

Broiler Chickens and a Critique of the Epistemic Foundations of Animal Modification

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Abstract Within this paper, I critique the history of the modification of the broiler chicken through selective breeding and possible future genetic modification. I utilize Margaret Atwood’s fictitious depiction of genetically engineered chickens, from her novel *Oryx and Crake*, in order to forward the argument that modifications that eliminate animal *telos* either move beyond the range of current ethical frameworks or can be ethically defended by them. I then utilize the work of feminist epistemologists to argue that understanding what it means to be a chicken shapes our conceptions of what modifications are or are not acceptable. Taking into account justifications stemming from practical knowledge when making ontological claims can help to shift our understanding of what animal modifications can or cannot be justified. The paper ends by addressing three possible problems brought about by accepting such justifications.

Keywords Philosophy of agriculture · Agriculture · Selective breeding · Genetic modification · Animal husbandry · Animal ethics · Animal metaphysics · Ontology · Epistemology · Chickens

Margaret Atwood, in her biotech apocalyptic novel *Oryx and Crake*, depicts a future where genetic engineering has twisted the animal kingdom into something much different than it is today. Atwood’s world is a place where scientists create hybrid species such as “pigoons” (pig-like creatures engineered for organ harvest), “snats” (a hybrid between a rat and snake), and genetically engineered chickens that have been practically reduced to a blob of breast meat (Atwood 2004). Although this is a

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work of fiction, currently great strides have been made in the modification of animals for medical purposes and food use (Prather et al. 2008). This makes Atwood's picture of the future seem more plausible than one may have first thought.

Within this paper, I specifically critique the history of the modification of the broiler chicken. I utilize the work of feminist epistemologists in this critique to forward the argument that the understanding of what it means to be a chicken shapes our conceptions of what modifications are or are not acceptable. In addition, I argue that utilizing justifications stemming from practical knowledge as well as physical knowledge when making ontological claims can shift our understanding of what modifications of animals (through selective breeding and genetic modification) can be justified. The practice of the modification of animals is not going away any time soon. However, without critiquing the epistemic foundations of such a practice, I fear that we are in danger of making a future like the one depicted in Atwood's novel a reality.

While at first glance, Atwood's blob chicken may seem disturbing and incomparable to the chickens that we raise today, the fact is that chickens grown for modern consumption bear more resemblance to Atwood's chicken than to the traditional barnyard chicken. In a recent paper on transgenesis, M. Greger writes that "decades of selecting traits for maximizing yield has led to endemic levels of so-called production diseases in all the major commercial farm animal species" (Greger 2011, p. 451). Selective breeding, historically undertaken with the aim of economic advantage, is geared towards profitability even at cost of animal welfare (Thompson 2008). It is this modification to suit industrial farming needs that has led to creation of what is commonly called the "designer chicken" (Boyd 2001). These chickens have been selectively bred to live in confinement and to produce more breast meat at the expense of the development of their internal organs. In addition, genetic changes have greatly increased their susceptibility for musculoskeletal problems, male infertility, metabolic disease, and increased mortality. In a 2011 paper on poultry pain, Michael Gentle writes that "in broilers there has been selection for rapid growth rate leading to pathologies in the growth plate and progressive degeneration of articular cartilage results in osteoarthritis and lameness" (Gentle 2011, p. 4). Such skeletal disorders have been a common feature of the poultry industry for years (Thorp 1994). As a consequence, the "designer chickens" can no longer survive in a traditional farming environment, but these modifications are still viewed as a success from a commercial standpoint because production yield has greatly increased (Boyd 2001).

While the above modifications are solely a result of selective breeding, with the advent of new genetic modification technology, chicken breeding programs are already looking at further ways to modify the chicken (Boyd 2001). William Boyd writes in his paper on technology and meat production that "the new genetic technologies could have a major impact on commercial breeding ventures. As in other sectors of the emerging life sciences industry, the development of genomics holds great promise for those interested in further manipulating the chicken genetic program" (2001, p. 660). This is especially the case with the release of the Final Guidance on Genetically Engineered Animals by the FDA. If the principle goal of transgenic food animals is improved productivity, which, according to M. Greger,

is the same goal that has historically been sought using traditional approaches of genetic selection, then there could be unintended welfare and health implications of such modifications similar to the ones outlined above (Greger 2010). If the result of past manipulation through breeding has produced severely unhealthy chickens, what other consequences might arise from the further manipulation of chickens?

By recognizing this history, genetic modification technology then becomes simply the latest way that humans modify animals. However, this new method provides future possibilities once not dreamed of, such as the animal creations found in Atwood's book. It is quite possible that the "designer chicken" could eventually become the blob of breast meat found within *Oryx and Crake's* pages. In fact, current animal ethic positions could condone such a course of action.

For example, utilitarians, such as Peter Singer, cite suffering as the main criterion of moral worth (Lafollette and Shanks 1996). Such a view might be used to condone the above genetic modifications in two ways. First, you could argue that creating a blob chicken is acceptable because the blob chicken no longer suffers. If suffering is the main criterion of moral work and if you modify chickens to the point where they are no longer sentient (i.e., where they no longer suffer) then Singer's consequential calculation is no longer applicable. Second, you could argue from a basic utilitarian position that the harm done to chickens in this instance is outweighed by the greater good done for humans and other food animals. Chickens may no longer be able to enjoy life in the barnyard, but this is outweighed by the fact that they now provide humans with the majority of our protein needs. This also could be seen as a benefit for other food animals because we no longer need to raise as many pigs or cows for production due to the increase in chicken production.

In addition, other ethical positions, such as Tom Regan's "subjects of a life" position may be of little use when deciding whether or not modification is ethical because you could argue that blob chickens do not have the capacity to be a subject of a life and, therefore, move beyond the scope of this ethical framework (Regan 2003) (However, it should be noted that you could also argue that the act of removing this capacity is itself an unmoral act.). Seemingly, this places us in a position where the genetic modification of animals to the point Atwood describes either moves beyond the range of current ethical frameworks or can be ethically defended.

However, if this is so, then why is it that such a depiction garners a negative emotional response? Arguably, Atwood created the blob chickens because she instinctively knew that her readers would be disturbed by such a creation. Rather than ignore this reaction and accept the outcome that logical arguments lead us to, I argue that our initial repulsion at this prospect, itself, has at least some moral weight and needs to be examined before we accept this course of action. Perhaps, this initial reaction is an indicator that something else of moral significance is not being taken into consideration by the above arguments. It may turn out (as in the case of human surgery) that these reservations are unwarranted but we will not know this until we investigate further.

In "Telos and Genetic Engineering," Bernard Rollin argues that this queasiness or reluctance may come from three possible concerns (Rollin 2003). First, it may come from the "slippery slope concern." If we genetically alter chickens to the

point that they are blobs of breast meat, then what is next? Soon we could justify growing brainless humans for organs or splicing animals together like the “snats” (a hybrid between a rat and a snake) in Atwood’s novel. Rollin dismisses this reason because it is a normal response to change and, therefore, does not automatically signify a justifiable moral concern. Second, this reluctance may come from an aesthetic concern. We all grow up with images of happy chickens sitting on nests in our minds. Our rejection of blob chickens may be due to the fact that they do not match this traditional image. Rollin argues against this reason because people simply need to realize that we are replacing one chicken with another that will not suffer in the industrial farming setting. His final concern stems from a virtue ethic concern. Such a feeling of reluctance may cause people to ask whether or not valuing profit and productivity to the point where we need to genetically alter chickens is acceptable. Thus this reluctance will most likely cause people to take animal welfare issues more seriously. However, even with this reluctance, Rollin still argues that genetically modifying chickens is morally acceptable.

For Rollin, preventing animal pain and suffering includes taking concerns of *telos* into account (Rollin 2003). Roughly, the *telos* of an animal is the needs and desires that stem from its nature. For example, chickens have a desire to nest and when we do not provide adequate space for them to nest, we are inhibiting their *telos*. According to Rollin, this denial causes animal suffering. Thus, if we want to limit the suffering of animals, we need to respect their *telos* as well as limit physical pain. Rollin proposes that we should follow the “Maxim to Respect *Telos*” when deciding how to treat animals. This maxim is, roughly, that if we have dealings with animals, we need to respect their needs and desires. However, it does not follow from this maxim that we should not alter an animal’s *telos*. Rollin argues that we can alter the *telos* of an animal if this alteration will alleviate animal suffering. If you accept this view, then the above designer chicken is not ethical because modifications have increased animal suffering but the blob chicken could be considered ethical because it alleviates suffering (albeit by rendering the chicken incapable of being a “subject of a life”). Once again, it seems that we are back in a position where the genetic modification of animals can be ethically justified.

Here I argue that while Rollin’s view acknowledges animal *telos*, it is still ultimately founded upon the pain and suffering of animals and, for this reason, is similar to Peter Singer’s position. But is suffering the ultimate factor of importance when deciding whether or not we should genetically modify animals? In addition, is the modification of an animal to the point where it no longer has a *telos* to alter justifiable? Shouldn’t a Maxim to Respect *Telos*, at the very least, guard against the destruction of this *telos*? Perhaps there is another condition that the negative emotional response stems from that was not identified by Rollin. I argue that our understanding of what it means *to be* a chicken shapes our conceptions of what modifications are acceptable. I utilize the work of feminist epistemologists in order to further clarify this position.

Alcoff and Dalmiya argue that the reason why the work of women has been traditionally undermined is rooted in “epistemic discrimination” (Alcoff and Dalmiya 1993). They go on to explain that in the field of epistemology, knowledge has been traditionally limited to propositional knowledge such as *a knows p*.

This type of knowledge ignores more practical knowledge such as *a knows how do p*. For Alcoff and Dalmiya, knowledge can be acquired in various ways including observation or doing something. These other forms of knowledge are undervalued in a system that values propositional knowledge, or *knowing that*, over practical knowledge, or *knowing how*. In a world where women were historically excluded from higher education, this served to undermine their knowledge claims, such as in the case of midwives. I bring this up because the above different types of knowledge can help us understand how we conceptualize chickens.

For example, we can have propositional knowledge of a chicken; namely, that this physical animal is a chicken. Albert knows that animal *b* is a chicken or *a knows that b is c*. This particular statement ends with the proposition that *b is c*, which is an ontological claim. Then you can go on to justify this ontological claim. *B is c* because it has the same genetic code as other animals that are called chickens, lays eggs, or can breed with other chickens. What's important here is that, in current science, justifications of the propositional knowledge that animal *b* is a chicken usually focus on the physical or genetic makeup of the animal. If you utilize these types of justifications and ignore others, then the broiler chicken is still a chicken even if it can no longer walk or forage for food. In addition, with such reductionist justifications, the primary criteria for chickeness may become predominantly traits utilized by humans such as the capacity to lay eggs or to produce meat. This is where practical knowledge or *knowing how* can come in handy.

Let's start again with the propositional claim that Albert knows that animal *b* is a chicken. Again, we go on to justify this claim but this time we utilize the practical knowledge of chickens by people who raise them. *B is c* because it hatches from an egg, looks like a chicken, clucks, lays eggs, and eats bugs. The justifications given by someone who has practical knowledge of chickens are more robust and detailed than justifications given from a purely materialistic or genetic point of view. This broadens the criteria for chickeness to include aspects that are not predominantly traits utilized by humans.

I argue that justifying your knowledge that *b* is a chicken using only materialistic justifications can be used to support the view that a genetically altered chicken reduced to breast meat is still ultimately a chicken because the chicken is still *genetically* a chicken. Using these justifications, it does not matter that the blob chicken no longer clucks or eats bugs. It's still physically chicken (i.e., made up of chicken cells). In contrast, justifications stemming from the wide ranging practical knowledge of chickens focus on many criteria including the behaviors of chickens deemed not directly valuable to humans. In a fundamental way, these behaviors define what chickens are. Thus, the greater understanding of a chicken that is grounded in these justifications value a wide range of behavior, or the practical knowledge, of chickens at least as much as the fact that it is materially the same animal. I argue that equally valuing knowledge justified by information stemming from wide ranging practical knowledge will give us new insights that can help us better determine which types of modifications (both from genetic manipulation and from selective breeding) should be allowed and which types should be deemed unethical.

If we equally value both materialistic and practical justifications that a chicken is a chicken, then it becomes difficult to justify a course of action where an animal

is altered to the point where it loses the behavior that makes it that animal; as in the case of both the designer chicken and the blob chicken. It seems clear that scientists in both cases gave little weight to preserving chicken behavior not deemed valuable to humans when modifying these animals for commercial use. While the designer chicken is a product of selective breeding and the blob chicken would be a product of genetic modification, in both cases, the scientists' conception of "chicken" was myopically focused on traits valuable to humans and largely reductionist in nature. To be fair, concerns stemming from wide ranging practical knowledge simply may not have crossed their minds. However, if we utilize ontological conceptions of animals based upon justifications stemming from practical knowledge, then this will change the way we formulate and address ethical concerns.

For example, if we accept practical justifications, and are morally committed to not causing the suffering of animals, as is the case with most animal ethics positions, then we have little choice but to reconsider possible actions taken to alleviate that suffering. Take industrial farming as an example. Utilizing practical justifications when defining what animals are makes the genetic alteration of animals to the point where they no longer display normal behavior unacceptable. If this is the case, then we may have to give more attention to the possibility of changing our methods of husbandry rather than to genetically altering animals. In addition, like Rollin's third cause of reluctance above, shifting to practical justifications for our ontological claims may also cause people to ask whether or not valuing profit and productivity to the point where we need to radically genetically alter chickens is acceptable. When we can no longer farm in the industrial manner without either causing suffering or genetically modifying animals to the point where they have a limited or a non-existent *telos*, utilizing ontological and epistemic claims based upon practical knowledge justifications may cause us to seriously question current farming practices.

A main problem when utilizing practical knowledge as justification is whose practical knowledge should we privilege? For example, many people have practical knowledge of chickens. Butchers have practical knowledge of butchering them. Small scale farmers have practical knowledge of raising them that is different from larger scale industrial farmers. Research scientists have different practical knowledge of chickens than farmers. In fact, different types of scientists will have different knowledge of chickens. Veterinarians also have a specialized practical knowledge of chickens. Thus this leads us to ask whose knowledge should dictate the criteria for chickenness.

This question is easier to answer than it first seems. People may have different practical knowledge of chickens, but there are fundamental features and behaviors (such as foraging for food) that link most if not all of these experiences. For example, in the book *Animals in Translation*, Temple Grandin writes about an experience she had at a chicken farm where they were breeding for increased growth and muscling (Grandin 2005). While she was walking through the barn, she found a dead hen. It turned out that half the roosters were killing the hens. The breeding program had increased the chicken's growth rates but at the expense of the rooster's courtship behavior, which causes hens to take a sexually receptive position. Grandin specifically argued that the result of this selective breeding was abnormal rooster

behavior. What's interesting here is that the farmer acted as if this were normal. Grandin immediately consulted backyard breeders and a chicken specialist who confirmed that this was, in fact, abnormal behavior. She ended by stating that monitoring only physical changes or select behaviors during breeding programs can cause serious problems like the one above.

This example illustrates the points I made above. First, Grandin's practical experience of chickens was similar to the backyard breeders and the specialists she consulted. It seems that you could safely extrapolate from this that roosters killing hens is abnormal behavior. The farmer had been focusing on physical traits and the behavior had changed so slowly that he became accustomed to this behavior. However, when his experience was compared to others with wide ranging practical knowledge, it was shown to not be normal chicken behavior. Here the trait of courtship behavior was similar within several different practical knowledges. Thus I argue that when utilizing practical knowledge to justify what a chicken *is*, it is necessary to consult people from many different contexts to find the unifying behaviors; behaviors such as courtship dances.

The second problem that we may face when utilizing practical knowledge as justification is which chickens should be used to dictate the criteria for chickenness? For example, if we only used the abnormal chickens above as representative of chickens as a whole, then we would find nothing wrong with the above behavior. However, as in the case above, it seems clear that we wouldn't use one set of chickens to justify chicken behavior as a whole; we would use many different types of chickens in different contexts. From this point of view, the above chicken is clearly abnormal and I would argue that the designer chicken above is also abnormal.

A third problem is the issue of which modifications to domestic animals should be deemed acceptable. Specifically, if we can alter animals, then what behaviors should be respected? For example, should we change behavioral characteristics of layer hens, such as aggressiveness or fearfulness, in order to minimize feather pecking in an industrial farming setting? This type of selective breeding is actively being pursued (Nordquist et al. 2011; Rodenburg et al. 2010) and is one that illustrates the ethical difficulties brought to light by such programs. Here, if you take the practical knowledge of chickens into account, it should become necessary to ask ourselves whether or not the behavior selected for modification is essential to an animal's *telos*. Will the modification of aggressiveness or fearfulness go against widely held practical knowledge of chickens? Will such a program change other behavior not deemed valuable to humans but important to chicken life? This view should not be taken as an argument against the modification of domestic animals. Rather, taking such knowledge of chickens into account when deciding what modifications should be attempted will hopefully guard against breeding programs like the ones that led to the designer chicken; ones myopically focused on increasing productivity at the expense of animal welfare.

In addition, Bernard Rollin's virtue ethic concern is also applicable here. As stated above, a feeling of reluctance, for Rollin, may cause people to ask whether or not valuing profit and productivity to the point where we need to alter chickens in the proposed way is acceptable (Rollin 2003). In a similar way, asking ourselves whether or not a proposed modification will affect an animal's *telos* may cause

people to take the wider implications of such modifications more seriously especially for the animals being modified.

The purpose of this paper is not to fully flesh out a new animal ethic. It is simply to show how utilizing justifications stemming from practical knowledge as well as physical knowledge when making ontological claims can shift our understanding of what modifications of animals (whether through selective breeding or genetic modification techniques) can be justified. An ontological view of a chicken based solely upon materialistic justifications can be used to justify modifications that may lead to further unintended animal welfare problems. This paper is also a call for the above view to be fully fleshed out in further work and incorporated into ethical frameworks that are utilized when making decisions throughout the varied processes of animal modification and husbandry. As stated at the beginning of this paper, the practice of modifying animals is not going away any time soon. However, without critiquing the epistemic foundations of such a practice, I fear that we are in danger of making a future like the one depicted in Atwood's novel a reality; a future where further modification can eliminate the *telos* of domesticated animals.

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References

- Alcoff, L., & Dalmiya, V. (1993). Are old wives' tales justified? In E. Potter & L. M. Alcoff (Eds.), *Feminist epistemologies* (pp. 217–244). New York: Routledge.
- Atwood, M. (2004). *Oryx and crane*. New York: Anchor Books.
- Boyd, W. (2001). Making meat: Science, technology, and American poultry production. *Technology and Culture*, 42(4), 631–664.
- Gentle, M. J. (2011). Pain issues in poultry. *Applied Animal Behaviour Science*. <http://ezproxy.msu.edu/login?url=http://search.proquest.com/docview/905213640?accounti=12598>. Accessed 24 Nov 2011. TBP.
- Grandin, T. (2005). *Animals in translation*. New York: Harcourt Books, Inc.
- Greger, M. (2010). Trait selection and welfare of genetically engineered animals in agriculture. *Journal of Animal Science*, 88(2), 811–814.
- Greger, M. (2011). Transgenesis in animal agriculture: Addressing animal health and welfare concerns. *Journal of Agricultural and Environmental Ethics*, 24(5), 451–472.
- Lafollette, H., & Shanks, N. (1996). *Brute science: Dilemmas of animal experimentation*. New York: Routledge.
- Nordquist, R. E., Heerkens, J. L. T., Rodenburg, T. B., Boks, S., Ellen, E. D., & Van der Staay, F. J. (2011). Laying hens selected for low mortality: Behaviour in tests of fearfulness, anxiety and cognition. *Applied Animal Behaviour Science*, 131(3–4), 110–122.
- Prather, R., Shen, M., & Dai, Y. (2008). Genetically modified pigs for medicine and agriculture. *Biotechnology and Genetic Engineering Reviews*, 25, 245–266.
- Regan, T. (2003). *Animal rights, human wrongs*. Oxford: Rowman and Littlefield Publishers, Inc.
- Rodenburg, T. B., de Haas, E. N., Nielsen, B. L., & Buitenhuis, A. J. (2010). Fearfulness and feather damage in laying hens divergently selected for high and low feather pecking. *Applied Animal Behaviour Science*, 128(1–4), 91–96.
- Rollin, B. E. (2003). On telos and genetic engineering. In S. J. Armstrong & R. G. Botzler (Eds.), *The animal ethics reader* (pp. 342–350). New York: Routledge.
- Thompson, P. B. (2008). Animal biotechnology: How not to presume. *American Journal of Bioethics*, 8(6), 49–50.
- Thorp, B. H. (1994). Skeletal disorders in the fowl: A review. *Avian Pathology*, 23, 203–236.