The Dairy Cow Labour Process: Notes from Marx's Value Theory

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Abstract Building upon the impulses in Deidre Wicks' 2018 essay, 'Demystifying Dairy', this essay describes the labour of dairy cows from the standpoint of Marx's labour value theory. I will firstly discuss current scholarship on animal labour, and its applicability to dairy cow labour, drawing in particular from my book *Animals and Capital*. I will discuss Marx's concepts of absolute and relative surplus value, and their application to understanding the future evolution of industrial dairy farms which aim to make dairy cow labour 'more efficient' through a focus on reproductive efficiency, yield, and lifespan. As I describe, these processes place the lives of dairy cow labours constantly in relation to the threshold of death, as a condition of production.

Keywords dairy cows, Marx, labour, animal labour, capitalism

In her 2018 essay 'Demystifying Dairy', Deidre Wicks offered a Marxist exploration of the reality of milk production, and the peculiar exploitation and violence experienced by dairy cows. The essay provided readers a glimpse into the production process behind the messaging provided by society and industry, in order to understand how 'the reality of the life of the dairy cow has been hidden, idealised and distorted' (Wicks 47). In building her analysis, Wicks drew from the Marxist concept of mystification (Wicks 47-51), which was interconnected with Marx's description of commodity fetishism, the process by which the commodity takes on social properties that are 'fantastical' and have 'absolutely no connection with the physical nature of the commodity and the material [*dinglich*] relations arising out of this' (Marx *Capital Vol.1*, 164-5; see also Stănescu). As Wicks argued, milk, the product of the production process, is accompanied by a naturalistic mystification, one that assumes both that cows 'naturally' produce milk, and simultaneously that it is 'natural' for humans to consume the lactation of cows and other non-human animals. This mystification veils the brutal reality of production, which depends upon practices of repeated forced insemination, pregnancy and calf birth, the theft and killing of juvenile calves and the routinised culling of 'non-productive' animals, amongst other practices, as part and parcel of production.

Wicks' important essay belongs to a now growing body of animal studies and feminist scholarship which has troubled milk production (see for example Gaard; Nimmo; Gillespie, *The Cow*; Gillespie 'The Afterlives'; Deckha; Gambert; Gambert and Linné; Karhu; Narayanan; and Otomo). This work arrives at a point at which we have seen a continued expansion of global dairy production, and with this, arguably, growing concerns about the nature of this production. Dairy consumption and per capita dairy consumption have grown (Ritchie, Rosado and Roser) and are predicted to grow significantly in the Global South (OECD-FAO). Despite the ethical, environmental and health issues associated with dairy production, in many contexts there remain social and cultural attachments to animal-based milk products, sometimes interconnected with gender, racial norms, and religio-nationalist norms (see Gambert and Linné; Stănescu '"White"'; and Narayanan).

Industrialisation and intensification of dairy production continues apace (Clay, Garnett and Lorimer), with fully automated 'robotic' dairy farms emerging as one trajectory for future agricultural systems (Holloway and Bear). Dairy production is also globalising: Asia is the region of the world where most milk is produced (FAO), with India the world's largest producer; while China is accelerating its dairy production (Wang, Wei and Wang; see also Fuller et al.) and the country is now reported to be home to some of the largest industrial dairy production facilities in the world (eDAIRYNEWS). Arguably, we are seeing the slow process by which dairy products become cemented into global human food supplies, which also means that as part of this production process millions of animals will be brought into existence to be subject to the violence of close confinement systems, forced reproduction techniques, and early deaths to enable the production of these products.

In this essay, I want to build on the contribution of Wicks and other scholars, in describing the labour of dairy cows from the standpoint of Marx's labour value theory. Here, I will be explicitly building on my monograph *Animals and Capital*; indeed, this essay might figure as a supplement to that book.[i] I will firstly discuss current scholarship on animal labour, and its applicability to dairy cow labour. As I shall discuss below, there is now a growing body of animal studies scholarship which describes the role of animals within production through the framing of 'labour' or 'work'. Applying this framing, and taking into account the expansion of industrialised dairy production, would suggest that dairy cows are a growing global 'labour force'. However, giving an account of the nature of this labour process is not straightforward, at least from the standpoint of traditional labour theory. While there are analogues to this sort of production within human labour processes – such as commercial surrogacy and wet nursing – arguably the structural positioning of the dairy cow is not strictly comparable to other human labourers.[ii] This is precisely where, as I shall discuss, a Marxist approach to labour is useful, as it allows us to precisely locate this labour within the value structure of capitalism.

Secondly, I will discuss the application of Marx's labour theory of value to dairy cow work, drawing in particular from my work in *Animals and Capital*. As I shall explore, dairy cows perform a 'metabolic' labour, where forced insemination, pregnancy, birth and loss of children are embedded parts of the labour process, and a necessity for the creation of a bodily fluid through a 'lactational labour' that is the object and 'product' of industry. This differs from the labour of animals whose bodies are used for food in a number of important ways. For example, as I shall discuss, while the death of the animal is 'value producing' for animals who are used for food (as death marks the turning point where a living being becomes a consumption commodity), for dairy cows the continuing ability to become pregnant, triggering lactation, is the key to value production for these animals. However, as I discuss, death still haunts the production process of industrial diary, since the failure of a dairy cow to respond to forced insemination will mean the animal will be 'culled'; thus, as I will argue, dairy cows must pass through a 'threshold of death' in order for value production to occur.

Finally, I will discuss Marx's concepts of absolute and relative surplus value, and their application to understanding the future evolution of industrial dairy farms which aim to make dairy cow labour more efficient through a focus on reproductive efficiency, yield, and lifespan. As I shall discuss, this framing allows us to see the long run tendencies of industrial dairy farms as they continue to intensify, and also highlights the somewhat paradoxical problem of the length of dairy cow life.

Theorising Animal Labour

There has been a growing scholarship on animal labour within animal studies and posthumanism (see for example Coulter; Blattner; Blattner, Coulter, and Kymlicka; Barua 'Animating'; Barua 'Nonhuman'; Beldo; Porcher; Cochrane; Collard and Dempsey; Hribal; Haraway; Stuart, Schewe and Gunderson; Petersen; Wadiwel *Animals*; Wadiwel 'The Working'). In my view this scholarship can be split into two different trajectories. Firstly, a

portion of this work is interested in normative questions of what might constitute beneficent or meaningful work for animals, as part of a broader project of improving human-animal relations (for example, Coulter; Blattner). In some cases, a focus on animal labour is justified as a way to overcome 'the "welfarist–abolitionist" dichotomy' within animal studies (Blattner, Coulter, and Kymlicka) as labour provides a different route to recognise the agency of animals within human animal relations, and offers pathways to challenge exploitation. For example, as Blattner argues, perhaps there is a case for entertaining rights for animals to work, as part of a project of animal liberation, particularly where these demands are made alongside legal and political enfranchisement of animals as self-determining rights bearing subjects (Blattner 65-66). Here, this trajectory of animal labour studies is broadly interested in the project of structural reform to societies to include animals as members, and with this, explores the possibilities for animals to be formally considered as co-workers.

The second trajectory of animal labour studies is analytically interested in the contributions of animal energies to systems of production. This understanding of work or labour could include forms of forced labour that are broadly considered violent and exploitative. Thus, this body of work is not interested in the liberatory potential of labour, nor work rights for animals *per se*; but instead focuses on understanding how animal labour occurs within productive processes, and the politics of value which arises from this. A portion of this work, drawing from the early work of Marx (Marx 'Economic'), is concerned with the unique conditions of 'alienation' which circulate animal labour within capitalist production (see for example Noske; Bachour; Porcher; Goris; and Stuart, Schewe and Gunderson; see also Benton and Maurizi). A different component of this scholarship is interested in how animal labour – forced or otherwise – contributes to the generation of value (see for example Barua 'Animating'; Barua 'Nonhuman'; Beldo; Collard and Dempsey; Hribal; Haraway; Wadiwel *Animals*). This latter body of scholarship is either directly or indirectly building on Marxist conceptualisations of the rationalities of capitalist production, which, as I shall discuss below, rely upon labour power for the creation of

abstracted value or surplus. While all the above scholarship is useful in seeking to better understand and conceptualise animal labour, it is this last trajectory of scholarship – that is, animal labour power as a source of value – that informs the below analysis of the labour process for dairy cows.

As I shall discuss, a focus on labour value is useful, not only to help conceptualise the specific and unique aspects of dairy cow labour within industrial food production, but also to understand the way in which these production processes have and will transform in future, based upon capitalist drives to promote efficiencies in the use of labour time. However, it is worth emphasising that this perspective on animal labour – that is animal work as value producing – remains contested, with some scholars rejecting the idea that animals labour in a 'valuable way' (Moore 65, 93n9; Foster and Burkett; Stache). This response is certainly in line with the ways Marx himself saw the contribution of animals to production, and his explicit rejection of animal labour as contributing to the generation of value (see Marx *Capital Vol.2*, 449n6; see also 278-279). One objection to seeing animal labour as creating value, and more particularly applying Marx's value theory to animal work, is that capitalism itself does not appear formally to value this work in the same way as human waged work is 'valued' (through the wage); indeed a defence of Marx's view that animals do not work in a value producing way is that he was only describing these relations as they are articulated within the logics of capitalism as an economic system (see Foster and Clarke). For Marx, as I shall discuss below, capitalism establishes concrete factors of production such as raw materials, circulating commodities, fixed capital, products and labour. Human workers, or at least some of them, are paid a wage; animals are simply used as resources. In this story, animals are never formally positioned as forms of labour within production. Animals thus are always positioned as raw materials, or as instruments of production – or 'living factories' as described by Kenneth Fish – but never as labour. And certainly, this is at least *prima facie* true if we reflect on the positioning of animal life on the balance sheets of global agribusiness: animals are assets, property and inert inputs to production, and not considered a labour input.

There are, however, a number of reasons for understanding the activity of animals within production processes as value producing. One reason is simply that theorizing animal labour as value creating is perfectly in line with much emerging scholarship on capitalism, value and labour. For example, Jason Moore's much cited intervention in ecological Marxism explicitly expands Marx's value theory, understanding production as a combined process of human and nonhuman interaction (Moore).[iii] But of more relevance to thinking about the specific labour that animals perform, particularly in food systems, is recent work in feminist labour theory on bodily forms of work. Of relevance is the analysis of commercial surrogacy by Amrita Pande. Here, focusing on surrogacy in India, Pande pays attention to the way in which commodification of this practice has led to the transformation of the bodily processes of insemination, pregnancy and birth into a productive labour process:

> Surrogacy is an extreme example of the manifestation of worker embodiment, where body is the ultimate site of labor, where the resources, the skills, and the ultimate product are derived primarily from the body of the laborer. The worker's embodiment is essentially living in the commodity produced – literally in the form of the worker's bodily fluids, her blood and sweat. (Pande 90)

Here the body is captured by production, and its metabolic processes (see Beldo; see also Cooper) and transformed into a process of generating value. This 'gestational labour' (see Lewis) thus becomes formally 'productive' labour within capitalism's value circuits, as the aim of production is the generation of surplus. While this analysis presented by Pande is focused on human metabolic labour as we shall see, this analysis is highly relevant for understanding the way in which the metabolic processes of animals are captured within animal agriculture, and particularly relevant for making sense of the labour of animals, such as dairy cows, whose 'work' involves the harnessing of reproductive processes in order to capture value.

Marx's description of the labour process typically involves a description of raw materials, fixed capital and labour coming together to create a product. Here the worker is imagined as labouring on raw material, often utilizing fixed capital, and through this process, adding value to the material that is worked upon in order to produce a new use value (see for example Marx *Capital Vol.1*, 314-5). For example, a worker might use a kitchen and the utensils in that kitchen (fixed capital) to assemble raw materials (vegetables, oil, grains) and through the effort that is applied (labour) a bowl of food is produced that realizes a new use value (the product). This story of production is typically 'disembodied' in that is imagined that there is an absolute separation between the worker and the raw material that is worked on. However, the metabolic or gestational labour described above by Pande provides us a different narrative. As Pande reminds us, the body of the commercial surrogate is both means of production and labour at the same time. Indeed, this sort of labour process requires a hybridisation of raw material and labour in order for a product to be produced; that is, the surrogate must enter the production process as both a 'raw material' for production and as a form of labour simultaneously.

This description of metabolic labour is very useful for understanding the labour of animals in animal agriculture. I have previously described the way in which animals used for food enter production as both raw materials and as labour; these animals are required to labour on themselves, and through this labour of growth and development, they are compelled to produce themselves as a final product, the value of which will be realized through the extinguishment of life (Wadiwel *Animals* 91-129). Here 'labour time' is modulated by different factors compared with that of the human labourer. For example while the length of the working day (for example, eight hours) would regulate the deployment of labour for many – but certainly not all – human workers, animal labour time in much food production would be determined by the lifetime of the animal (that is, slaughter marks the end of the animal labour process, and the beginning of the 'life' of the

animal as an inert consumption commodity). This shapes the logics of animal agriculture in seeking to reduce animal labour time by shortening lives, while simultaneously, through the use of selective breeding and feed control, to maximize 'yield' (Wadiwel, *Animals* 117-129).

However, the focus of the above analysis is largely upon animals whose bodies will be used for food. How might this same value theory analysis apply to dairy cows, whose metabolic labour involves the production of lactation as a valued commodity, but also, the simultaneous labour of forced insemination, pregnancy and calf birth as a material reality of the production process? As I shall discuss, the co-occurrence of these two labour processes, one formally productive, the other 'non-productive', highlights the distinctive, and horrifyingly brutal, character of industrial dairy production.

The Labour Process for Dairy Cows

I have so far laid out the basic building blocks for making sense of animal labour power from the perspective of Marx's value theory. As I have indicated above, this description is amenable as a way to describe the metabolic labour of animals who themselves will become food, but it is unclear exactly how this same logic might be applied to labour of dairy cows.

Certainly, like animals whose bodies will become food, the 'lifetime' of the dairy cow will be captured by the production process, and similarly, dairy cows will be born into production through forced reproduction practices, and then will need to be nurtured by the production process in such a way that the animal will be ready to perform the 'productive' labour of generating milk. The production process will then need to engage in a cycle of forced insemination, pregnancy and calf birth to maintain the metabolic labour of the dairy cow in lactation. As the juvenile animal approaches puberty, at the first sign of the beginning of the 21-day oestrus cycle, the process of forced insemination begins, either through the use of a bull or through artificial insemination. The goal of many producers is for the dairy cow to become pregnant and have their first calf by the time they are two years old.[iv]

At the outset, we can note here some important differences between the labour performed by animals who will become food, and that performed by the dairy cow. The first difference is, as described above, that the product is not the body of the cow themselves, but the lactation they produce: milk will be the product that the production process aims to generate. Of course, this does not mean that the body of the animal themselves will not become a product, since when the 'productive life' of the dairy cow is determined to be over their bodies will be 'disposed' (see Ambrose and Kastelic 246) for sale to a slaughterhouse. However, overtly, the goal of dairy production is milk. This means that, as Gillespie highlights, the bodies of dairy cows effectively become 'waste' products of production, even if these by-products are sold to re-capture some of the costs of production for the producer (Gillespie 'The Afterlives').

Secondly, unlike the animals who labour to produce their own bodies as products, the production phase in dairy industries is not marked by the death of the animal itself, which as we have seen is, perversely, positioned as a 'value producing moment' for animals whose bodies are used for food. Instead, the production cycle is shaped by the carefully timed forced insemination of the dairy cow, which determines the future possibility of a productive life for the animal as a labourer. If the forced insemination succeeds, then the dairy cow will effectively be placed on a pathway for two production processes that occur within the metabolism of their own body: the first, the primary purpose of production, a metabolic labour that generates lactation, the product of which (milk) is captured as a product with a use value (for humans); the second, the 'labour' of the animal to generate, carry and birth a new life, the latter which will be taken away at each calving, another 'waste' product of production (see Wicks 66-7; Narayanan 108-117).[v]

Here the life of the dairy cow is not punctuated by death as a value producing moment; it is instead interrupted by forced insemination, pregnancy, and calf birth (and loss) as core elements of the production process that enables the production of value. However, death nevertheless interrupts the production cycle with its own rhythm, through the use of culling as a technique to remove labourers who are deemed unproductive or are

unable to persevere within the antagonistic environment of production. If forced insemination fails, as frequently occurs, then the animal will be extinguished: one study suggests that 'reproductive problems' are the main reasons for culling dairy cows, accounting for 31% of dairy cows who are 'disposed' of (Ambrose and Kastelic 246; see also Dallago et al. This means that in dairy production, while death is not 'value producing', it nevertheless forms a continuing frame for production; something I will discuss further below.

We could attempt to map the life of the dairy cow with an eye to these elements of the labour process and value production. Figure 1 below lays this out in a timeline. At birth, the dairy cow enters life through a process of forced reproduction. Care has been taken by producers to ensure, through selective breeding and genetic control, that this new life holds the promise of 'high productivity' in terms of milk yield. The life of calf is nurtured towards this instrumental purpose, raised initially alone in an individual enclosure with strict controls over movement and nutrition. Here, the calf is positioned as a hybrid of factors of production. They are understood as raw material that is being worked upon by the production process. But they are also working on themselves – through a metabolic labour – to become beings who produce value, that is preparing themselves to become productive workers. Further, insofar as the metabolic processes of growth and maturation are subsumed by the capitalist value process, the 'work' of the calf becoming a being who will then labour to produce milk is also value producing. As such, in the first phase of production, the dairy cow is compelled to perform one form of metabolic labour – growing and maturing their own body – so that this being will be ready at the next stage of production to perform a different sort of metabolic labour that enables milk production. In other words, the calf is compelled to perform the labour of creating themselves – growing and developing their own bodies – as a labourer who will later perform the formally 'productive' task of lactation.

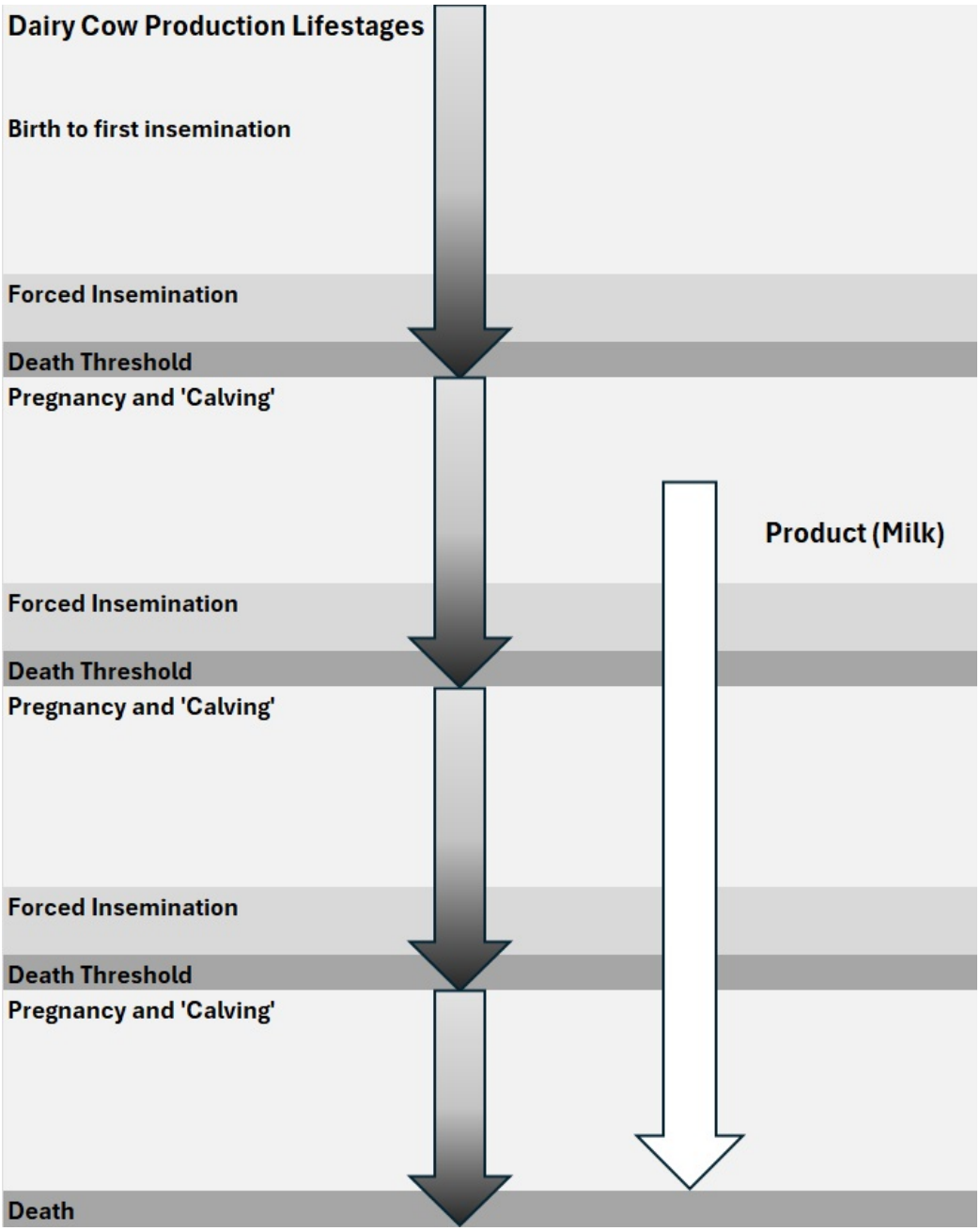

Figure 1: Dairy Cow Labour Process Life Timeline

Milk production begins either at the time of 'calving' or just before this point: this is the point at which the animal begins the metabolic labour of producing milk, and the milk production cycle begins. Here the life of the dairy cow is punctuated by birth, forced insemination and birth again. Their 'labour' is continual over this period. This labour is not merely about metabolizing large quantities of food in order to produce, in some cases, over 30,000kg of milk over a lifetime (Vredenberg et al.; Dallago et al.), but also the continual reproductive process of becoming pregnant, carrying the pregnancy, giving birth, having their offspring taken away, and then being forcibly inseminated again.

While the dairy cow labours to produce both milk and new life, it is the former, the secreted milk from the cow's mammary glands, that is the object of production, the product with a use value; the latter, the calves that are generated by the production process, are essentially discarded as by-products. Thus, from the standpoint of dairy production, the labour power of the dairy cow is identified by production as the 'lactational labour' of the animal; everything else is arranged to enable and maximise this use value. The goal of producers will be to establish a continuing supply of milk from the body, even if the nature of the metabolic rhythms of the animal, from insemination, through pregnancy, to calving, to insemination again will produce a continuing oscillation between abundance and decline in relation to milk supply over time. While the dream of the production process is a continual, smooth, uninterrupted supply of milk, for dairy cows themselves, this process is far from smooth, since they endure each essential element in the process: forced reproduction, pregnancy, birth and loss of child, forced insemination again.

Aside from the misery of each of these stages of production (for dairy cows), it is important to remember that they represent life and death transactions. The dairy cow who fails to reproduce, and therefore does not produce milk, will be culled. The animals the dairy cow gives birth to will also be culled, as they are extraneous to the production process. And the dairy cows themselves face a production process that is antagonistic to their survival: death during pregnancy and calving is a legitimate risk, as is sickness, injury and disease. Thus, the whole production process is contained by death and its possibility, either

induced for productive purposes at routine threshold points – such as when the dairy cow fails to respond to forced insemination – or periodically imposed by a failure in the vitality of the animal to counter the brutality of the production process itself. It for this reason in the figure above that I have suggested that the life of the dairy cow is demarcated by distinct 'Death Thresholds', where the possibility of the animal continuing to live depends upon the 'success' of forced insemination, pregnancy and lactation. Dairy cows can only continue the labour of lactation if they are able to pass through these threshold points where death threatens those dairy cows who are not able to respond to the challenge of insemination, becoming pregnant, lactating and losing their child.

I note here the role of human labour in the production process, which is active. While we have seen the rise of fully automated or 'robotic' dairy farming, it is notable that much human labour is still required within contemporary industrialised dairy production. Human labour is required to enable the forced reproduction that brings the dairy cow into the world; it is required to diligently survey the herd, ready to pounce on the still-developing calf when the first signs of oestrus make themselves visible and forced insemination can begin (see Ambrose and Kastelic 254-256). Human labour is required when calving occurs, bringing new life into the world only to drag this life away at the first opportunity in order to extinguish it. And finally human labour is required to take 'spent' animals away at the end of the production process, when the dairy cow body proves unresponsive to attempts to force reproduction, or the cow is deemed no longer productive due to sickness, injury, old age or 'temperament'.

These relations are by definition antagonistic. I stress this antagonism between human workers and animal workers in the scene of dairy production as it runs against the grain of some animal studies and posthuman scholarship which would suggest that sites of multispecies production represent examples of animals as workers and 'partners' (Haraway 73) or even, as Jocelyn Porcher and Tiphaine Schmitt suggest in relation to dairy cows, examples of collaboration with the human farmer (Porcher and Schmitt). In my view, these human animal relations are not merely 'significantly unfree' to use Donna Haraway's phrase

(72), but represent relations of outright antagonism, in the sense that they are by nature non-reciprocal, and structurally position human freedom in relation to animal unfreedom (see Wadiwel, *Animals* 48-54; see also Wadiwel, *The War*). This antagonism is of course central to mainstay human food systems, which positions animal lives as a means of subsistence and survival for human populations. As I discuss below, this antagonism is key to understanding the inherent tensions within dairy production, which pitches the survival of the animal and lifespan against the imperative of the production system towards the realisation of surplus.

Dairy Cow Labour Efficiency – Absolute and Relative Surplus

Key to Marx's value theory is the idea of 'surplus': in this view, capitalism is exploitative because it extracts a difference between the time taken by labour to generate the resources to maintain or reproduce that labour (typically measured by the human wage) and the value that is generated in addition to this cost of reproduction (Marx *Capital Vol.1*, 270-80). In simple terms this is the difference between the wage that is paid to the worker and the value that the worker generates while they are at work; this difference or surplus motivates capitalist production, since – at least according to Marx – the goal of this production is not the creation of useful or needed products, but the production of profit through an exploitative relation with labour. Marx argued that there were two strategies deployed by capital in its drive to extract more value from labour; namely in the forms of absolute and relative surplus value (see Marx, *Capital Vol.1* 557). Absolute surplus value can be achieved by expanding the working day; for example, compelling workers to work longer hours for the same pay, and thus extracting more value from their labour. Relative surplus value, on the other hand, is achieved through the use of technologies and increased intensity within production processes; this has the effect of increasing output relative to labour time expended, and thus effectively reduces labour time per unit of output to increase surplus. For example, much social debate today relates to the question of whether generative

artificial intelligence will replace human jobs; this is an example of production utilizing technologies to increase relative surplus value, since relative labour time will, presumably, fall when technologies replace work that could have otherwise been performed by humans.

How these concepts of absolute and relative surplus value relate to animal agriculture differ from how they might be applied to human labour forces. As I have argued (see Wadiwel, *Animals* 107-29), an important difference between human waged workers and animal labour forces is that typically the whole life of food animals has been subsumed by the production process, so that every moment within production is spent engaged with metabolic labour towards the end product; as such there is no 'working day' for food animals (Wadiwel, *Animals and Capital* 119-20). This means that on the face of it is not possible to increase surplus value in absolute terms, since the 'working day', the period during which labour is employed, is effectively the whole life of the animal. However, we know that animal agriculture utilizes a range of techniques which have the effect of making animal labour time more efficient in relative terms, including techniques of selective breeding and feed management which increase 'yield' (that is, increase the saleable weight of the animal after slaughter), or the use of successive techniques to simultaneously shorten the lives of animals, so that the production cycle (or the time taken to realise surplus) can be accelerated (see Wadiwel, *Animals and Capital* 120-124). Thus, while animals are not paid a wage, the trajectory of capitalist animal agriculture towards simultaneously increasing yield and shortening animal lives demonstrates the way that animal labour time, and the associated drive to make it more efficient, is an important cost consideration for animal agriculture (Wadiwel, *Animals and Capital*124).

We could certainly apply some of these concepts of absolute and relative surplus labour to dairy cow labour. One important trajectory is the reduction in human labour time which has improved efficiencies in production. The reduction, or even apparent elimination, of human labour time within animal agriculture is a hallmark of the development of the factory farm, something that is accompanied by the simultaneous expansion in the use of enclosures and machines or 'fixed capital' (Wadiwel, *Animals and Capital* ix). This is evident

in the rise of robotic dairy farms, which almost completely replace human labour time with fixed capital, thus orchestrating a new set of relations in the production process between animals and machines (see Holloway and Bear; see also Wadiwel, *Animals and Capital* 27-28). In this scenario, dairy cow labour is made more efficient by the elimination of the human labour time that was previously an essential part of production.

However, it is notable that dairy cow labour time cannot be eliminated in the same way as human labour time – i.e. replaced by machines – because machines cannot produce the bovine lactation that is the goal of production. However, there are other ways to improve dairy cow labour efficiency, that is, increase relative surplus value, through intensification. There has been substantial research into how feed intake and reproductive practices can be used to shape and increase dairy cow 'yield' in terms of volume of milk (see for example Fariña et al; Huhtanen, Miettinen and Ylinen; and Kawashima et al.); we are also seeing recent research which promotes expansions in dairy cow yield as a solution to meeting environmental goals, including reduced carbon and methane emissions (see Zehetmeier et al.; see also Grainger et al.). This research seeks, in the way described above, to optimise the design of production systems to increase the relative surplus value of dairy cow labour, by increasing output for a given period of labour time. As Wicks highlights, the continuing drive for yield generates increased risk of injury and death for dairy cows, including through mastitis (Wicks 64-5); indeed, as Narayanan observes, 'dairying is an industry *that actively causes mastitis*' (Narayanan 121). Mastitis is, of course, another common reason that producers will cull an animal (Ambrose and Kastelic 246; see also Moroni and Addis). In this case, intensification leads to the demise of the body of the worker, which in turn leads to their destruction. Here we can note the tension between the drive for increased production and the antagonistic environment which threatens the dairy cow with death; in this case, increased intensity of production further increases the hostility of the environment that confronts the animal.

As discussed above, increasing absolute surplus by expanding the working day is not possible for animals who are used for food within capitalist production, since the whole logic of the achievement of relative surplus value depends upon shortening animal lives (and increasing yield) in order to speed the production cycle and achieve surplus sooner. However, as we have seen, the process of dairy cow labour differs from that of the metabolic labour of animals who explicitly are intended to become food products, since death is not positioned as 'value producing' for dairy cows, instead, forced insemination and the promise of gestational and lactational labour are what enables value to be produced. Note here that, curiously, we find a different biopolitics of death, since in contrast to the tendency of animal agriculture to shorten lives, the theoretical possibility exists to extend the lifetime of the dairy cow in order to potentially extract more surplus. We could reasonably ask, why have we not seen producers seek to increase the lifespan of dairy cows in production, in order to extract more milk from these animals during their lifetimes? As we have seen above, capitalist animal agriculture expends significant effort and expense to enable dairy cows to be born and mature so that they can be ready to produce milk; why are these animals culled so quickly given these system costs?

One answer relates to the intensity of production, which as we have seen, wears down the bodies of dairy cows, effectively shortening the life of the labourer in the process of extracting value, 'in the same way as a greedy farmer snatches more produce from the soil by robbing it of its fertility' (Marx, *Capital Vol.1* 367). This tendency to wear down the bodies of dairy cows through increased production intensity places the relative efficiencies of stealing value from these animals through high yield production in contradiction with any demand, whether economic or normative, to increase the life of the animal. In this context, and from the standpoint of production, life and its reproduction is 'cheap' (Patel and Moore), at least relative to the yield that can be extracted from it. Indeed, one study into dairy cow longevity points out 'herds with a higher longevity did not perform economically better nor worse than herds resulting in lower longevity' (Vredenberg et al. 7). The authors optimistically note that this provides evidence to producers that responding to public

welfare concerns about the short lives of dairy cows, or environmental concerns around the environmental impacts of dairy production, can be achieved without any cost to production (Vredenberg et al. 7). However, a less optimistic reading would suggest that the reproductive costs of dairy cow lives to production are so low that there is no real financial incentive to amend production conditions to enable these animals to live longer; hence the indifference of producers to extending the lives of these animals. In other words, the reproductive costs of bringing new dairy cow labourers into the world, and raising these animals to become lactational labourers, can be minimised in relative terms; thus, it makes little sense for producers to allow productive cows to live longer than they currently do. I of course leave aside here the question of whether it would be a 'good' thing for dairy cows in industrial production to live longer lives. Whether or not this brutal life of metabolic, gestational and lactational labour is a worthwhile one for dairy cows to endure, or even contemplate extending, is a separate question, and certainly not a question that scholarship which supports the continuation of these industries has pondered.

Conclusion

In this article I have provided an outline of how the activity of dairy cows might be considered as labour, making use of concepts from Marx's labour theory of value. As I have discussed, this allows us to notice some unique aspects of dairy cow labour, differentiated from animals in food systems whose bodies are intended to become products. Firstly, a foundational difference is that forced insemination, followed by pregnancy and lactation, is the trigger for value production in dairy, as opposed to the death of the animal which enables the creation of the valued product in meat production. Death thus serves a different purpose in dairy industries; it marks the exit of the labourer from the production system and the end of their capacity to produce a valued product (milk), rather than the moment that the outcome of their labour is realised within a product that can only be realised through death (meat). Secondly, as I have discussed, this difference in value process structures the life of the dairy cow in a way that is different from animals used for food; the dairy cow must

endure repeated forced reproduction in order to continuously engage with the lactational labour that is the site of their value production. If the dairy cow fails to become pregnant and lactate they will be culled; as such the production life of the dairy cow is demarcated by death thresholds they must survive in order for the future value of their lactational labour to be realised. Thirdly, while the general tendency of capitalist agriculture is to shorten animal lives in order to speed turnover times and realise surplus, there is a tension around this strategy for dairy cow labour. There are reasons why producers might seek to increase the lifespan of dairy cows, as this would maximise the 'absolute' surplus that can be attained from the animal, in the form of volume of milk that can be extracted over a lifetime. However, the fact that producers have not increased the lifespan of dairy cows is revealing of the relative cheapness of the lives dairy cows; in the eyes of producers, it is clearly more efficient to maintain an intense and brutal production system that ends life early, than to allow productive cows to live a longer life.

Wicks placed faith in the 'demystification' of dairy production as a way to inform the public of the horrors of this production process; to 'look clearly at what we have made and "unmake" the damage we have done' (Wicks 70). In this essay I have provided a different kind of demystification, pointing to the value relations that sit behind and drive dairy production. As I have argued elsewhere, the trajectory of the factory farm has been driven not just by the demand for animal-based food as a means of subsistence, but by a capitalist demand to extract surplus value from the labour of animals through accelerated production (Wadiwel, *Animals and Capital* 192-93). Here we might note that the global expansion of dairy industries has been driven not merely by the positioning of milk products as a central means of human subsistence, but also by an infinite quest to extract value from the labour of dairy cows. Here, it is the labour of these animals, and the value produced by this labour, that has motivated production. These animals have been multiplied into existence through forced reproduction, so that they can in turn engage in the labour of forced reproduction, gestation and lactation in order for profits to be generated. The application of the value theory to thinking about this labour offers us prescience: it helps advocates to makes sense of

the general directions of dairy industries towards increased efficiencies in dairy cow labour, through increasing automation which eliminated human labour time, towards more ruthless controls over reproduction processes, which are key to value production. It also assists us to understand the structure of production, the values that inform the priority that is placed on 'welfare', and the naked brutality of the threshold points life must pass through in order for value to be realised. Soberingly, we can note that as dairy industries intensify we can expect a tighter balance between the quest for increased yield and the risk this poses to the life of the dairy cow worker who is forced to endure these horrific conditions of production.

Notes

[i] In *Animals and Capital*, I theorised animal labour from the standpoint of animals who are reproduced and grown to be eaten as food. While *Animals and Capital* discussed dairy cow labour, and the development of dairy industries in forms of automation (see Wadiwel, *Animals* 101-107; 127-28), space constraints limited my ability to fully develop a theory of dairy cow labour from the perspective of Marx's value theory. This essay, dedicated to the memory of Deidre Wicks, has provided an opportunity to think about this further.

[ii] Perhaps the closest modern comparison relates to forced wet nursing as part of ante-bellum racial slavery, where practices included the theft of milk and the removal of children from mothers and families to prioritise the supply of breast milk for white plantation owners (see West and Knight; see also Wood). However, care must be taken in drawing such comparisons because the structural conditions differ; for example, Black slave women were separated from their children so that they could work in the day, and then provide milk in the evening, effectively performing a double form of labour exploitation (see West and Knight). Further, forced wet nursing in the context of racial slavery served a function in elaborating a system of racial subordination. In this case, forcing Black women to set aside the needs of their own children for white women underlined the diminished value of Black lives within this racial economy. On the comparisons between racial slavery and the structural position of animals used for food in capitalist economies, see my discussion in *Animals and Capital* (Wadiwel, *Animals* 95-98).

[iii] Though, as have I have noted above, Moore is one of a group of theorists that explicitly rejects the idea that animals labour in a 'valuable way' (Moore 65, 93n9). This is because Moore argues that capitalism produces relations of exploitation, embodied in wage labour relations, and appropriation, which is a relation with unpaid labour and energies; animals are *appropriated* in Moore's framework. This differs from my argument in *Animal and Capital*, where I argue that animals are exploited in a technical sense, since capitalist production seeks to extract the difference between the reproductive costs of animal labour and the value

that can be derived from this labour. We see evidence of this in the use of 'feed conversion' ratios in animal agriculture, which aim to extract maximum yield for a given input of food (see Wadiwel, *Animals* 121-22).

[iv] Kathryn Gillespie provides the following summary of the life of the dairy cow from the moment of their initiation into formally productive labour, through forced insemination:

> When she reached 15 months of age, she would be impregnated through artificial insemination for the first time. Artificial insemination is the most common method of reproducing cows in the dairy industry. To artificially inseminate a cow, the farmer inserts his/her left hand into the cow's rectum in order to manipulate the reproductive tract … Meanwhile, the right hand is inserted into the cow's vagina and an insemination gun is used to reach the cervix… Three weeks before giving birth, she would be moved into a 'maternity pen' with other cows nearing their due dates. When the time came, she would be isolated and monitored while she gives birth to her calf. Several hours after the calf is born, it would be taken away from the cow and she would be moved into the milking string… About 60–90 days after the cow gives birth, she would be artificially inseminated again and continuously milked through her pregnancy until 60 days before giving birth (the 'drying off' period). This cycle of artificial insemination, birth, and milking would be repeated for several years until lameness, mastitis, infertility, and/or declining milk production set in. These conditions are common in cows used for dairy because of the immense physical strain and nutrient depletion (hence their frequent emaciated appearance) caused by the excessive milking and forced impregnation inherent in the industry. At this point, the farmer would make a careful calculation of her profitability as a milk producer weighed against the cost of maintaining her. When she is deemed 'spent', she would end up at auction, or she might be sent directly to the slaughterhouse. (Gillespie 'Sexualized' 1326-1327)

[v] Narayanan summarises these two labour processes as follows: 'Dairy production is founded upon two foundational acts – impregnating a cow or buffalo repeatedly, to make them go through the high risks of labor to produce colostrum and lactate; and separating the suckling newborn from its mother in order to divert the milk for human consumption' (Narayanan 105).

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