

Bear Life

Weather Permitting

Kathryn Yusoff and Jennifer Gabrys

Bear Life and Bare Life

Imagine green polar bears, algae-stained and idling in air-conditioned dens, emerging to dip in concrete-formed tropical pools. Far from the icy Arctic seas, in the Singapore Zoo, the tropical and the polar converge in this peculiar scene. Removed from the now-receding ice caps, captive polar bears are maintained in an environment that alternates between a paddock in open-air equatorial heat and an air-conditioned cell. But this staid tropical haven reveals not the salvation of a troubled species, but rather its continued state of peril. Climate scientists estimate that by 2040 no summer sea ice will remain in the Arctic regions due to global warming, and as a consequence polar bears will have no wild habitat in which to dwell. While polar bears are kept in the manufactured if marginal comfort of air conditioning, these same technologies contribute to the ongoing de-freezing of the planet. Increasingly, the only zone where polar bears may remain will be in zoos, exiles in simulated habitats.

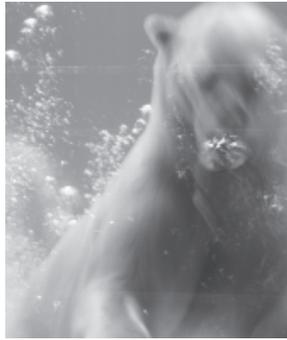
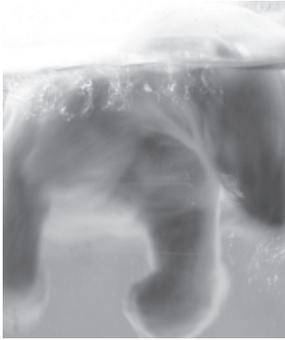
As the international poster animal for climate change, this striking white bear is a repository not just of the effects of industrialisation, but also of our sense of impending loss at the widespread extinction of both marine and land animals. Polar bears, like many other animals, have to endure the consequences of anthropogenic climate change. And while polar bears as a species are protected, their habitat is not. For those polar bears that roam the wilds of the North, habitat deterioration is their greatest threat. *Ursus maritimus* ('sea bear') is a relatively young species, having evolved from



Weather Permitting.
Image by Kathryn Yusoff & Jennifer Gabrys (2006).

grizzly bears between 200,000 and 500,000 years ago in response to the environmental conditions of the last ice age. Satellite observations over the last 30 years show that the sea ice on which polar bears now depend has retreated by up to 15 per cent (with 40 per cent loss of ice thickness). Without the sea ice that they rely on to hunt seals, their main prey, polar bears are unlikely to survive. Polar bears are an indicator species for Arctic biomes, and changes in their distribution or numbers could ultimately affect the entire Arctic ecosystem.

In the context of this bear life, which is at once contingent upon the status of environments, and is also faced with the threat of extinction, we ask, ‘What is life?’ and ‘What is “bare life”?’ The philosopher Giorgio Agamben suggests that bare life emerges at the ‘mobile border’ that separates human from animal. For Agamben, bare life occurs at the divisions between that which is conscious in the world and that which is vegetative, or in an in-between state of living death. It is these multiple practical and political divisions between human and animal life that make a conceptualisation of the human possible. Crucially for Agamben, that which constitutes bare life is neither animal life nor human life, but rather is this politics of separation that inform life. Aping Agamben, we explore the bare life of bear life in the Singapore Zoo and beyond, to suggest that the life of polar bears significantly qualifies and extends the concept of bare life.



Inuka, Singapore Zoo. Photographs by Kathryn Yusoff (2006).

Animalities

For Agamben, who follows Heidegger's notion of 'the open' (that space that man has made for himself out of the animal world through his 'handicraft' of signs, or language), the way in which animals are lodged in their environment is a form of incomprehension, a state in which the animal is 'poor in the world'. In this sense, we can only understand the 'abyss' between animals and ourselves by subtracting our own human understanding of 'being in the world'. To clarify this animal poverty, Agamben cites zoologist Jakob von Uexküll's example of the tick, which he claims is open only to precise phenomena, 'captivated' (in Heidegger's terms) by the events that trigger behaviours. The tick's world is one among many in the 'infinite variety of perceptual worlds': the world for the tick, the world for the human, the world for the wild bear, the world for the zoo bear.¹ These multiplicities of inhabitation 'in the world' bring about a consideration of the many ways of being in the world that constitute life—or life worlds. But these life worlds also have an uneasy arrangement in philosophical thought, sifting into a delineation of them and us, or 'man and animal' in Agamben's terms. This delineation carries through into performances of rights and ethics, as well as the politics of harming, eating and desiring animals. Such divisions often present less than compelling ways of considering, for instance, what it means to force as much as one third of the planet's species to the verge of extinction.

Georges Bataille offers another perspective on animality, which Agamben and Heidegger have critiqued as a form of nostalgia, but that nevertheless brings some force and clarity to the difficult questions of what constitutes animal life. For Bataille, 'animality is immediacy or immanence.' Animality is an operative force. He suggests that, 'for the animal nothing is given through time,' so that it has no perceivable duration posited beyond the present. In this sense, *every animal is in the world like water in water.*²

Moving away from Agamben's interest in the divisions between lives, if we think of the animal 'like water in water', what responsibilities does this generate towards thinking about the animal, not as a taxonomic thing, but as a being entangled with its environment? If animality is continuous with environment, as so many extinction and generative life events of the past forcibly suggest, our responsibility to animals must consider not just how animal life is constituted together with environments, but also how human life is constituted together with animal life and environments.

Man and Animal, Woman and Dog

For both Agamben and Heidegger, 'the privileged place of the human' is something that 'has always been strategically produced and ensured by the "anthropological machine" of Western thought.'³ For Bataille, this privilege is ambiguous, as it is accompanied by a loss of intimacy with the world. And while all these philosophers mobilise this privilege in order to critique it, its devices are often inadvertently reinforced through points of access that involve 'man' and 'animal'.

But in the reified terrain of philosophical inquiry, we might do well to let in a few of those other organisms that have shaped both us and our environments—those fungi, bacteria, viruses, plants and animals that will undoubtedly exceed our brief tenure on Earth. In this way, if we turn instead to the question of woman and dog, as suggested by Donna Haraway's work on companion species, quite a different picture of life emerges. She argues that other histories of co-constitution, co-evolution, communication and collaboration upset the usual designation of forms of life, including consciousness and non-consciousness, on which so many rights-based, animal-human ethics rest.⁴

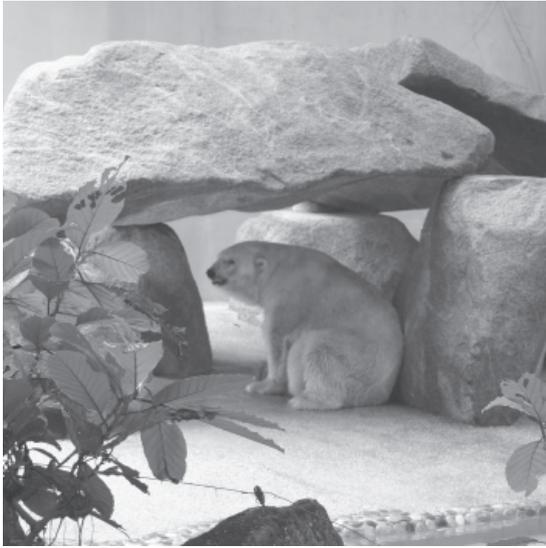
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Taking this argument of co-constitution into the environment, we can begin to think about the integrity of animals and environments, like some very particular bodies of water in water. Here, questions emerge about the constitution of species in response to environments; and the inability of some species, including the polar bear, to rapidly adapt to environments such as zoos.⁵ Also emerging here are questions about the ways in which the thing-ness of the animal is circumscribed to limit or contain the animal in certain ways. As we make the animal-thing through spaces such as zoos, and in doing so subjugate it to us in various ways, we also need to consider how we are tied to these subjugated things that reinforce our sense of human-ness.

Beyond this, we conceive of animality not so much as a category that congeals through its difference to the human; but instead as a porous, historically-constructed register. In this way, inquiries into animality produce a terrain that interrupts and generates multiple notions of politics, ethics and environments, which lead toward the politicising and reconstituting of ecologies. In the sections that follow, we return to those polar bears, pacing restlessly in their cages, which recast the bareness of bear life at the equator and beyond.

Zoo Life

It is estimated that in addition to a worldwide species count of 21,000–25,000 polar bears, today there are over 1,000 polar bears that are in captivity. The first polar bear generally considered to have been kept in zoo-like conditions was the 'pale bear' in residence from 1252 at the Tower Menagerie of London. This pale bear was a gift from King Håkon IV of Norway to King Henry III, and as a white bear from the reaches of the Arctic it is assumed to have been a polar bear. Passing in the gift economy from empire to empire, the white bear found itself unwittingly entering



Sheba, Singapore Zoo.
Photograph by Kathryn Yusoff (2006).

that 'Parliament of Monsters' of imperial animal collections. Even while it inhabited this regal hall of exotic and living specimens, the Tower Menagerie polar bear proved to be quite difficult and expensive to maintain. In order to economise on food costs, the bear was kept on a muzzle and chain, and allowed to fish for its own food from the Thames, which at the time ran clear and abounded with salmon. A strange creature then, it was regarded with curiosity by all who passed by the Tower of London.

The first of its kind in the United Kingdom, the bear was one of only a few kept in captivity until the polar bear Samson arrived in the London Zoo in 1829.⁶ The London Zoo, or Zoological Society of London, bears some relationship to Singapore. The 'founder' of Singapore, Sir Stamford Raffles, was also the founder of the first London Zoological Society. A dedicated animal collector, Raffles kept a wide assortment of strange and curious creatures. Upon leaving South East Asia for the last time to return to London, his ship caught fire and many of the animals on board were lost. Raffles was determined to re-establish this collection in some form, and once in London he initiated the Zoological Society and invited members to join in 1826. While initial interest in the endeavour was well short of enthusiastic, and many considered the proposal to keep living animal specimens for public exhibition to be strange indeed, Raffles proceeded undeterred, convinced of the importance of his mission.



Polar bear in the zoo, lantern slide. Photograph by Kathryn Yusoff (2006).

The London Zoo began to take shape in 1829 at Regents Park, three years after Raffles had died. In turn referred to as the London Zoo or the London Zoological Gardens, the zoo held great appeal as public entertainment, but was considered first and foremost to be a scientific institution. And yet, in this first zoo, stories abound of human–animal encounters that span from the dangerous to the ridiculous. In the early days of the London Zoo, members of the public were encouraged to feed the animals, as this kept costs down. Yet soon enough, breadcrumbs and meat scraps, as well as rat poison and nails, found their way into these animal offerings. Some unsuspecting visitors entered bear dens for a closer view or simply to retrieve a lost hat, and while most people were rescued before mishap, some did not surface wholly un-maimed.

These visitors were perhaps all too fortunate that they were able to remove themselves from these cages, for true to the grisly histories, the first zoos of the nineteenth century were quite bleak. Not gardens these, but rather iron bars and concrete slabs, enclosing closet-sized spaces. Within these cages were animals of all types, isolated to illustrate those solidifying taxonomies that formed the basis for so much scientific knowledge. Perhaps less the Batailleian animals existing as ‘water in water’, here were animals as water out of water. And yet this proximity to the animal, to the thing in itself, seemed to provide some sure measure of knowledge, of approximating through proximity. While the scientific and public-entertainment aspects of zoos may have initially been seen as characteristics in conflict, in fact each sought in some way to *show* the animals—for demonstration

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or performance. Through the show, we would know more about these creatures, and how we came to have such mastery over them.

The show, however, came to exhibit more than a few technical difficulties. Cages, as it turns out, do not form the best dwellings for the vast majority of animals. But sentimental notions of animal freedom are not necessary to prove this point. Instead, the same scientific observation that would propose to know the animal better through the zoo, could not avoid the fact that animals seemed to be less and less as they ought to be in the zoo. This fact was made most blankly apparent with the polar bear. One of many creatures that does not take well to captivity, the polar bear has been an animal most prone to exhibit abnormal behaviours and 'madness' while in a state of captivity. Pacing and panting, showing lethargic behaviour that snaps into aggression and then retreat, polar bears in zoos everywhere, whether Singapore or London, have failed to adapt to these confines.⁷

While cages may have been replaced by, in some cases, more 'naturalistic' zoo landscapes that attempted to emulate the typical environs of wild animals, this emulation often falls far short of the actual landscapes that animals would inhabit. When one learns of the average range that a polar bear covers in a day or year, for instance, it becomes clear that through sheer distance alone, a zoo could never approximate the territory or habitat of a polar bear. Living in captivity, polar bears experience a sharply delimited territory that can be reduced as little as 'one millionth of the

size of their natural home ranges'. Philosopher Keekok Lee discusses how this would be comparable to a person who grew up in a village 1 sq km large suddenly being forced to spend the rest of her or his life in a phone box.⁸ In this 'miniaturisation carried to an extreme', not only does the captive experience an extreme diminution of range, but also a diminishment of landscape complexity. The captive, moreover, lives without any sense of eventual release; for in this hybrid island of amusement-science, captive species cannot know what fate lies beyond these tight delineations of life and animality.

Island Effects

While the connection between zoos and science has not abated, perhaps another element now used to provide justification for zoo collections is the interests of conservation. Zoos increasingly funnel large sums of money into protecting and purchasing wild habitats. At the same time, zoos maintain that they are living collections, preserves for endangered species. With polar bears, a species endangered by climate change and the rapidly melting Arctic, every animal that can be reproduced and kept alive seems to be another small victory against the threat of total extinction. The polar bear Knut, born in captivity in the Berlin Zoo in 2006 and rejected by his mother, has been caught in the snare of this logic, where debates have ranged from calls to maintain this endangered if 'unnatural' animal, to arguments that he should be 'killed' in order to uphold the natural order of wild things. In the end, the sheer cuteness of this animal has prevailed. Stuffed bears and media feeding frenzies feature at the perimeter of the bear enclosure. And yet in the debates over the validity of maintaining Knut, lost in the usual polarisations was any discussion of what life is—and what, if anything, may be particular about the life of polar bears.

Knut exists as a living entity because of his bear-ness that we recognise as such, which is then swiftly abstracted into stuffed and iconic polypropylene novelties. But we do not ask if this bear's life must



Taxidermy polar bear, Norwegian Polar Institute, Tromsø.
Photograph by Kathryn Yusoff (2006).

also necessarily extend to his habitat, his connection to his mother and his ability to roam across large territorial expanses. Beyond the arguments to maintain or dispose of Knut, his appearance suggests that now more than ever these questions press upon us. Habitat is essential to the understanding and constitution of animal and plant species, including the polar bear. As Lee suggests, ‘One cannot understand what a polar bear is, and what the species *Ursus maritimus* to which the bear belongs is without having an idea of the Arctic landscape and seascape, and the rapid series of evolutionary changes which its ancestors underwent in order to survive the cold.’⁹ In zoos, these environments are seldom more than background considerations, if they are present in the understanding of animals at all. Our attention to polar bears, and Knut pre-eminent among them, likely tells us more about ourselves, as Werner Herzog opines in his documentary *Grizzly Man*, than it does about the bears. Our projections toward these bears reveal rather entrenched—if often damaging—notions of what constitutes animal life. Saving an orphaned polar bear from death may seem a heroic act, but it does little to address the fact that zoos are less than optimal environments for these bears. And it also stops far short of preserving the eroding habitats that polar bears would call home, if they were not kept in temperate or equatorial paddocks.

The question of what constitutes life and animal life gains renewed focus, moreover, when we consider that just as zoos constitute preserves or living collections of sorts, so too does this logic of ‘banking’ life carry across scales and forms. Databanks of DNA, seed archives and repositories, software programs that emulate life processes, and various collections of living codes, parts and operable systems, have been or are proposed to be kept in collections. The impetus of these banking projects exceeds the advancement of science, and necessarily encompasses the imminent moment that we all anticipate—when all life forms may be extinguished, and all that will be left for us is to recreate life forms from codes and recipes. What if some animal or organism should become extinct before we recognise that it may have had some value for humans? We can short-circuit this tragic

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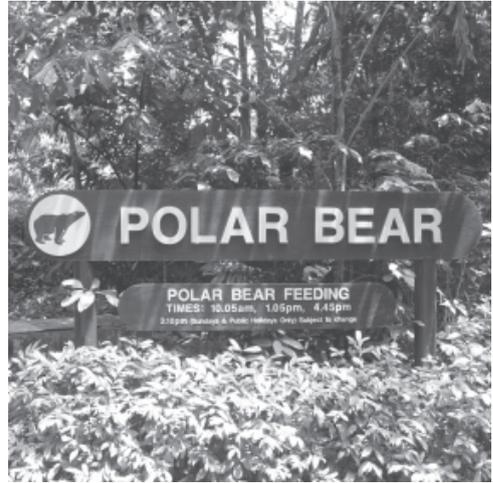
future realisation if we catalogue the DNA of all organisms now, so that their eventual disappearance does not pose as much of a problem. These will be our twenty-first century zoos, where even in the absence of the animal we may possess the program to replicate their presence.

This tale of animal programs has been told before, despite its leaning toward the future. In *Do Androids Dream of Electric Sheep?* Philip K. Dick imagines a time when, covered in toxic dust, the planet has reached a state of total animal extinction. So great is the loss that comes with the absence of animals that a brisk trade in electric animals develops, where every remaining member of Earth tends to and keeps an electric replication. The dreams of bounty hunter Rick Deckard are permeated with animals, and his waking life becomes a nervous watch for signs of any remaining animal life. Animal life, contra Descartes, does not equate to the functioning of machines in this tale, however; no technology, however sophisticated, can stand in for the presence of animals.

Dick's novel reveals what may be missing from a databank—and artefactual—approach to life. Indeed, Lee suggests that animals in zoos should not be considered as 'wild animals in captivity', but rather as 'artefactual species' or 'biotic artefacts'. Zoos should, Lee argues, recognise that their approach to animals is distinctly thing-like, as objects in a collection. Collecting these artefacts, furthermore, does not contribute to biodiversity, as the artefacts are divorced from the conditions that engender, maintain and contribute to such biodiversity.¹⁰

Perhaps it is for these same reasons that stories of animals escaping from zoos loom so large in the human imagination. Whether it is the lone tiger scaling its fence, or the more wholesale turning

Polar bear in the tropics, Singapore Zoo.
Photograph by Kathryn Yusoff (2006).



loose of animals during times of war or catastrophe, images abound of wild creatures on the lam, concrete and iron enclosures turned to rubble, and exotica scavenging through city dumpsters. As art historian Johanne Sloan points out in her discussion of Bill Burns' *Safety Gear for Small Animals*, however, an escape from the zoo may not be enough. For an escape from the binds of natural history, representation and environmental degradation may even be in order. As Sloan suggests, it may be that we can only begin to recognise the transformative and imaginative energies of animals once they make their exits from these binding structures.¹¹ At this point, we then begin to wonder what would become of polar bears if they escaped from the zoo? In Singapore, these bears would find that even if they negotiated their tropical surroundings to move farther north, they could find their world is melting, and the extent of their captivity could seem only to have increased.

Zero Degrees

Where would a polar bear escaping from the Singapore Zoo go? And as the Animal Concerns Research & Education Society (Acres) asks in its report, *Polar Bears at Singapore Zoo: What's a Polar Bear Doing in the Tropics?*, at the Degree Zero of the equator in the urban and equatorial island of Singapore, and at the Zero Degrees of the Polar Regions, polar bears are captive in degraded and degrading environments. Inuka, the first polar bear to be born in the tropics in 1990, is a tropical polar bear, a taxonomic misdemeanour. In 2004, Inuka turned green. A new speciation perhaps? As it turned out, he had algae growing in his hair shafts caused by the hot, humid climate. To remove the algae, zookeepers sprayed him with hydrogen peroxide.¹² The Singapore Zoo further claims that as a physiological reaction to the warm climate, the polar bears have a thinner coat and they

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moult more often than their counterparts in cold countries. Evolution may transpire quickly in response to environmental changes, but not that quickly.

Inuka also exhibits, according to the Acres report, stereotypic behaviour and physical signs of distress, including loss of lean muscle mass and fur. Acres' observational research recorded Inuka panting for 36 per cent of the time he spent 'on show'. For most bears in captivity, adaptation may only be happening in terms of behavioural and mental collapse. Stereotypic behaviour is a pattern of locomotion that is repeated in an identical fashion in the same place. It is generally assumed to be a way of searching for something. Dr Sophie Vickery of the Department of Zoology at the University of Oxford suggests, 'Stereotypical behaviours arise when the animal is motivated to perform a behaviour or reach a goal that is somehow restricted. ... They are repeated because the animal is trying to do something but is unable to (for example, explore, forage, seek a mate, roam, or escape other bears). Other factors responsible for stereotypical behaviour are stress, lack of stimulation,

and lack of control.¹³ So what is it that polar bears are trying to do that they cannot? Zoologists believe that stereotypical behaviour is a way of coping with the stress of imprisonment, and it is identified that polar bears suffer from this more than any other species (which has led some zoos to put polar bears on Prozac).¹⁴

So if we leave (once again) the distressed polar bears in their equatorial pens, a polar bear escaping and finding its freedom would find another kind of captivity in a melting world. Here, rapid adaptation (or extinction) is a distinct possibility. Changing sexual, behavioural and species 'natures' of polar bears are already detectable, caused in large part by environmental pollutants.¹⁵ Polar bears are carrying high concentrations of POCs, PCBs and mercury. It seems it is a 'zero-sum' game for polar bears at the poles and equator. Indeed, as scientists from the Malaysian Antarctic Research Centre at the University of Malaya point out, stress factors from equatorial regions are actively influenced by the resilience of polar regions. Melting of the Arctic and Antarctic ice threatens to overwhelm many of the low-lying islands of the Pacific region, including Singapore, as climate changes are forcing the increased occurrence and force of tropical storms, as well as rising sea levels. In this sense, the threshold of Zero Degrees and Degree Zero marks the migration of animalities and bare life from distant degraded habitats to zoologically managed scenes. The seemingly contained animalities of polar bears in the Singapore Zoo pushes beyond into regions to reveal how these spaces are always managed in relation to zones and lives that seem far distant.

Extinction and Metamorphosis

In contrast to the pervasive images of animals escaping from zoos, there is instead another set of scenes—inverted, but equally pervasive. These involve the sight of flooded zoos, from European cities to the annals of science fiction, as captured by Kim Stanley Robinson in *Forty Signs of Rain*.¹⁶ What Robinson describes in his climate-change trilogy, through the trope of a flooded zoo, is the possibility of a Noah's Ark in reverse, where the paired collections of the entire world's species are not preserved, but rather decimated by the twin misfortune of their captivity within human-induced catastrophes. Even if zoos were able to save animals from extinction by preserving them in smaller numbers, there is, with the threat of climate change, no surefire way of saving even the zoos themselves from catastrophe and collapse.

The bare life we encounter in such scenes is that of extinction and the disappearance of the animal. Here is the loss of that 'mobile border' between the human and the non-human. This separation is

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more than ever up for grabs. But focusing on these demarcations may be open for questioning as well. Rather than starting with such divisions and essential categories, we may instead, in the context of these bear lives, turn to consider the irreducibility of the assemblages that constitute life. Extinction forces this wider consideration; of the irreducible complexity of even the seemingly barest of lives; and the specificity of life, such as bear life, that cannot be constituted through the arid divisions of bare life.

In the Singapore Zoo, Acres notes again, "The average time adult visitors spent looking at the polar bears was found to be only 46.3 seconds."¹⁷ Far from an encounter with the animal Other, the time spent surveying the overheating polar bears in the Singapore Zoo is a momentary idle, not even long enough to register what may be amiss in the tropical compound these bears call home. We do not even take the time to stare across the void, across the separation that delimits bare life. But perhaps the encounter with animality does not, in the end, take place through such a frontal focus.

In his tale of a captured ape that finds, through sheer force of necessity, that he is able to 'ape' the human, Franz Kafka suggests that the animal 'tickles' at the 'heels' of us all. In 'A Report to an Academy,' this ape, Red Peter, develops the ability to perform as a human, complete with speech and attire. In this transformation from ape to seeming human, Red Peter reflects how his primary preoccupation was to find some kind of escape, a 'way out.' Red Peter conveys how 'I had had in my previous life so many ways out, and now I had none at all. I was run to a standstill.' For this reason, he notes, he 'ceased being an ape,' and found himself instead becoming human.¹⁸

On first reading, it seems that by exceeding the cage the ape becomes human. But another reading suggests that it is by focusing so intently on a 'way out', that the ape ceased to be ape and became well and truly human. For to be human is to look always for a way out—becoming human, in contrast to becoming animal. Here is an enfolding of human and animal, in the drive to find ways out. The ape informs his audience, then, 'your apehood, gentlemen, inasmuch you have something of the sort behind you, cannot be any remoter from you than mine is from me. Yet everyone who walks the earth feels this little tickle at his heel: from the little chimpanzee to the great Achilles.'¹⁹ Our simultaneous fascination with and denigration of animals hinges on this drive, on the seeming 'mobile border' that separates the human and the animal, as we cited from Agamben earlier in this essay. But as Red Peter reveals, this shifting boundary is less a division as such, but rather the site of a continual metamorphosis.

The way out that Red Peter discusses in his capture and longing for some kind of release is the condition that interminably afflicts humans: to exceed the self, and to do so through the encounter with animals. This, as Lorraine Daston and Gregg Mitman suggest, is the hidden aspect of anthropomorphism, even, where *morphos*, or transformation, reveals how 'thinking with animals can take the form of an intense yearning to transcend the confines of self and species, to understand from the inside or even to become an animal.'²⁰ The transformative aspect of anthropomorphism, the metamorphosis buried in this term, has as much to do with *anthro* as it does with exceeding the self. For animal life presents such a challenge to these categories of containment. This much Bataille recognised when he suggested, 'Man's first movement amid animals and trees had been to conceive of the existence of these animals and trees and to negate his own. The human body appears as a Cartesian diver, like a toy of the wind and the grass, like a cluster of dust charged with an activity that decomposes it.'²¹

In this decomposition, we may find approaches to life, which as Haraway suggests, involve 'a multi-species and a multi-expertise way of doing/thinking worlds and ways of life.'²² The simultaneous conservation of species in unlikely environments, while all around animals and their habitats disappear irretrievably, requires that we move toward understandings of life that go beyond separation and containment. In this way, we can recover the transformative and imaginative energies of animals, environments and ourselves.

Acknowledgements

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Endnotes

1. Giorgio Agamben, *The Open: Man and Animal*, Kevin Attell (trans.), Stanford: Stanford University Press (2004), pp. 39–42.
2. Georges Bataille, *Theory of Religion*, Robert Hurley (trans.), New York: Zone Books (1989), pp. 17–20.
3. Agamben, p. 37.
4. Donna Haraway, 'Cyborgs to Companion Species: Reconfiguring Kinship in Technoscience', in *The Haraway Reader*, New York and London: Routledge (2004), pp. 295–320. Haraway famously discusses the extent to which human and dog animal evolution cannot be drawn along a uni-directional causal course. She writes, 'Whatever else humans and dogs can illustrate, it is that these large-bodied, globally distributed, ecologically opportunistic, gregariously social, mammalian co-travellers have written into their genomes a record of couplings and infectious exchanges to set the teeth of even the most committed free trader on edge.' See Donna Haraway, *The Companion Species Manifesto: Dogs, People, and Significant Otherness*, Chicago: Prickly Paradigm Press (2003), p. 9.
5. This is well-documented in the Animal Concerns Research & Education Society (Acres) report, *Polar Bears in the Singapore Zoo* (2004). Available at <http://www.acres.org.sg/campaigns_polarbears.html>
6. Daniel Hahn, *The Tower Menagerie: The Amazing True Story of the Royal Collection of Wild Beasts*, London: Simon and Schuster (2003), pp. 19–22.
7. Acres, pp. 12–13.
8. Keekok Lee, *Zoos: A Philosophical Tour*, Houndmills, UK and New York: Palgrave Macmillan (2005), pp. 44–5.
9. *Ibid.*, p. 22.
10. *Ibid.*, pp. 1, 127. In this respect, Lee refutes the well-known zoological study *Wild Animals in Captivity* by H. Hediger (New York: Dover Publications, Inc., 1964).
11. Johanne Sloan, 'The Great Escape', in *Safety Gear for Small Animals* (Canada: Tom Thomson Memorial Art Gallery, 2005), pp. 32–49. Bill Burns has developed equipment and installations that attempt to help animals survive and escape degraded habitats. For more on Safety Gear for Small Animals, see <<http://www.safetygearforsmallanimals.com/>>

12. See 'Polar bears turn green in Singapore', *BBC News* (24 February 2004). <<http://news.bbc.co.uk/2/hi/asia-pacific/3518631.stm>>
13. International Polar Bear Husbandry Conference Proceedings, hosted by Polar Bears International, 4–7 February 2004, San Diego, California. See <[http://www.polarbearsinternational.org/ipbhc/behaviormanagement/presentations/.](http://www.polarbearsinternational.org/ipbhc/behaviormanagement/presentations/)>
14. Misty, the polar bear at Calgary Zoo, was prescribed Prozac in the 1990s in an attempt to mitigate her habitual stereotypic behaviours. Misty was euthanised in May 1999 at the age of 24 years, 4 months, due to severe arthritis of her hip. <[http://calgaryzoo.org/Project Discovery/Arctic Shores/Q and A/ArcticQandA.htm](http://calgaryzoo.org/Project%20Discovery/Arctic%20Shores/Q%20and%20A/ArcticQandA.htm)>
15. See R.J. Norstrom et al., 'Chlorinated Hydrocarbon Contaminants in Polar Bears from Eastern Russia, North America, Greenland, and Svalbard: Biomonitoring of Arctic Pollution', *Archives of Environmental Contamination and Toxicology* 35:2 (August 1998), pp. 354–67; 'World Wildlife Fund Report', <<http://www.worldwildlife.org/polarbears/threats.cfm>>; and Marika Willeroider, 'Roaming Polar Bears Reveal Arctic Role of Pollutants', *Nature* 426:6962 (6 November 2003), p. 5.
16. Kim Stanley Robinson, *Forty Signs of Rain*, London: Harper Collins (2005), p. 344.
17. Acres, p. 69.
18. Franz Kafka, "A Report to an Academy," *Metamorphosis & Other Stories*, Michael Hofmann (trans.), London: Penguin Books (2007, first published 1917), p. 228.
19. Kafka, p. 226.
20. Lorraine Daston and Gregg Mitman (eds.), *Thinking with Animals: New Perspectives on Anthropomorphism*, New York: Columbia University Press (2005), p. 7.
21. Georges Bataille, *The Cradle of Humanity: Prehistoric Art and Culture*, Stuart Kendall (ed.), Michelle & Stuart Kendall (trans.), New York: Zone Books (2005), p. 4.
22. Haraway, p. 308.