Chapter 1

Removing Ourselves from the Picture

I'm personally convinced that at least chimps do plan for future needs, that they do have this autonoetic consciousness.
—*Mathias Osvath, BBC News, March 9th 2009*[1]

I saw only Bush and it was like something black in my eyes.
—*Muntazer al-Zaidi,* Guardian*, March 13, 2009*[2]

In March 2009, a short research report in the journal *Current Biology* caught the attention of news outlets around the globe.[3] In the report, Mathias Osvath described how, over a period of ten years, Santino, a thirty-one-year-old chimpanzee living in Furuvik Zoo, Northern Sweden, would collect rocks from the bottom of the moat around his island enclosure in the morning before the zoo opened, pile them up on the side of the island visible to the public, and then spend the morning hurling his rock collection at visitors, in a highly agitated and aggressive fashion. Santino was also observed making his own missiles by dislodging pieces of concrete from the floor of his enclosure once the supply of naturally occurring rocks began to dwindle. Santino's calm, deliberate, and methodical "stockpiling" of the rocks ahead of the time they were needed was interpreted by Osvath as unequivocal evidence of planning for the future.

Future planning has long been seen as a unique human trait because it is thought to require "autonoetic consciousness." Autonoetic means "self-knowing," which Osvath defines as "a consciousness that is very special, that you can close your eyes [and] you can see this inner world."[4] More precisely, it is the idea that you can understand yourself as "a self," and that you can, therefore, think about yourself in a detached fashion, considering how you might act in the future, and reflecting on what you did in the past. Osvath argued for this interpretation of Santino's stockpiling behavior on the grounds that it simply wasn't explicable in terms of Santino's current

drives or motivation, but only on the assumption that he was anticipating visitors arriving later in the day. In addition, over the ten or so years that Santino was observed behaving like this, he stockpiled the stones only during the summer months when the zoo was open. For Osvath, this spontaneous planning behavior—so reminiscent of our own—suggested that chimpanzees "probably have an 'inner world' like we have when reviewing past episodes of our lives or thinking of days to come."[5]

Of course, having a large rock flung at your paying customers by a hefty male ape is not particularly good for business, and the zoo staff were a little less impressed by Santino's antics than the scientists were. Given the suggestion that Santino possessed a highly developed form of consciousness, and an "inner world" much like our own, one might suppose that the solution to a problem like Santino would capitalize on his advanced cognitive capacities: given the ability to plan ahead and understand the consequences of his own actions—given, in other words, Santino's rationality—it would seem possible to reason with him by some means, so that he would understand why his behavior was problematic. But no. The zookeepers decided that the best way to reduce Santino's aggressive tendencies, and so his rock-flinging antics, was to castrate him.[6]

Coincidentally, the consequences of some other unwanted missile throwing were reported in the press that same week. Muntazer al-Zaidi, an Iraqi journalist, was sentenced, by a court in Baghdad, to three years in prison for throwing his shoes at President George W. Bush during a press conference held three months previously.[7] Despite the fact that al-Zaidi's actions—unlike those of Santino—were apparently not premeditated but, by his own admission, reflected his inability to control his emotions, no one (thankfully) concluded that castration would be an appropriate way to curb al-Zaidi's missile throwing. So why the difference in the chimpanzee's case?

What's Wrong with Anthropomorphism?

> Whenever you feel like criticizing someone, first walk a mile in his shoes. Then, when you do criticize that person, you'll be a mile away and you'll have his shoes.
> —*Anonymous*

Leaving aside the question of whether observations of one particular individual in a highly artificial setting[8] are good evidence for forward planning—let alone autonoetic consciousness—the ambivalent nature of Santino's humanlike status and the difference in response to the same behavior in chimpanzee and human is instructive. Santino's behavior was taken to indicate the presence of a "humanlike" inner life, and yet he lives under lock and key, on a moated island, his aggressive tendencies curbed by an irreversible operation. All this suggests that, despite his humanlike cognitive skills, no one expected Santino to understand why his actions were troublesome, nor did they expect him to control his behavior appropriately according to human standards of conduct. When you get right down to it, no one regarded Santino as humanlike in any way that really counted, and it remains unclear to what degree we should assume his "inner life" is anything like our own. Are we perhaps guilty of selectively "anthropomorphizing" Santino's stockpiling behavior? Are we attributing human thoughts and feelings to him simply because his behavior looks so familiar to us, and not because we really have any good evidence that he sees the world exactly as we do? Are we missing out on discovering what really makes animals like Santino tick—and what governs the behavior of many other species besides—because we're blinkered by our own human-oriented view of the world?

My answer to all those questions is yes, but let me be clear. In our everyday lives, our tendency to anthropomorphize other animals does no harm. Quite the contrary. Assuming that our dogs love us and are "happy" to see us in the exact same way that we are happy to see them can increase our sense of well-being, and it certainly benefits the dogs themselves, who are well treated and cared for as a consequence. It is also true that dogs form strong and loyal attachments to their owners, and they often pine for us when we are away from home. But none of this proves that their view of us is the same as our view of them. If we want to understand how animals work from a scientific perspective, we have to drop our anthropomorphic stance for three interrelated reasons.

Created in Our Image

First, an anthropomorphic stance means that often we end up asking scientific questions that simply reflect our own concerns. As large-brained,

forward-planning, self-aware, numerate, linguistically gifted animals, we have a tendency to view each of these attributes as an unalloyed good: they serve us well, and allow us to achieve so many diverse and useful things (wheels, the printing press, combustion engines, computers, take-out pizza) that we tend to assume that similar attributes, or their precursors, would no doubt benefit other animals. So we look to see whether they have them, make our obsessions their obsessions, and see how well they measure up. This anthropocentric viewpoint fuses with our anthropomorphic tendencies so that we inevitably end up interpreting animals in human terms, regardless of whether humanlike skills would serve any real purpose for the animal in question.

The pernicious effects of such an attitude can be seen most prominently in media reports of scientific research findings. A recent report on the BBC News Web site,[9] for example, claimed that plants could "think and remember," and that they transmitted information from leaf to leaf in a manner similar to the electrical transmission that takes place in our own nervous systems. Although the report is littered with scare quotes indicating that "thought" and "memory" should perhaps not be taken literally, even a metaphorical interpretation is problematic because, as Ferris Jabr points out,[10] the analogy is far from exact[11] and creates the entirely misleading impression that plants actually do have "nervous systems" like animals, when they don't. As Jabr notes, plants are immensely sophisticated organisms that can achieve all manner of amazing things; it does them a disservice to endow them with humanlike cognitive capacities that they don't possess and don't need. Indeed, it promotes the idea that other organisms are interesting only to the degree that their capacities and abilities match our own.

An even more irritating example of this is the report of a "human-like brain found in worms"[12] (specifically, in the marine ragworm, *Platynereis dumerilii*). What this study actually shows is that ragworms possess certain cell types that correspond to those found in the brainlike structures of other invertebrates, known as "mushroom bodies," and that are also found in the mammalian cortex. In other words, the study shows that invertebrate and vertebrate brain tissue must have shared a common precursor, which evolved in the last common ancestor shared by these two groups more than six hundred million years ago. To claim that a humanlike brain has been found in worms gets the actual reasoning of the

scientific article entirely backward, and generates the false impression that the whole of brain evolution has been geared toward the production of specifically humanlike brains. As my colleague John Vokey pointed out, the idea that these findings have anything to do with human brains is as ludicrous as showing that ragworms display bilateral symmetry,[13] and then declaring that the human form has been found in worms. So, again, an interesting finding, worthy of attention in its own right, gets hijacked and distorted by our strange obsession with the idea that other creatures are interesting only to the extent that they resemble us.

Whose Traits Are They Anyway?

The second reason why an anthropomorphic approach is problematic is that it cuts both ways and can create errors in both directions. While the mistaken attribution of human characteristics to other animals is the common concern, the assumption that we know exactly which traits are "uniquely human" (an assumption inherent in the concept of anthropomorphism) can result in the equivalent error of categorically denying such traits to other animals simply on the grounds that they "belong" to us.[14] The very use of the term "anthropomorphism" in this context implies that there is something very special about humans, "bursting as they are with a whole host of unique qualities that we cannot resist attributing to other beings"[15] even when they don't "deserve" it.

Both of the above problems with an anthropomorphic view spring from our overarching anthropocentrism: we consider ourselves as humans first and foremost, rather than as members of the animal kingdom, and, in so doing, we place ourselves above other animals, with the result that they inevitably fall short by comparison.[16] Consider the recent blockbuster movie *Avatar*: the gentle Na'vi of Pandora are completely in tune with nature and recognize the interconnectedness of all organisms. Nevertheless, when they entwine the nervelike tendrils of their "neural queue" (an external part of the nervous system that looks like a human hair braid) with the external neural whip of other Pandoran animals to form "Tsahaylu"—a deep bond between their nervous systems—it is the Na'vi who control the behavior of the other animals with their thoughts, and never the other way around. But why should this be? Apparently it is simply because the Na'vi are the most humanlike of all Pandora's residents (and, although the

film is chock-full of exposition, this particular aspect of Na'vi life is never explained. Apparently, it is so obvious that the Na'vi should be the ones in control that it doesn't require any explanation; it is, as they say in anthropology, "an unmarked category").

This kind of anthropocentrism also means that we cannot fully appreciate our own place in nature because we are too blinkered by the traits we regard as "special." Let's consider Santino again. His behavior was taken as evidence for forward planning and the presence of autonoetic consciousness. As a result, Santino was raised up to what we clearly consider to be our own exalted level of ability, rather than leading us to question the apparent complexity of our own cognition. For if it were true that Santino possessed the ability to mentally plan his own future using a brain only one-third the size of our own, then it is equally true—and perhaps evolutionarily more valid—to argue that this ability is a general ape-level capacity and not a humanlike trait. More bluntly, it would mean that we are more mundane and apelike than we suppose, rather than that Santino is as "special" as us.

Mock Anthropomorphism, Genuine Anthropomorphism, and the Intentional Stance

Finally, anthropomorphism is a problem because the attribution of human characteristics often results in confusion about what, exactly, we have explained about an animal's behavior and psychology. More specifically, there is often confusion between so-called functional explanations that can tell us why a particular behavior evolved (why the behavior evolved in a big-picture sense; that is, how it enhances an animal's ability to survive and reproduce) and explanations of the actual "proximate" mechanisms that produce behavior in the here and now (why does the animal perform that particular behavior at that particular time?). It is perfectly reasonable to use anthropomorphic language (cautiously) in the former case as a means of generating testable hypotheses. Asking, "If I were a rat/bat/bonobo, what would I do to solve this problem?" is a useful way of going about things if we want to know why a behavior acts to increase the individual's chances of passing its genes to future generations (known as its "fitness"). This is because, as luck would have it, natural selection is a

mechanism that tends to optimize behavior in exactly the way that makes this kind of intuitive sense. As John Kennedy puts it in his book *The New Anthropomorphism*: [17]

> there is no doubt that identifying the ultimate causes of any behaviour we observe is very gratifying to us. Because we are intentional beings ourselves who constantly think in such terms we long to know what an animal is 'up to', to 'make sense' of what it is doing.

Our natural tendency to assume that other people do things for a reason helps us make sense of how natural selection has acted to produce animals that behave in certain ways. It is, in other words, a metaphor: we treat the process of natural selection as though it were a person, with beliefs, desires, and plans. Anthropomorphism creeps in, however, whenever there is slippage between evolutionary explanations for behavior and explanations of the proximate physiological and psychological mechanisms that actually produce it.

For example, if we argue that male frogs sit and call by a pond all night because they "want" to attract a mate and "know" that calling will entice females, we are using the words "want" and "know" in a purely metaphorical sense. What we're really saying is that calling has been favored by natural selection because it increases the males' chances of achieving a mating relative to males that do not call. It doesn't mean that male frogs literally "know" that they "want" a mate, that they "know" they must call in order to attract one, and that they "believe" that if they call, then a female frog is sure to appear. Making any of these assumptions is anthropomorphic because we're attributing a proximate mechanism to the frogs that is, in fact, our own.[18] Evidence in support of the former statement—that calling frogs have been favored over evolutionary time because they are more successful at attracting mates—does not provide any evidence or data regarding the specific nature of the mechanisms that lead male frogs to call at ponds on any given evening. There is a clear distinction to be made between this kind of "mock anthropomorphism," which refers to the metaphorical use of anthropomorphic language in evolutionary explanations, and "genuine anthropomorphism," which refers to our tendency to assume an animal's current motivations are the same as our own without any evidence that this is the case.[19]

Mock anthropomorphism is very similar to a philosophical position known as "the intentional stance."[20] Specifically, we can predict the behavior of an organism quite accurately by treating it "as if" it possessed "intentions"—human beliefs and desires that dispose it to act in particular ways. This is because—as just noted—natural selection produces animals whose behavior we can describe metaphorically as "desiring" mates and "wanting" to call in order to attract them. Importantly, these patterns are "real" and "go all the way down,"[21] which is why we can use the intentional stance so effectively—that is, when we attribute beliefs and desires to animals in a functional evolutionary context, this isn't merely wishful thinking or naive anthropomorphism on our part, but a successful strategy that picks out a highly relevant fact about how patterns of animal behavior are organized. Our very human, highly mentalistic, take on the world allows us to predict the behavior of other animals besides ourselves because, as we noted above, it just so happens to coincide with what evolution has produced. Daniel Dennett, the philosopher who developed the idea of the "intentional stance," refers to this as "the blind, foresightless cleverness of Mother Nature, evolution, which ratified the free-floating rationale of this arrangement."[22]

It should be apparent, however, that we run into the same problem with the intentional stance that we do with mock anthropomorphism (and of course we will, since they are one and the same thing), namely, that predicting behavior isn't the same as explaining it. Indeed, Dennett explicitly recognized this problem, referring to it as "the interpretative gap"—the chasm that exists between knowing that an organism will do something in a predictable fashion and explaining why this should be the case. If we don't keep the existence of this gap in mind at all times, it becomes all too easy, and very tempting, to assume that, because we have accurately predicted an animal's behavior by attributing certain beliefs or desires to it, then we have also shown that the animal really does possess such beliefs and desires. But all we have done is named the behavior; we haven't identified or explained the mechanism by which the animal displays a particular behavior given a particular set of circumstance.[23] To do this, we need to go beyond prediction to explanation, and this requires a completely different approach.

Using Anthropomorphism Wisely?

> When we find it helpful to suppose that animals have preferences, the way we think about them is not evidence that they think.
> —*Patrick Bateson*

Given that our anthropomorphic tendencies are often useful for identifying relevant evolutionary questions and their potential answers, we needn't (and indeed, couldn't) attempt to eradicate anthropomorphism completely from studies of animals.[24] What we do need to ensure is that we think more deeply about how we are asking questions, and what our use of language implies. Given that we have only human language to describe the behavior of other animals, we can't help but use anthropomorphic terms, but we can use that language very precisely so that it is clear whether we're talking about an evolutionary solution to a problem or about the actual physiological and psychological means by which the animal achieves a solution. When we read that natural selection has favored baboon females that "decide" to groom their oldest daughters because they "want" to protect their rank position, it is very easy to slip into thinking that the female baboon is consciously making that decision—that she is choosing this from a range of options that she has weighed up carefully and consciously—because that's how we make decisions, and also because female baboons sometimes do look as though that's what they're doing, if you spend long enough watching them. But if we have only the behavior and its fitness consequences, then all we can really say is that evolution has favored females who act in this way because they tend to leave more descendants than females who don't pursue this strategy. We simply don't know what goes on in the female's head. Our own "folk psychology" that we have used to make predictions about the female's behavior doesn't allow us to assume that we also understand something about the "folk psychology" by which one baboon understands another. If we want to find out why a female baboon grooms another right now—as opposed to why grooming evolved or why it enhances fitness—we require a different set of

questions and a different means of probing the animal's behavior to find the answer.

Prediction, Explanation, and Parsimony

If I seem to be laboring a point here, it is only because many critics of this kind of supposed "antianthropomorphic" position tend to attribute a more extreme view to its proponents than they actually present. A standard response to the arguments made by prominent critics of animal mental abilities[25] is to state that any opposition to attributing thoughts and feelings to other animals besides ourselves necessarily implies that animals are then treated as mindless automatons, robots, empty boxes, mere stimulus-response machines.[26] Having set up this straw man, they can then knock it down easily by expressing their incredulity that any reasonable person could hold such a position: Why do they want to deny animals these abilities? Are they perhaps afraid of their own animal natures? Are they arrogantly assuming that we are superior to the rest of the animal kingdom? The next move is to shift the burden of proof onto those who deny the similarity between our minds and those of animals. As Frans de Waal puts it:[27]

> As soon as we admit that animals are not machines, that they are more like us than automations [*sic*], then anthropodenial [the a priori rejection of shared characteristics between humans and animals] becomes impossible and anthropomorphism inevitable. Nor is anthropomorphism necessarily unscientific.

But this simply is a caricature of the actual arguments that can be made against a strongly anthropomorphic stance. First of all, to contrast "cognitive processes" with "noncognitive" stimulus-response machines or "automatons" is to generate a false dichotomy. This is because, broadly speaking, any process by which sensory input is transformed into behavioral output can be considered "cognitive," and so a stimulus-response mechanism is a legitimate "cognitive" process.[28] The alternative to assuming that animals think and feel as we do is not to assume that they have no cognitive processes at all. Rather, the more reasonable assumption is that an organism's behavior is driven by physiological processes (which include cognitive/psychological processes) that reflect the kind of nervous sys-

tem it possesses, which in turn reflects the kind of body it has, which in turn is influenced by the kind of ecological niche it occupies. If we accept this as a reasonable proposition, then anthropomorphism becomes inappropriate, not because of the adoption of a some warped moral position or anthropocentric arrogance, but because other animals have different bodies and different nervous systems, and live in different habitats. This means that, even though their behavior may look similar to ours in some way or another, it need not be produced by the same underlying mechanisms (and these need not be psychological, as we'll see).

Equally, if we attempt to understand other animals only by formulating our hypotheses in anthropomorphic terms, and ask only, "What would I do if I if I were a cat, bat, or bear?" we may fail to generate a sufficiently broad range of hypotheses to test because our cultural behaviors and moral codes will impinge on this process. Consider the problem faced by a female mouse with a new litter of offspring. She needs to get enough to eat so that she can fuel milk production, while avoiding being eaten herself by a predator while out foraging. Putting oneself in a female mouse's "shoes" might well help to generate predictions that females should restrict their foraging outside the nest to times when predators aren't around, or that they should hoard food so that they can remain in the nest for longer. As the neurobiologist Mark Blumberg suggests,[29] however, it is highly unlikely that this kind of anthropomorphic projection would ever generate the hypothesis that a female should lick the anus of her young, and then eat and drink its feces and urine, as a means of regaining vital nutrients, which is the strategy that female mice actually adopt.[30]

Evolutionary and Cognitive Parsimony

One tactic used by defenders of anthropomorphism to circumvent these kinds of arguments, at least when comparing humans with other primates, is to appeal strongly to evolutionary relatedness to help them out. As Frans de Waal argues, given that humans are so closely related evolutionarily to the apes—and to chimpanzees in particular—then, if we see a behavior in a chimpanzee that looks like our own, we should be safe in assuming that similar underlying cognitive processes produce that behavior. After all, "given that a mere seven million years separate

us from our chimpanzee cousins it seems most parsimonious to assume that behaviors that look the same are driven by the same processes that they are in humans."[31]

A second tactic is to make an appeal to cognitive parsimony. Cognitively simpler explanations based on "associative learning" (for example, a chain of learned stimulus-response associations between individual components of behavior) are argued to be less parsimonious than the cognitively more complex "representational" explanations they are designed to refute.[32] Here again, we should first note the false dichotomy made between "associative learning" and "cognition": associative learning is a feature of many, if not most, "cognitive" mechanisms, rather than a mechanism in itself, so asking whether something is (a) the result of "associative learning" or (b) "cognitive" is unhelpful because it is simply a confusion of logical types. Having falsely separated "associative learning" from "cognitive processes" in this way, proponents of cognitive parsimony proceed to argue that, if associative mechanisms are the only ones involved, then, to explain a complex behavior, the chain of individual associations will need to be so long, and the likelihood of all the contingent events occurring in exactly the right order will be so remote, that associative explanations actually end up being far less parsimonious than explanations that infer a more complex cognitive (and often more explicitly anthropomorphic) mechanism.[33]

Using both these tactics, de Waal argues that it is, therefore, more reasonable to accept that an animal whose behavior shows evidence of a "rich inner life"[34] is indeed possessed of one—which was exactly the argument made for the unfortunate Santino. Now, it may be more parsimonious to do this, but is this really what we're aiming for? After all, a simple explanation is not necessarily a virtue in and of itself. The real question is this: do we enhance our scientific understanding by adopting this stance? I suspect not, for the following reasons.

Why Evolutionary Parsimony Is Not a "Get Out of Jail Free" Card . . .

Let's take evolutionary parsimony first. On the one hand, given the nature of evolutionary processes, it is entirely reasonable to hypothesize that, in general, cognitive processes will be more similar between closely

related species than between those that are more distantly related. On the other hand, we still have to acknowledge that this is a hypothesis to be tested; one cannot simply assume that it is true. This is because, first, our own introspection about how our own minds work need not be an accurate guide to how they actually do work. Our decision making may be much simpler than our conscious self-monitoring suggests.[35] If so, our anthropomorphizing will be doubly wrong: it assumes we understand our own cognitive mechanisms, and it then attributes this inaccurate and imperfect model to other species. A second, related problem with using behavior as a guide to our psychology is that there are many instances where behavior can be explained by more than one mechanism, and it is often very difficult to tell which one is operating in any particular instance through the observation of behavior alone.[36] The behavior seen in another species may well be consistent with the operation of some characteristically human skill—like attributing thoughts and beliefs to another individual or forward planning—but we cannot exclude an explanation based on different psychological mechanisms altogether. How, then, can we be sure that we've interpreted the behavior correctly simply by using our imperfect understanding of our own behavior as a guide? And how much more difficult is this task when we're dealing with animals that have flippers instead of hands, or can use their legs in the same way as their arms, or navigate the world using echolocation?

Another reason to be cautious about arguments based on evolutionary parsimony is that, just because, given a four-billion-year history of life on earth, seven million years is quite short, it is still a pretty long stretch of time during which significant evolutionary change is possible. Although many successful traits are, indeed, conserved across time (e.g., yeast and human beings digest sugar using exactly the same biochemical mechanisms), evolution is also a process that generates diversity. Studies on the Y chromosome of humans and chimpanzees, for example, suggest that "wholesale renovation is the paramount theme," with enormous differences in both sequence structure and gene content across the two species.[37] Given findings like these, it is prudent to consider alternative hypotheses relating to evolutionary divergence in species' capacities, even when the time spans seem relatively short. After all, just over two and half million years ago there was no such thing on the planet as a *Papio* baboon,

whereas today there are at least five subspecies distributed across the whole of Africa, displaying quite distinct behavioral differences.[38] Given this, and given the divergence seen in Y chromosomes, it seems equally reasonable to suppose that, in the seven million years that separate us from the chimpanzees, there has been the potential for a significant amount of evolutionary change in both lineages, in all sorts of traits, including those relating to cognition.

Consider working memory. Chimpanzees have been shown to be far superior at tasks requiring them to reproduce a certain sequence of numbers after having them flashed briefly on a TV screen. Unlike the humans tested, the chimpanzees were both amazingly fast and impressively accurate at reproducing the correct sequence.[39] Working memory capacity in the chimpanzee line has clearly been under different selection pressures from those affecting the human lineage, so why not other kinds of psychological mechanisms as well?

. . . And Why Cognitive Parsimony Isn't One Either

This brings us to cognitive parsimony. What constitutes a "parsimonious" explanation is something of a movable feast in the field of animal psychology. In part, this reflects how researchers choose to interpret the nineteenth-century animal psychologist Conwy Lloyd Morgan's famous "canon":

> In no case may we interpret an action as the outcome of a higher psychical faculty, if it can be interpreted as the outcome of one which stands lower on the psychical scale.[40]

As such, it sounds very like the general principle known as Occam's razor, which states that "entities must not be multiplied beyond necessity"; as it is usually understood, the simplest explanation for a phenomenon is likely to be the correct one. Morgan's canon is generally assumed to be a similar "principle of parsimony" applied to animal psychology, and hence it is a recommendation that we always accept the simplest possible psychological explanation that accounts for the facts.

Interestingly, given its widespread acceptance, this interpretation is incorrect.[41] As Morgan himself made clear, simplicity should not be the measure of the correctness of an explanation because "we do not know

enough about the causes of variation to be rigidly bound by the laws of parcimony [*sic*]."[42] Instead, Morgan developed his canon to make the point that, because other animals have very different sensory capacities from our own, and so encounter the world in very different ways, we should endeavor to exhaust every possible alternative explanation for their behavior before we can assume it results from psychological mechanisms similar to ours. Morgan saw no problem in attributing "higher faculties" to other animals, providing there was independent evidence to support such an attribution,[43] and he certainly didn't believe one should stick with the simplest explanation purely as a point of principle.

Despite being quite clear on these points, Morgan's canon is frequently misinterpreted as advocating exactly this kind of strictly parsimonious approach, but what then counts as parsimony is often a matter of taste. As we noted above, the convoluted nature of so-called associative learning accounts can make such explanations appear less than parsimonious, despite the simplicity of the underlying psychological mechanism. In contrast, more "cognitive" strategies, although less parsimonious in terms of the level of psychological complexity proposed, have the virtue of appearing simpler to implement and achieve than the formation of long chains of contingent associations. Accordingly, both sides of the "associative-cognitive" divide can claim parsimony as their ally on the grounds of simplicity. But the question we have to ask is this: simpler for whom? It is certainly simpler for us to understand behavior when it is described in terms that appeal to our own folk psychology, but does that really trump an argument for a simpler mechanism that happens to require a more convoluted route? Not at all. As Morgan himself noted, applying his canon anthropomorphically can mislead us:

> [B]y adopting the principle in question, we may be shutting our eyes to the simplest explanation of phenomena. Is it not simpler to explain the higher activities of animals as the direct outcome of reason or intellectual thought, than to explain them as the complex results of mere intelligence or practical sense experience? Undoubtedly, in many cases it may seem simpler. It is the apparent simplicity that leads many people to naively adopt it. But surely the simplicity of

> an explanation is no criterion of its truth. The explanation of the genesis of the organic world by direct creative fiat is far simpler than the explanation of the genesis through the indirect method of evolution.[44]

That is, although a long chain of associative responses might seem more convoluted to our eyes, and an anthropomorphic explanation much simpler, we can't decide that the latter is, in fact, more likely, based on these grounds alone. As Morgan notes, it is also much simpler to explain the existence of the organic world through the assumption that God created it in six days, than as a result of the long, slow, convoluted process of evolution, but that is no reason to accept the former explanation over the latter. As clunky and unparsimonious as it may seem, it is possible that long chains of associations are exactly the way in which many skills are learned, and complex behaviors are brought about.

Parsimony, in other words, is a red herring. It simply doesn't allow us to decide the argument one way or the other. We have to go out and test hypotheses, not simply make assumptions. If we don't test hypotheses concerning both simple and complex mechanisms rigorously and unambiguously, then we'll never know whether a more complex explanation is truly justified (especially as the power of associative learning is vastly underestimated by many of those who argue against these kind of explanations; associative learning processes have been shown to produce neural networks that can comprehend the meaning of written text, for example).[45]

A related point here is that so-called cognitive interpretations of behavior are almost inevitably pitted against the simplest possible stimulus-response forms of learning. But as we've already discussed, the opposite of a highly cognitive account of an animal's behavior is not one that posits no cognitive processing at all: first, because associative processes are themselves cognitive, but also because there are other mechanisms that can give rise to complex behavioral phenomena. As we'll see, "unfeasibly" long chains of simple associations are not the only means by which animals can produce complex and smart behavior, and it simply isn't true that the only alternative to convoluted associative chains is a heavily anthropomorphic account of psychological processes. We have

to consider cognition more broadly—as the way in which animals come to know and engage with their environments, and not simply as a matter of having internal "thought processes" that are more or less similar to our own.

Minding the Gap

> The mind is like a parachute—it works only when it is open.
> —*Frank Zappa*

So those are the problems as I see them with an "anthropomorphic" approach to animal cognition and behavior. Of course, if what we want to do is ensure that chimpanzees, and other animals, are treated humanely and not exposed to potential pain and suffering, then assuming that they think exactly like us is a reasonable and defensible position. Even if they can't experience suffering, it doesn't really matter—either way, we have done no harm. In addition, it may well help us feel better as humans to treat all animals humanely, regardless of their actual capacities, so we could even be justified in doing so for these egocentric reasons alone.

If our aim is not merely to prevent potential animal suffering, however, but to understand something about the cognition and behavior of another species, then this strategy just won't do. This is not because anthropomorphism is an inherent sin, but because it does no good to merely recognize the dilemma presented by the interpretative gap, but then plow on regardless and plump for the anthropomorphic side of the argument. If we insist that other animals think and feel almost exactly as we do—or as close as makes no difference—and we can therefore explain their behavior in human terms, then we deny the animals their own voice: we impose our views on them, instead of allowing their view to be revealed to us (to the extent that we are able to appreciate it). We may do so to flatter them by allowing them human characteristics and, in so doing, flatter ourselves, but even if we don't do it for these reasons, even if our intentions are "pure" and we truly believe we are correct, the outcome is the same: we lose our ability to appreciate

the animal on its own terms, and our chance to understand another way of being in the world. For scientists, the job is to jump into the interpretative gap, with all the difficulties this presents, and see how far we can explain, and not just predict, why animals do what they do when they do it.

My aim here is to attempt to shed some of the inevitable anthropocentric biases that can lead us astray, in the hope that this will help level the playing field so that we can view animal behavior and psychology—including our own—with new eyes. This simply means asking what it means to be any kind of animal, and not whether other animals are more or less like us. In some ways, then, the argument here is not really against anthropomorphism at all. The real point I'm making is that we should be wary of making premature assumptions about the level of mechanism needed to explain any particular instance of a behavior. Anthropomorphism is really just the symptom of a deeper problem: that of assuming that complex behavior and complex cognition are necessarily linked, and that only the latter can give rise to the former. All I want to do here is illustrate that this isn't the case.

Given what I've just said, it should also be clear what I won't be doing. But, just to be on the safe side, let me lay that out too: I'm not arguing that other animals do not share any of our psychological and behavioral traits, nor I am saying that only humans are clever and other animals are stupid. I am not trying to defend some kind of human superiority or specialness, and I am not writing this because I feel threatened by the notion that humans are an integral part of the animal kingdom or by the fact that we share a common evolutionary heritage with other nonhuman species. I'm not attempting a comprehensive survey of comparative psychology and cognition, and I'm not attempting to reinterpret all previous work in light of the ideas presented here, but to give no more than a brief glimpse of how some of these new approaches (and indeed some very old ones) might pay dividends. All I want to do is show how a broader perspective—one that isn't particularly concerned about whether other species possess nifty humanlike skills—allows us to appreciate other animals on their own terms, and that a reduced focus on the nature of animals' "inner lives" and greater attention to how their brains, bodies, and environments work together will give us a deeper understanding of how intelligent, adaptive behavior is produced.

Before we embark on this, however, it is worth considering the issue of anthropomorphism in a little more detail, and exploring why we are so prone to it. After all, it is well known that the first step toward changing one's views on an issue is to understand it better. A brief exploration of this topic is not only useful but also intriguing in its own right as a glimpse of an area full of fascinating research.