

What is it that makes us human? We think and reason, we build and destroy, we develop and invent, we feel and believe. Scores of philosophers and scientists through the ages vehemently claim our exclusive ownership of these experiences. The beliefs and creeds of theology have shaped much of human opinion regarding consciousness. More recently, mankind has gained the ability to gather evidence about subjective mental states in an objective way. From these combined ideas, we are better able to determine what distinguishes our consciousness from animal minds. Differences remain; but from modern discoveries, we've realized that animal consciousness reaches much farther than we thought.

But what do we really mean by consciousness? The subjectivity of consciousness makes it resistant to solid definition. If anything, it seems like a spectrum; "conscious" and "unconscious" have no clearly marked line between them. Consciousness as a quantitative attribute is composed of several components, many of which are quantitative themselves. To establish a working definition of conscious-ness, we must briefly consider some of these aspects and their relative importance. I don't intend this list to be exhaustive, nor do I claim any scholarly consensus on the following hierarchy. My purpose here is to provide a system of gradations by which we can roughly evaluate the extent of animal consciousness.

Seven levels of consciousness

To start with the bare minimum requirements, it seems that any conscious entity must have at least one way of gathering information from the outside world. We will call this first level of conscious-ness sensation. "Sensation" here is by no means restricted to the five sensory modalities we find most salient as humans, even though we share one or more of these with most animals. Echolocation, the sonar system used by several bat and whale species, is only one example of a non-human sensory apparatus that certainly qualifies as gathering information.

Once stable systems of sensation are implemented, an organism must learn to prune away the unimportant and deleterious components. Evolution has done the lion's share of the legwork here: genes

that give rise to burdensome, faulty, or inefficient sensory machinery often meet their end in a predator's digestive system. Thus, many destructive habits that could damage an individual's safety were selected out long ago. Despite the benefits this brings, every creature needs a quality control system that is many times faster than the ten-thousand-year pace of natural selection. This system must enable the animal, at any given time, to filter out unnecessary stimuli and focus their energy on what is most important. We call this system attention; and because attention dictates what information enters awareness and what does not, it is dubbed the second level of consciousness.

Attention is indeed vital to the efficient reporting of an animal's world, but it lacks a degree of permanence. It would be tiresome, indeed perilous, for a beast to require constant updating of its behavioral schema in order to live out each day. It makes sense for repeated patterns of feeding, finding shelter, and avoiding predators to be available for quick recall. The proper storage of data obtained from sensation and attention is the essence of learning and memory, the third level of consciousness. Messages can be encoded into the neuronal circuitry of brains, or they can be stored simply in the base-pairing language of genes. The self-replicating nature of genes, and the reproductive behavior they have evolved to stimulate, echo ideas from Judeo-Christian theology of the necessity to multiply (see Genesis 1:22). The sophistication and specificity of memory is certainly not constant across the animal kingdom, but no species could thrive without a repository of knowledge.

Thus far we have focused on the processing of outside stimuli by the individual. Yet, few if any animals can subsist without interaction among their own kind. Food, shelter, and safety are almost always easier in groups, and this utility is only made possible by the exchange of information between its members. Once information is received, sorted, and stored, it must be transmitted to allow this vital collaboration to occur. Communication, therefore, is the fourth level of consciousness, and takes on a sort of shared awareness of the status quo. Bees perform their waggle dance, birds undergo complex mating

rituals, and humans write great questions essays, but all help to fulfill the never-ending mission of the replicators: to survive and multiply.

The fifth level of consciousness brings with it the experience and perspective that many perceive to be of a uniquely human character. After all, the previous skills we've discussed often do little to dissuade one from the image of animals as automata, merely performing the gene-programmed behavior patterns necessary to subsist and grow. Sparks of light may appear here and there; but for the most part, communication is crude, memory is basic, and we observe no semblance of real awareness. It is when animals exhibit self-recognition that our prejudices begin to break down. Dolphins, apes, and elephants have all shown compelling evidence of having a true mental conception of themselves in relation to their environment. Along with this comes the appearance of personality: likes and dislikes, pleasure and pain, changes in mood, long-term relationships, and many other traits that we cannot so easily attribute to DNA and natural selection. Self-concept seems to be a critical point of separation between man and beast, and we will later delve into the subject further.

One of mankind's championed accomplishments is the ability to conceptualize ideas that have little or no connection to reality. This habit of abstract thought is the sixth level of consciousness. It finds a welcoming habitat in the arts and humanities, providing intellectual scaffolding for fictional worlds. It has also taken up residence in mathematics and science, allowing seekers of universal truth to hold the hand of theory and hypothesis until they can stand on the firm foundation of data and understanding. If abstraction is inherently ethereal, though, what form would it take in the wild? We likely won't find a coven of chimpanzees deep in Socratic discussion about the cave allegory, but things like planning and creativity could show signs of a creature constructing a mental representation of something before bringing it to fruition. Succeeding pages will give a more thorough treatment of both behavioral and neuroanatomical data that give us a glimpse into animal minds.

Morality, the seventh and final level of consciousness, is likewise difficult to objectively evaluate. Behaviors exist that seem indicative of a sense of fairness or sacrifice in both humans and animals, but can we discern the motive behind those actions? How do we know whether an individual is doing a favor out of a sense of altruism, or if he does so expecting repayment in the future? Theology, of course, has shaped much of human opinion regarding the presence of animal morality. On the surface, Western religious teachings appear to deny an awareness of right and wrong to nonhumans. Meanwhile, Eastern traditions blur the moral lines between beast and man, often exalting humble creatures as shining examples of correct behavior. Later, we will examine theological arguments from both sides, as well as the evidence provided by evolutionary and behavioral studies.

Having set definitions, we are nearly in a position to begin evaluating consciousness in animals. There first exists a caveat, a flaw in human nature that must be briefly addressed. Humans have an overwhelming tendency to judge their world by their own standards. This is only to be expected; what other standards could we use? However, this introduces a sort of systematic error in our investigation of animal consciousness. *Homo sapiens* has a primary visual sense, emphasizes speaking and writing heavily, and is dominated by numbers, quantity, and measurement. In behavioral assays of animal awareness, we often overfocus on these aspects of our subjective experience of consciousness, a habit called human chauvinism. Throughout the essay, I will point out potential examples of human chauvinism and give ideas to help us adjust for it in animal studies.

How far have the animals reached?

It is quite obvious that every animal has at least one sensory system, with the vast majority possessing several. No creature could survive without sensation. Attention, too, seems universally fulfilled: mammal, fish, and fowl all exhibit time-related patterns of behavior such as feeding, sleeping, and mating. Whether these habits are due to instinct or conscious choice, every beast is able to detect a biological need and specifically attend to it. The ability to learn and remember has no counterexample.

From the early stages of life, most animals know where to find food and how to find their way back home. Even migrating birds and salmon, which spend long periods of time away from their origin, have an uncanny ability to return to exactly where they departed, to our utter fascination.

Communication is a widely shared attribute of behavior. Many species of aquatic animals may be hatched or spawned far from their parents, but even they find or form a communal group quickly. Being in isolation for too long is simply dangerous for an animal; it is almost always more beneficial for each individual to participate in a congregation. The sharing of food, mates, or shelter may result in a loss to an animal's fitness, but sharing of information is synergistic. The ability to pass knowledge from one member of a group to another is therefore not just helpful for survival; it is necessary. Later, I will examine what we can learn from the sophistication of certain constructs of animal language; but for now, suffice it to say that every species can share information in some way, however crude.

From our brief examination, it seems so far that almost all animals have attained a degree of conscious awareness that enables communicative behavior. As we begin to discuss self-awareness, abstract thought, and morality (together referred to hereafter as "higher consciousness"), we begin to tread upon the territory of what makes man "[differ] so greatly in his mental powers from all other animals" (Darwin 34). This separation is a gray area, delocalized over several of the aspects of consciousness set forth earlier. Before we can give a thorough treatment to the issue of higher consciousness, however, there are questions that need to be answered. First, I will examine the idea of a "seat" of consciousness from several angles, including the behaviors and teachings that gave rise to different perspectives. Then, I address the subject of human dominion upon the earth, what our dominion implies, and what really makes us different from the animals.

Does consciousness have a residential address, or just a P.O. box?

In the thousands of years before humans developed the technology and scientific methodology to objectively evaluate consciousness, religious tradition shaped our attitude of animal awareness. Not

surprisingly, theological authorities often take an all-or-nothing standpoint with regard to animal consciousness. Hindu and Buddhist traditions tend to assert little or no separation between our sense of being and the animals' experience, largely due to the doctrine of reincarnation. Islam also emphasizes the shared identity of beasts and humans: "All the beasts that roam the earth and all the birds that wing their flight are communities like your own" (Quran 6:38). Even Jewish doctrine reinforces the spiritual independence of animals. In contrast, classical Christian teachings frequently deny the higher consciousness of animals, though several theologians diverge from the historic anthropocentric view. Most major world religions hold a dualistic view of the mind of man. Each individual is composed of a body and a spirit; the spirit is usually thought to be the seat of man's being. How does this translate to the animals? In Hindu and Buddhist traditions, the transition is quite seamless: "Across incalculable ages, each *atman* [soul] has moved from birth to birth, from body to body, dwelling in billions of individuals from innumerable species" (Kemmerer 62). This further reinforces the soul as the location of awareness: it is eternal, while bodies are temporary habitations. Additionally, reincarnation creates an overwhelming sense of oneness with all other living beings. If the soul, the seat of consciousness, is no different in a man than in a deer or dog, then consciousness itself must be remarkably constant across all species. The soul in Islamic teaching lacks the fundamental sameness that comes from the doctrine of reincarnation; but despite the difference in approach, Muslims need not suppose that animal spirits are any different from man. "The Islamic universe is connected through creation, through a common Creator; all that exists comes from Allah, and all beings return to Allah" (Kemmerer 249).

Christian and Jewish traditions also teach that everything in the universe originates in God, but there is some disagreement as to the nature and existence of animal spirits. Jewish tradition, specifically the Torah, provides a greater position for the animals in God's plan than Christianity. The doctrine of *nefesh chaya* (Hebrew for "living soul" or "living being") refers to the "breath of life" spoken of in the creation story in Genesis 1. "...all animals are given the breath of life in the act of creation", and "nowhere in the

Tanakh does the Creator provide humans with an essentially different nature or sub-stance” (Kemmerer 182). Interestingly, Hasidic Jews speak of the trans-migration of souls, a doctrine strikingly similar to the reincarnation of Hindu and Buddhist lore. Concepts like these help dissolve the boundary between man and beast.

Christian theology is among the most hostile towards the possibility of animal consciousness. Like Jews, Christians believe that God gave Adam and Eve dominion over all the earth (Genesis 1:26). However, many believers have used scripture to extrapolate the notion that animals were created solely for the use of man, and that man is inherently better than the rest of creation. The prominent Cartesian view held “that the absence of rational soulfulness [in animals] also meant the absence of a subjective self. Animals became classed as automata, machines” (Linzey 8). This idea is echoed in the words of John Locke: “Beasts abstract not” (quoted in Sagan 107). Jesus clearly taught of a difference in value between God’s children and the rest of His creations (see Matthew 6:26, Luke 12:6-7).

However, contemporary Christian theologians seek to call attention to existing teachings to help believers shift their attitude from one of dominion to one of service and stewardship. Proverbs 12:10 reads, “A righteous man regardeth the life of his beast, but the tender mercies of the wicked are cruel.” Christians are well familiar with the loving and compassionate example of Jesus towards the weak and downtrodden of his day, but they rarely think of the weak and downtrodden as animals. Christian scholar Andrew Linzey encourages a view of Christ’s love that includes animals: “God loves the whole world. What we see in Jesus is the revelation of an inclusive, all-embracing, generous loving” (Linzey 23). Linzey argues that Christ’s love and suffering extends to animals, giving them value similar to man. “Christian exemplars (most frequently Catholic saints) have spoken of and demonstrated love for the natural world as servants of God” (Kemmerer 106). Hagiographies (stories of Catholic saints) often depict their subjects living in harmony with the natural world, communing with and sometimes conversing with remarkably intelligent animals. Several Christian denominations are quite open about the existence of

animal spirits, as mentioned in Mormon scripture: “the spirit of man in the likeness of his person, as also the spirit of the beast, and every other creature which God has created” (D&C 77:2).

From these examples, we see that even humanocentric theologies contain teachings respecting the spiritual efficacy of animals, even if these doctrines are rarely mentioned. Theologians like Linzey are helping dismantle the human chauvinism that exists in religion. Similarly, biologists in recent decades have made substantial progress in supplying neurological and behavioral evidence for higher consciousness in animals. Data from behavioral science came earlier, of course; but recent advances in neuro-imaging technology and genetics have helped us to identify the neural structures that may be responsible for the intelligent behavior observed in many species.

For decades, science has held that the majority of higher consciousness is contained in the neocortex. The neocortex is the latest brain structure to evolve (hence the Latin “new bark” or “new rind”). Its inception was an abrupt, “punctuated” event, occurring at about the same time in history as the evolution of mammals. We hypothesize this because the neocortex and the class Mammalia are integrally connected; if an animal has a neocortex, it is a mammal, and vice versa, with few exceptions (Karten). Throughout evolutionary time, the neocortex has become more convoluted and sophisticated, able to store more information (or so we think). We share the most developed neocortex primarily with primates, dolphins, and elephants, suggesting that this structure evolved several times independently. Of course, the idea that the neocortex alone is responsible for our advanced faculties is partially due to human chauvinism. Some of this association is likely correct, but until recently, science has lacked the neuro-anatomical data to point out other brain regions that play a part, regions that many more animals have.

Harvey Karten of the University of California-San Diego is a key player in the field of comparative neuroanatomy, connectivity, and histochemistry. He contends that, since plenty of birds exhibit intelligent behavior equal to most mammals, there must be other brain structures contributing to that intelligence. His research seeks for the kind of microarchitecture involved. Much of his findings have centered on the

dorsoventricular ridge (DVR) in birds, a structure that is admittedly less complex than the neocortex (it has three layers instead of six), but is definitely not the basal ganglia, the evolutionarily “old” brain we share with them. Through studying connectivity and microcircuitry, Karten postulates that much of the difficult cognitive tasks birds complete (such as visual discrimination, object recognition, and movement planning) are done in the DVR just like they are done in the neocortex for mammals (Karten).

Neuroscientist Ryan Remedios has found that the claustrum, a thin subcortical region found in mammals, has a great deal to do with complex movement coordination and planning. His research is based on Daniel Dennett’s speculative model of the Cartesian theater of consciousness, in which Dennett explores the possibility of a single neural region that is the culmination of many electrical inputs and the origin of many electrical outputs. Using connectivity data, Remedios has found that this explanation is not far from the truth, at least for the case of bilateral motor control in mammals. Research like Remedios’ makes the claustrum heavily implied in the conscious control of mammalian behavior.

What is the significance of these findings? The recurring theme is that consciousness is much more abundant and widespread than we previously thought. Traditional opinion has held for many years that intelligence is the unique signature of the neocortex, and its evolution was only found on the evolutionary path of the primates (Reiss). Many laymen, of course, still cling to this view, but experts on consciousness and cognition are beginning to diverge by the dozens. Remedios, Karten, and twelve other researchers were recently part of the signing of the Cambridge Declaration on Consciousness, a definitive statement of their developing paradigm of animal consciousness. Their concluding testimony:

“The absence of a neocortex does not appear to preclude an organism from experiencing affective states. Convergent evidence indicates that non-human animals have the...substrates of conscious states along with the capacity to exhibit intentional behaviors. Consequently, the weight of evidence indicates that humans are not unique in possessing the neurological substrates that generate consciousness.

Non-human animals, including all mammals and birds, and many other creatures, including octopuses, also possess these neurological substrates.” (Low et al)

Intelligent behavior

With the biological argument posited, let us focus on some of the “intentional behaviors” the researchers suggested. I will highlight three here: tool use, self-recognition, and language. All of these, until fairly recently, were thought to be either completely limited to humans or far more sophisticated in humans (yet another example of our human chauvinistic attitude). Newer studies are proving just how wrong we are. As the real occurrence of tool use is somewhat controversial, I will use a previously published definition of tool use: “the use of physical objects other than the animal’s own body or appendages as a means to extend the physical influence realized by the animal” (Kamil 1976). Essentially, it is considered tool use when an animal uses an environmental object as an extension of its own body. Tool manufacture, the altering of an environmental object to suit an intended purpose, is thought to be an even higher form of cognitive functioning, and is much rarer than tool use.

One of the most long-standing and well-known examples of animal tool use is the employment of long grass blades by chimpanzees to forage for termites. Chimps have also been observed stripping leaves off of twigs to make them suitable to fish for insects, making them tool manufacturers as well. While chimpanzees have arguably the best-documented history of tool use, there is certainly no shortage of evidence in countless other primate species. And lest we think this trait is confined to our most closely related ancestors, consider that Asian elephants use branches to scratch themselves. Dolphins often place marine sponges on their snouts to protect them while feeding, endangering our prejudice of land mammals as tool users. Galapagos finches use cactus spines to extract insects from enclosed spaces, and New Caledonian crows have been observed making complex tools from twigs, giving evidence to an evolutionary path contributing to higher intelligence in birds. Even invertebrates have isolated examples of tool use, the most prominent being the removal, transportation, and eventual sheltering use of discarded

coconut shells by the veined octopus. This is only a brief summary of what has been observed in the animal kingdom, but evidence like this helped to overturn the long-standing assumption that humans are the only tool users.

A crucial indicator of higher intelligence in an animal is its ability to identify itself as a part of its own world. Such a capacity may not reach the degree of self-awareness we experience as humans, but the more we study behavior, the more we realize it shares certain similarities with our own perception.

Probably the most widely known examination of animal self-awareness is mirror self-recognition (MSR). Much can be inferred of an animal's sense of self by its behavior exhibited upon seeing its reflection. A subject's possible responses include paying no attention to the mirror image, acting as if the reflection is another animal, and investigating visual data in connection with the animal's own movements. The last item is referred to by Diana Reiss as "contingency testing", in which an animal compares the sight of its movements to its own proprioceptive sensing. Reiss contends that this in itself is not self-awareness, but a vital precursor nonetheless (Reiss). The real evidence of a self-concept is when we see animals displaying self-directed behavior. Observing parts of the body that an animal cannot see without a mirror is a good example of this, but more compelling evidence of self-recognition is found in the mark test.

The mark test is performed with an animal subject with previous exposure to its own reflection.

Researchers place a visible, non-toxic mark on a part of the animal that it cannot see without a mirror. In early stages of viewing the mark, the subject will spend long stretches of time focusing its vision on the mark. Apes and elephants will often attempt to remove the mark, while dolphins obviously cannot do so. Repetitions of the mark test usually result in the subject rapidly moving to the mirror to view the location and nature of the mark. As a control, Diana Reiss' group "marked" a bottlenose dolphin with water, giving the dolphin the impression it had been marked without the visible sign. As expected, the dolphin rushed directly to the mirror and began contorting and gyrating its body in a vain endeavor to visualize it (Reiss). In each situation, we see clear evidence that the animal had correctly identified the image in the

mirror as “self”, and had some concept of its own ability to manipulate its appearance with respect to the mark.

While Reiss’s team has focused on the bottlenose dolphin and Asian elephant, other researchers have given evidence for killer whales (Delfour et al) and magpies (Prior et al) passing the mirror self-recognition test. Such data pressures us to reevaluate our position; not only is self-concept not the prize of the primates, it may not even be specific to mammals. Critics of MSR may lead the way to an even wider range of animal self-awareness. Since mirror self-recognition relies on vision being a primary sense of the subject animal, we may be making anthropocentric conclusions about self-concept in animals who perceive the world with sound or smell as their main vehicle. Until we begin to develop and use tests that adjust for the non-visual paradigm of dogs and other species, we are very likely leaving out enlightening examples of self-concept in the animal kingdom.

Mankind’s fascination with the concept of talking animals has been around for millennia. Accounts of humans conversing with beasts can be found in every major religion. The Book of Jubilees, an ancient Jewish religious work, describes the ability of animals to speak in the garden of Eden: “for they had all spoken with one another with one lip and one tongue” (3:28). From the Christian tradition, Biblical scripture and several Catholic hagiographies feature stories of animals speaking in human language, and the regular vocalization of animals is often thought to be their giving praise to God (Kemmerer). Indeed, in Revelations 5:13, the apostle John hears and understands the animals glorifying their Lord; of this account, Mormon prophet Joseph Smith remarked, “John heard the words of the beasts giving glory to God, and understood them. God who made the beasts could understand every language spoken by them” (Smith 343). Islam, Hindu, and Buddhist stories are rife with animals instructing humans in the ways of wisdom and righteousness, especially Hinduism, as the Hindu deities often appear as animals or part-animals (Kemmerer). But are all of these accounts merely stories, or is there concrete evidence of animals having linguistic ability like humans?

Linguistic ability, yes; the “like humans” argument, however, is hard to support. Granted, it’s common knowledge that parrots and several other bird species can articulate speech. And once we got over our human chauvinism and realized that communication need not be vocal, numerous other primates flourished in the education of American Sign Language. Critics argue that these examples of animal language are merely imitation for a reward, a result of operant conditioning. But experimental method-ology with individuals like Alex the parrot has shown that some animals are capable of understanding concepts of number, making relationships between objects, responding to requests, and making inquiries of their own (Pepperberg).

The main rift in linguistic propensity is that of vocabulary size. The best trained parrots and apes have maximized their vocabulary at a few hundred words. This achievement in itself is remarkable, seeing as a wild animal would hardly need to express more than a couple dozen ideas to communicate and survive. But human language has reached a diversity that no other animal has achieved. The average adult vocabulary contains over ten thousand words (Zechmeister et al), dwarfing the vocabularies of the best lab animals. As we compare the skills and behaviors recently highlighted, there may be more in common than anyone expected, but humans still show superior performance. We now turn to the discussion of differences: why are humans dominant upon the earth?

Man’s dominion: What makes us different?

By whose definition do we have dominion? Old Testament scripture, significant to Jews, Christians, and Muslims, clearly gives the monotheistic God’s answer: “Let them have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth, and over every creeping thing that creepeth upon the earth” (Genesis 1:26). Of course, interpretation of this scripture ranges from selfish superiority to compassionate stewardship, but an overseeing responsibility (or privilege) is definitely indicated. Hindus and Buddhists carry a different sentiment. They often view animals as vehicles of the divine; indeed, animals are sometimes objects of worship and veneration

(Kemmerer). The Eastern view of man as a servant to the earth and its inhabitants is compatible with the monotheistic view of dominion, provided that the purpose of man's dominion is interpreted as a mandate to preserve and protect. The creation story later includes God's commandment to man to "replenish the earth, and subdue it" (Genesis 1:28), which suggests a nurturing relationship between our species and all others. Regardless of what our dominion implies, the fact remains that the human race has made such progress and development that no species could overthrow our rule (except, perhaps, our own). Where did this dominion come from, and what really makes us different from other animals?

Evolution and natural selection bring a lot to this argument. Carl Sagan, in addressing the question of the separation of mental prowess between man and ape, has this to say: "One possible answer, it seems to me, is that humans have systematically exterminated those other primates who displayed signs of intelligence. ...We may have been the agent of natural selection in suppressing the intellectual competition" (Sagan 124). Sagan's speculative proposal is based on archaeological finds of weapon-like tools, as well as skeletons of humans and near-humans found with holes in the skull. It is somewhat of a stretch to say that these holes were inflicted by non-human predatory brute force; such a blow would fracture, not leave a gap. Sagan goes on, "In Pliocene/Pleistocene times there was almost certainly a vigorous competition among many manlike forms, of which only one line survived—the tool users, the line that led to us" (92). Some have questioned the possibility of early man gaining dominance through tool and weapon use, as the archaeological evidence supporting the linkage is scant. Whether through tool use or other means, however, intelligence confers such an advantage upon its possessors that it remains a viable evolutionary explanation for our superiority over other species.

Another aspect of the difference between man and beast is rooted in Judeo-Christian teachings. As I have already discussed, the Hindu/Buddhist doctrine of reincarnation creates an all-encompassing feeling of oneness between man and beast, but monotheistic traditions are more clear about a separation in spiritual identity. The Hasidic Jewish belief of the transmigration of souls resembles reincarnation, but as Jewish

mystic Isaac Luria points out, there's a certain degree of morality connected to it: "Not all souls, [Luria] argued, transmigrate into the bodies of animals—only the souls of the wicked who are compelled to take on animal form. In this way they are able to cleanse themselves by being lowered to the level of plants or animals until they become purified" (Cohn-Sherbok 43). Thus, if the bodies of animals are only inhabited by the wicked, there's a definite moral inferiority of the beasts as compared to man. Eastern teachings of reincarnation follow a similar vein; there are some species that are of higher value than others (cows, for example, are especially elevated in Hindu thought).

Christian theology, in speaking of the human/animal comparison, often focuses on the discrepancy in eternal potential. People, as God's offspring, share qualities of being with deity that no other creatures possess. Animals, while they may have spirits and even enjoy a blissful afterlife, cannot achieve the same spiritual level as humans. The first epistle of John raises the possibility of men being elevated to the stature of Jesus Christ: "When he [Jesus] shall appear, we shall be like him; for we shall see him as he is" (1 John 3:2). With respect to the status of other beings, Mormon leader Joseph Fielding Smith teaches, "...the beast, the fowl, the fish—all creatures were given laws and commandments, *which they cannot pass*. Among these laws was the measure of intelligence which each possesses and beyond the bounds of this decree they cannot go" (Smith 195, italics in original).

The final separation we will discuss is described by Richard Dawkins at the conclusion of his work, "The Selfish Gene". Dawkins describes a relatively new replicator dubbed the meme, "a unit of cultural transmission" (206). Memes include ideas, doctrines, truths, traditions, and anything that is spread from man to man; or, as Dawkins puts it, "from brain to brain" (206). Dawkins argues that memes are a relatively recent replicator whose progress is beginning to outstrip the influence of the long-reigning genes. While some memes have a positive or neutral influence on the spread of genetic material, ideas like celibacy, abstinence, and morality directly oppose the mission of the genes to survive and propagate as much as possible. Because our brains have evolved enough to acquire skills of planning and foresight,

Dawkins claims that we have seized upon the ability to overcome the indirect influence of our myopic genes and make choices for long-term benefit. “We have the power to defy the selfish genes of our birth and, if necessary, the selfish memes of our indoctrination.... We, alone on earth, can rebel against the tyranny of the selfish replicators” (Dawkins 215).

Is this true? Are we the only ones who can break free from the genes’ multi-million-year sovereignty? The critical redeeming element, according to Dawkins, is foresight. No replicator, gene or meme, has the ability to sacrifice short-term gain for long-term interest. Replicators are blind and unconscious, merely acting according to the laws by which they were conceived. Any animal which hopes to compete with us in this regard must exhibit behavior that cannot be explained by the selfish gene theory. In other words, it must behave in a way that would not contribute to the maximal propagation of its DNA. Are there any examples of this? Sadly, and largely because of our dominance, the evidence is scant. There have been glimmers of sentience from some laboratory-raised and domesticated animals, but in the wild, a beast cannot afford to invest in behavior whose return is unconfirmed. For now, we may be the only ones who are truly independent.

Higher consciousness

We are now ready to address the question of higher consciousness in animals, the last three levels of consciousness set forth at the beginning. Regarding self-concept, we can no more confidently claim that all animals possess it than we can assert that all animals lack it. Both extremes present cases of reasonable doubt. From behavioral indices of self-awareness discussed earlier, such as mirror self-recognition, we can confidently assert that several species of animal do have a working sense of self, albeit basic. Dolphins, elephants, and great apes have all reliably passed the mark test, with killer whales and magpies being potential candidates as well. Since many animals do not exhibit self-directed behavior in front of a mirror, we cannot say that the achievement of self-concept is universal. But we do have enough evidence to know that the threshold of self-awareness is a line animals can cross.

What about abstract thought? This is an expansive category, encompassing planning, creativity, meta-self-awareness (an awareness of one's own awareness), a theory of mind, belief, faith, and multiple other faculties. All but the first two items are incredibly difficult for us to observe. Regarding planning, it has long been known that several animals possess premotor association areas in the brain that are quite similar to ours. But motor planning is swift and does not necessarily constitute the sort of mental activity we experience when we plan. Essentially, planning is creating a mental, abstract representation of the future to use as a framework for making decisions. Creativity is observed when an animal uses a novel behavior to solve a problem, describe a new object, or entertain itself. Have any animals shown behavior evident of internal planning and creativity?

We can unquestionably respond in the affirmative. Kuczaj et al, in an experiment with bottlenose dolphins, had them observe a human diver dropping weights one at a time into an apparatus. After four weights were deposited, a fish was released as a reward for the dolphin. Later, the weights were provided to the dolphin alone, farther from the apparatus than it had observed the human using them. If the dolphin behaved according to mimicry or operant conditioning, it would have performed a similar action as the diver. However, the researchers observed both dolphins independently ferrying multiple weights at a time over to the apparatus to obtain the fish more efficiently. This was a behavior neither dolphin had learned before, and according to the researchers, "this suggests that the dolphins understood that multiple weights were required to release the fish and that they were able to plan their behaviors to achieve their goal more efficiently" (Kuczaj et al). The animal subjects were both creating a new activity to solve a problem and using planning and foresight to accomplish their goal.

Creativity is also salient in the behavior of intelligent animals, especially in those trained to use symbolic language. Carl Sagan reports on several examples of ASL-proficient chimps combining learned signs to create a description of a novel stimulus: "On seeing for the first time a duck land quacking in a pond, Washoe gestured 'water bird'...Lana, upon spying a technician eating an orange, signed 'orange

apple'. After tasting a watermelon, Lucy described it as 'candy drink' or 'drink fruit', which is essentially the same word form as the English 'water melon'" (Sagan 110). Linguistic examples are not limited to the apes. Alex, an African grey parrot trained by researcher Irene Pepperberg, referred to an apple as a "banerry", which Pepperberg took to be a combination of "banana" and "cherry", fruits more familiar to Alex (Wise 107). Beyond words, many examples exist of both wild and captive animals inventing new tools or new methods to acquire food. These created behaviors often spread rapidly among the inventor's companions and become standard. It is almost certain that several species have broken the boundaries of abstract thought, perhaps as many as have shown self-concept. Due to human chauvinism and our inability to appropriately research these qualities, it is highly likely we are erring on the side of caution. Let us now evaluate morality in animals. In doing so, I must add to my definition of morality given earlier. Observable moral behavior (or altruistic behavior) is characterized by a resultant deficit in a subject's fitness. In the language of the selfish gene theory, it is behavior for which the genetic cost is higher than the genetic benefit, both short-term and long-term: pure, unadulterated altruism. To be fair, *homo sapiens* has a poor track record with morality. We are the only other species besides the social insects to engage in large-scale war (Dawkins 191). Along with our intelligence evolved ways to lie, steal, cheat, and kill more efficiently than any other animal. But humans also developed religion, which is partially a system of morality that depends little upon any expectation of earthly reward. We may be pathetic examples of morality, but does truly moral behavior exist anywhere else in the animal kingdom?

As stated before in the Cambridge Declaration of Consciousness, many animals do possess the neural substrates thought to be linked to complex emotion, intentional behavior, and self-concept. Extrapolating from neuroscience research linked to animal consciousness, Dr. Franz de Waal argues that several species contain neural substrates that are precursors to morality, if not a sense of morality itself. His hypothesis is based on years of observing altruistic behavior in chimpanzees, such as sharing food or showing sympathy towards the loser of a fight (Wade). Dr. de Waal posits that chimps can make purely

altruistic and moral decisions. Dawkins, champion of the selfish gene theory, agrees with de Waal's approach but diverges from his conclusion. In his 1976 book "The Selfish Gene", Dawkins asserts that all altruistic behavior can be explained by the selfish, blind mechanism of gene propagation in every animal species except our own (as we have already discussed, Dawkins claims humans as the sole individuals who are developed enough to break free of the rule of the genes). But how is it possible for altruism to arise from a necessarily selfish entity like the gene?

Dawkins describes two tendencies that arise from social animals in an evolutionary context. The first is kin selection. On the gene level, any gene which causes its host to behave altruistically towards other carriers of the same gene will tend to multiply in a population. The genetic significance of kin is likelihood for one animal to carry the same given gene as another in its family. Translating this into a social setting, the more likely it is that another individual bears your genes (the more familiarly linked you are), the more genetically beneficial it will be for you to show altruism towards them. Closer family members (siblings, parents) will tend to be willing to sacrifice more than distant family members (cousins, grandparents). In many cases, this theory proves sound, especially in the case of the parent-child bond. The second mechanism Dawkins described is reciprocal altruism, and it too is grounded in genetic cost and benefit. Put simply, it is favorable for an individual to show altruism towards an individual who is likely to return it, but not towards an individual who is greedy (an evolutionary echo of the law of Moses or the golden rule). Can any animal behavior escape explanation by these two theories?

Dr. de Waal would say yes, and this is precisely his reasoning for animal morality. The fact remains that animal behavior appearing purely altruistic has been observed and recorded, and the selfish gene theory must come up with an answer for it. In an interview with de Waal, Dawkins mentions the importance of group size in determining how well kin selection and reciprocal altruism will work. As social groups become larger (more than a couple hundred), it becomes less and less likely that two

individuals are genetically related. The probability that the receiver of altruism will encounter the giver again is also minute, making reciprocal altruism unreliable. Societies of chimpanzees in the wild usually consist of around 50 individuals, which is not enough to give us reason to question the selfish gene theory. But humans have developed communities several thousand strong for millennia. The only way for gatherings of this size to remain cohesive is for the species to develop a behavior modification system stronger than kin selection or reciprocal altruism, and according to Dawkins, this is precisely the place morality has taken in the evolutionary theory of human development.

At present, conflicting theories explaining the basis of morality in animals complicate the issue. Several compelling stories from research seem enlightening, but the verdict from evolutionary biology and behavioral science is unclear. I don't believe we know enough about the reasoning behind animal behavior to determine if animal altruism is completely explainable by natural selection and genetics. What does theology have to say on the subject? In the ancient story of the fall, Adam and Eve were the only ones to eat of the fruit of the tree of knowledge of good and evil. "And the Lord God said, Behold, the man is become as one of us, to know good and evil" (Genesis 3:22). Scripture such as this, considered canon to both Christians and Jews, would seem to be enough to limit morality to humans. But stories from nearly every major religion feature animals as moral exemplars, actively instructing people in the ways of truth (Kemmerer). In other situations, both the wicked and the penitent learn lessons from observing the quietly innocent behavior of bird and beast. Consistent throughout all theology is the idea that the human is certainly not without misdeed, and requires morality for purification. But if animals are guiltless, does that cleanliness come from a knowledge and observance of correct moral codes, or from a blissful ignorance and resulting lack of accountability? Joseph Fielding Smith writes, "This great gift of 'conscience'...*was not given to the animal world!* The Lord does not require of them repentance of sin, *for they do not sin*. It requires intelligence and a knowledge of right and wrong" (Smith 204, italics in original). This emphatic declaration may appear to some to rob animals of consciousness

altogether. After all, if animals cannot sin, how can they have free will? And if they have no free will, how can we call them conscious at any level? It is important here to make a distinction between free will and moral agency. Both concepts constitute a choice between two or more alternatives, but only moral agency includes a knowledge of the consequences of those choices. Free will is not denied to animals, and we have already shown that all animals are conscious to some degree.

Just like experimental data reveals the apparently altruistic behavior of animals, stories from religious tradition make believers aware of the possibility of morality in animals. And just as in biology, there are those who seek to explain animal morality away. The purity of animals can be attributed to their high ethical awareness, or it can be attributed to ignorant innocence. Instances of animals teaching humans right from wrong can be seen as an intuitive possession of religious principles, or they can be construed as a god or gods speaking through the animal or appearing in animal form. Experts in all fields have sidestepped the option of accepting animal morality; and some, like Dawkins, have constructed logical and consistent models for an alternative explanation. We won't know for sure if any animals really are motivated by a sense of right and wrong until we know enough to disprove the opposing theories, and we haven't reached that point yet. Groundbreaking neurological data, or an afterlife (if there is one) may prove the naysayers wrong, but for now, animal morality remains a mystery.

Looking forward: where is consciousness taking us?

As the dominant species on earth, what can we predict about the approaching developments of animal consciousness? In many ways, the future looks grim. Billions of animals are exploited for human use, whether for fur, food, or scientific advancement. The advent of genetic engineering has practically made our species the agents of natural selection. We work faster than evolution, of course, but rarely in favor of increasing the animals' genetic fitness for their own ends. Individual researchers encourage the intellectual development of their individual subjects; but as a whole, the possibility for species-wide enhancement beyond our own seems infinitesimal. Ask yourself: If any animal species collectively

started to display intelligence rivaling our own, would we let them continue? You might, but how many people, especially those in positions of power, would see it as a threat to our dominance?

I need to digress here, because theology gives us a much brighter hope. Hindu and Buddhist tradition see the future state of animals as a continuous journey, with each *atman* moving from man to pig to dog to cow throughout millennia. In this sense, the future of animals is our future, because the soul of man and the soul of beast are essentially the same. This concept is echoed in Judeo-Christian scripture: “For that which befalleth the sons of men befalleth beasts; even one thing befalleth them: as the one dieth, so dieth the other” (Ecclesiastes 3:19). Our destiny and the animals’ destiny are intertwined. But believers in the Old Testament have even greater things to expect of God’s plan for the animals. Devout Jews and Christians everywhere wait for the prophesied Peaceable Kingdom described in Isaiah, in which man and beast will enjoy a world returned to the glory of the garden of Eden: “The wolf also shall lie down with the lamb, and the leopard shall lie down with the kid; and the calf and the young lion and the fatling together, and a little child shall lead them....They shall not hurt nor destroy in all my holy mountain: for the earth shall be full of the knowledge of the Lord, as the waters cover the sea” (Isaiah 11:6,9). No more pain, no more death, no more killing, and no more meat-eating for every being created by God the Father. “The creature itself also shall be delivered from the bondage of corruption into the glorious liberty of the children of God” (Romans 8:21). Of this scripture, several Christian theologians have taught that animals will be compensated for suffering endured in this life, including suffering inflicted by selfish man (Kemmerer). Mormon doctrine suggests a blissful afterlife for animals: “John saw curious looking beasts in heaven; he saw every creature that was in heaven—all the beasts, fowls, and fish in heaven—actually there, giving glory to God” (Smith 5:343). Mormon scripture teaches that Christ “saves all the works of his hands” (Doctrine & Covenants 76:43), so that all creatures will live “in the enjoyment of their eternal felicity” (Doctrine & Covenants 77:3). There are abundant reasons for

Christians and Jews to believe that we and our earthly companions will enjoy the blessings of God in the life to come.

There is so much we don't know, and so much that we have to expect from our study of animal consciousness. They know more than we think; and they experience, emote, empathize, and express more than we realize. Despite our prejudice, and perhaps because of it, animals will continue to surprise us no matter how long we live among them. If we foster an environment for animals to thrive and evolve to their highest potential, they will prove themselves capable of feats we never could have imagined. We just have to let them grow.

If we are to see the tiger's Creator, shall we not also penetrate the distant deeps and skies, the forests of the night, and face without fear the burning eyes of the creature now forever free?

-Edward Quinn

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