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ARTICLES

The Animal Ethics of Temple Grandin: A Protectionist Analysis

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Abstract
This article brings animal protection theory to bear on Temple Grandin's work, in her capacity both as a designer of slaughter facilities and as an advocate for omnivorism. Animal protection is a better term for what is often termed animal rights, given that many of the theories grouped under the animal rights label do not extend the concept of rights to animals. I outline the nature of Grandin's system of humane slaughter as it pertains to cattle. I then outline four arguments Grandin has made defending meat-eating. On a protection-based approach, I argue, Grandin's system of slaughter is superior to its traditional counterpart. Grandin's success as a designer of humane slaughterhouses however is not matched by any corresponding success in offering a moral defence of meat-eating. Despite, or perhaps because of, the popularity of her work, Grandin's arguments for continuing to eat animals are noteworthy only in how disappointing and rudimentary they are. If we can thank Grandin for making a difference in the lives of millions of farm animals, her work can also be criticized for not engaging the moral status of animals with the depth and rigor that it deserves.

Keywords Temple Grandin · Humane slaughter · Animal protection · Animal rights · Evolutionary theory

Introduction

Temple Grandin is well known as a representative of both people with autism and of the meat industry. She rose to prominence through the work of Oliver Sacks, whose 1995 book, *An Anthropologist on Mars*, was named after a phrase Grandin used to describe her life as a person with autism in a non-autistic world, one that contains social and emotional cues she finds difficult to decipher. Grandin has since gone on

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to become a bestselling author in her own right, and writings by and about her highlight her career as a designer of humane slaughterhouses. In both her popular books as well as over 100 peer-reviewed articles she has published as an animal scientist, Grandin frequently addresses issues related to the ethical status of animals, and makes arguments to the effect that when animals are killed in her system the result is ethically superior not only to traditional slaughter but also to vegan agriculture.

Systems designed by Grandin have long handled over half the cattle killed for food in Canada and the United States (Grandin 2001: 103). Facilities she designed are also located in Europe, Asia, Australia and South America. Chances are good that readers of this work who eat meat will have consumed beef, pork or chicken processed according to Grandin's method at least once. As for Grandin's ethical ideas as they pertain to animals, they have been disseminated by CNN, NBC and the BBC, not to mention every major newspaper in the English-speaking world.[1] In terms of her industrial impact and audience, Grandin is one of the world's most influential voices on animal issues.

In spite of Grandin's prominence, animal ethicists have taken little interest in her work.[2] Although the ethics of killing and eating animals that are killed painlessly has been extensively analysed, the discussion to date has been at an abstract level, with little attention to the question of whether or to what degree existing systems such as Grandin's have eliminated pain from the slaughter process (e.g. Singer 1993; Višak 2013). Similarly, Grandin's writings frequently defend omnivorism as superior to vegetarianism or veganism. Given the size of her audience, these arguments are among the most widely read arguments, pro or con, on the ethics of eating meat. As such the need to analyze them also is overdue.

What follows is an attempt to bring animal protection theory to bear on Grandin's work, in her capacity both as a designer of slaughter facilities and as an advocate for omnivorism. Animal protection is a better term for what is often termed animal rights, given that many of the theories grouped under the animal rights label do not extend the concept of rights to animals (e.g. Singer 1990; McMahan 2002). Animal protection thus is an umbrella term for theories such as those of Singer, Regan (2004), McMahan and Cochrane (2012). Despite their differences, such theories eschew speciesism and grant equal moral weight to the interest animals have in avoiding suffering relative to the similar interest of human beings. With the exception of Singer, who argues that it is permissible to kill merely sentient animals so long as they are replaced, all such theorists call into question the practice of systematically killing animals when nutritious plant-based alternative are widely available. My analysis endorses these two widely held views in the animal protection literature regarding animal suffering. As such it seeks to be ecumenical across such

[1] For a small sampling of Grandin's electronic media coverage see Grandin (2009c). Typing Grandin's name into the Factiva newspaper database calls up over 1600 articles from across the English-speaking world.

[2] Gary Francione and Jeff McMahan are among the few animal theorists to comment on Grandin. See the brief discussions in Francione (1996: 99–100, 199–202, 2008: 74–75) and McMahan (2002: 200–203). Peter Singer discusses lobbying efforts to persuade McDonald's to hire Grandin in Singer (1998: 166–177). I have not been able to find any scholarly discussion of Grandin's defence of meat-eating.

approaches by appealing to ideas they all agree on, with the exception of Singer's outlier view on the replaceability of merely sentient beings (Singer 2011: 94–122).[3]

I outline the nature of Grandin's system of humane slaughter as it pertains to cattle. I focus on her cattle system because it is the one she has devoted the most time and energy to developing and is the system with which she has long been most identified.[4] I then outline four arguments Grandin has made defending meat-eating. Two of these arguments appeal to evolutionary considerations while a third posits the fact that we cannot but help grant moral significance to membership in the species *Homo sapiens*, which inevitably entails a lower moral status for livestock and other animals. Grandin's fourth and final argument maintains that when the slaughter process is performed correctly it yields moral insights of a kind not attainable through the cultivation of plant food. On a protection-based approach, I argue, Grandin's system of slaughter is superior to its traditional counterpart. Grandin's success as a designer of humane slaughterhouses however is not matched by any corresponding success in offering a moral defence of meat-eating. Despite, or perhaps because of, the popularity of her work, Grandin's arguments for continuing to eat animals are noteworthy only in how disappointing and rudimentary they are. If we can thank Grandin for making a difference in the lives of millions of farm animals, her work can also be criticized for not engaging the moral status of animals with the depth and rigor that the issue deserves.

Grandin's Method of Slaughter

Grandin has written that much of her success in working with animals comes from the fact that "I see all kinds of connections between their behavior and certain autistic behaviors" (2006a: 172).[5] She gives the example of responses to high-pitched noise. Just as someone whistling in the middle of the night will cause her heart to race more than it would that of a non-autistic person, animals are easily startled by noises such as a bell or the sudden hiss of an air brake (2006a: 169). Grandin's system therefore not only minimizes high-pitch sounds that animals can hear, it also eliminates many visual details that loom large from an animal's point of view. In the case of cows for example, an entire herd can stop if it comes across a swinging chain, which will cause the lead cow to move its head back and forth with its swing. Similarly, strong visual contrasts such as shadows, light reflecting in a puddle or a drain running across the animals' path

[3] For critical discussion of Singer's view on killing animals see Višak (2013: 46–70).

[4] For an analysis of Grandin's system of slaughter for chicken see Chapter Five of Lamey (2019).

[5] Karen Davis has challenged Grandin's claim that her system of slaughter is inspired by her autism. "Many of the problems Grandin presents herself as uniquely spotting in the slaughterhouse environment are the kinds of things that an intelligent non-autistic sees on entering an inbred culture" (Davis 2005: 1). Grandin's emphasis on a link between autism and animal behaviour is noticeably more pronounced in her popular books than in her academic writings and may sometimes be slightly exaggerated. However, I am more inclined to accept it than Davis is. Among other reasons, there have been cases of other autistic people identifying strongly with animal behaviours (e.g. Price-Hughes 2004).

will cause balking. Even something as seemingly minor as a styrofoam cup on the ground or a piece of cloth flapping in the wind can cause a herd to freeze up (2006a: 167–168). Grandin's system meticulously avoids all such distractions that can cause the animals to stop moving.

Image One: A Curved Handling Chute

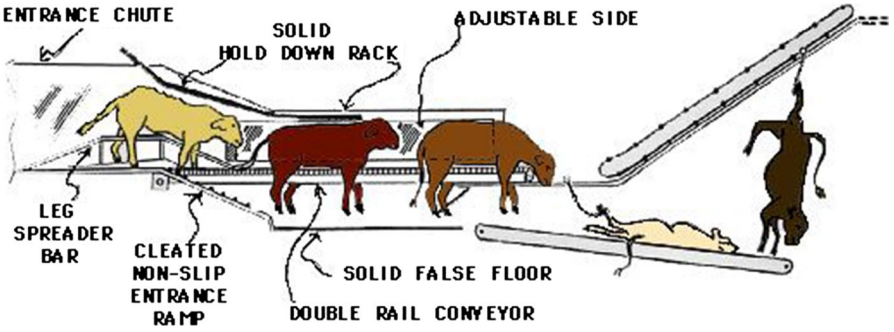
At a structural level, one of the most distinctive features of a plant designed by Grandin is its curved handling chute, which is located between the holding pens and the slaughter facility proper. The chute's design principles are rooted in animal behaviour research (Grandin 2003). This is evident in the fact that the chute has solid walls. The location of a cow's eyes on the sides of its head gives it almost 360° panoramic vision, but only when looking ahead does it have binocular eyesight. The lack of depth perception to the side or rear means that even distant objects in those directions can appear to be within the animal's flight zone. Solid walls in the chute eliminate the possibility of the animal seeing people or other distractions outside of the facility that might startle them (Grandin 1983a: 2).

The curvature in the chute follows a similar logic. It is more efficient than a straight chute as the cows cannot see people or moving objects up ahead, which can cause them to balk. Cattle will also not enter a chute that bends too sharply, which to them appears to be a dead end. In Grandin's system the degree of curvature allows entering cows to see at least two body lengths ahead. In nature cows will move in a circle to keep an eye on possible predators and both the curve in the chute and the single-file width exploit this natural tendency (Grandin 2002b). The end result is that rather than plant personnel having to force a herd through the chute, most cows will willingly walk through on their own.

People with autism often experience anxiety and panic attacks, particularly in unfamiliar situations. Grandin was able to diminish her anxiety by building a

so-called Squeeze Box, a device which she lies into have even pressure applied to both sides of her body, an experience which many autistic people find soothing. Grandin's Squeeze Box, which is now sold commercially, was inspired by an animal husbandry device known as a squeeze chute, which is used during vaccination and other procedures in which an animal needs to be immobilized. Grandin's slaughter system in turn employs a device partly inspired by her Squeeze Box, which is known as a conveyor restrainer. It is what is waiting for the animals at the end of the handling chute after they enter the slaughterhouse, where they are immediately immobilized in a low-stress manner.

Image Two: The Conveyor Restrainer



As image two illustrates, a leg-spreader bar and false floor position the animals so that as they step forward their weight shifts onto a conveyor belt. The walls of the conveyor restrainer are again solid, but unlike the handling chute they apply pressure to the animal's body, firmly enough to keep the animal in place, but not so hard as to cause gouging. The absence of noise and the experience of motion in an upright position have a calming effect on the animal, as does the presence of other animals, particularly when they are close enough to touch each other and are all from the same herd. A rack above the animal's head prevents lunging by eliminating the sight of people and other threatening figures deep inside its flight zone. In a beef plant the conveyor belt is additionally shaped so as to fit a bull's brisket. As the animal moves forward it is brought to the stunning platform where a plant employee is waiting with a captive bolt stunner. The stunner operator positions the gun-like tool on the animal's forehead to fire a bolt into its brain, a procedure which when properly performed instantly knocks the animal unconscious, thereby resulting in a painless method of death (Grandin 1995: 1, 2009a: 1).[6]

Elements such as the handling chute and the conveyor restrainer illustrate the technical details of Grandin's system. Yet Grandin has often stressed that the most important

[6] Grandin has separate guidelines for electric stunning, a potentially painless method used on pigs and sheep, and ritual slaughter methods (kosher and halaal) that prohibit stunning and require placing the animals in a head-immobilizing device before its throat is slit. See respectively Grandin (2008) and Grandin and Regenstein (1994).

element of her system is not any mechanical aspect, but the way it is used. As she puts it, "the best equipment in the world is worthless unless management controls the behavior of plant employees" (2006a: 175). A key aspect of her system therefore involves plant audits. Unannounced inspectors record the success rate of various procedures throughout the animals' time inside a facility. In a beef plant for example auditors observe the slaughter of set number of cows, such as 50, 100 or 1000, and record what percentage of them are instantly rendered insensible with one shot of the bolt gun, marking employee performance according to the following criteria:

Excellent = 99–100% of animals killed with one shot.
Acceptable = 95–98% of animals killed with one shot.
Not acceptable = 90–94% of animals killed with one shot.
Serious problem = under 90% of animals killed with one shot.

Other audited criteria include the number of animals that slip, fall or vocalize while inside the facility, how many are still conscious when they reach the bleed rail and the rate at which employees use cattle prods, with use on up to 25% of processed animals rated acceptable. If an employee commits a wilful act of abuse, such as hitting an animal or applying a prod to its rectum or other sensitive area, it is grounds for automatic audit failure. Publicly available summaries of audits conducted between 2007 and 2015 indicate a total of 187 audits performed at unidentified beef facilities (Grandin 2018). Of these 172 audits (92%) resulted in a pass, often with very high scores: 137 audits (74%) recorded 99–100% of cattle being successfully stunned with one shot of the captive bolt gun. Fourteen audits resulted in failure and two required a re-audit following a corrective action letter. Grounds for failure ranged from cutting off the leg of a conscious cow to touching a cow with a cattle prod on a sensitive part of its body. Plants were re-audited when more than 2% of cows fell during live handling or more than 5% vocalized during handling and stunning. Such scores are broadly representative of how most plants have performed since Grandin's program was adopted at the turn of the century (Singer 1998: 166–177). Plants that incorporate Grandin's technology and auditing method generally score highly.

Grandin has frequently framed the appeal of her system in economic terms. Animals that go through her system have been measured to have the same level of the stress hormone cortisol as they do when undergoing vaccination (Grandin 1998). They also receive fewer bruises than at traditional slaughter plants (Grandin 2000). These and other factors increase the value of the animal's carcass, factors which Grandin frequently cites to suggest that a humane system is a more profitable one (Grandin 1983b, 2000, 2009b).

Grandin's Arguments for Omnivorism

Grandin's writings offer an ethical rationale for her system of slaughter. That rationale is one that recognizes animals' interest in avoiding suffering, but stops short of advocating a plant-based diet. "Often I get asked if am a vegetarian," she has

written. "I eat meat, because I believed that a totally vegan diet, in which all animal products are eliminated, is unnatural" (2006a: 235). Grandin's writings present a series of arguments to the effect that her system is superior not only to traditional slaughter, but that eating meat is superior to veganism, on grounds that appeal not only to "naturalness" but more purely normative concerns. Fully assessing Grandin's animal ethic therefore requires examining the justifications for the superiority of meat-eating that she has put forward.

Grandin's most sophisticated argument does not originate with her. Rather she credits an argument made by Stephen Budiansky that "had a profound effect on [her] thinking" regarding animals (2006a: 235). Budiansky offers a coevolutionary defence of meat-eating. Coevolution occurs when one species triggers evolutionary change in another. In Budiansky's view, this principle explains the rise of modern agriculture, which is not merely the creation of human beings but, in a real sense, is the creation of domesticated animal as well. Such a view is inspired by the work of anthropologist David Rindos, who has put forward a co-evolutionary explanation for plant domestication (Rindos 1984). Budiansky innovates on Rindos not only by extending his theory to animal domestication, but by invoking it as an argument against veganism. According to Budinasky, were we to attempt to abolish meat farming, we would be turning our back on the metaphoric equivalent of a moral contract between human beings and domesticated animals, one that benefits not only us but also the animals (Budiansky 1999).

Coevolution is known to occur in nature with symbiotic species. Budiansky gives the example of an African species of melon that only grows outside the tunnels of aardvarks (1999: 84). The aardvarks eat the melons and, through their toilet habits, plant the melons' seeds in fertile mounds. Unlike all other wild cucurbits (the species to which melons belong) the variety eaten by aardvarks do not contain a bitter toxin. This increases the reproductive fitness of the melons, as they are able to reproduce by having their seeds distributed by the aardvarks. The aardvarks have access to a safe and abundant water supply, and so benefit from sharing a habitat with melons. Thus although the aardvarks have a greater influence on the evolutionary history of the melons than vice versa, both species benefit from the relationship (1999: 84).

On Budiansky's account something similar has happened between human beings and food animals. He asks us to imagine the original contact between human beings and members of the species that eventually became domesticated. Such contact occurred over 9000 years ago, shortly after the end of an ice age. During periods of climactic upheaval, many species of mammals and birds would have undergone a process known as neoteny, whereby traits associated with juvenile members of a species are retained into adulthood. "All young mammals and birds," Budiansky writes, "show a curiosity about their surroundings, an ability to learn new things, a lack of fear of new situations, and even a nondiscriminating willingness to associate and play with members of other species," (1999: 77–78). Adults that retained such juvenile characteristics would have increased their reproductive fitness during an ice age, as they would have been more likely to seek out and inhabit new territories after their original habitats were iced over. Given that such animals would have come in contact with human beings soon after, they would have increased their

reproductive fitness in a second way, in that their more curious and gentler nature would have allowed them to occupy what was in effect a new habitat, the human sphere of domestication.

Budiansky invokes the concept of preadaptation to summarize the initial contact between humans and domesticated species (1989: 5). Preadaptation is misunderstood if it is taken to imply an intentional or teleological process of change. It rather refers to a process whereby an adaptation or other trait that evolved to perform one function is used for a new, potentially unrelated function. In this case, curiosity and other traits helpful in seeking out new natural habitats preadapted sheep, cows, horses pigs and chickens to be suitable for domestication. The process of change in the animals would only have continued after domestication began, as domesticated animals increasingly took on docility and other characteristics that separated them from their wild counterparts. The result thousands of years later is that food animals are now adapted to occupy the ecological niche that is human agriculture.

For Budiansky, the evolutionary history of domesticated animals creates an onus on us to continue raising them for food. This is because domestication is not a purely cultural process. Cultural matters we regard as subject to our control. Budianksy gives the example of someone saying that we should not abolish nuclear weapons on the grounds that they are the natural product of evolution. Such a person would fail to adequately distinguish culture from nature (1999: 163). With regard to food animals however, their genetic character and behavior "is arguably much more the product of evolution in its truest sense, something that is not subordinate to human consciousness. The fate of these species was dictated by nature more than by man's cultural institutions" (1999: 164). Were veganism to become popular, it would represent an abandonment of our ethical responsibilities to the animals whose destiny we now find intertwined with our own. Or as Budiansky puts it in the article that first caught Grandin's eye, "we now have no choice but to care for animals that as a result of thousands of years of evolution are genetically programed to depend on us" (1989: 5).

Grandin takes over from Budiansky the notion that food animals benefit from our consumption of them. One benefit they gain is an ability to reproduce in large numbers. With almost a billion cattle in the world, there is no danger of them going extinct any time soon (Statista 2018). But another thing animals gain from agriculture is a more merciful death than they would experience in the wild. Starvation, exposure, being torn apart by another animal: against this backdrop, being knocked unconscious and killed with a bolt through the brain would seem the far better option (Grandin 2006a: 235).

Grandin's second argument makes a separate appeal to evolution. Grandin has noted that she once tried vegetarianism and found that it made her physically ill. She suggests that people with autism and similar conditions may be physically unable to live on a meat-free diet. People with conditions such as autism are of course only a small portion of the population, and Grandin does not invoke her experience as a justification for universal meat-eating. Instead she speculates on a possible genetic link between being autistic and having a metabolism that requires eating meat, a speculation which in turn leads her to offer an evolutionary justification of meat eating that does apply to the general population:

> [U]ntil someone proves otherwise I'm operating from the hypothesis that at lest some people [such as people with autism] are genetically built so that they have to have meat to function. Even if that's not so, the fact that humans evolved as both plant and meat eaters means that the vast majority of human beings are going to continue to eat both. Humans are animals, too, and we do what our animal natures tell us to do. (Grandin and Johnson 2005: 180).

This is Grandin's second evolutionary argument against plant-based diets. Whether or not people with autism have a special need for meat, she suggests, it is a fact about our species that we evolved as omnivores. Veganism is thus not as natural as meat-eating. Ethicists who advocate meat-free diets may do so due to an interest in animals, but in an important sense, they overlook our own needs as animals.

A third argument Grandin has offered to justify omnivorism over veganism involves a different appeal to biology. It occurs when Grandin grapples with the question of why a human being and an animal with similar cognitive abilities should occupy different moral statuses. Grandin uses the example of a cow and a mentally handicapped child with the same level of cognitive development. It is perfectly acceptable to sell or kill the cow, she notes, but forbidden to do the same to a handicapped child. Grandin asks why the handicapped child or human newborn should have more protection than the bovine (2002a: 2). This of course is a question that frequently occurs in the debate over the ethical status of animals, in which the standard approach is to think of the handicapped child or newborn as an orphan (in order to focus on his or her direct moral worth, rather than indirect status acquired through relationships with others).

Grandin does not attempt to give a complete answer to this question. She notes that there are arguments for and against assigning moral significance to species-membership that she does not deal with. Grandin does however offer one reason for the different moral status of cognitively disabled child and cow that a complete answer will presumably have to take into account. It is that species membership is something we cannot *help* but grant strong moral weight to. As with her first evolutionary argument, this is a claim by Grandin that again highlights our animal identity. "Why should [a] retarded child or human newborn have more protection than a cow?," Grandin asks. "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… there is an instinct to protect one's own kind" (2002a: 2). Thus for Grandin there is something illusory about the thought that we might disregard species membership as a moral category. The moral significance of being *Homo sapiens* is something moral theory can seek to explain but not overcome.

Grandin's final argument against veganism is inspired by her work in religious slaughterhouses. According to Grandin, slaughterhouse employees can be divided into three different categories. The first are those who adopt a mechanical approach. They become desensitised to their work, and kill animals with the same rote indifference with which they might staple boxes moving along a conveyor belt (1988: 119). The second group are sadists. They begin to enjoy killing and deliberately torture the animals, justifying their actions with rationales such as "it is going to die in five minutes so it does not matter how I treat it" (1988: 120). The third and far superior

approach sees killing as part of a sacred ritual. This understanding, which Grandin commonly observes in Jewish and Muslim slaughterhouses, exhibits respect for the animals and approaches slaughter within a ritualised framework, one that places limits on the act of killing and prevents it from spiralling out of control (1988: 121).

Grandin has frequently drawn parallels between her slaughter system and the sacred ritual approach. She has for example described personal rituals she observes in and around non-religious slaughterhouses, such as bowing before entry, as well as religious experiences she has had during the killing process (1988: xx, 2006a: 230). Grandin's religious understanding of slaughter draws of a wide range of sources, from traditional theism to sacrificial practices in Pagan Greece to popular accounts of the Eastern notion of Karma. But in general, two ideas pervade her discussion of sacred rituals. One is that the moment of slaughter can make us aware of a larger cosmic order (2006a: 229–230). The second is that killing is a type of therapeutic release for the slaughterer: encountering death makes us more appreciative of life (2006a: 229). The first of these ideas could potentially be embraced by members of a wide variety of religious traditions, while the second could in principle be embraced by a non-believer. Taken together, both notions suggest that appropriately conducted slaughter can generate moral knowledge of a kind not generated in the cultivation of plant food.

Criticism

What are we to make of Grandin and her unique contribution to modern agriculture? As a feat of engineering, her system of slaughter combines technical ingenuity and insight into animal behaviour. Grandin's design is based on empathetic insight into animal perception. Whether or not one thinks the empathetic element extends far enough should not stand in the way of recognizing that Grandin's system represents a progressive step against the backdrop of traditional agriculture.

Grandin's system however has gaps and limitations. One is that Grandin's system allows more painful killing than is formally permitted by U.S. law. The 1958 Humane Methods of Slaughter Act legally requires that all pigs and cows killed for food be unconscious at the time of death. That the law was never enforced explains how Grandin's system could represent an improvement over what came before (Jones 2008). Grandin however maintains that a 100% painless kill rate is not possible. As a government report Grandin was involved with put it, "Dr. Grandin believes that effectively stunning animals on the first try 100% of the time is unachievable—that is why she proposed an objective scoring method as an alternative" (GAO 2004: 18; Grandin 2006b: 133).

This is an important point that is often overlooked. Painless slaughter was thought for several decades to be an appropriate standard to aim for from the ideal point of view. It remains in principle, if not at the level of enforcement, the standard of American law. Grandin, who may have a more detailed grasp of industrial slaughter than anyone else alive, urges that we accept the inevitability of suffering as part of animal slaughter. As much as her system seeks to reduce suffering in practice, therefore, at an ideal level it simultaneously represents a greater tolerance of animal suffering.

This is because of the 5% of painful animals deaths Grandin considers acceptable. As one NGO report pointed out, "[e]ven if 100 per cent of slaughter plants were able to meet [Grandin's] standards, it would meant that 185 million chickens, 1.8 million cattle and sheep and one million pigs may be killed inhumanely each year in the United States" (Jones 2008: 86). Grandin's method ultimately confirms something critics of industrialized animal killing have long maintained. Suffering is an inescapable part of the process.[7]

Food animals can live for years but typically only spend a few hours at a slaughter facility. Grandin's system does not address many forms of suffering that can take place prior to slaughter. These forms include practices such as castration, branding, animal fighting and intensive confinement. Grandin's guidelines also say nothing about what an animal is fed prior to slaughter or issues having to with the manipulation of an animal's size and body structure. Grandin notes that it is now common for dairy cows to be bred at such a size their feet can no longer support their bodyweight (Grandin 2001: 107). Grandin's approach, which does not implement welfare regulations that require economic sacrifice, does not address such issues.

Grandin's system finally is designed to reduce animal suffering but not animal killing. This is a limitation, for two reasons. First, it seems plausible to grant some moral weight to the interest of at least vertebrate animals in continued existence. Imagine a sick dog or cat that will die unless we give it an injection (McMahan 2008: 67). Suppose that the animal's ailment, while it will end the animal's life, will cause it no pain. If we were to give the animal a shot we would be causing it some pain for the sake of extending its life. It seems intuitive to think that a certain amount of pain from the injection would be justified if it extended the animal's life by some non-trivial amount. If so then from a non-speciesist, and thus protectionist, point of view, it is reasonable to grant at least some moral weight to the interests that cows and pigs have in continued existence, an interest Grandin's system does not recognize. The second reason why Grandin's concern with reducing suffering but not killing is a limitation is that it has an absurd implication. Such a view suggests that we should painlessly kill dogs, cats and other animals so as to avoid the possibility of them suffering (McMahan 2002: 201). If they have an interest only in avoiding suffering and not living, we spare them suffering while depriving them of nothing of value by painlessly killing them as soon as possible. This outcome however is at odds with the intuition that no wrong is done when animals are allowed to live relatively pain-free lives.

These considerations should be born in mind when humane slaughter is put forward as an alternative to veganism at an idea level. The fact that humane slaughter does not completely eliminate acts of suffering during slaughter; does not address significant suffering that occurs before slaughter; and does not recognize farm animals' legitimate interest in not being killed, all suggest that it is not

[7] Grandin's system also currently does not involve any labelling program. This means that unless one eats only meat from McDonald's, Burger King or other restaurant chains whose suppliers employ Grandin's system, there is no way for consumers to know when they are buying meat from animals killed in one of Grandin's facilities.

an ideal outcome for farm animals when such an ideal is informed by a philosophy of animal protection.

However, for all that animal suffering remains a legitimate subject of concern in facilities audited by Grandin, it is likely to be a far greater concern in plants that do not even attempt to follow her guidelines. If it seems unlikely that Grandin's system has taken all suffering out of animal slaughter, it seems equally unlikely that it has made no difference either. The handling chutes and other elements that reduce an animal's stress in its final hours are improvements over previous slaughter systems which did nothing to reduce the terror animals experienced immediately before death. For this reason, pointing out problems with Grandin's approach at an ideal level should not be taken to show that nothing is gained when plants adopt her approach.

On an ethical level, Grandin's system encourages slaughterhouse operators to give moral weight to the issue of animal suffering. In this way it shares an important commitment with animal protection theory. All else being equal, it is better for an animal to be killed in a manner recommended by Grandin that it would be for it to die according to a method of slaughter which gave no weight to the animal's suffering, such as killing it with a sledgehammer, an approach still used in parts of the developing world. Although sledgehammers have not been used in American slaughterhouses since the 1950s, slaughter continued to be carried out with little regard for the animals' welfare long after this time (Singer 1990; Warrick 2001). Grandin's system has raised awareness regarding food animal welfare and reduced their suffering. Despite its flaws at an ideal level, in the non-ideal world we actually inhabit, Grandin's method of slaughter has been a force for good. If it is not as good as embracing veganism, its superiority over traditional slaughter is still worth recognizing.

Some proponents of protection theory might dispute this verdict, on the grounds that Grandin's system actually makes life worse for animals than traditional slaughter. Programs such as Grandin's, for example, "are commonly cited by agribusiness during legislative deliberations and used to argue that it is not necessary to pass legislation to prevent cruel farming practices" (Farm Sanctuary 2005: 3). This raises the possibility that more rigorous legal protection for farm animals might exist but for the rise of humane slaughter. By the same standard, the existence of Grandin's system might cause some people to continue to eat meat, and so participate in the wrong of killing animals, who would have otherwise eschewed meat had traditional slaughter remained the norm.

In response to this objection, it bears noting that resisting regulatory change is a failing of the agribusiness industry, not Grandin's system itself. There is no contradiction in viewing Grandin's system of slaughter as better than traditional slaughter and also favouring increased regulatory protection for animals. Indeed, there is no contradiction between ranking humane slaughter better than inhumane slaughter but second best to vegan agriculture. It also seems to underestimate the intellectual creativity of the agribusiness sector to think that if Grandin's system did not exist, its representatives would be unable to find some other rationale for opposing greater regulation.

As for people who would have stopped eating meat, I am unaware of anyone who actually falls into this category, and the concern that some such people may exist would seem speculative. Suppose however we grant that some such people do exist. The objection would still only be worth heeding if they were above a trivial number. Meta-analysis of survey data obtained between the mid-1990s and 2018 suggests that between 2 and 6% of the American public identify as vegetarians. A significant portion of this group however also report "eating meat when asked to list everything they ate during two non-consecutive 24-hour periods" (Šimčikas 2018). When people who eat meat are removed from the survey data approximately 1% of the population identifies as vegetarian and does not eat meat, an amount that has not significantly changed since the mid-1990s (Šimčikas 2018). Let us imagine that without the existence of Grandin's system, the percentage of vegetarians would double to 2% of the population. In other words, let us assume that the absence of Grandin's system would be as powerful a motivator to adopt vegetarianism as all actually existing motivations combined. Even under this generous assumption, the number of additional people who would have become vegetarian is small. Given the large number of animals now processed by Grandin's system, it does not seem reasonable to view the reduction in their suffering as being outweighed by the failure of the vegetarian population to rise from 1 to 2%. Even in such a world, the reduced suffering of the vast majority of animals killed to feed 98% of society would be a significant moral gain.

Another reason some protectionists may not rank Grandin's system superior to traditional slaughter is due to the thought that it increases profitability. As Gary Francione puts it, Grandin's work means that meat companies are "becoming better at exploiting animals in an economically efficient manner by adopting measures that improve meat quality and worker safety" (2008: 75). On this understanding of Grandin's system, the ostensible concern with animal well-being is a fig leaf obscuring its real rationale, which is the more efficient exploitation of animals.[8]

This objection takes at face value Grandin's frequent assertions that a humane system is also a more profitable one. Grandin's discussion of the economic impact of humane slaughter however is often couched in general terms. Neither Grandin's popular writings nor her academic texts discuss the economic costs of implementing her system. When she has specified possible cost savings they have sometimes turned out to be small. In 1995 for example Grandin calculated that bruises of fed steers and heifers cost the industry $22 million per year, or one dollar per animal (Grandin 2000). At the time a 500–600 lb steer would have sold for $330–$400 (Schulz 2018). This raises the possibility that the economic advantages of Grandin's system may be minimal. Independent studies of the economic impact of farm animal welfare regulations also document that they can increase rather than reduce costs. One study for example found that the introduction of minimum space requirements for egg-laying hens saw the price of eggs increase 9% (Mullally and Lusk 2018). Although the study looked at the egg rather than beef industry it nevertheless serves as a reminder that welfare measures need not save the industry any money. The

[8] An anonymous reviewer raised this objection.

claim that Grandin's system makes the exploitation of animals more efficient thus remains unproven.

But even if Grandin's system did increase profitability this would not gainsay its status as an improvement on traditional slaughter. The meat industry has long been extremely efficient to begin with. During the period in which Grandin's system has been in operation, there has been little chance of the general public converting to vegetarianism, let alone veganism, en masse. For the overwhelming majority of the animals involved, the realistic options were being slaughtered according to either Grandin's method or its less-humane predecessor. The reduction in suffering Grandin's system represents is justified even if it comes at the cost of some gain in industry efficiency, particularly if that gain is small or negligible.

Grandin's Arguments for Omnivorism Revisited

As we saw, two of Grandin's four arguments for meat-eating involved an appeal to evolution. Anyone who follows contemporary political debates will recognize in Grandin's work a curious shift that often occurs when evolutionary theory is invoked in contentious moral disputes. Although evolutionary theory emphasises flux, adaptation and change on an explanatory level, it is frequently invoked at a normative level to prevent or rule out some innovation or shift. The defence of traditional gender roles offered by evolutionary psychologists against feminist critiques is a well-known example. In Grandin's case, the "unnatural" option in question is switching to a meat-free diet. In this way her work reflects the time and place in which it was written, North America after the rise of evolution as not only a biological paradigm, but a cultural touchstone as well.

Grandin has something in common with other writers who make normative appeal to evolutionary processes. Such thinkers commonly take it for granted that if such processes have normative implications, they must be conservative. That is, it seems routine for thinkers who make normative appeals to Darwinism to overlook the possibility that evolutionary theory might challenge the status quo in a given field. In Grandin's case, she appeals to a concept of what is natural in an evolutionary sense to ground a conservative stance toward animal agriculture. Yet such an argument passes over in silence the many aspects of industrial farming that violate or redirect the animals' normal biological functions.

As an example, consider the account Grandin offers of the steps a farmer took to breed pigs at an economically efficient rate:

> Each boar had his own little perversion the man had to do to get the boar turned on so he could collect the semen. Some of them were just things like the boar wanted to have his dandruff scratched while they were collecting him. (Pigs have big flaky dandruff all over their backs.) The other things the man had to do were a lot more intimate. He might have to hold the boar's penis in exactly the right way the boar liked, and he had to masturbate some of them in exactly the right way. There was one boar, he told me, who wanted to have his butt hole played with. "I have to stick my finger in his butt, he just really loves

> that," he told me. Then he got all red in the face. I'm not going to tell you his name, because I know he'd be embarrassed (Grandin and Johnson 2005: 103).

The activity Grandin describes here is a form of beastiality, something boars do not spontaneously seek out with humans, with whom they cannot reproduce. The sexual element may make us squeamish, but it symbolizes a larger truth about agriculture. When it is practiced on an industrial scale it requires frustrating or redirecting an animal's normal behaviors or biology, most obviously through confinement, but also through procedures mentioned above such as castration. Grandin's evolutionary perspective asks us to take seriously the idea that an animal's evolved nature is relevant to determining how we should treat it. But even if we grant for the sake of argument that evolutionary theory should be conceived of in normative terms, it is not clear why its implications are necessarily conservative. It could just as easily be taken to justify a radical critique of the meat industry and the many "unnatural" acts in involves. Even if Grandin's normative understanding of revolutionary theory is correct, in short, it seems inadequate. For there are many elements of modern agriculture that do not meet the standard of naturalness Grandin appeals to in her evolutionary mode.

But let us look beyond this general consideration to the specific evolutionary arguments that Grandin offers. As we saw, the first one took over the idea of co-evolution from Budiansky, whose argument was in turn inspired by the work of archeologist David Rindos. A potential danger that can occur when a theory from one discipline is invoked to settle a debate in another is that the theory in question is mischaracterized as being more settled and authoritative in the home discipline than is in fact the case. I believe this has happened with Budiansky's appropriation of Rindos. He does not adequately acknowledge that while Rindos's theory is a respectable one within archeology, it has inevitably been subject to criticism and debate.

In a review of theories of domestication for example, archeologist Peter Bellwood notes that the domestication of plant crops took place with different speeds in different regions, and that Rindos's emphasis on co-evolution is better able to explain the gradual domestication of fruits and tubers that took place in regions such as New Guinea and the Amazon than the sudden explosion of cereal crops that took place in China and Mesopotamia (Bellwood 2005: 25). Bellwood cautions against "one line explanations" for something as complex and regionally diverse as the rise of agriculture, and argues that co-evolution is more appropriately regarded as one among many concepts that need to be invoked to explain the origin of domestication. To the degree that there are grounds to doubt the history of domestication Budiansky relies on, therefore, there will also be grounds to doubt the normative implications Budiansky derives from that history.

Let us assume however that Budiansky's historical account is correct. Even if that were the case, his argument would still face a problem. Why should a co-evolutionary account of the origins of animal agriculture have the normative implication that we must continue to eat meat? Rindos, it is worth noting, does not see any conservative implications following from co-evolutionary theory as it applies to plants. "Although I call for a nonintentionalistic interpretation of the evolution

of agricultural systems, this is not to be read as support for the status quo; indeed, the reverse is true" (Rindos 1984: 285). Rindos gives the example of plant-breeding projects and agricultural developments that arise in response to food shortages. If the co-evolutionary theory is correct, he argues, then it will only enhance the breeding of improved crops and other conscious agricultural changes (1984: 284). If coevolution does not entail conservatism in the case of plants, why should things be any different with animals?

It is a shortcoming of Budiansky's account that he does not answer this question. He instead seems to take it for granted that if animal agriculture had a non-intentional origin, this implies that we have a moral obligation to continue raising animals for slaughter. Such an assumption however is unlikely. Since the time of David Hume, philosophers have debated whether it makes sense to see is-claims as entailing ought-claims. Even critics who reject Hume's unbridgeable divide between facts and values acknowledge that moral claims can be derived from factual statements in a simplistic and hasty way. In Budiansky's case, his particular transition from the realm of causation to that of justification is bedeviled by two issues that undermine his conclusion that "we have no choice" but to continue eating pigs, chickens and cows.

The first problem is that his claim that we must continue raising animals to eat them is at odds with by Budiansky's reliance on the concept of a preadaptation. On Budiansky's telling, the docility and other traits that made some species suitable for domestication originally arose for a different reason in nature. Yet if that is the case, it means there is no necessary link between a trait's continued existence and its continuing to perform the same function. In the United States for example some vegans currently operate sanctuaries for farm animals, where cows, pigs and chickens receive food and shelter for the purpose of their own protection rather than slaughter. If factory farms declined while the number of such sanctuaries increased, it would represent a form of domestication detached from the purpose of meat eating. Something similar would happen if our society saw a widescale conversion to Hinduism, in which we no longer raised cattle for beef but regarded them as holy creatures, allowing them to walk the streets as they do in India.

Such new forms of domestication are worth considering not because they are likely to happen any time soon, but because they illustrate the conceptual possibility of docile animals continuing to exist without being raised for food. Such a transition would only be in keeping with Budiansky's narrative of preadaptation. Yet when it comes to defending the status quo regarding meat eating, Budiansky equates the idea of domesticated animals continuing to exist with the idea of their continuing to perform the same function. This is inconsistent with the evolutionary story he tells, which separates the question of a trait's continued existence from its continuing to perform the same function.

The second problem with Budiansky's argument cuts deeper. It has to do with the bedrock notion that if something has an evolutionary rather than intentional origin, that fact obliges us to preserve the thing in question. There are aspects of our own biology that are the result of non-conscious evolutionary forces, yet we do not take this to rule out change and intervention regarding those traits. Human beings for example evolved so as to be susceptible to viruses and to reproduce through

sex. None of these biological truths however show that a moral wrong occurs when someone takes anti-viral medication or practices birth control. A co-evolutionary understanding of the origin of agriculture no more obliges us to preserve agricultural practices that arose nine thousand years ago than an evolutionary understanding of biology obliges us to preserve aspects of our own biological identity that are even older.

Grandin links her evolutionary account to the idea that food animals themselves benefit from domestication, in that they experience a death more merciful than that which they experience in the wild. It is not clear however why this is relevant. An animal dying in nature has a different consequence than one killed for food. When it is eaten by another predator or decomposes into the earth, it contributes to the ongoing existence of other animal and plant life. It is doubtful that there is currently any realistic way for ecosystems to sustain themselves other than through the natural cycle of life and death. It is plausible therefore to think animal deaths in the wild are necessary, in a way that raising and killing them for food is not.

Grandin's second evolutionary argument holds that human beings had evolved so as to require both meat and plant food. This claim overlooks evidence suggesting that the health impact of vegetarian diets is either positive or neutral. The official view of the American Dietetic Association's for example is that "appropriately planned vegetarian diets, including total vegetarian or vegan diets, are healthful [and] nutritionally adequate… Well-planned vegetarian diets are appropriate for individuals during all stages of the life cycle, including pregnancy" (ADA 2009: 1266). That meat-free diets can be healthy has also been acknowledged by national dietician associations in Australia, Canada and the United Kingdom (DAA 2008; DOC 2003; BDA 2005). Such statements remind us that it is possible to live a healthy life without eating meat. This is surely why vegans have existed for thousands of years, and why they exist in large numbers in places like India today.

But the primary reason dieticians' statements are worth noting is to illustrate the standard of proof that Grandin must meet to substantiate her claim that avoiding meet is not in keeping with our biology. She would have to explain away the nutritional evidence running counter to her suggestion, and present negative health evidence of her own. That Grandin does neither of these things suggests that she may misunderstand the sense in which it is accurate to say our species evolved as both plant and meat eaters. We are natural omnivores in the sense that we are able to digest either plant or animal foods, not in the sense that our biology requires us to continue to consume both. Grandin is therefore wrong to say that our evolutionary history rules out widespread veganism.

In recounting her own experience on a vegetarian diet, Grandin suggests that the situation may be different for people with autism. This is a more limited claim, but it also suffers from a lack of evidence. Unlike her habit elsewhere in her writings, Grandin does not cite any scientific evidence for her empirical claim about autistic physiology. Nor does she take note of the experience of other autistic authors who have given up meat without reporting any negative health consequences (O'Neill 2000: 225; Hull 2018). Meat-free diets are in fact fairly common among autistic people, in part because they have a lower level of food acceptance than the general public (Ledford and Gast 2006). As a guide to food issues for autistic adults notes,

"many of us are vegetarians or vegans, or 'want to be,' or are working toward the goal of vegetarianism" (Clark 2002: 1). Such factors suggests that Grandin either has made a false generalization from her own experience, or wrongly blamed her vegetarian diet for health problems that were caused by another source.

In addition to advancing evolutionary arguments, Grandin, as we saw, took up the question of why we extend a greater moral status to a disabled human than we do to an animal with a similar level of cognitive ability. Her response was that biologically, we have an instinct to protect our own kind. Given how the handicapped and other groups have historically been ostracized, this claim requires more support than Grandin provides. However, even if Grandin is right, it still does not justify the moral chasm that separates animals from severely mentally handicapped humans. An instinct to protect members of our own kind only precludes higher moral status for animals if morality must always overlap with what our instincts tell us to do. Anger and sexual attraction may be instinctive, however, but we do not take this to show that giving reign to our temper or our sexual impulses is always justified. So even if we did have an instinct to protect every member of our own species, it would not justify a lower moral status for animals.

Grandin's final argument invoked the moral knowledge generated by slaughter. This argument has special significance, in that people with autism have traditionally been thought to have such empty interiors as to rule out the very possibility of inner self-examination. The autistic psyche was long likened to an "empty fortress," as the title of a book on autism once put it (Bettelheim 1972). Grandin's reflections on slaughter as a ritual serve as a valuable reminder that the inner lives of people with autism can be rich and complex enough to engage in the quest for meaning that is often associated with religion. An exhaustive account of the ethical significance of Grandin's writings would need to give special emphasis to this aspect of her work.

When it comes to the narrow issue of the ethical status of animals, however, Grandin's reflections do not justify continuing to kill them for food. One reason is the perennial problem of religious arguments not holding legitimacy for people who do not share the religion in question. The idea that killing animals places us in touch with a larger cosmic order makes supernatural assumptions that many modern readers do not share and for which Grandin offers no justification. Even if we overlook this, however, there are other grounds on which someone who took a religious view of the universe could have a similar experience. They might read a religious text, or pray or reflect on animal birth rather than death. Even if we grant the importance of cosmic awareness, therefore, there are surely other ways to achieve it than through mechanized killing, which could be abolished without reducing the possibility or likelihood of spiritual development.

A similar problem holds with Grandin's claim that killing animals helps us see the value of life. Even if it is always true—and Grandin's account of sadist slaughterhouse employees suggests it is not—it is unlikely we will stop valuing life if we stop eating meat. If anything, an ethics of affirming life seems most in keeping with a refusal to kill animals when we do not have to.

There is a noticeable difference between Grandin's work as a designer of slaughterhouses and her work as a critic of veganism. When it comes to designing slaughterhouses, Grandin is focused and methodical. She works from an interlocking set

of principle drawn from animal behaviour research and applies them in a systematic way to the problem of slaughterhouse design. When it comes to addressing the problem of veganism, by contrast, Grandin invokes a series of ad hoc arguments derived from many different sources, ranging from evolutionary theory to spiritual experiences she has had inside slaughterhouses. Taken individually, none of her arguments succeed. Collectively, they highlight a major blind spot in Grandin's writings. In the matter of veganism, Grandin has for years criticized it on unjustified grounds. Despite her valuable contributions to the well-being of animals as a designer of humane slaughterhouses, this is a serious shortcoming of her work.

Conclusion

One of Grandin's most popular works, *Thinking in Pictures*, contains a photograph of a Buffalo-handling facility Grandin designed for a wildlife refuge in Oklahoma. Bison who pass through the facility are auctioned off once a year to private breeders, so the facility ultimately serves the purpose of slaughter. But that is not its only function. It is also used for conservation purposes, as when Buffalo in the park require veterinary attention. As such, the photo gives rise to reflection on alternative uses for Grandin's gifts. In a more humane universe than ours, one can imagine Grandin having opportunities to use her unique insights into animal behaviour for a purpose other than slaughter. Which is to say, for a purpose other than endless and unnecessary killing.

As it stands, the Grandin who exists in our universe warrants both praise and criticism. Many of the criticisms offered above could be avoided if Grandin admitted that vegetarianism was morally superior to meat consumption, and instead defended humane slaughter as a second-best compromise. The great value of her system is that it has the capacity to make a difference in a world of meat eating, which animal protection advocates to date have not been able to eliminate. Grandin's misguided attempts to portray humane slaughter as superior to veganism defend her approach at the wrong level. She opposes it to veganism in ideal terms, when it is more plausible regarded as a pragmatic compromise at the non-idea level.

Grandin's writings speak to a real ethical impulse in the way they focus on the moral issues surrounding slaughter. Grandin's particular method of addressing those issues, however, allows a meat-eating society to maintain a compartmentalized view of animals, one that never implicates consumers in the negative aspects of meat production. Just how indulgent Grandin's approach is toward the appetite for meat can be seen by comparing it to compromise views that fall short of veganism yet nonetheless call for reduced meat consumption. One such view for example recommends a diet that includes a limited amount of free-range beef alongside plant foods (Davis 2003). Another holds that the average person would be better off cutting meat consumptions of all kinds, whether it is beef, chicken or anything else (Pollan 2006). A third possible compromise is the "vegan before six" diet. It sees dinner is the only meal of the day in which meat is consumed, and even then only in small amounts (Parker-Pole 2009).

These diets all have something in common. They are all premised on the view that it is reasonable to ask people to make changes regarding the amount of meat they consume. Grandin's dietary ethic is different from these compromise views in that it does not ask the average meat-consumer to reduce the amount of meat in his or her diet even slightly. On Grandin's account one could have a daily diet of bacon for breakfast, chicken for lunch and steak for dinner and still have done all one could to reduce animal harm. Perhaps it is unsurprising that the meat industry would embrace a reformer with this particular message. One has to wonder however how far we can go in reducing animal harm when the amount of meat consumed remains off the table of discussion. Grandin's animal ethic is one with real moral value. Yet from the point of view of protection theory it ultimately signifies not how far our society has come regarding animals, but how far we still have to go.

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