence for the extra-discursive existence of things in the world, including different creatures, that are of different kinds; thus the naming of these categories is, at least in part, a manifestation in discourse of a state of affairs outside of discourse, rather than an artefact of discursive practice.

There are eight occurrences of the word 'unadulterated' in Teubert's article, to describe what he claims is the unattainable (for humans) state of experiencing 'authentically', outside of discourse. But does discourse, as this formulation implies, merely 'adulterate' experience? Or is its role more one of mediating between the external world and the particular senses we use (as other living organisms do theirs) to perceive it? Where taxonomies of phenomena that are known as 'natural kinds' (loosely — see below) are concerned, it seems highly plausible that the earliest human communicators would have developed ways to share, within their naming systems, experientially useful knowledge about the properties of different kinds of things in the world. This includes which categories of things are safe or dangerous to eat, which kinds of creatures are susceptible or resistant to which kinds of hunting methods and so on. One does not need to subscribe to the most reductionist forms of evolutionary psychology to accept that some of the communication in which human beings currently engage has properties in common with that which contributed to the survival of their ancestors.

And this does seem to be borne out by empirical evidence about the kinds of taxonomies developed by different groups of speakers (and 'experiencers') around

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the world. Research into folk taxonomies (or 'folksonomies', Gluck 2012) reveals two findings relevant to this discussion. Firstly, the ways in which people tend to group things — including animals — into categories have much in common with each other (e.g. Brown 1983). Berlin et al. (1973, 214) found that "[i]n all languages it is possible to isolate groupings of organisms known as 'taxa'", and that "terms [such] as *tree*, *vine*, *herb*, *fish*, and *bird* refer to examples of commonly recognized life form taxa in most folk taxonomies," leading Berlin to abandon his previous relativistic position (Berlin 1973, 260). Or, as Atran et al. (2004, 398) observe, based on fieldwork with many different populations, "When people are asked to sort biological kinds into groups, they show strong agreement, both within and across cultures, that also corresponds fairly well with scientific taxonomy." If discourse is such a powerful determiner of our ways of categorising our experience, how do we account for these patterns of classification being found among such disparate discourse communities? Are they just coincidences? The alternative explanation is connected to the second kind of finding from "[o]ver a century of ethnobiological research." This is that "folkbiological classifications" tend to be "organized by particular interests for particular uses (for example, beneficial/noxious, domestic/wild, edible/inedible)" (Atran et al. 2004, 397). Classifications of plants and animals "allow an understanding of species and how they relate to one another. … [T]hey are a powerful tool to allow for the organization and control of the surrounding environment" (Gluck 2012, 3–4). For the discourse-reductionist, these material properties of people and the things they encounter in their environment must of course be played down, if not denied altogether; the knowledge shared through discourse cannot come from experience, because "without being … a member of a discourse community, we have no way of 'knowing' what we experience" (p. 275). Thus, while for Teubert the discourse creates the categories, for the realist it is from people's embodied engagement with the material world that many of the properties of language emerge — giving rise, in turn, to further ways of modifying matter (through increasingly complex technology, for example).

4. Ways of knowing

Much of Teubert's argument concerns what it means to 'know' and to 'interpret' experience, and rests on the differences between the way humans and other creatures do — or fail to do — this. However, as a skilled manipulator of discourse, Teubert is adept at slipping in assertions and eliding one idea with another. Of chimpanzees, for example, he asks whether they would "'know' that a tabby and a ginger cat constitute the same category, namely the biological species of cat?" (p. 276), with scare quotes around 'know' as applied to chimps' putative (non)

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ability to categorise creatures. The ability to do so is equated, by the appositive final phrase, with deploying the linguistic label "the biological species of cat" — which of course the chimpanzee does not do. But does Teubert know either whether or how a chimpanzee — or any other non-human creature — 'knows' what a cat is? He poses this as the first of several (rhetorical) questions, thus linking this one, which is about the capacity to recognise a kind of living organism, with others that are about the identification of socio-cultural constructs such as 'gardens'. I have no quarrel with him when it comes to animals' indifference to many of the symbols we humans deploy to mark out 'our' territory. Cats, bats, birds and insects deal efficiently with the walls, fences and hedges we have placed in their way, deploying a range of capacities to negotiate these physical obstacles, just as they do trees and rivers. But are we justified in maintaining that such negotiations involve no 'interpretation'? For example, do the insects that frequent 'our' gardens not discriminate between nectar-bearing and other categories of plants? According to the emerging science of biosemiotics, living organisms, right down to the cellular level, necessarily engage in interpretation. Now it may be that Teubert and I are interpreting 'interpretation' in different ways. However, human beings, with our rich semiotic capabilities, have evolved from creatures with which we share the more fundamental properties that allowed for the development of the symbolic resources which are so distinctive of our species. There is growing evidence that even very primitive organisms such as the bacterium *E. coli*, for example, measure the concentration of nutrients they encounter while swimming, registering and responding to changes by altering the direction in which they swim. Hoffmeyer (2008, 152) maintains that we can understand this process thus: "the cell through its evolutionary ancestry has evolved this particular mechanism for a mediation between its sensoric capacity (e.g., the receptors at its surface) and its needs (the regularly assured movement towards nutrients)," and that this process results in the formation of 'an interpretant'. For him, it is precisely these "historically created semiotic interaction mechanisms" that distinguish living from non-living systems (ibid.).

Here is another of Teubert's clever uses of apposition to elide different kinds of proposition:

> As chimpanzees and dogs show us, *it is perfectly possible to survive without belonging to a discourse community*, without thinking in terms of discursively constructed concepts, *without interpreting one's experiences.* (p. 277, my emphasis)

Is it? If 'interpret' means only 'use humanly produced discourse to understand', then of course this is true, and the argument is in any case circular: by definition only humans use what only humans use. But if 'interpreting' includes recognising the differences between different kinds of stimuli and responding to them

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differently, then this capacity is not confined to human beings. Teubert concedes that:

> When a dog has repeatedly come into contact with a cat she will recognise something encountered now as something familiar if there is sufficient similarity. She can even learn to distinguish between the various cat things in her environment and tell a nasty cat from a friendly one. For her, the two cat things are not the same thing. (p. 277)

The final sentence is another rhetorical ploy: all individual organisms are, in one sense, even discursively, 'not the same thing'. Human beings too can distinguish 'nasty' cats from 'friendly' ones, while simultaneously maintaining the classification that admits both to a single biological category. That other creatures may respond differently to individuals of the same species by no means warrants the assertion that these creatures have no perception of categories at all. It has been shown, for example, that elephants can distinguish the members of a human group that hunts them from people from a group that does not, responding to the odours and colours of their clothes (Bates et al. 2007). So if an ape doesn't have discourse, can it 'know' what a cat is? In one sense, we cannot know this. We cannot know either, absolutely or definitively, what other human beings know, but, as Teubert rightly says, our access to a shared discursive world makes possible a significant degree of shared knowledge, understanding and interpretation.

What evidence do we have that non-discursive creatures classify things in their environment? New answers to such questions, albeit always partial, are emerging all the time. Very young human babies make simple categorisations, for example between animate and inanimate objects, long before they have "joined the discourse community" (e.g. Spelke and Kinzler 2007). While the most basic living organisms apparently use receptors to identify and respond to differential stimuli using a narrow range of predictable responses, other creatures, including mammals, birds and insects make use not only of instinctual reflexes but also of learning (Hoffmeyer 2007). According to Sterelny (2004), many creatures are, as he puts it, 'epistemic engineers'; one of the examples he provides is of birds that 'decorate' their nests so that they are effectively camouflaged. "Such nests," he argues:

> […] are almost certainly cryptic by design. Their unobtrusiveness is no mere side-effect of the methods and materials from which they are constructed. These birds are engaged in epistemic counter-measures against their enemies, attempting to render their predators' informational environment opaque.

In experiments where tamarins and other non-human primates are trained on a stimulus-and-reward basis, they have been shown to exhibit discrimination between the functional and non-functional design features of tools (Hauser 1997, 305; Santos et al. 2003, 269), indicating a potential for responding in similar ways

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to things that human discourse classifies as being of like kind. Even outside the laboratory, signs feature in a process of 'sense-making' that contributes to creatures' survival. For example, "deliberate changes in elephant behaviour in the case of an approaching earthquake is a general trigger for uphill evacuation for the majority of mammal species in the biome" (Maran et al. 2011, 4). To be sure, the tremor may be an indexical sign, and the signal perceived by other animals may not have been an intentional one on the part of the elephants, but surely some interpretation of experience is involved here. There is also fairly clear evidence that monkeys can distinguish between a leopard, a snake and an eagle. Research in the 1970s and 1980s identified three different calls made by vervet monkeys when they became aware of different predators nearby (Cheney and Seyfarth 1980). Other monkeys then took the sort of action that was useful for evading the kind of creature associated with the call, positioning and concealing themselves differently in respect of snakes, eagles and leopards. A large number of commentators continue to cite this and similar kinds of evidence for complex communication among various kinds of creature.

Yet Teubert claims to know definitively that "Chimpanzees cannot deal with representations. They cannot deal with symbolic content" (p. 296). To sustain this position, it really is incumbent on him to engage with the extensive and growing evidence about this issue in relation to apes — and to various other creatures. Once again, in these two sentences Teubert implies that dealing with 'representations' and with 'symbolic content' are synonymous. Yet his own critique of Peirce centres on the critical difference between "iconic and indexical signs on the one hand and symbolic, i.e. arbitrary signs on the other" (p. 277). As Teubert concedes, animals of various kinds do respond to iconic and indexical cues. However, many of those who study animal communication believe they have evidence that establishes considerably more than this.

For example, chimpanzees have been shown to exhibit facility with complex number concepts, such as "functional and symbolic counting including rudimentary summation and addition" (Boysen 1997, 435; see also Matsuzawa 2010). Viewers on YouTube can see examples of recent comparisons of humans and chimpanzees undertaking these sequencing and memorising tasks involving Arabic numerals appearing on a computer screen (*The Telegraph*, no date), where the claim that the chimps "cannot deal with symbolic content" is, to say the least, called into question (see also Segerdahl et al. 2005). Lyn reports "on mental representations and categories in symbol use from two bonobos (*Pan paniscus*)," concluding from her study that "apes spontaneously create a complex, hierarchical, web of representations when exposed to a symbol system" (2007, 461). Similarly, Rumbaugh et al. (2013) found in research, where keyboards with over 200 visuographic symbols (lexigrams) were used as the mode of communication, that bonobos "have

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a profound ability to learn meanings of hundreds of arbitrary visual symbols … and through their use to accomplish social discourse." Summarising the findings from a range of studies, Lyn (2011, 64) reports on apes' "acquisition of symbolic capacities without explicit training […]; using symbols to name objects in double blind studies […]; associating novel English names with novel objects […]; [and] making semantically-based combinations across both lexigram and gestural combinations," while Segerdahl (2012, 19) maintains that human-enculturated apes:

> […] learn things that animals are not supposed to be able to do, such as communicating in language at the level of a 2.-year-old human child, pointing declaratively, manufacturing and using their own stone tools, [and] understanding what another believes is the case […].

It is not only apes that can be trained to engage in symbolic communication with humans. Grey parrots have been taught to use English speech referentially, and the bird in one study has been recorded labelling more than 50 different objects, 7 colours, 5 shapes, quantities to 6, 3 categories (colour, shape, material) and combining labels to identify, request, comment upon or refuse more than 100 items (Pepperberg 2002). It has been suggested that corvids' propensity to recache food when the original caching site has been observed by another bird "raises the possibility that recaching behavior is based on simulation of another's viewpoint (one form of mental attribution)" (Emery and Clayton 2004, 1905). Honeybees are renowned for the 'waggle dance' that seems to act as an indication to other members of the colony of where food is to be found (Frisch [1967] 2011). More recent research, including into behaviour that is identified as a signal of danger to other bees, suggests that:

> Communication in honeybees turns out to be vastly more sophisticated than originally imagined. Research is revealing a variety of subtle, interwoven feedback loops that act, through the behaviour of individual bees, to provide the colony with a collective intelligence that endows it with a capacity to adapt quickly and appropriately to changes in the foraging environment.
> (Srinivasan 2010, 368)

Elsewhere in the literature, a series of laboratory studies "have shown that the dolphin can understand that a symbol can stand for something, can form a mental representation of the item related to the symbol, and can appropriately decode and respond to a human trainer's symbols" (Pack 2010, 554).

Examples such as these undermine fairly conclusively Teubert's claim that it is only human beings that "can deal with representations or symbolic content." However, I also acknowledge that there are those who draw on this kind of evidence to make much greater claims than it can support. Researchers routinely point out, for example, that the apes that manipulate keyboards have been trained

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by human beings to do so; and indeed no-one has yet come across a colony of bonobos typing out their manifesto in the forest. Popularisations of these studies often exaggerate the findings, so that headlines like the following overstate considerably what has actually been demonstrated: "Genius female chimpanzee found to be smarter than U.S. high school students" (Adams 2012); "Bees solve hard computing problems faster than supercomputers" (Boyle 2010); "Birds smarter than seven year old kids" (Anon. 2012) and so on. Apart from the imperative to sensationalise research findings so as to attract audiences, one of the mistakes here is the tendency to equate all kinds of consciousness and experience with those we recognise best (Döring and Chitke 2011). Paradoxically, the inclination to celebrate the capabilities of these other creatures in domains which are actually those in which humans excel is a rather perverse form of anthropocentrism, one to which I fear Teubert, in his own way, succumbs too.

5. Ways of being

I do not disagree with Teubert that we are prone to represent the behaviour we observe using the discursive resources available to us. The mediators of animal behaviour, such as wildlife broadcasters, have only the language developed by and for human beings with which to describe behaviour, resulting often in an anthropomorphic frame of reference (see Sealey and Oakley 2014; 2013). The nature of that discourse, though, derives in part from the characteristics of the kinds of bodies that we inhabit. Even people whose principal motivation for asserting the abilities of other species is a concern for their welfare sometimes fall foul of anthropocentric assumptions. For example, human beings, at least in many contemporary cultures, appreciate an extensive living space, and this priority may be inappropriately transferred to provision for captive animals, despite the fact that they may well feel more secure in a smaller area (Durrell 2011). Concerns with hygiene may lead those responsible for dogs and cats in shelters or laboratories to clean away the very scents that would otherwise be reassuring and help to decrease their experience of stress (Hubrecht and Buckwell 2007). Herzog (2011) recounts the efforts of an arachnologist who sought to discover what it is like to be a spider by sitting in a web he had woven from stretchy rubber tubing. The problem with this approach to understanding the phenomenological experience of other species, as Nagel recognised in his famous essay of 1974 "What is it like to be a bat?" is that even if one could contrive to look and behave like a wasp or a bat, unless one could change one's fundamental structure, what one experienced "would not be anything like the experiences of those animals." Nagel, claiming much less certainty than Teubert about the priorities and concerns of creatures whose physical

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make-up is different from our own, argues that it is our *experience* that "provides the basic material for our imagination" (p. 439), and that we are restricted by the resources of our own minds.

> The fact that we cannot expect ever to accommodate in our language a detailed description of […] bat phenomenology should not lead us to dismiss as meaningless the claim that bats […] have experiences fully comparable in richness of detail to our own. It would be fine if someone were to develop concepts and a theory that enabled us to think about those things; but such an understanding may be permanently denied to us by the limits of our nature.
> (Nagel 1974, 440)

People who are intent on extending human rights to animals, and those who are keen to redress the imbalance in the attention given to human beings and their needs, as opposed to those of other species, may overstate the case for non-human creatures thinking, feeling and communicating as we do. Because our interpretation of animal behaviour is often based on introspection about our own, we are inclined to imagine that, as Harley puts it, "[w]hen animals behave as humans would in the same situation, then they are likely using consciousness as humans would" (2013, 568), before she concludes that "[r]ecent studies potentially providing evidence of aspects of dolphin [self-] consciousness have not confirmed its existence" (2013, 577).

Various kinds of behaviour have been adduced to attribute to animals self-consciousness, theory of mind, or communicative abilities equivalent to human language. These include responding to pointing or to reflections in a mirror, but when researchers break free from arguing by analogy about what other species are doing, it becomes apparent that alternative explanations are possible (Povinelli et al. 2000). Further research may then throw into question the original interpretations of the behaviour reported in the kind of studies I have cited above. Because we are equipped with enormous communicative potential, perhaps we are prone to see communication among animals where other explanations are more plausible.

For example, the correlation between the differential calls of vervet monkeys and the evasive action taken by other monkeys which hear them has now been reinterpreted. It had been inferred that these calls had the 'social' function of alerting other monkeys to the danger. More recent research has concluded that it is a "fascinating paradox" that, although the varied vocalisations do indeed prompt others about the presence of dangerous predators, "the effect is inadvertent or unwitting. The monkeys themselves do not understand the effect their calls have" (Rendall 2013). Rendall et al. (2009) conclude from their studies of primates that it may be more appropriate to understand animal communication as less concerned with 'informing others' than with 'influencing others', thus avoiding "the teleology inherent in using complex linguistic phenomena from humans as models for

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simpler vocal processes in nonhumans" (Owren and Rendall 2001, 58). In relation to the bees' waggle-dance, Wenner (no date) sparked a controversy by challenging the 'language' analogy, suggesting that it "may well be only a *symptom* of what a foraging bee has experienced as it flies between hive and food place, not a *signal* for other bees" (cited in Munz 2005, 559). Currently, entomologists are beginning to explore how the behaviour of insects may be accurately described without relying on anthropomorphic concepts and language: "Insect behaviour, in all its diversity, is unlikely to be wholly describable by the concepts that are derived from just one, very unusual species, *Homo sapiens*" (Döring and Chittka 2011, 92).

The other side of this coin, though, is the huge range of capacities for perception and navigation of the environment that other kinds of creatures *do* have. As human beings, we are grounded creatures, perceiving the world via a limited set of senses, often privileging the visual. It is unsurprising, then, that when Teubert posits that creatures of another species would not identify two instances of the cat species as being of like kind, the characteristic by which he contrasts them is their colour ('tabby' and 'ginger'). As a human being, he is particularly predisposed to notice these visual distinctions, but other kinds of creature have very different, often more highly developed means of sensory perception, as well as ecological pressures to make different kinds of distinction. Teubert asserts that all that chimpanzees "… are normally interested in is sex, food, or non-symbolic interaction (grooming in particular)" (p. 278), but he provides no supporting evidence for this rather dismissive summary. For Teubert, grooming is decisively 'non-symbolic', but those who study primates are struck by the recurring patterns around which individuals — and categories of individuals — engage in grooming with which others. A consistent finding is that grooming has not only the practical function of maintaining hygiene, but also social functions, including the indication and reinforcement of relationships, place in the dominance hierarchy, reconciliation and conflict resolution (Schino 2001; Tiddi et al. 2012).

Furthermore, contrary to Teubert's assertion that chimps "are monadic individuals," animal researchers recognise that "there is no such thing as a completely singular animal: all are living in associations" (Maran et al. 2011, 4). This observation comes from a collection about 'zoosemiotics', which "studies the ways animals make sense of their environment and other animals" (Maran et al. 2011, 1), and it is this kind of research that helps to put human ways of doing — and perceiving — things into a broader perspective. Given that "the evolutionary process can yield a complex and sometimes surprising mosaic of outcomes" (Rendall 2013), it is much more likely that our fellow creatures share with us variants of sensory perception, experiencing — and interpreting — life in ways that we cannot presume to know. As Gould (1980, 135) recognises, "We are blind to our own blindnesses, and must try not to read our own disabilities into the rest of the animal kingdom."

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Scholars who have grappled with the challenge of trying to empathise with the world view, or *Umwelt*, of other creatures, have enumerated the perceptions of which various species are capable, and the interpretations that they evidently attach to the signs that are meaningful to them. Among "the estimated ten to thirty million extant species," Sagan (2010, 21–22) reports that von Uexküll (2010 [1934]) considered:

> water-scorpions with built-in fathometers sensing hydrostatic pressure gradients, plants with gravity sensors, algae perceiving barium sulphate and calcium ions, fish that gauge the amplitude and frequency of turbulent waters with dipole electrostatic field generator-and-sensors, magnetosensitive bacteria, homing pigeons and polarized light-detecting bees whose peregrinations are not impeded by clouds, male silkworm moths sensing sexually mature females miles away, and deep-sea fish with luminous lures attached to their heads that attract each other as well as provide bait to dupe their prey into an ugly mouth.

These are just some examples of the abilities many creatures have to behave differently in response to the presence of different *kinds* of stimuli, including other creatures, rather than randomly to the occurrence of singular events or the presence of different individuals. This indicates that many of the categories that we use our discursive resources to name are 'meaningful' and 'interpretable' to creatures other than ourselves. Teubert distinguishes between the knowledge held by the behavioural scientists who observe the creatures, and the knowledge held by the creatures themselves, and there is no question that there are clearly good reasons to draw distinctions between non-human semiosis and human discourse, with all the reflexivity that is an important feature of the latter. But for Teubert the distinction is categorical and absolute; it has to be, to sustain his miasmic model of discourse, which separates us from the other species on the planet, permeates every aspect of our consciousness, and creates all the meaning in our experience. The realist, however, recognises that there are phenomena — such as, for example, 'hydrostatic pressure gradients', and 'barium sulphate and calcium ions' — that our empirical senses cannot perceive, but that are nevertheless real, perceptible by other kinds of creatures, and not reducible to the labels we invent in discourse.

If this were not the case, the many ways in which human beings make vicarious use of the sensory and semiotic resources of other creatures would be impossible. For example, the adaptive way that ants navigate, by a combination of pheromones and edge following, has been used to devise 'shortest path algorithms' that are used as the basis of human enterprises such as marine navigation, optimal routes for freight deliveries and vehicle guidance systems for minimising traffic congestion (e.g. Kammoun et al. 2010; Vaughan et al. 2000). The echolocation method of spatial perception deployed by creatures such as bats and marine mammals has been imitated by blind people as an aid to navigation (Teng et al. 2012). Dogs, in

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particular, act as aids to people because of their abilities to recognise and respond to categories of phenomena. The guide-dog may not 'understand' a pelican road crossing, nor may the police dog 'know' what people consider to be a 'Class A drug', but both will recognise an instance of the category when they encounter one, even if this instance is not familiar from previous encounters with other instances of the same category. In the latter example, the sniffer dog might well perform the task of identifying a tiny amount of the target substance much more efficiently than either I or Professor Teubert would!

6. Language as emergent

Teubert wants to deny that it is possible for human beings to have "'raw', i.e. genuine unadulterated experience" (p. 274), apparently believing that because we must use discourse to share communication about our experience, that experience is constituted by our discourse. This is a version of what realists call the epistemic fallacy (Bhaskar 1997): redefining ontological questions into epistemological questions, or assuming that "statements about being can be reduced to or analysed in terms of statements about knowledge" (McAnulla 2006, 113). This discursive reductionism is, necessarily, ontologically flat, conflating as it does the different kinds of things, with their distinct properties and powers, that constitute the material and social world.

A 'variegated' ontology, by contrast (c.f. Layder 2004), can accommodate the extraordinary diversity and complexity of life on our planet. From this perspective, we can allow for the continuities between human discourses and the sensory and semiotic resources of other species, on the one hand, and, on the other, for the emergence of the spectacularly far-reaching effects of the human language capacity that have made possible achievements quite unlike those of any other creature. One does not need to accept wholeheartedly the idea of species equivalence proclaimed by some advocates of animal rights to recognise that there is likely to be some degree of continuity between different species in the evolutionary timeline. It is, to be sure, human beings and not apes who have explored what language is, how it may have evolved, how we acquire it, and how far it is accessible to other kinds of creature. These explorations have revealed continuities in the genetic and neuroanatomical properties of humans and other primates, and the most recent studies of bonobos demonstrate the crucial importance not only of these similarities, but also of the material and cultural dimensions of experience in the development of *Pan paniscus/Homo sapiens* communication. Savage-Rumbaugh et al. (2000, 916) report, in relation to one of the most linguistically competent bonobos, Kanzi, that "[h]is understanding of language informed his interpretation of

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real world events and his broadened capacity to interpret and appropriately classify real world events informed his linguistic comprehension in a boot strapping effect." In this respect, the development of Kanzi's communicative competence is consistent with that of human children as described by Halliday (e.g. 2004; Painter 2009), where lexis and grammar emerge from a more basic semiotic in the context of material practice and culturally contextualised interpersonal negotiations. A similar point is made by Thibault (2009, 110), when he says:

> Cultural dynamics … depend on the pooling and accumulation across generations of the constructive efforts of organisms in their environments such that the cultural landscape in which the interactions occur is, over time, altered. This further entails that the cognitive and semiotic resources of organisms are themselves transformed by their participation in cultural dynamics.

These are examples of what realists describe as the 'acting back' of emergent properties on the constituents from which they emerge. In the material world, including the biosphere, this process can be seen repeatedly, acting at different levels of complexity, as described by Dupré (2012, 290):

> The complex macromolecules employed by living systems have properties — catalysing other reactions, forming structures with strength, elasticity, etc., neutralizing alien biological entities, and so on — that are a result of their particular complex structures. The combinations of these new causal capacities in turn create systems with entirely new (emergent) capacities — the abilities to fix atmospheric nitrogen, say, or run down and consume prey — capacities that contribute to the persistence of the highly complex systems of which they are part.

And at some point, from the proto-linguistic semiotic systems which we continue to share to a greater or lesser degree with the other species with which we are evolutionarily connected, human beings developed the emergent property that is language as we know it. I suspect Teubert and I would agree that human language is qualitatively different from the means of communication deployed by other species in its hierarchical organisation, recursivity, reflexivity and combinatorial properties. However, for Teubert, the difference between humans, with their discourse, and other creatures, which lack discourse, is absolute and undifferentiated. The alternative view that I am presenting here recognises the interplay between non-living matter, living organisms and human culture, including language and discourse. This perspective also highlights relations and processes, rather than entities. From an evolutionary perspective, single-cell organisms are capable of decoding signals from the environment, in the sense that they are sensitive to light, react to sounds and detect hormones, but they do not interpret these signals: they do not 'see', 'hear' or 'smell' (Barbieri 2010, 207). By contrast, animals — multicellular creatures — "build internal representations of the outside world … [and]

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these representations allow them to *perceive*, to *feel*, and to *interpret* the world" (ibid.). Although this difference may represent a 'macroevolutionary' event, as Barbieri maintains, there is nonetheless a continuity between the stimuli to be experienced and the response occasioned in the experiencer. If the development of language in our species represents a second macroevolutionary development, this does not preclude a similar continuity between the ecological relations affecting non-human creatures and discourse-generating humans.

Descriptions and explanations of the origins of human language necessarily remain speculative and unproven, and Teubert, in his efforts to erect rigid divisions between humans and other animals, concerns himself more with ontogeny than phylogeny. However, despite disagreements among researchers (see, for example, Christiansen and Kirby 2003), investigations of the archaeological and biological evidence lead many to conclude that linguistic development is tightly connected to developments in humans' biological properties, environmental pressures, the use of tools and so on. Once the resources of language are available, they do, to be sure, make possible exponentially increasing, emergent possibilities. People can make jokes and lie; they can invent imaginary worlds and share ideas, including fantasies, across enormous ranges of space and time; they can develop machines to compute calculations in inconceivably short order; they can hand down designs for future generations to realise and adapt. In short, because of language human beings can accomplish all manner of things that are so far outside the capacities of other animals that they seem the most likely inhabitants of the planet to be capable of destroying themselves and many of their fellow species in a fraction of the time that evolutionary processes took to create them.

The capacity for language (and thus for engagement in discourse) is, I would agree, a profoundly significant, probably the most significant, characteristic of the human species. Language and discourse are also illustrations of the way in which complex systems emerge from simpler ones, and how emergent properties serve, over time, to change the conditions of their own emergence. Returning to the leitmotif of the cat — once absorbed into the complexities of human culture, versions of cats appear in countless manifestations that would be meaningless to any actual, living cat, including as: comic characters created with a few strokes of a cartoonist's pen; miniature statues waving their artificial arms to wish 'good luck' to the customers of Chinese businesses; metamorphosing 'familiars' signifying powers of witchcraft among isolated women; metaphors for the cruel behaviour stereotypically associated with groups of girls, and so on. In the provision of texts to entertain and educate young readers, the *Dr Seuss* books exploit the entirely contingent fact that the English word 'cat' rhymes with 'hat', an example of the properties of language itself, which interact with each other in a myriad of creative ways that make possible poetry and puns — and the new 'dialect', that has emerged through

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internet communication, known as 'lol-cats'. And once human beings have developed cultural norms about the preferred features of cats, they can, through breeding programmes, manipulate biological cats to resemble more closely the ideals they have in mind — another example of culture 'acting back' on nature. Teubert sees the lack of a literal, visual resemblance between the child's soft toy and the domestic cat in the garden as evidence of a complete arbitrariness in the characteristics of a free-floating, separate world of discourse ("Why do you call this toy a cat? It doesn't at all look like one," p. 278). For me, however, the two are linked by the human capacity for creativity and imagination *in interaction with* the material world, including the living creatures that inhabit it, and with the products of culture that have come before and continue to be adapted in complex ways.

7. Conclusion: Categories, creatures and discourse

"The concept of 'species'," maintains Teubert (p. 277), "has little to do with nature; it is a highly controversial construct." Yes: like many, if not most, areas of human research, there are controversies about the definitions and delineations of species. But no: recognition of this second proposition does not entail acceptance of the first. In fact in the first section of this sentence Teubert illustrates the performative contradiction in which he is obliged to engage, and which besets most forms of ontological relativism. As a discourse constructionist, Teubert wants us both to accept that we are at the mercy of discourse, with no means of adjudicating between conflicting accounts of the world and our experiences, and also to accept his discursive account in preference to others. But what, for Teubert, is the 'nature' with which the concept of species "has little to do?" Merely a discursive construction, presumably. Likewise, in what sense are chimpanzees 'our cousins' (p. 276)? Surely, to be consistent, Teubert has to deny that there is any such thing as 'nature', any such category of species as 'chimpanzee', and any such relation between humans and chimpanzees as 'cousin'. Humans and other primates are scientifically classified as 'related' in two main ways: having relatively recently shared a common ancestor and continuing to share a high proportion of DNA. To those of us who accept the material basis on which such classifications depend, the label 'cousin', although anthropomorphic and so mostly figurative, bears some relation to an actual collection of scientific findings. But from a discursive reductionist who does not believe in the reality of species, it is hard to understand what it is meant to signify.

Research into the classification of living things increasingly recognises the importance of the dynamic processes that blur the boundaries, not only between species, but also between organisms, especially at the microbial level. Dupré and O'Malley (2007, 842) propose that it may be more accurate to think of organisms

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as "temporarily stable nexuses in the flow of upward and downward causal interaction." Likewise, in relation to species: "Evolution has generated highly diverse patterns of diversity, some of which involve divisions similar to, or even coextensive with, what have previously been considered species, but some of which do not" (Dupré 2001, 217). Elsewhere, Dupré notes that "[n]ature is not divided by God into genes, organisms or species: how we choose to perform these divisions is theory relative and question relative" (Dupré 2012, 93). This is important, because it articulates an epistemological relativism that is consistent with an ontological realism. That is, the pragmatic goals associated with the classification of organisms will vary among ecologists, ethnobotanists and ethologists, as well as foresters, conservationists, gamekeepers, and herbalists (ibid., 204). Nevertheless, it is not only these disparate goals, but also the characteristics of the organisms themselves, that will give rise to largely overlapping, if not isomorphic, categories and labels.

As mentioned above, I am currently collaborating in the construction of a corpus of contemporary British English where animals feature as a key topic, and I conclude this paper by summarising briefly some of the thinking that underpins the project. A range of potential orientations towards animals provides us with a starting point for constructing our corpus. Animals feature in human experience and discourse as: objects of observation, study or entertainment (in the 'wild', in laboratories, in zoos); companions; tools (for transport and/or work); commodities (for meat, other edible products, fur and clothes), competitors (as quarry in hunting, racing, fighting) and 'out of place' ('pests' / 'vermin') (see DeMello 2012; Herzog 2011; Ingold 1988). Relevant categories for naming and describing animals are both practical and cultural. For example, is it possible to eat the flesh of this kind of animal without being poisoned, or to keep this kind of animal as a pet without the risk of being mauled or killed? And is it acceptable to do either of these without flouting a cultural, ethical or religious norm? We want to know, among other things, how different kinds of animals are represented linguistically in different kinds of discourse. Our project is concerned in part with the way that the categories encoded in language reflect the non-discursive properties of living things, but also with how these interact, such that, once a particular kind of creature has been labelled as a 'pet' or a 'pest', certain kinds of linguistic, cultural and material processes may become more likely to follow, with very real consequences for both humans and other animals.

Teubert's article seeks to persuade us that there is no 'authentic' human experience outside of its discursive representation. His position is unconvincing because it disregards the continuities between humans and other species, and under-acknowledges an important fact of our embodied existence: that the way human beings engage in and develop discourse is emergent not only from our intra-discursive interactions with other people, but also from our animal, material being in the world.

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