Animals Are Not Things: A View on Animal Welfare Based on Neurological Complexity*

Temple Grandin*

Since I am autistic I do not understand purely abstract concepts that are based only in language. To understand a word I have to make a picture in my imagination and define words with concrete examples. When I think of the phrase "buy a car" I immediately get images of past experiences of buying cars. Some purely philosophical arguments I do not understand because I cannot visualize them.

I am going to approach the subject of animals as property in a very concrete manner that is based more on neuroscience instead of philosophical concepts. First of all, an animal does not understand an abstract concept such as being property or non-property. It is going to experience an environment that humans can manipulate to the animal's detriment or well-being. The student essay that I could relate to the most was the one by Allen Yancy on "Veterinarians and the Case Against Legal Personhood for Animals." Yancy states that, "Although animals are currently considered property the law grants them rights."

To discuss whether or not animals should be property, I first have to define what the word property means in a concrete manner. I will limit my discussion to the framework of the U.S. legal system and culture. When I own an item as property, I am allowed to do certain things with it. If I own a cow and a screwdriver I can sell

---

* This paper was originally presented at a discussion on whether or not animals should be property, with Marc Hauser, Dept. of Psychology, Harvard University, 2002. It is reprinted here with permission from the author.

** Temple Grandin is a Professor of Animal Sciences at Colorado State University. She is an acclaimed author, speaker, and activist of animal welfare and autism. Her works include *Emergence: Labeled Autistic* (1986), *The Learning Style of People with Autism: An Autobiography* (1995), *Thinking in Pictures: Other Reports from My Life with Autism* (1996), *Animals in Translation: Using the Mysteries of Autism to Decode Animal Behavior* (2005), and *Animals Make Us Human: Creating the Best Life for Animals* (2009).

them, give them away, destroy them, experiment on them, eat them, put them in my will, profit from them, or use them in my business. I am also allowed to buy another cow or screwdriver. For example, I am allowed to slaughter the cow or destroy the screwdriver in a stamping press. Although absurd, I could even eat the screwdriver if I ground it into very fine powder. Both the cow and the screwdriver can be used in my business and I can put them in my will. I am allowed to modify cattle by selective breeding and I can modify my screwdriver by painting its handle green.

However, both the laws in the U.S. and our culture put severe restrictions on the kinds of things I can do to the cow and but place no restrictions on the things I can do to the screwdriver. I could be punished for felony animal abuse if I stabbed the cow in the eye with the screwdriver, but there would be no penalty for mangling the screwdriver and slowly destroying it by hitting it with my hammer.

Animals Feel Pain

There is a fundamental difference between cows and screwdrivers. Cows feel pain and screwdrivers do not. I am allowed to kill the cow for food but she must be killed in a manner that will not cause pain. From many hours of observing the behavior of cattle at slaughter plants and feedlots, I have learned that cattle do no understand that they will be slaughtered. During handling they behave the same way at both a slaughter plant and in a feedlot veterinary chute. If they knew they were going to die they should be wilder and more agitated during handling at a slaughter plant (Grandin, 2001).

A reviewer of this paper asked me to address the possibility that the observation that the animal's behavior is the same in both places is learned helplessness. It is not learned helplessness because in both the slaughter plant and the feedlot, cattle sometimes make active attempts to jump fences or run away from people. Active escape attempts occur more frequently when cattle are shocked with electric prods. The way the people handle the cattle has a much greater effect on their behavior than the location where handling occurred.

Measurements of cortisol also indicate that stress levels are similar at both the slaughter plant and handling in the veterinary chute at a feedlot. A review of these studies is in Grandin (1997). If cattle knew they were going to die it would be reasonable to assume that cortisol levels would be much higher in the slaughter plant. U.S. law and culture requires that even though the cow is property, I have certain responsibilities for the cow and no moral responsibilities for the screwdriver. I can be charged with animal abuse and punished if I beat or starve my cow. These laws are designed to prevent the animal from suffering. Laws for protecting research animals require keeping them in social groups so they have the company of their

own kind. As scientists learn more about animal behavior, additional protections may be needed. I am not required to keep a pair of screwdrivers in my toolbox, so that they can socialize with other screwdrivers.

The cow has legal protections that a screwdriver does not have. These legal protections only apply to live animals that have a well-developed nervous system. Science has shown that animals such as mammals and birds feel pain in a manner similar to humans. Insects, viruses and microbes are not able to feel pain or suffer. More research is needed to determine the extent that fishes and amphibians feel pain. Present research shows that they do experience fear. Fear is very aversive and animals should be shielded form situations that cause great fear. Fear will cause a great rise in stress hormones. Animals such as dogs also need to have environmental enrichments. Melzack (1954) and Burns (1955) found that puppies kept in barren kennels became hyperexcitable and had abnormal EEG patterns, which indicated extreme arousal.

When the structure of the brain and nervous system is studied, there is no black and white line between people and higher mammals such as chimps, dogs or cows. The genome project has shown that humans and mice share many genes (Gunter and Dhand, 2002). In mammals 30 to 40% of all genes are involved in nervous system development and function. The basic design of the nervous system and the neural mechanisms that process fear and pain are similar in humans and other mammals (Rogan and LeDoux, 1996). Colpaert et al. (2001) reported that rats will self medicate themselves with pain killers to relieve pain in arthritic joints.. Pain and fear both cause suffering. As nervous system and brain complexity increases the welfare needs of the animal increase and become more complex, but all animals that have sufficient nervous systems complexity to suffer from either pain or fear need basic welfare protections. Animals with complex brains also have greater social needs and a need for greater environmental enrichment.

My logic falls apart in two areas. Human babies are given full protection even though a newborn's cognitive abilities are less than the abilities of mature farm animals. They are given this protection because they will grow and develop into people. A mentally retarded child and a cow may have the same cognitive abilities. I can sell or kill the cow but I am not allowed to do this with a retarded child. Why should the retarded child or human newborn have more protection than a cow? One reason is that the child is our own species and we protect our own species. Even lions do not usually dine on lion for dinner. A further discussion of arguments for or against specism is beyond the scope of this article. However, biologically I think there is an instinct to protect one's own kind.

The cows have legal protection from pain and suffering but they have less legal protection than a retarded child. I would be sent to prison for killing or selling a retarded child and I would not be allowed to do invasive research on the child. Human children are legally not property. Legally, a major distinction between property and non-property is that I can buy, modify, sell, give away or destroy items that I own.

In Boulder, Colorado, dog owners are now called "guardians" but the dog "guardians" still have the same property rights. Legally they can still sell or kill their dogs. Changing the dog owner's name to guardians may help improve people's attitudes towards dogs, but legally they are still property. Even though they are still property, their welfare may be improved if people's attitudes are changed. Improving attitudes towards animals can greatly improve how people treat animals. Hemsworth et al. (1989) did studies that showed when people had positive attitudes towards farm animals they treated them better and the pigs were less fearful of people.

Nervous System Complexity

With the framework outlined above, I can argue that animals can be property and still have a high standard of welfare. However, I will argue very strongly that animals need many protections because they are not things like a screwdriver. As the phylogenetic tree of animal species is climbed, protection from suffering must be increased. Chimps would require more protection and need different kinds of protection than frogs to insure that they would not suffer. Chimps have a more complex brain than frogs and a rich social life. As nervous system complexity increases, the animal needs increasing amounts of protection from society to insure that it does not suffer from pain, fear or a lack of environmental and social stimulation. Even though the phylogenetic tree is not linear it moves along its various branches from less complex nervous systems to more complex ones. Comparative physiology and psychology has shown that there is a broad range of nervous system complexity. As complexity increases a brain forms in the head of the animal that becomes increasingly complex. Different animals can be ranked in order of brain complexity. For example, ranking from less complex to more complex would be clams, lobsters, fish, birds, mice, dogs, apes, chimpanzees and people. There are some animals that are approximately equal in nervous system complexity such as dogs and pigs. Both rats and chimps should have equal protection from pain and fear, but the chimp may need additional protection to insure that it has adequate social stimulation. Chimps have a greater need for social and environmental stimulation than rats but new research indicates that even mice need social stimulation to prevent abnormal stereotypic behavior (Bohannon, 2002). Simple environmental enrichments such as materials to burrow in and several companions are probably adequate for a rat, but a chimp needs much more.

As one travels back in evolutionary time, there is a point where an organism does not have sufficient central nervous system capacity to experience fear or pain. The brain circuits that process fear are more primitive than the circuits that process pain. For example, fish experience fear but their pain perception may be limited. They may need protection to primarily reduce fear. Research is needed to determine the points on the hierarchy of nervous system complexity where conscious pain perception and fear perception is lost. It is likely that pain perception will cease at a higher level of nervous system complexity than fear perception. As the phylogenetic tree is ascended and nervous system complexity increases, animals will have other needs such as social interaction in addition to protection from pain and fear. My basic principle is that development of the nervous system is a major determinant of the welfare needs of the animal.

Animals are not things, but there is probably a point where legally protecting an organism from pain and fear should cease. From my knowledge of neuroscience, I can be reasonably sure that oysters, flu viruses and bacteria do not need legal protection to prevent people from being cruel by inflicting pain and fear. Advocating for the rights of oysters is something I think is silly.

The key is, does the animal have sufficient nervous system complexity to experience pain and fear and actually suffer? Simple reflexes are not reliable indications of suffering. Removing the cortex of the brain leaves reflexes intact and the decerebrate animal will not feel pain (Woolf, 1983). To suffer, the animal must have sufficient associative circuits in the brain to process pain or fear.[1]

It is obvious to me that intelligent animals such as elephants experience emotions that are more complex than simple pain or fear. They will need different legal protections than animals with simpler nervous systems. The degree of protection, and environmental and social enrichment an animal will require will be dependent on the level of complexity of its nervous system. Brain development is the key, and more research is needed to make logical decisions about protecting fish or worms. Fish probably experience fear and worms are probably too primitive to suffer.

Property is a legal term and a language based concept that animals do not fully understand. Monkeys have a sense that they own certain things (Kummer and Cords, 1991). Even the family dog may growl if you attempt to take away his bone. Animals guard both their territories and their food. To put it simply, animals have a sense that certain places or food items are theirs. However, animals do not understand that they themselves may be the property of a human being. Property is a legal term and a language based concept that gives the owners of property certain legal rights above

[1] This is discussed in a review by Grandin (2002).

and beyond physical possession. For example, if my prize bull is stolen the insurance company will pay for him. I can also transfer ownership by selling my bull. Animals deserve the same protections from society whether or not they are property or non-property. How can I justify eating meat when I say that animals deserve the same protections whether or not they are property or non-property? The cattle I have eaten would have never lived at all if we had not raised them. Another viewpoint from a reviewer is that this does not justify eating them because that perpetuates more cattle and more care. It is my opinion that having more cattle is justified provided we take care of their welfare. I feel very strongly that we owe agricultural animals a decent life and I will be the first to admit that some agricultural practices need to be changed. If I were in total agreement with this reviewer, the extreme outcome of this statement would be to let animals become extinct so they would not suffer. I would not want this to happen. Ironically, ownership of animals on the African plains may motivate the local people to take care of them and improve their welfare.

There is another issue of the value of different animals and plants. The above discussion only applies to welfare and protection from pain, suffering or boredom. It does not imply that more primitive living organisms such as oysters or insects have less value than the animals with more complex nervous systems and social lives. Biological and genetic diversity in the animal and plant kingdom is of great value. Preserving the organisms that are not capable of suffering is important. When a species becomes instinct, it is lost. To formalize my agreement, I will give some concrete definitions of value and how it differences from property. Some examples of value in the animal world would be, bees pollinating, flowers, worms maintain the soil ecosystem, a species that becomes extinct may have provided a cure for cancer, natural ecosystems are beautiful and the genetic information in all species is valuable. Our society also has laws to protect animals and plants from becoming extinct. In many cases, this value concept overrides property rights. Even if I own the land I am not allowed to completely destroy a unique wildlife habitat.

In conclusion, animals can be property and still have many laws and other protections to insure their welfare. Changing language based concepts like property are only important to animals if changes in rhetoric cause people to treat animals better. I have little interest in rhetoric unless it provides actual changes where the animals live. All my life I have worked, making concrete improvements out in the field.

Works Cited

Bohannon, John. "Can a mouse be standardized?". *Science* 20. Vol. 298, No. 2602: pp.2320-2321. December 2002.

Colpaert, F.C. et al. "Opiate self-administration as a measure of chronic nonreceptive(?) pain in arthritic rats." *Pain*. Vol. 91 (1-2). pp.33-45. 2001.

Grandin, Temple. "Assessment of stress during handling and transport." *Journal of Animal Science*. Vol. 75: pp.249-257. 1997.

_____. "Distress in Animals: Is it Fear, Pain or Physical Stress?" Special session: *Pain, Stress, Disaster, and Fear: Emerging Concepts and Strategies in Veterinary Medicine*. American Board of Veterinary Practitioners. 17 May 2002. Manhattan Beach, CA.

_____. "Welfare of cattle during slaughter and the prevention of nonambulatory (downer) cattle." *Journal of the American Society of Veterinary Medicine*. Vol. 219: pp.10-15. 2001.

Gunter, Chris and Ritu Dhand. "Human biology by proxy." *Nature* 420:509. 5 December 2002.

Hemsworth, P.H. et al. "A study of the relationship between the attitudinal and behavioral profiles of stockpersons and the level of fear of humans and reproductive performance of commercial pigs." *Applied Animal Behaviour Science*. Vol. 24 (4): pp.301-314. July 1989.

Kummer, Hans and Cords, Marina. "Cues of ownership in long-tailed macaques, *Macaca fasicularis*." *Animal Behaviour*. Vol. 42: pp.529-549. 1991.

Melzack, R. "The genesis of emotional behavior: An experimental study of the dog." *Journal of Comparative and Physiological Psychology*. Vol. 47 (2): pp.166-188. April 1954.

_____ and S. K. Burns. " Neuropsychological effects of early sensory restriction." *Experimental Neurology*. Vol. 13: pp.163-175. 1955.

Rogan, M.T. and J.E. LeDoux. "Emotion: Systems cells, synaptic plasticity." *Cell*. Vol. 85(4): pp.469-75. 17 May 1996.

Woolf, C.J. "Evidence for central component of post injury hypersensitivity." *Nature*. Vol. 306(5944): pp.686-8. 15 December 1983.