



Building ‘cowshed cultures’: A cultural perspective on the promotion of stockmanship and animal welfare on dairy farms

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A B S T R A C T

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Improving animal welfare is an important part of the development of the agricultural industry, particularly at a time when intensification and the encroachment of factory-style production systems is making the maintenance of human-animal relations increasingly difficult. Animal science deals with the issue of improving stockmanship by focusing on the relationships between attitudes and behaviour, under the premise that improved attitudes will lead to improved behaviour. From an analysis of 42 interviews with owners, sharemilkers and workers on dairy farms in New Zealand we present a different view, seeing behaviour instead as part of a self-reinforcing culture in which animals, humans and the physical structure all contribute to the development of farm specific ways of doing and being. We further suggest that changing one stockperson's attitude alone is insufficient to ensure a change in the culture as other actors – including animals and non-human actors – reinforce any existing culture that has developed, making both attitudinal and behavioural change difficult. We conclude by discussing the key importance of designing farm systems and structures that promote positive interactions between animals and humans and suggest that this, rather than simply promoting knowledge and attitudinal change, is likely to be the most effective way of maintaining stockmanship in the face of an industrialising agriculture.

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1. Introduction

Evidence from across the world indicates a growing public concern for the welfare of farm animals both in developed (Appleby, 2004; Lassen et al., 2006; Hall and Sandilands, 2007) and developing economies (e.g. China – Shuxian et al., 2005). Within Europe, animal welfare has become a central feature of the new multifunctional model for agriculture (Mann, 2005) while, at the same time, industry players are increasingly recognising that many consumers incorporate welfare conditions into their purchasing decisions (Clarke et al., 2007). Consequently governments, industry and retailers alike are looking to improve welfare measures through either legislation and public policy (Lassen et al., 2006), or, in the case of retailers, incorporating welfare standards within contractual obligations for suppliers (Marsden, 1998; Serpell, 2004).

This has led to widespread debate on the issue of how best to view and assess animal welfare. Whether to focus on biological functioning, natural functioning or feeling-based definitions of welfare (Fraser, 2003; Dwyer, 2009), the validity of the “five freedoms” (freedom from hunger and thirst; discomfort; pain, injury and disease; the ability to express normal behaviour; and freedom from fear and distress – Farm Animal Welfare Council, 1992) (Buller and Morris, 2003), and whether to base policies on input-based measures or animal-based measures (Keeling, 2009) are among a range of critical issues currently being discussed within public, scientific, industry and policy circles.¹

While the focus has clearly been on indicators and measurement, one issue that has received less attention is the relationship between stockpeople and their animals, and the implications this has for the wellbeing of stock. In particular, it has been suggested that the industrialisation of farming systems and establishment of

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¹ Note that the body of research defining and discussing these concepts is extensive. Thus, rather than repeating this discussion, we refer readers to existing literature.

factory-style management techniques is breaking down the traditional relationship between farmers and their livestock and treating animals as commodities in a production chain rather than as sentient beings (Fraser, 2003; Lassen et al., 2006; Lusk and Norwood, 2010). As a result, the question of how to maintain our millennia old relationship in the face of structural changes to the industry is of increasing importance to the animal welfare debate.

Europe, for example, has witnessed the development of ever larger and more mechanised farms, rationalised labour systems, and “confined and barren” housing systems inhabited by animals bred to maximise production (Bracke et al., 2005: 32). Consequently, the relationship between stockpeople and animals has changed (Larrère and Larrère, 2000; Boivin et al., 2003). For example, the development of large confined systems with a high ratio of animals to people has increased the difficulties in providing human care to farm animals (Vaarst and Alrøe, 2011). Similarly, changes to the production chain have led to animals having shorter more transient lives which, consequently, limits the ability of farmers to form relationships or develop empathy (Te Velde et al., 2002; Wilkie, 2005).

Within these new ‘industrialised systems’ stockmanship² thus becomes increasingly difficult but, at the same time, increasingly important. Besides the critical role stockpeople play in detecting illness, lameness or parasites within a herd (e.g. Morgan-Davies et al., 2006; Dwyer, 2009) studies have illustrated clearly that the quality of care provided by stockpeople can be critical to levels of stress experienced by farm animals (e.g. Lensink, 2002; Boivin et al., 2003; Rennie et al., 2003; Bertenshaw and Rowlinson, 2008; Hemsworth et al., 2009), identifying stockmanship as a key issue for the promotion of good animal welfare.

However, research into stockmanship (and farm-animal/human interactions in general) has been patchy. Researchers such as Boivin et al. (2003) have observed that while the issue has strongly motivated biologists and psychologists, it has received less attention from sociologists and philosophers – despite the sociological and philosophical issues that arise in the debate. In part, this absence of a coherent body of research may be attributable to an epistemological conflict between the social and natural sciences. Kristensen et al. (2008: 5), investigating herd health management, note that “qualitative approaches are received with scepticism by the natural scientific community because of an accused subjective nature and the absence of ‘facts’”.

Yet a lack of interest amongst the social sciences is also noted in the sociological literature. For example, Bryant (1979: 399) describes sociologists as “singularly derelict in their failure to address the zoological component in human interaction and attendant social systems” a dereliction still not addressed 23 years later when Arluke (2002: 369) asks “why is there a lack of interest within sociology to animal studies?” Buller (2009: 127) goes so far as to suggest that humanist social scientists have ignored farm animals in general “rendering them largely invisible and their agency unaccounted for in the analysis of human society.”

Some recent sociological/geographical studies have focused more specifically on farm animals. For example, Wilkie (2005) used the concept of emotional ‘attachment’ and ‘detachment’ to investigate changes in the welfare social contract between animals and stockpeople in the context of agricultural intensification. Riley (2011) investigated how dairy farmers emotionally detach themselves from their animals at the point of retirement. Holloway (2001) illustrated the ethical complexity of the relationship between people and their livestock by

focusing on hobby-farms, where there was conflict between the animal’s role as a pet and its consumption, and, in a later paper, Holloway (2007) explored how farming technologies (milking facilities) mediate the relationship between humans and animals. Yarwood and Evans (2006) employed the sociological concept of ‘habitus’ (effectively, socialised and embodied predispositions – Bourdieu, 1998) to explore the cultural value of Welsh livestock and its connectedness with farming communities. Finally, Gray’s (1998) work exploring constancy between sheep, the farm, and the farm family offers further insights into how the identity of the farmer becomes intertwined with that of his/her animals.

Although this research is promising, social scientists have still, in general, failed to engage with Boivin et al.’s (2003) main concern – sociological issues surrounding the question of stockmanship and animal welfare. The result of this lack of interest by the social sciences and the corresponding ‘strong motivation’ of biologists and psychologists to study these issues is that, by default, the body of literature on this aspect of the human–animal relationship has only a limited sociological or cultural perspective. On the other hand, numerous studies have employed quantitative attitudinal approaches such as the Theory of Reasoned Action (Fishbein and Ajzen, 1975) or the Theory of Planned Behaviour (Ajzen, 1985) to explore the behaviour of stockpeople towards animals (e.g. Coleman et al., 1998, 2003; Hemsworth et al., 2000; Boivin et al., 2007; Jansen et al., 2009; Kauppinen et al., 2010) and, as a result, approaches to improving standards of care by stockpeople focus strongly on the need to change attitudes.

This has created somewhat of a schism in the literature on stockmanship and welfare. Research tends to be either qualitative and contextual (in the case of the social sciences) or quantitative and psychometric – generally perceiving stockmanship as a discrete cognitive activity rather than a cultural process (in the case of animal welfare science). While social research focuses on the nature of the relationship between stockpeople and animals in terms of its construction and how farmers emotionally attach and detach themselves from their animals, animal welfare researchers deal with the more practical issue of how to improve the relationship between stockpeople and animals through inducing attitudinal and behavioural change. We contend that it is important that these two strands are joined.

In particular, the focus on quantitative research and cognitive (attitudinal) solutions means that much of the current understanding of how to improve welfare through behavioural change suffers from problems common to quantitative research. This includes: a neglect of the social and cultural construction of the variables studied (Silverman, 1998), a focus on attitudes without considering how attitudes develop (Kirk and Miller, 1986), and a tendency to “provide ‘idealised’ accounts of attitudes and behaviour which, because they are rationalisations have an uncertain relation to actual situations” (Silverman, 1985: 15).

To address the above issues we adopt Segerdahl’s (2007) perspective of viewing individual farms as a culture and develop this idea further to examine the interaction between the material culture, human (stockperson) culture and animal ‘culture’ on dairy farms. This builds on and critiques the existing attitudinal theory (Hemsworth and Coleman, 1998) and presents a more contextual view – conceiving of the behaviour of stockpeople not as solely based on cognition/knowledge, but developing through being part of a wider farm culture. Through the analysis we outline the key components of the culture (such as communication, the development of empathy, the role of the cow ‘culture’, and so on) and discuss the implications for the development of intensive farming systems, i.e. how to maintain a positive cowshed culture in a rapidly intensifying industry.

² While the generic term for the process of caring for farm animals, this term also refers also to the actions of many female stockpeople.

2. Cowshed cultures – building a cultural approach

The connection between stockpeople's attitudes and animal welfare has been thoroughly investigated across a variety of livestock types, for example: cattle (Boivin et al., 2007), pigs (Coleman et al., 1998) and dairy cows (Breuer et al., 2000; Hemsworth et al., 2000; Waiblinger et al., 2002; Jansen et al., 2009). These studies consistently indicate a close link between positive attitudes towards livestock, positive behaviours by the stockpeople, and the stress responses of the animals. As a result of research throughout the 1980s and 1990s Hemsworth and Coleman (1998 – also see Hemsworth, 2003) proposed a 'model of human-animal interactions' (Fig. 1).

Key to the model is the existence of what Hemsworth, (2003: 189) describes as 'true relationships' between stockpeople and animals that are "frequent and often intense and importantly, the interactions have reciprocal effects on the partners" (also see Waiblinger et al., 2002). Fear responses such as being difficult to handle, kicking or defecating when stockpeople are around are thus thought to negatively influence the attitudes of stockpeople, leading them to behave negatively towards the livestock, which makes the livestock more fearful, and so on.³ Under this model the potential exists for the creation of an endogenous cycle between cows and stockpeople, whereby the behaviour of both parties becomes progressively worse (or better) and both animal welfare and human happiness suffer (or are enhanced) accordingly.

Through its representation of a reciprocal relationship between the animal and stockpeople, Hemsworth and Coleman's model offers an advance over standard attitude-behaviour approaches – although it remains, according to (Hemsworth, 2003) a 'simple' representation. However, it is still problematic. One particular concern is that it treats the behaviour of stockpeople towards their animals as being overwhelmingly 'cognitive' – based on rational and reasoned decisions via the experience of interactions with the animal rather than instinctive, subconscious, embodied or empathic responses. Nor does it consider external factors such as the important influence of the material construction of the farm (e.g. Andrews and Davison, 2002; Holloway, 2007), or, from the animal's perspective, factors that might influence the relationship such as the predictability of the stockperson's behaviour, the period of life in which they experience that behaviour, the physical context within which the behaviour occurs and the social context of the behaviour (Boivin et al., 2003). In summary, it takes no account of the lives and experiences of animals or humans or the context within which the interactions occur and, consequently, much of the explanatory potential is lost.

We contend that to advance this perspective requires reconceptualising the model such that a simple attitude-behaviour link is no longer seen as driving the relationship between the stockpeople and livestock. Instead, we propose that the interactions are better viewed as a human/animal culture (e.g. Segerdahl, 2007), with each farm developing its own particular culture as a result of interactions between humans, livestock and the farm buildings themselves. While 'culture' is not a new concept to many disciplines outside of

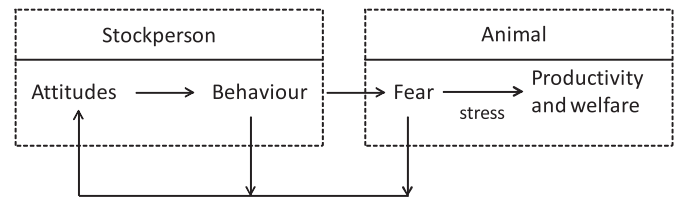


Fig. 1. Hemsworth and Coleman's (1998) 'model of human-animal interactions'.

animal welfare science, the failure of animal welfare sciences and social sciences to engage over the issue (noted above) means that a basic definition of culture may be required for some readers.

This is easier said than done. Besides being *the* most complex word in the English language (Williams, 1976) and one of the most difficult concepts to define (Williams, 1976; Ingold, 1994), there are literally hundreds of definitions of culture in circulation with "no overall consensus as to its precise meaning" (Seymour-Smith, 1986: 65). Further, Mitchell (1995: 112) observes that, because of the complexity of culture in reality, the simple term 'culture' is problematic in that it "serves to obfuscate that which it is meant to name." Hutnyk (2006: 357) describes the 'feel' of culture in an appropriately insuccinct manner:

"Culture is both playground and commodity; it is the refined and profound, mundane and extreme ... It is what makes us human, in a vast variety of, sometimes still changing, ways. It is not something wholly separate from the politics of commerce, nor religion or hate ... We live in it, there is no other choice, even for Robinson alone with Friday on his island. You are soaking in it."

One of the most commonly cited, interdisciplinary and comprehensive definitions of culture (see Cochrane, 2006; Baldwin et al., 2006) is that of Kroeber and Kluckhohn (1952: 181):

"Culture consists of patterns, explicit and implicit, of and for behaviour acquired and transmitted by symbols, constituting the distinctive achievement of human groups, including their embodiments in artefacts; the essential core of culture consists of traditional (i.e., historically derived and selected) ideas and especially their attached values; culture systems may, on the one hand, be considered as products of action, on the other as conditioning elements of further action"

In the vast majority of cases where 'culture' is used analytically, it is not held as a conscious or coherent system of abstracted ideas (although culture can be "codified, organised, and packaged for easy retrieval and use" – Hall, 1990: 21) but rather people simply "know their way of doing things; they know a customary mode of thought and performance" (Cohen, 1982, 5). Thus, while attitudes may indeed lead to intended behaviour, the notion of culture acknowledges they are formed within a social milieu that makes them appear logical or 'the thing to do'. Without being consciously aware of alternatives, thought is patterned to a particular cultural perspective or "common belief system" (Curry-Roper, 2000). However, culture does not impose itself in a deterministic fashion but, by providing a system of symbols with which to understand the world, it ensures that people with a shared culture are likely to react similarly when a 'problem' emerges (Cohen, 1985; Hall, 1990).

The concept of culture draws parallels with Hemsworth and Coleman's (1998) model, in particular, the iterative nature of the relationship. Cows and stockpeople, from the minute they step on to the farm, are immersed in the existing meanings, practices and material culture of the farm. Cows learn the meanings behind the behaviours of stockpeople, stockpeople learn the meaning of cows'

³ A number of studies have also suggested a link between attitudes and the productivity of the animals (Breuer et al., 2000; Hemsworth et al., 2000; Waiblinger et al., 2002; Hanna et al., 2009), however, a study by Panamá-Arias and Špinka (2005) found no such relationship and both Breuer et al.'s (2000) and Waiblinger's (2002) methodologies have been subject to criticism (Panamá-Arias and Špinka, 2005; Hanna et al., 2009). While Hanna et al.'s (2009) study found three 'attitudes' related to milk yields, the strongest attitude was 'empathy' (which is not technically an attitude) and another was job satisfaction (which is unrelated to attitudes towards animals). The one true 'attitude towards animals' measurement "negative beliefs" showed the weakest correlation.

behaviour, cows learn from each other's behaviour, stockpeople learn from each other's behaviour – and all interactions are influenced by the material culture of the farm environment.⁴ This is further affected by any historical engagement with other farm cultures – e.g. the reading of each others' body language and utterances that leads to patterned responses that are specific to 'local farm cultures' (Segerdahl, 2007).

In this paper we coin the term "cowshed culture" to both refer to the culture that is generated by interactions between material culture, cow 'culture' and human culture, and acknowledge the critical role of the milking shed as the centre of interactions on the farm. While the term 'cow culture' is used, we do not contend that cows possess a true culture as this would require the accumulation of cultural modifications over historical time (the "ratchet effect" – Tomasello, 2001). Nevertheless, there is little doubt that cows exhibit some aspects typical of human cultures such as developing and maintaining social hierarchies and passing on new behaviours to others (Hulsen, 2008).

3. Methodology

This research was commissioned to address a problem the New Zealand dairy industry has been having with maintaining the quality of stockmanship in the face of rapid industrialisation and intensification. Farm size, herd size and measures of intensity such as cows per hectare and kg milk fat per animal have been increasing over the last 25 years. Between market liberalisation in 1983/84 and 2009 average herd size increased from 139 to 366, average farm size from 65 to 131 Ha, cows per hectare from 2.2 to 2.83, and kg milk fat per cow from 143 to 184 kgs (LIC and DairyNZ, 2009) – leading to welfare problems on some New Zealand dairy farms. In 2010 as a direct result of repeated welfare violations by one business with 22 farms and over 20,000 cows the Animal Welfare Amendment Bill was introduced to incorporate a new category of "reckless ill-treatment" into the *Animal Welfare Act 1999*, covering "neglect arising from animals being abandoned and left, perhaps without food or water" (NZ House of Representatives, 2010: 11418). In part, the problem can be attributed to the rapidly expanding dairy industry's difficulties in attracting skilled staff (Tipples et al., 2005; Wilson and Tipples, 2008). This recruitment problem led to a "Go Dairy" campaign by DairyNZ focused on encouraging young urban people (often with little or no experience with farm animals) into dairy farming careers (DairyNZ, 2009).

The study itself involved 42 interviews conducted in three regions of New Zealand: Westland (South Island), Wairarapa (North Island) and Taranaki (North Island). Interviews were divided into owner, sharemilker⁵ and worker sub-populations as research in the UK had suggested that managers, staff and owners perform different roles on the farm and often hold different views on animals' welfare (Rennie et al., 2003). In addition, because many owners/sharemilkers in New Zealand work as couples, both partners were invited to attend the interview (see Table 1). All farms operated outdoor predominantly grass fed dairy systems.

⁴ Where these interactions have beneficial welfare outcomes, we refer to them in the text as 'positive cultures', whereas when the outcomes compromise the welfare of the animals, these are referred to as 'negative cultures'.

⁵ Sharemilking involves operating a farm on behalf of the farm owner for an agreed share of the receipts and an agreed division of work on the farm. The extent to which the owner is involved in managing the farm can vary considerably, but owners are invariably responsible for maintaining the farm infrastructure. As sharemilkers can gradually increase their investment in the farm (e.g. build up their own herd), sharemilking has traditionally been a stepping stone to farm ownership (LIC and DairyNZ, 2009).

The worker sample comprised a group of mostly young males and one female (median age under 30), with all but one coming from farming backgrounds. Sharemilkers were generally older (median between 30 and 40), many were farming with their spouse or partner and, again, the majority came from a farming background. Sharemilkers spent the greatest amount of time working directly with the animals (2013 h per year on average). Owners were the oldest group (median between 40 and 50) and, whilst having a considerable amount of past experience working with animals, now spent the least amount of time working directly with the livestock (1537 h per year on average). All were working with Holstein–Friesian cows with a few cross breeds.

Within each region 10 potential interviewees (5 sharemilkers and 5 owners from different farms) were identified by DairyNZ consultancy officers. Participants were asked to provide names of other possible interviewees following a chain-referral methodology (Salganik and Heckathorn, 2004) in order to repopulate the sampling frame in the case of refusal. The potential for selecting a sample consisting only of a single close network was minimised by using multiple initial contacts. The workers sample was more problematic as no list of workers was accessible for selecting initial interviewees. Instead, owners/sharemilkers were asked to suggest workers and these, in turn, were asked to provide additional contacts. Problems with accessing workers on the Westland sample meant that no workers were interviewed, and, instead, an additional two sharemilker interviews were conducted.

Table 1 details the presence and absence of male and female farmers at the interview and outlines a number of measures of the intensity of production on the farm, namely; the size of the herd, the number of cows per hectare, and the kilograms of milk solids produced by each cow per year. In addition to providing information to help in the interpretation of individual farmers' responses, the average figures also suggest that the sample is relatively representative of the national production averages. For example, the average herd size in New Zealand is 366 cows whereas the sample average is 405, and the average production of kg milk solids per cow per year is 323 in comparison to the sample's 347 (2009 figures - LIC and DairyNZ, 2009).

The interview explored three key themes: (a) general enjoyment from working with animals and beliefs about the sentience of dairy cows (personalities, social hierarchies, experience of pain, intelligence), (b) cow requirements in terms of welfare provision, and (c) the role of stockmanship in contributing to good animal welfare (e.g. what makes a good stockperson, what a good stockperson does, and how is it learnt). A mixed-method approach (Massey et al., 2006) was employed. Quantitative data gathered included basic structural data about the farms and some psychometric scales which served as focus points for discussion – for example, asking farmers to first rate the intelligence of cows and then explain their response. Although quantitative data was gathered, it is not employed here. Rather, it was compiled into a report for industry (Burton et al., 2009) with the qualitative data providing interpretative information for the quantitative analysis.

Seven farmers (all from the Westland population) did not want to be recorded and, in these cases, verbatim notes were taken of the interview. An additional two interviews with workers were lost as the interviews were conducted in a milking shed, rendering the conversations inaudible. Interviews were fully transcribed and analysis was completed using qualitative analysis software NVivo® to apply a cross-sectional code and retrieve approach, where a common system of conceptual and analytical categories was applied across the data set to enable search and retrieval of labelled data (Spencer et al., 2003). Although two members of the research team conducted the interviews, the coding was conducted by a single team member in order to maintain consistency.

4. Cowshed cultures

Analysis of the transcripts revealed that the construction of positive (or negative) cycles of behaviour between the livestock and stockpeople is a complex process. As numerous researchers have observed, material culture and human culture are co-dependent – with the material culture structuring our everyday lives and, in turn, our everyday lives structuring the development of our material culture (Gieryn, 2002; Holloway, 2007; O’Toole and Were, 2008). Thus, even if a new farm is established from scratch, elements of previous cowshed cultures are invariably incorporated within the system – for example, through the design of the buildings and field layout. As structures can fix social behavioural patterns and routines over the longer term and consequently exert a strong influence over the development of the farm culture (Gieryn, 2002; Holloway, 2007) we begin this analysis by looking at the material culture of the farm.

4.1. Environment and farm structure – a structural framework for cultural development

In its construction, a dairy farm is as much a product of ‘material culture’ as any other human-made object. Decisions of field layout, shed design, shed location, location of buildings relative to the road, type of milking shed, and so on, are all subject to historical cultural knowledge and beliefs concerning how a dairy farm ‘should’ be constructed. As with any material culture, the farm “constitutes a specific context and reality which strongly determines the experience and the everyday life of the individual. In an often forceful way, it can influence, paralyze or stimulate the individual and generate positive or negative feelings” (Roth, 2001: 568). Analysis of the interviews identified two key areas where the structure of the farm strongly influences the culture, namely, around the milking shed and on the farm ‘races’ – the walking tracks that provide cows access between the fields and the shed.

4.1.1. The milking shed

As the economic centre of the farm and the building where much of the interaction between the livestock and stockpeople occurs, the milking shed plays a key role in any cowshed culture. It is intended for one purpose, to collect milk. Through a combination of building and machinery design and maintenance (e.g. ensuring there are no stones on the concrete that can damage cows’ hooves), the role of the building is to facilitate a good ‘flow’ of cows through the milking apparatus and back onto the fields. Disrupted flow is often a result of the human component of the system. For example, within the building smoking, shouting or mishandling the animals can result in the cows experiencing an unpleasant and stressful environment (e.g. 6SWA, 21ST).⁶ However, problems can also occur where the shed is poorly designed or maintained. For example, farmer (40SWE) observes:

“Inside it is an old cow shed added on to bit by bit. Cows don’t like coming in. They come up to the shed at a good pace and then 10–20 m away come to a grinding halt. It’s pitted and stony and their bodies ripple showing discontent ...”

The shed thus establishes the context for the milking experience of both cows and stockpeople and, worker (27WT) suggests, if “the

shed’s not up to scratch, you’re going to have problems” (also 6SWA). Research suggests the implications of building design are felt across the system. For example, Maller et al. (2005) found that shed design influences both the movement/behaviour of the animals and the level of job satisfaction, enjoyment and even the mood of the stockperson. Factors such as good pit depth, lighting, shielding, and so on, are necessary to provide a comfortable working environment (Andrews and Davison, 2002). The design similarly influences the way in which cows position themselves and this, in turn, has direct influence on their welfare through, for example, affecting lameness (Bowell et al., 2003).

Researchers have considered the general impact of buildings on cultural development. For example, Gieryn (2002) argues that buildings are the solidification of cultural choices that, through their floor plans and design, have interactive routines built into them. Holloway (2007: 1051) notes similar results with respect to the introduction of automatic milking systems to farms as “Architecture is thus used to structure cow’s behaviour and coerce them to move in particular ways and according to particular rhythms.” Discussions with farmers who have converted from herring bone to rotary milking systems suggest similarly that changing the shed design, in repositioning the animals and humans, reduced the interaction between the two, but may have improved the cows’ individual experience of milking by providing them with individual bails (milking stalls):

“In a rotary shed you don’t get that personal touch with the cows, they’re just going past you, you put the milking cups on the cow ... Whereas the herring bone is quite good because you can chat as you row your cows up, you know the slow cows.” (41SWE)

“I don’t mind milking, but, as I said, in a herringbone, cool, yeah. You see the cow all the time in the rotary, you put the cups on, she’s gone, next cow. It’s just; *you’re a robot in a rotary*. Trying to milk 200 cows through a herring bone is probably not feasible.” (25ST) [emphasis added]

“... these big 1200 cow herds and these 1000 cow herds and 800 cow herds. They’ve just got cup slingers, you know? Just stand in the cow shed and put the cups on and they don’t really have much else. They might – in Taranaki I’ve found that the most is that they run around with a grubber [weeding fields] when they’re not slinging cups, during the day. They’re not learning anything.” (26WT)

“It is easy for everyone, less stressful and the cows are happy. Has made an amazing change to us.” (34OWE)

Thus the change in building structure changes the routines such that, while interactions are made more difficult, the ‘flow’ of the shed and level of stress generated during the milking process is reduced. Yet at the same time, it generates an additional problem – boredom – which may have flow on effects in terms of the attentiveness of the stockperson to the animals and make the task of milking less fulfilling or challenging. As a result, worker (26WT) suggests, the role of the stockperson may be reduced to that of a ‘cup slinger’ – simply putting the cups on the cows and removing them without any opportunity to learn about stockmanship or getting to know individual animals. Changes to the relationship may also occur where upgrading machinery leads to the repositioning of the animals and stockpeople. For example, farmer (17OT), expressed concern that his decision to install ‘cup removers’ may decrease their ability to detect welfare problems as “you’re putting cups on but there’s no one ‘round the other side’, where ‘Jane’ [pseudonym] has always been ‘round the other side’ looking for problems”.

⁶ References are made to specific individuals by a code. For example 8SWA-F refers to farm 8, Sharemilker, Wairarapa, and that it is the woman that is speaking. The codes are: Farm: 1 to 42 – farm 1 to 42; Position: (O) = Owner, (S) = Sharemilker, (W) = Worker; Region: (WA) = Wairarapa, (T) = Taranaki, (WE) = Westland; Gender: (F) = female.

Table 1

Characteristics of interviewed farmers and measures of the intensity of farming on their farms (Herd size, cows per hectare., kilograms of milk solid per cow per year). * indicates respondents were unable to answer.

	Farmer characteristics					Intensity/industrialisation measures		
	Farm	Role	Age	Male	Female	Herd size	Cows per ha	Kg milk solids per cow per year*
Wairarapa	1	Owners	40s	Yes	Yes	755	2.45	390
	2	Owner	40s	Yes	No	250	2.25	395
	3	Owner	50s	Yes	No	430	1.43	325
	4	Owner	40s	Yes	No	350	2.41	445
	5	Owners	40s	Yes	Yes	445	2.02	300
	6	Sharemilker	30s	Yes	No	410	2.65	390
	7	Sharemilkers	30s	Yes	Yes	250	3.25	400
	8	Sharemilkers	30s	Yes	Yes	230	2.25	280
	9	Sharemilker	30s	Yes	No	600	3.37	300
	10	Sharemilker	30s	Yes	No	240	1.20	325
	11	Workers	20s	Yes	No	400	2.67	*
	12	Workers	20s	Yes	No	320	2.29	*
	13	Workers	20s	Yes	No	700	2.33	*
	14	Workers	20s	Yes	No	720	2.77	*
	15	Workers	30s	No	Yes	150	2.34	*
Taranaki	16	Owner	40s	Yes	No	110	2.16	340
	17	Owners	50s	Yes	Yes	240	2.89	360
	18	Owners	30s	Yes	Yes	650	2.03	292
	19	Owners	40s	Yes	Yes	340	3.82	330
	20	Owners	40s	Yes	Yes	820	2.73	380
	21	Sharemilkers	30s	Yes	Yes	500	3.03	370
	22	Sharemilker	30s	Yes	No	320	2.54	340
	23	Sharemilker	30s	Yes	No	205	3.01	330
	24	Sharemilkers	30s	Yes	Yes	220	3.19	350
	25	Sharemilker	30s	Yes	No	720	3.17	330
	26	Workers	30s	Yes	No	380	1.98	*
	27	Workers	20s	Yes	No	490	1.40	*
	28	Workers	20s	Yes	No	250	3.13	*
	29	Workers	20s	Yes	No	500	3.03	*
	30	Workers	20s	Yes	No	825	2.75	*
Westland	31	Owners	50s	Yes	Yes	360	1.83	325
	32	Owners	20s	Yes	Yes	470	1.94	400
	33	Owners	30s	Yes	Yes	330	2.00	330
	34	Owners	40s	Yes	Yes	340	2.27	410
	35	Owners	40s/50s	Yes	Yes	510	1.82	320
	36	Sharemilker	20s	Yes	No	400	2.22	350
	37	Sharemilkers	60s	Yes	Yes	160	2.13	350
	38	Sharemilker	40s	No	Yes	350	1.67	285
	39	Sharemilkers	50s	Yes	Yes	360	2.00	320
	40	Sharemilkers	30s	Yes	Yes	300	2.00	370
	41	Sharemilker	20s	No	Yes	285	1.10	300
	42	Sharemilkers	30s	Yes	Yes	340	1.48	358
Total						405	2.36	347

4.1.2. Races (laneways)

The second main structural feature influencing the relationship between cows and humans is the condition and design of the farm 'races'. Where the races are short and well maintained (e.g. dry, hard surfaced, devoid of large or sharp stones – Andrews and Davison, 2002) there is generally little problem. However, a number of stockpeople reported problems with staff pushing animals 'too hard' along the races – either as a result of impatience, inexperience, or a desire to 'leave work' on time – leading to problems with lameness as animals injure themselves (6SWA, 7SWA, 8SWA, 11WWA, 25ST, 27WT, 30WA, 37SWE, 41SWE). Keeping the races in good condition is thus important for developing a positive culture. Races kept in poor condition combined with impatient stockpeople can lead to increasing incidences of lameness which, in turn, will further slow down the milking process and lead stockpeople to push animals even harder – establishing a negative feedback cycle.

In some cases, farmers have broken this cycle by changing the management system on the farm. For example, three farmers in Westland (who tend to have long distances for cows to walk between fields and sheds – up to 4 kms) reduced their milking from twice to once a day (31OWE, 35OWE, 38SWE). Farmers (35OWE) experience typifies this group. These farmers (husband

and wife) were managing a property with long races and impatient staff – which was creating welfare problems in terms of lameness in the animals while simultaneously creating a stressful environment for the farm family. On shifting to once a day milking they found a positive change in the "attitudes" of the cows (i.e. less stropy), less lameness, only a slight production loss and an increase in their own quality of life.

4.2. Cow 'cultures' – establishing a positive herd dynamic

Establishing a herd that is both productive and well behaved is paramount to the development of a positive cowshed culture. For farmers who begin as sharemilkers and gradually build up their own herd, this can be difficult. As farmer (8SWA-F) notes:

"You don't sell your top cows, do you? There's budget cows. You sell your ones that they're either an attitude problem in your shed, or they're a 3-titter or they repeatedly get mastitis, or difficult calves, or whatever it is."

Weeding out cows with an 'attitude problem' in this instance is an important step to building a positive culture, while weeding out those with constant health problems is an important step to

productivity. As the above sharemilkers later state, they purchased their cows from a number of different sources and “so we’ve got lots of dog cows, probably, to start with. And so it’s taken 2 or 3 years to actually start.” This problem of inheriting ‘dog cows’ from others, was widespread among respondents as stockpeople were often milking cows that have been raised within different farm management cultures. Negative comments about previous systems and the lasting impact they leave on the animals were common among respondents. Sharemilker (41SWE) for example, observes of his current herd:

“When we first came here the cows were just nervy from the previous people, they would run, you’d get them out of the shed and they would run.”

Similarly, farmer (17OT-F) notes:

“We bought some cows once, and you walked in the paddock, and the paddock’s 150 m long. And there’d be a cow down and the end and she’d prick her ears up and look.” (17OT-F).

By purchasing animals who have developed psychological issues in response to previous treatment, farmers import not only the genetic material, but also behavioural aspects of the previous culture. These can then influence the culture of the new farm – particularly if the additional flightiness of the animals creates workplace dangers and, consequently, influences stockpeople’s interactions with their livestock. In the case of both owners 17OT and sharemilker 41SWE, it was 2–3 years before a positive culture was able to be established. Farmer 41SWE notes that his problem was resolved by the culling of some of the older cows (those they “could not get out of the paddock”), and that it was with “new heifers coming in, they know no different. They’ve always known us and they’ve always been quiet” that the culture was finally turned.

An interesting aspect of ‘cow culture’ is the extent to which social hierarchies are evident. The importance of social hierarchies in dairy herds has long been recognised (Guhl and Atkeson, 1959; Dickson et al., 1967; Hulsén, 2008), with cows following not just one social structure, but three: a milking order, a leadership-followership pattern and a dominance-subordination pattern (Dickson et al., 1967). In small to medium size herds the social structure may run throughout the entire herd. However, as herd size increases, the social order becomes more difficult to maintain as the ability of cows to recognise herd-mates declines, causing cows to split into sub-groups (Hemsworth et al., 1995; Stafford and Gregory, 2008). Social hierarchies are thus an important aspect of cow ‘culture’.

Social hierarchical behaviour was widely acknowledged in responses to this survey. For example, when asked if cows have social hierarchies, farmer 30WT replied “Yeah, for sure. Big time” and farmer 10WA “Yeah. S**t, yeah. There’s bosses and there’s the low ones. No two ways about that.” Farmers also confirmed that there are different hierarchies within the herd, resulting in a complex social structure. For example, farmer (24ST) observes that rather than the “fat girls” (sic) always being dominant, they are dominant in getting to the grass, but may not be dominant in other areas – for example, where they stand in the yard. Knowing the social position of individual cows (and in different contexts) is an important part of good stockmanship as the two following quotations illustrate:

“Even simple things like going through the cow shed. You’re aware of danger, aren’t you? Getting cows trapped and - you don’t - when you draft out a cow, for whatever reason, you don’t leave one cow in a pen, ‘cause she wants to join her mate. You draft out 2 or 3 to put with her to keep her company.” (5OWA) [Emphasis added]

Or 3OWA notes that social structures of the herd can be as effective as physical barriers when it comes to stock management as:

“... sometimes what happens is if there’s a dominant cow in front of them, they don’t want to push up against the dominant cow.” (3OWA)

In the first instance, farmer (5OWA) prevents issues with cow behaviour by simply ensuring that the cow does not feel isolated from the herd but is able to socialise with her ‘mate’ (friend) – thus averting the possibility of ‘danger’ to the stockpeople. In the second instance, farmer (3OWA) notes that the presence of an adjacent dominant cow acts as a physical barrier to ‘pushing’ the cow whereas, implicitly, a subordinate cow would not. There are two levels of knowledge displayed here. The first is knowledge of general cow social behaviour, and the second is specific knowledge of individual cows’ positions in the social structure of the herd. Understanding which cows are dominant and in which situation is thus important for preventing problems arising. When dealing with herds of hundreds of cows and in multiple contexts this is likely to require considerable experience – something that a transient, unskilled, or over-specialised (e.g. ‘cup slinger’) worker may not be able to achieve.

4.3. Human influences on the cowshed culture

The above sections illustrate how the material culture of the farm and the ‘culture’ of the herd can affect the development of a positive cowshed culture. If a farm has poor milking facilities, long, narrow and stony races, a large herd of cows where the hierarchy has broken down, and individual animals carrying the behavioural vestiges of previous poor management systems it is likely to be very difficult to create a positive environment for either the cows or the workers. With no other guidance, staff (particularly those with little or no experience in the industry) would encounter dangerously behaving animals that do not move easily into the sheds and are slow through the races – and they are likely to develop their relationships with and responses to cows accordingly. However, good stockmanship and management practices can turn this situation around.

Of particular importance is the role of the farm manager (owner or sharemilker) responsible for balancing the economic requirements of the farm with the requirements of the staff, animals and buildings. Worker (11WWA) observes that the atmosphere in the cowshed is determined by the personality of the farmer as:

“If you’re walking through the cow shed, I think you can tell a farmer’s personality without him being there. You can walk down the aisle, and if the cows are happy, you’re happy and if the cows aren’t, then you’re quite a stress freak.”

In this instance he is referring to the ‘mood’ of the farmer being transferred to the mood of the cows. Worker (12WWA) believes the way the farmer treats animals is also likely to be transferred to the workers “... cause how they act is how the workers act as well.” Others have noted how the mood of the staff can affect the mood of the animals, for example, farmer (37SWE) notes:

“If we’re happy they’re happy. If we’re pissed off or angry or we raise our voices in the pit they get ratty and they respond to how we are feeling at the time.” (also 36SWE and 17OT)

Sharemilker (25ST) takes this further by suggesting that workers can ‘push cows’ too hard through he races, leading to lameness. In turn, this can cause workers to “get shitty” [angry] with the cow (lameness makes the cows more difficult to move), leading the cow to “get shittier” with both the workers and with

other cows who, in turn, get “shittier” and consequently, the bad mood of the stockperson can be transferred through the entire herd and, potentially, back to other stockpeople.

An important aspect of the human component is the role of socialisation and experience in the development of the culture of the stockperson, with many of the reflexes and reactions to animals thought to derive not from codified knowledge, but being ascribed to experience and innate abilities. Farmer (22ST) encapsulates aspects of the development of ‘stockmanship’ skills that recurred in the transcripts:

“So, as a kid, um, I’ve always been helping my father draft cattle [separate cattle out when in a herd], and stuff like that. Knowing how to draft cattle - it’s not something that you learn overnight. *And knowing what an animal is going to do before it does it.* You know, that’s part of it. Knowing what way they’re going to turn before they turn. That sort of thing, you know. It’s something you learn. And you can easily learn it. You can pick what they’re going to do. *Um, some people can’t see that. Some people can’t pick what an animal is going to do before they do it. Whereas they’re fairly - they’re really predictable as far as that sort of thing goes. But some people just can’t see it.* I think, um, you know, some people are a lot better with that sort of thing, knowing what the animal’s going to do. You know, you have a lot less stress around places and that sort of thing. If you can be one step ahead of the animal, then, uh, *situations don’t arise that would otherwise arise.*” [Emphasis added]

A number of issues are raised here. First, the sharemilker emphasises the importance of both socialisation and experience to building up an intuitive understanding of how to handle animals – learning to anticipate what the animal is thinking and therefore what it will do. Second, the opinion is expressed that some people are completely unable to develop the understanding of or empathy with the animals required to anticipate behaviour – e.g. “He couldn’t realize that if a cow looks some way, that she might go that way” (3OWA). This belief that some people can understand animals and others can not mirrors the mystical ‘farming’s in the blood’ ability to farm found in other studies (Sachs, 1973; Saugeres, 2002; Burton, 2004). Third, the farmer identifies the lack of this ability as a cause of welfare problems – not in that the stockperson is unable to physically diagnose problems (such as lameness and mastitis), but rather because in being unable to read the animals their actions lead to stressful ‘situations’ and injury that would not normally have arisen.

One interesting feature of the interviews was the frequency with which farmers were unable to explain how they detected welfare problems with animals or were able to anticipate animals’ movements. For example, “... it’s something I can’t really - it’s just always something I’ve done and been brought up with” (10SWA), or in the case of a farmer explaining how she detects welfare problems:

“They don’t ... You can see it in their eyes. Sometimes they’ll just look like they’re as full as the others. Just little things. You’ll just look at them and especially over calving, you think, “Ah there’s something not right there.” (7SWA-F)

While stockpeople undoubtedly engage in reasoned or planned behaviour, there appears to be an additional component that is more instinctive. Farmers variously described their stockmanship skills as “intuitive” (5OWA), “an innate 6th sense” (40SWE), “you just sense something going there” (17OT) triggered by “just little things” (7SWA-F), “just one of those things” (2OWA) or “you can just tell” (8SWA). It is possible, therefore, that initial detection of problems with animals is not something

farmers engage with in a cognitive sense, but rather through numerous experience learnt insubstantial cues farmers subconsciously detect welfare issues.

If socialisation and experience-based learning are important in developing stockpeople’s relationships with animals then they may also provide a means by which the human interactions with animals practised in one ‘cowshed culture’ can be transferred to another via the human component. However, to some extent this can be moderated. Two key ways were identified by respondents. First, as stockmanship is learned through experience it may improve throughout the life of the stockworker. One older worker (26WT) expressed how his approach to livestock has mellowed as a result of gaining a greater understanding of the animals;

“The older you get and the more you learn, the more you ease up on things, you know? I believe. And you work out that the more, the more you are more quiet and nice and easy going with the stock, the better they perform for you.”

Similarly, farmer (7SWA):

“There’s a lot of stockmanship that doesn’t make sense. Like, when you’re young you use a stick in the shed ’cause you think it makes it faster, but when you get older you realize that when you chuck the stick away ... you know, you could do some fast milkings or you could milk fast all year.” (7SWA)

However, another issue is the influence of the mood of the stockperson on their behaviour towards the animals. Worker (11WWA) in particular expressed this as a concern about the behaviour of some of his colleagues:

“... you could be a real good stockman, you know, and your wife might leave you and you’re having a horrible time, and the next thing, you’re pissed off, so you become a really bad stockman, you know? And, um, everyone knows how it should be done, really. *People know what they should be doing. It’s just whether they do that or not.*” [Emphasis added]

This suggests that even when the stockperson has the knowledge to treat the animals well (i.e. “everyone knows how it should be done really”) they may not necessarily act upon it as they are simultaneously acting upon other influences within their lives. In this case, behaviour may not reflect the worker’s attitudes towards the cows at all, but rather the influences of external social environments on his/her mood. Farmer (7SWA-F) notes, for example, that workers can “take their moodiness or their tiredness out on their cows. Um, or you know, their stress, some people just take it all out on the animals”. This ‘mood’ could be influenced by factors external to the farm – but it could equally result from internal influences, such as workers’ relationship with their manager or the extent to which they enjoy their job.

Within the survey farms, the relationship between sharemilkers/owners and workers appeared to be a strained one at best. The primary issue for managers was that workers were always in too much of a hurry, causing them to drive the animals too hard (5OWA, 21ST, 30WA), to neglect animals with obvious welfare issues (knowing the manager would pick it up and deal with it eventually) (19OT), or to injure the animals through rough treatment driven by impatience (6WA, 20OT, 21ST). Interestingly, there was little concern that they did not know what to do (as noted by 11WWA above) other than individual examples who were classed as ‘nasty’ or simply incapable of reading cows. Workers’ comments about employers presented a counter argument – that bosses simply had unrealistic expectations of workers and workers needed to be provided with more time (11WWA, 15WWA, 29WT).

As observed above, many respondents noted that stockmanship is learnt through socialisation, is based on experience rather than

formally taught knowledge, and is often executed at a subconscious level. While sharemilkers and owners thus often have considerable experience with the animals and are able to put their stockmanship skills to good use, workers may lack the ability to do likewise. Thus, because of the often subconscious nature of ‘knowing’, owners/sharemilkers’ frustration may be in part because they cannot see the difficulties others have performing the same behaviours – to them, they are obvious and ‘common sense’. In contrast, for workers the owners’ expectations may be seen as utterly unreasonable or even impossible to meet.

4.4. Understanding between the cow and human components of the culture

Communication between the two key components in the cowshed clearly plays an important role in the development of a positive or negative cycle. One of the key qualities of stockmanship that emerged from the interviews was the importance of ‘observing’ the animals (10WA, 16OT, 20WA, 20OT, 21ST-F, 22ST, 8SWA, 9SWA, 50WA) – or developing the ‘watching knowhow’ that Dockès and Kling-Eveillard (2006: 245) suggest is one of the major characteristics of a good livestock farmer. There are two facets to this ‘watching knowhow’ as described by farmer (16OT):

“If you’re working with your cattle, it’s understanding the cows you’re working with. You know, you’ve got cows there that their temperaments are different. *So if you’re working with a cow that’s pretty agitated, you know it’s going to get agitated because of the temperament.* How you work with her. But also, *if you’re working with somebody else’s stock, it’s knowing how to handle those animals.* How to handle animals to minimize stressing them.” [Emphasis added]

In this quote the farmer again identifies the two types of knowledge that can lead to good stockmanship. First is the knowledge of specific animals, their temperaments and their behaviours – such that where an individual cow is known to be easily agitated, the ‘good stockman’ can avoid stressing the animal. In addition, this knowledge of individuals can assist the stockman to diagnose welfare problems with the animal before symptoms become obvious. For example,

“Um, you can tell when the cows are out of character. Like this morning we had a cow that’s not very happy. You know, so, we give her a bit of a - you can just tell. ‘Cause you’re looking at your animal all the time, anyway.” (8SWA)

Stockpeople with in-depth knowledge of their herds thus have the advantage that they are viewing the animal in the context of its normal behaviour, rather than observing a snapshot of discrete ‘indicator’ symptoms. The second type of observing knowledge (16OT) is the more generic understanding of livestock that enables the handling of animals when “working with somebody else’s stock.” This relates back to previous comments about the experience-based ability to understand livestock and anticipate their movements, but also to a more general accumulation of knowledge about animal welfare.

Empathic connections are also important in the cowshed and, in this area too, knowing individual animals can assist in the creation of a positive cowshed culture. Farmers often identify with individual animals that stand out from the herd in some way (also see Wilkie, 2005). For example,

“Worker: Um, I’ve got a cow, 230, she’s, um, comes on last, kicks like crap, but um, without her standing in the way of the milker for the entire milking, everyone else will, um - sort of if she wasn’t there, they wouldn’t come in.

Interviewer: Right, right. So everybody else knows she goes last.

Worker: *Even though we hate her, we still like her in a way.* Um, ah you get all sorts. You get the skinny little cow that will come in last, but will end up in the first bale. Um, all sorts. Um, yeah, pushy ones that push their mates around. All sorts.” (30WT) [Emphasis added]

By observing individual personalities, moods or ‘characters’ that some cows appear to have, stockmen begin to draw similarities with human behaviour. For example, “Every cow has its own character. *Just like humans*” (37SWE), “For every cow, there’s a different personality. *Just like for every human*” (50WA), “Well, they’re *just like people*. There are some that are uptight and grumpy and there are ones that are just mellow and go with the flow” (9SWA) or “you’re always going to get that percentage of grumpy cows, which are never going to feel any good, ‘cause they’re always grumpy all the bloody time, *just like humans*” (25ST).

Theory suggests that an empathic response is the result of the interrelatedness of the subject and object, with the greater the interrelation, the more likely that similar representations will be activated, triggering a response (Preston and de Waal, 2002). Thus, “Animals that are close phylogenetically to humans, or that are physically, behaviourally, or cognitively similar to them, tend to evoke more positive affect than those that are phylogenetically distant or dissimilar” (Serpell, 2004: S147 – also see Würbel, 2009). Empathy with animals has been found to be a critical pre-determinate of stockpeople’s behaviour as it makes “... him or her and more sensitive to the animal’s responses to handling” (Coleman et al., 2003, 198 – also see Hanna et al., 2009; Hemsworth et al., 2009). Further, while empathy for animals is, in part, an inherited trait, Phillips et al. (2009) argues that the evidence that empathy can be influenced experientially indicates it is also influenced by environmental and social factors. Consequently, interviewees’ frequent observations of the human similarities mirrored in individual cows may be an important component in developing empathy.

Finally, some farmers contend that cows attempt to communicate directly, particularly when they having problems with birthing. Farmer (10WA) gives an example:

“Calving cows through the spring. I’ve had cows come out of the mob, come walking up to you, and just turn around and show you their ass and look at the fet (fetal) sac kicking out ... *that hasn’t happened once. It’s happened numerous times.*” [Emphasis added]

A similar story was told by sharemilker (36SWE) of a cow who was nearing calving but there was no sign of the calf so she was left, but then she “came up and gave us a nudge”. As a result the cow was examined more carefully and found to be having problems birthing. Farmers’ knowledge of individuals within the herd is again important as part of this communication process as, for communication, the farmer must know the ‘normal’ behaviour of the animal in order to recognise when the animal is attempting to communicate. For example, farmer (40SWE) observes “if cows lash out they are trying to tell you something ... if the cow is not behaving as her normal self”.

5. Discussion

Based on the above analysis, Fig. 2 illustrates how Hemsworth and Coleman’s (1998) model of human-animal interactions might be usefully extended by viewing the stockperson-animal interactions as part of a ‘cowshed culture’.

In this representation, the cowshed culture is depicted as three simultaneous endogenous cycles. The first contains the everyday interactions between stockpeople and cows whereby good

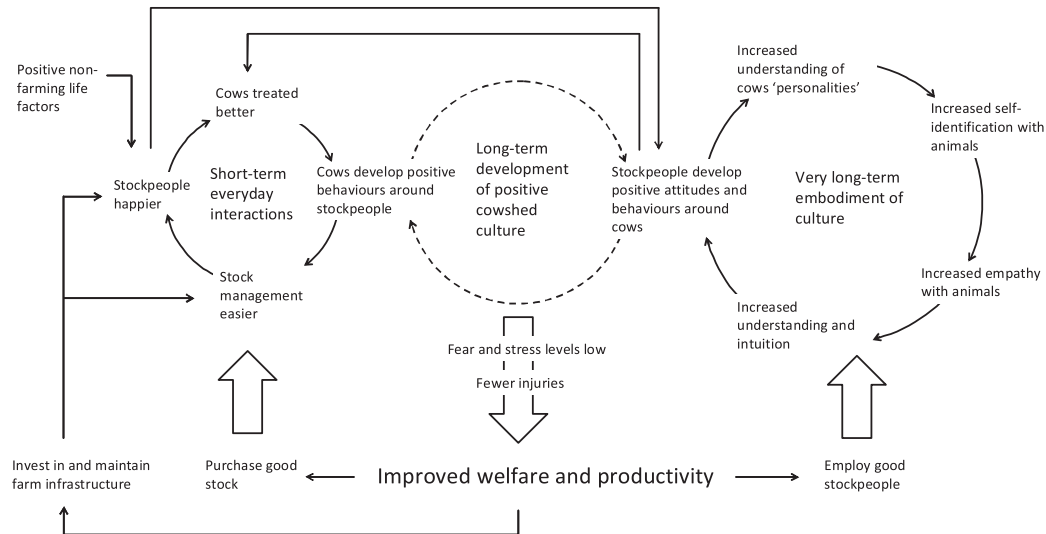


Fig. 2. Conceptual framework illustrating a positive 'cowshed culture'.

infrastructure makes stock management easier, which leads in turn to happier workers, better treatment of cows and, ultimately the cows developing good behavioural patterns. In addition, we recognise the influence of factors external to the relationship between animals and humans that influence the mood of stockpeople, and the need for the development of a material culture (good design and well maintained) that facilitates both good animal flow and positive human-animal interactions. If building a herd, investing in cows that are known to come from a farm with a good cowshed culture would also assist in building a positive cycle.

Leaving aside the second cycle for the moment, the third cycle represents the embedding of the culture into individual stockpeople through extended periods of contact with livestock, perhaps even over the lifetime of the individual. Within this cycle the development of intuitive 'just knowing' or empathic responses towards animals is driven by a combination of experience and getting to know individual animals, leading to the development of an understanding of the behavioural and cognitive similarities between cows and humans. This then contributes to positive stockmanship through the ability to anticipate the animal's behaviours or even moods and 'just know' when there is something that is not right with the animal's demeanour. Although this cycle may take a considerable amount of time to develop, the result is a long-lasting disposition and it is this disposition that the stockperson is likely to carry with them into their next position of employment.

We contend that the way stockpeople behave towards cows is guided by this embedded 'natural' disposition. For those from a farming background, this will be transferred from their previous place of employment or their home farm (the environment in which they have been socialised). However, if new to the industry, the individual may initially have little intuition or empathy towards cows (although they may have general empathy towards animals). Employment of a good or bad stockperson will contribute towards the development of a good or bad culture, whereas an untrained stockperson (who has the aptitude to learn and an ability to empathise) may internalise the meanings of the cultures they are immersed in, be they positive or negative.

The second cycle represents interaction between the everyday activities of cows and stockpeople and the embedded dispositions of the stockpeople. Through this iterative cycle it is evident that a good stockperson working in a poor everyday environment may

decline in terms of their response to animals and, likewise, a poor stockperson working in a good environment may, through imbibing the culture, improve their interaction. Similarly, good stockpeople will ultimately improve the everyday interactions on the farm (cycle 1). Thus both the first and third cycles are contributing to the establishment of an overall pattern of practice on the farm and these patterns simultaneously influence and are influenced by others engaged in the creation of the culture (cows and humans). A positive culture will result in lower levels of fear and stress as well as fewer injuries to the animals which may, if empirical studies are correct, lead to improved welfare and productivity. Investment of productivity (and profitability) gains back into the system by purchasing good animals, employing good stockpeople and investing in the material capital would then reinforce the positive nature of the farm culture.

Changing the attitudes of stockpeople or increasing their knowledge of stockmanship *might*, to some extent, improve the farm culture as is supposed in the animal welfare science literature. However, a problem with cultures is, as *Cochrane (2006)* observes, they tend to have considerable built-in inertia. As a consequence, targeting one particular aspect of the system is not guaranteed to produce an overall cultural change. For example, changing the attitudes of some stockpeople while the majority stick to the same practices may not see an improvement in the behaviours of the livestock and thus prevent the cycle from becoming a positively reinforcing one. Alternatively, when the material culture is patterning behaviours in a negative fashion (e.g. causing illness, stress or lameness) it will keep pulling the system in a negative direction, regardless of the attitudes of the stockpeople. *Whay (2007: 120)* suggests that, as a general rule for welfare interventions:

"There appears to be a very strong link between the amount of effort expended on the design and facilitation of an intervention; *the recognition of the underlying complexity of human behaviours which relate to poor animal welfare* and the level of impact that an intervention may achieve." [Emphasis added]

Indeed, successful interventions have generally required substantial and sustained effort (e.g. *Hemsworth et al., 1994; Algers and Berg, 2001*) and, as *Whay (2007)* suggests, the recognition of complexity in the system is one of the key ingredients of success. Results of this study suggest viewing the 'cowshed culture' as a system, and identifying areas where the system is not working

may be the only guaranteed way of improving standards of care and welfare on a farm-by-farm basis.

An additional area in which understanding farms as ‘cowshed cultures’ may assist welfare provision is through contributing to the design of large-herd farming systems. As noted in the analysis, an important element in the development of good stockmanship skills is the direct contact between the stockperson and individual animals – which assists in the development of empathy and allows stockpeople to build up knowledge of behaviours or even ‘moods’ which can be used to identify welfare problems. In large industrially managed systems, however, the lack of this contact can hinder the development of these relationships (Boivin et al., 2003; Wilkie, 2005). This observation led Boivin et al. (2003) to ask “What is the number of animals that a stockperson is really able to care for with respect to animal welfare and productivity?” However, some have argued that it is not the number of animals that counts but, as Holloway (2007: 1055) observes “particular farming systems produce varying and related effects of freedom and domination according to their use of particular technologies, spatialities, knowledges and so on.” In other words, if we can design appropriate farming systems, we can maintain, at least to some degree, the subjectivity of animals while meeting the commercial needs of the industry.

Farmers in this study showed considerable variation in terms of their ability to connect with individual animals. In some cases, those managing very large herds had strong connections. For example, farmer (10WA), milking over 700 cows, asserts “my wife and I ... we’ve got a bloody name for everything” – and throughout the interview they were able to tell stories of individual cows, recalling them by number, events, behaviours and occasionally pet names. Yet, at the same time, others working with smaller herds seemed unable or unwilling to form the same connections. One worker (12WWA) who, coincidentally or otherwise, always worked with a portable music player on, had been milking the same 320 cows for a year and, when asked how many cows he knew, replied “2 or 3. Yeah, I can pick some cows, but not all of them.” Thus the question of how large and industrial a farm can become before the stockpeople lose the connection with the animal is not a simple matter of the quantity of contacts, but the quality of the relationships.

As Holloway (2007) and this study both suggest, adverse human-animal relations as a result of industrialisation are not inevitable, but, in order to prevent negative welfare consequences, we need to pay attention to the broader impact of industrialisation on the development of individual farm ‘cultures’ and design systems accordingly. In this respect, there are a number of issues that need to be addressed.

First, it is important that material cultures continue to facilitate positive contacts between humans and livestock. Riley (2011) suggests that, with dairy cows, empathy for the animal is generated as much through the proximity of contact as with phylogenetic similarities. The impact of moving from herringbone to a rotary shed (now constituting 10% of dairies in NZ – Clarke et al., 2007) has been to alter the position of the humans and livestock such that observation of the animals is made more difficult and, simultaneously, human interaction becomes ‘robotic’ with the role of the stockperson, in some instances being reduced to that of a “cup slinger”. While rotary sheds may make milking large herds easier (Andrews and Davison, 2002), systems need to be put in place to ensure that stockpeople still have the opportunity to interact with animals outside of the shed. This may require the engagement of companies designing and installing agricultural equipment as well as recognition by farmers that a fast turnover, while lowering staffing costs, may result in unmotivated staff and/or additional welfare costs. Further, any increase in herd size needs to be matched by improvements in infrastructure such as improving the

racers. This should not be viewed mechanistically as simply a matter of facilitating the efficient flow of animals, but also as ensuring that the opportunities for negative interactions between cows and staff (caused by the driving of animals too hard into the shed) occur less frequently.

Second, there is a need to facilitate stockpeople’s understanding of individual animals in order to (a) identify welfare problems with animals, (b) develop good stock handling skills, and (c) develop an empathic feeling for the livestock. Although we contend this is not necessarily lost through the industrialisation of agriculture, it certainly can be if the right management, structure and culture are not in place. A number of interviewees observed this about large herds, for example:

I: Have you been on farms or seen other farms where animals don’t get as much care as individuals?

F: Yeah, definitely. Larger farms, yes.

I: So what do you think can be done to keep larger farms from getting that way? Is it staff shortage or is it just the focus on ...

F: The sheer size of the herd.” (23ST – 205 cows).

“I like to do things properly. It’s definitely a challenge on this farm with that many cows, so ... Getting enough time for each cow” (25ST – 720 cows)

Developing knowledge of individual cows is not something that can be addressed through normal promotional channels in the same way as teaching a stockperson what is ‘good’ or ‘bad’ behaviour or attempting to change their attitudes towards cows, yet it is a critical part of developing as a good stockperson. Even leaving aside the obvious advantages of being able to detect subtle changes in behaviour or mood as a diagnostic tool and its role in facilitating communication between humans’ and animals, identification of cognitive and behavioural similarities with people may play an important role in the development of empathy for animals (e.g. Serpell, 2004; Würbel, 2009), with empathy, in turn, being both an important predeterminant of positive attitudes to and behaviour towards livestock (Coleman et al., 2003; Hemsworth et al., 2009; Hanna et al., 2009). Interviewees identified many shared characteristics between humans’ and animals’ personalities including ‘attitudes’, anxiousness, curiosity, intelligence, inventiveness, temper/mood, bossiness, impatience, sexual drive, docility, and light heartedness.

Third, maintaining the social structure of the herd within farm systems has advantages for welfare as stockpeople are able to incorporate it into their knowledge of the ‘personality’ of the animal as a diagnostic tool, to use this knowledge when ‘communicating’ with the animals, and to use it to assist in stock management decisions (e.g. when to ‘push’ an animal and when not). Essentially, there is a danger of industrial systems ceasing to work with the animal’s social instincts.

A fourth issue that may need to be addressed in the future is what happens if ‘stockmanship’ skills are no longer embedded via on-farm socialisation? Increasing levels of industrialisation are undoubtedly leading to a more commercial dairy industry and, while family farming continues to dominate in terms of numbers (Pritchard et al., 2007; Brookfield, 2008), an increasingly large proportion of dairy production is via corporate farms (LIC & DairyNZ, 2009). In the majority of cases in this study (69%) at least one of the interviewees had been raised on a farm, and in many of these cases their stockmanship skills appeared as embodied dispositions, subconscious understanding of how animals are likely to behave ‘you just know’ and whether they are ‘just not right’. Although there is no way of ascertaining the value or impact of the socialisation process on stockmanship skills, if understanding animals is a matter of experience or spending time

observing behaviours (as many farmers thought), then industries increasingly not based on family farming principles will lose the level of embodied expertise farms currently enjoy. The question is: can this loss be compensated for or negated in the design of future large herd systems?

6. Conclusion

At the beginning of this paper we noted the tendency of biologists and psychologists to dominate the literature on stockmanship and welfare, the consequent focus on quantitative studies of the attitude/behaviour relationship, and the need for greater integration of sociological theory into such studies. In contrast, this study has examined stockmanship as part of the farm culture rather than the result of discrete cognitive choices. The result suggests that attitudes – rather than dominating behaviour – may instead play a relatively minor role as an integrated component of a complex farm system involving material cultures, cow ‘cultures’ and human cultures. For example, factors influencing the behaviour of stockpeople include:

- the structures and machinery that pattern the movements of both stockpeople and animals and determine the nature and extent of their interactions;
- ‘moods’ that are transferred both within the human culture and between the animal and human cultures – affecting their behaviour towards each other;
- external life-events that influence the moods of the stockpeople and that can be reflected in their behaviour towards the animals;
- repeated interactions that lead to a development of knowledge of individual animals which, in turn, can be used to perceive illnesses in advance of obvious symptoms and guide (intuitive) stockmanship decisions;
- repeated interactions that lead to an understanding of the similarities between cows and humans and thus promote the development of empathy – potentially leading to more positive behaviours;
- repeated interactions that lead stockpeople to develop an understanding of the social structures of the cow ‘culture’ which guides stockmanship and prevents injuries;
- instinctive understandings of animals and stockmanship that develop through long-term socialisation in a farming environment; and
- culturally learned behaviours that can be transferred between farms – either through the movement of stockpeople, or the movement of cows.

Consequently, we conclude that attempts to improve the behaviour of stockpeople towards livestock by changing attitudes alone are problematic and unlikely to succeed without intervention into other areas of the farm system. Further, as cultural change is generally slow, there should be no expectation of immediate and dramatic changes as a result of intervention. Rather, the process of building up positive cowshed cultures is likely to be a slow one, with change occurring at different temporal rates across the system. Changes to the behaviours of stockpeople, for example, can be made immediately through simply altering their role on the farm or allowing more time for particular tasks. However the impact of this change on the cow ‘culture’ or the development of empathy and embodied skills in stockpeople is likely to occur only on a longer time-frame.

The slow rate at which cultural changes occur may also be influencing the apparent viability of our current industrial farming practices. These systems are benefitting from a supply of

stockpeople who have embodied skills that reflect earlier, less intensive systems – where stockpeople had the time and opportunity to develop empathy with and understanding of their animals. As a consequence, the standard of stockmanship in large commercial units is likely to be higher now than will naturally develop in an agricultural regime that only operates factory-style labour management (e.g. ‘cup slingers’) and restricts the interactions between stockmen and livestock. Thus, large industrial dairy farms may function because of the historical buildup of stockmanship skills (an accumulation of cultural capital) on smaller family farms, but this should not be taken to mean these systems will work the same way in the future. Without intervention aimed at promoting stockmanship (through a combination of building design, training and appropriate farm management systems) working on a dairy farm may soon become like working in any other industrial factory – if it is not there already.

Politically, consideration is currently being given to issues of improving stockmanship. Existing policy in the EU (under the guidance of the 5 freedoms) advocates welfare in the design of intensive systems by imposing largely ‘input-based’ measures such as a space allowance, allowing freedom of movement, allowing interactions between animals, and so on (see [Veissier et al., 2008](#)). Recently, however, the UK’s Farm Animal Welfare Council (the creators of the original ‘5 freedoms’) reviewed the effectiveness of British farm animal welfare policy since 1965 and concluded that policy should instead focus on the obligation to provide an acceptable quality of life for the animal over its lifetime – concentrating on aspects such as “good husbandry, considerate handling and transport, humane slaughter and, above all else, skilled and conscientious stockmen (sic)” ([FAWC, 2009](#), iii) rather than largely arbitrary metrics such as space allowances that are focused on the animals alone. The issue of how to promote the development of “skilled and conscientious stockmen” may thus become of greater importance in the future if these suggestions are adopted.

A final observation to make is that while we profess to employ the concept of culture we acknowledge that we have not employed classical ‘cultural theory’ as is prevalent in the sociological and geographical literature. The reason for this is simple. While animal welfare sciences have focused on the practical issues involved in behavioural change, the social sciences have not. In line with our stated aim of bringing these two threads together, therefore, we are addressing predominantly researchers who are working in areas with more practical than theoretical application (such as extension, animal health or systems design) and, consequently, often operate on the margins of the social sciences. Our main objective has been to encourage these researchers to think beyond attitudes as ‘drivers of change’ to seeing the farm as a culture – and, hopefully, apply this sociological theory to the practical goal of improving the lives of farm animals.

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References

- Ajzen, I., 1985. From intentions to actions: a theory of planned behaviour. In: Kuhl, J., Beckermann, J. (Eds.), *Action Control: From Cognition to Behaviour*. Springer, New York, pp. 11–39.
- Algers, B., Berg, C., 2001. Monitoring animal welfare on commercial broiler farms in Sweden. *Acta Agriculturae Scandinavica Section A, Animal Science* 530, 88–92.

- Andrews, J., Davison, T., 2002. Dairy farm design and layout. Building and Yard design, warm climates. In: Roginski, H. (Ed.), *Encyclopaedia of Dairy Sciences*. Academic Press, New York, pp. 656–672.
- Appleby, M., 2004. Science is not enough. How do we increase implementation? *Animal Welfare* 13, 159–162.
- Arluke, A., 2002. A sociology of sociological animal studies. *Society and Animals* 10 (4), 369–374.
- Baldwin, J.R., Faulkner, S.L., Hecht, M.L., 2006. A moving target: the illusive definition of culture. In: Baldwin, J.R., Faulkner, S.L., Hecht, M.L., Lindsley, S.L. (Eds.), *Redefining Culture: Perspectives across Disciplines*. LEA Publishers, New Jersey, pp. 3–26.
- Bertenshaw, C.E., Rowlinson, P., 2008. Exploring heifers' perception of 'positive' treatment through their motivation to pursue a retreated human. *Animal Welfare* 17, 313–319.
- Boivin, X., Lensink, J., Tallet, C., Veisser, I., 2003. Stockmanship and farm animal welfare. *Animal Welfare* 12, 479–492.
- Boivin, X., Marcantognini, L., Bouteisteix, P., Godet, J., Brulé, A., Veisser, I., 2007. Attitudes of farmers towards Limosin cattle and their handling. *Animal Welfare* 16, 147–151.
- Bourdieu, P., 1998. *Practical Reason*. Stanford University Press, Stanford.
- Bowell, V.A., Rennie, L.J., Tierney, G., Lawrence, A.B., Haskell, M.J., 2003. Relationships between building design, management system and dairy cow welfare. *Animal Welfare* 12, 547–552.
- Bracke, M.B.M., de Greef, K.H., Hopster, H., 2005. Qualitative stakeholder analysis for the development of sustainable monitoring systems for farm animal welfare. *Journal of Agricultural and Environmental Ethics* 18, 27–56.
- Breuer, K., Hemsworth, P.H., Barnett, J.L., Matthews, L.R., Coleman, G.J., 2000. Behavioural response to humans and the productivity of commercial dairy cows. *Applied Animal Behaviour Science* 66, 273–288.
- Brookfield, H., 2008. Family farms are still around: time to invert the old agrarian question. *Geography Compass* 2/1, 108–126.
- Bryant, C.D., 1979. The zoological connection: animal-related human behaviour. *Social Forces* 58 (2), 399–421.
- Buller, H.J., 2009. Agricultural animal welfare. In: Kitchin, R., Thrift, N. (Eds.), *International Encyclopaedia of Human Geography*. Elsevier, Oxford, pp. 127–132.
- Buller, H.J., Morris, C., 2003. Farm animal welfare: a new repertoire of nature-society relations or Modernism re-embedded? *Sociologia Ruralis* 43 (3), 216–237.
- Burton, R.J.F., 2004. Seeing through the 'good farmer's' eyes: towards developing an understanding of the social symbolic value of 'productivist' behaviour. *Sociologia Ruralis* 44 (2), 195–216.
- Burton, R.J.F., Cooper, M., Peoples, S., 2009. Dairy farmers' beliefs about animal welfare: a preliminary analysis of survey data. Report prepared for DairyNZ as part of the research program "Animal welfare for market success" (PROJ-13852-PPS-AGR). AgResearch, Ruakura. May 2009.
- Clarke, N., Barnett, C., Cloke, P., Malpass, A., 2007. Globalising the consumer: doing politics in an ethical register. *Political Geography* 26, 231–249.
- Cochrane, P., 2006. Exploring cultural capital and its importance in sustainable development. *Ecological Economics* 57, 318–330.
- Cohen, A.P., 1982. Belonging: the experience of culture. In: Cohen, A.P. (Ed.), *Belonging – Identity and Social Organisation in British Rural Communities*. Manchester University Press, Manchester.
- Cohen, A.P., 1985. *The Symbolic Construction of Community*. Routledge, London.
- Coleman, G.J., Hemsworth, P.H., Hay, M., Cox, M., 1998. Predicting stockperson behaviour towards pigs from attitudinal and job-related variables and empathy. *Applied Animal Behaviour Science* 58, 63–75.
- Coleman, G.J., McGregor, M., Hemsworth, P.H., Boyce, J., Dowling, S., 2003. The relationship between beliefs, attitudes and observed behaviours of abattoir personnel in the pig industry. *Applied Animal Behaviour Science* 82, 189–200.
- Curry-Roper, J.M., 2000. Embeddedness in place: its role in the sustainability of a rural farm community in Iowa. *Space and Culture* 3, 204–222.
- DairyNZ, 2009. DairyNewz. Autumn 2009. DairyNZ, Hamilton. <http://www.dairynz.co.nz/file/fileid/28415> (accessed 30.06.11.).
- Dickson, D.P., Barr, G.R., Wiekert, D.A., 1967. Social relationship of dairy cows in a feed lot. *Behaviour* 29 (2/4), 195–203.
- Dockès, A., Kling-Eveillard, F., 2006. Farmers' and advisers' representations of animals and animal welfare. *Livestock Science* 103, 243–249.
- Dwyer, C.M., 2009. Welfare of sheep: providing for welfare in an extensive environment. *Small Ruminant Research* 86, 14–21.
- Farm Animal Welfare Council, 1992. FAWC updates the five freedoms. *Veterinary Record* 131, 357.
- Farm Animal Welfare Council, 2009. *Farm Animal Welfare in Great Britain: Past, Present and Future*. Farm Animal Welfare Council, London. <http://www.fawc.org.uk/pdf/ppf-report091012.pdf> (accessed 30.09.11.).
- Fishbein, M., Ajzen, I., 1975. *Belief, Attitude, Intention and Behaviour: An Introduction to Theory and Research*. Addison-Wesley, Reading MA.
- Fraser, D., 2003. Assessing animal welfare at the farm and group level: the interplay of science and values. *Animal Welfare* 12, 433–443.
- Gieryn, T.F., 2002. What buildings do. *Theory and Society* 31, 35–74.
- Gray, J., 1998. Family farms in the Scottish borders: a practical definition by hill farmers. *Journal of Rural Studies* 14 (3), 341–356.
- Guhl, A.M., Atkeson, F.W., 1959. Social organization in a herd of dairy cows. *Transactions of the Kansas Academy of Science* 62 (1), 80–87.
- Hall, J.R., 1990. Social interaction, culture and historical studies. In: Becker, H., McCall, M. (Eds.), *Symbolic Interaction and Cultural Studies*. University of Chicago Press, London, pp. 16–45.
- Hall, C., Sandilands, V., 2007. Public attitudes to the welfare of broiler chickens. *Animal Welfare* 16, 499–512.
- Hanna, D., Sneddon, I.A., Beattie, V.E., 2009. The relationship between the stockperson's personality and attitudes and the productivity of dairy cows. *Animal* 3 (5), 737–743.
- Hemsworth, P.H., 2003. Human-animal interactions in livestock production. *Applied Animal Behaviour Science* 81, 185–198.
- Hemsworth, P.H., Coleman, G.J., 1998. *Human-Livestock Interactions: The Stockperson and the Productivity and Welfare of Intensively-farmed Animals*. CAB International, Oxon, U.K.
- Hemsworth, P.H., Coleman, G.J., Barnett, J.L., 1994. Improving the attitude and behaviour of stockpeople towards pigs and the consequences on the behaviour and reproductive performance of commercial pigs. *Applied Animal Behaviour Science* 39, 349–362.
- Hemsworth, P.H., Barnett, J.L., Beveridge, L., Matthews, L., 1995. The welfare of extensively managed dairy cattle: a review. *Applied Animal Behaviour Science* 42, 161–182.
- Hemsworth, P.H., Coleman, G.J., Barnett, J.L., Borg, S., 2000. Relationships between human-animal interactions and productivity of commercial dairy cows. *Journal of Animal Science* 78, 2821–2831.
- Hemsworth, P.H., Barnett, J.L., Coleman, G.J., 2009. The integration of human-animal relations into animal welfare monitoring schemes. *Animal Welfare* 18, 335–345.
- Holloway, L., 2001. Pets and protein: placing domestic livestock on hobby-farms in England and Wales. *Journal of Rural Studies* 17, 293–307.
- Holloway, L., 2007. Subjecting cows to robots: farming technologies and the making of animal subjects. *Environment and Planning D: Society and Space* 25, 1041–1060.
- Hulsen, J., 2008. *Cow Signals. A Practical Guide to Dairy Farm Management*. Roodbont Publishers, Zutphen, The Netherlands.
- Hutnyk, J., 2006. Culture. *Theory, Culture & Society* 23 (2–3), 351–375.
- Ingold, T., 1994. Introduction to culture. In: Ingold, T. (Ed.), *Companion Encyclopaedia of Anthropology: Humanity, Culture and Social Life*. Routledge, London, pp. 329–349.
- Jansen, J., van den Borne, B.H.P., Renes, R.J., van Schaik, G., Lam, T.J.G.M., Leeuwis, C., 2009. Explaining mastitis incidence in Dutch dairy farming: the influence of farmers' attitudes and behaviour. *Preventive Veterinary Medicine* 92, 210–223.
- Kauppinen, T., Vaino, A., Valros, A., Rita, H., Vesala, K.M., 2010. Improving animal welfare: qualitative and quantitative methodology in the study of farmers' attitudes. *Animal Welfare* 20 (19), 523–536.
- Keeling, L.J., 2009. An analysis of animal-based versus resource-based comments in official animal welfare inspection reports from organic and conventional farms in Sweden. *Animal Welfare* 18, 391–397.
- Kirk, J., Miller, M., 1986. *Reliability and Validity in Qualitative Research, Qualitative Research Methods Series, Vol. 1*. Sage, London.
- Kristensen, E., Nielsen, D.B., Jensen, L.N., Vaarst, M., Enevoldsen, C., 2008. A mixed methods inquiry into the validity of data. *Acta Veterinaria Scandinavica* 50, 30. doi:10.1186/1751-0147-50-30.
- Kroeber, A.L., Kluckhohn, C., 1952. *Culture: A Critical Review of Concepts and Definitions*. The Museum, Cambridge, Massachusetts.
- Larrère, C., Larrère, R., 2000. Animal rearing as a contract? *Journal of Agricultural and Environmental Ethics* 12, 51–58.
- Lassen, J., Sandøe, P., Forkman, B., 2006. Happy pigs are dirty! – conflicting perspectives on animal welfare. *Livestock Science* 103, 221–230.
- Lensink, B.J., 2002. The human-animal relationship in animal production. First Virtual Global Conference on Organic Beef Cattle Production September, 02 to October, 15 – 2002 (<http://www.cpap.embrapa.br/agencia/congressovirtual/pdf/ingles/02en04.pdf> accessed 29.07.10.).
- LIC, DairyNZ, 2009. *New Zealand Dairy Statistics 2008–2009*. DairyNZ, Hamilton.
- Lusk, J.L., Norwood, F.B., 2010. Direct versus indirect questioning: an application to the well-being of farm animals. *Social Indicators Research* 96, 551–565.
- Maller, C.J., Hemsworth, P.H., Ng, K.T., Jongman, E.J., Coleman, G.J., Arnold, N.A., 2005. The relationships between characteristics of milking sheds and the attitudes to dairy cows, working conditions, and quality of life of dairy farmers. *Australian Journal of Agricultural Research* 56, 363–372.
- Mann, S., 2005. Ethological farm programs and the "market" for animal welfare. *Journal of Agricultural and Environmental Ethics* 18, 369–382.
- Marsden, T., 1998. New rural territories: regulating the differentiated rural spaces. *Journal of Rural Studies* 14 (1), 107–117.
- Massey, C., Alpess, F., Flett, R., Lewis, K., Morriss, S., Sligo, F., 2006. Crossing fields: the case of a multi-disciplinary research team. *Qualitative Research* 6 (2), 131–149.
- Mitchell, D., 1995. There's no such thing as culture: towards a reconceptualisation of the idea of culture in geography. *Transactions of the Institute of British Geographers* 20, 102–116.
- Morgan-Davies, C., Waterhouse, A., Milne, C.E., Stott, A.W., 2006. Farmers' opinions on welfare, health and production practices in extensive hill sheep flocks in Great Britain. *Livestock Science* 104, 268–277.
- New Zealand House of Representatives, 2010. First Session, Forty-ninth Parliament, 2008–10. *Parliamentary Debates* 663 Week 43. Wellington, New Zealand.
- O'Toole, P., Were, P., 2008. Observing places: using space and material culture in qualitative research. *Qualitative Research* 8, 616–634.
- Panamá-Arias, J.L., Špinková, M., 2005. Associations of stockpersons' personalities and attitudes with performance of dairy cattle herds. *Czech Journal of Animal Science* 50 (5), 226–234.
- Phillips, C.J.C., Wojciechowska, J., Meng, J., Cross, N., 2009. Perceptions of the importance of different welfare issues in livestock production. *Animal* 3 (8), 1152–1166.

- Preston, S.D., de Waal, F.B.M., 2002. Empathy: its ultimate and proximate bases. *Behavioural and Brain Sciences* 25, 1–72.
- Pritchard, B., Burch, D., Lawrence, G., 2007. Neither 'family' nor 'corporate' farming. Australian tomato growers as farm family entrepreneurs. *Journal of Rural Studies* 23, 75–87.
- Rennie, L., Howell, V., Dearling, J., Haskell, M., Lawrence, A., 2003. A study of three methods used to assess stockmanship on commercial dairy farms: can these become effective welfare assessment techniques? *Animal Welfare* 12, 591–597.
- Riley, M., 2011. 'Letting them go' – agricultural retirement and human–livestock relations. *Geoforum* 42, 16–27.
- Roth, K., 2001. Material culture and intercultural communication. *International Journal of Intercultural Relations* 25, 563–580.
- Sachs, R.E., 1973. The farmer: an entrepreneur personality? *Sociologia Ruralis* 13, 194–211.
- Salganik, M.J., Heckathorn, D.D., 2004. Sampling and estimation in hidden populations using respondent-driven sampling. *Sociological Methodology* 34, 193–239.
- Saugeres, L., 2002. The cultural representation of the farming landscape: masculinity, power and nature. *Journal of Rural Studies* 18, 373–384.
- Segeardahl, P., 2007. Can natural behaviour be cultivated? The farm as a local human/animal culture. *Journal of Agricultural and Environmental Ethics* 20, 167–193.
- Serpell, J., 2004. Factors influencing human attitudes to animals and their welfare. *Animal Welfare* 13, 145–151.
- Seymour-Smith, C., 1986. *Dictionary of Anthropology*. Macmillan, London.
- Shuxian, Z., Li, P., Su, P.-F., 2005. Animal welfare consciousness of college students: findings and analysis. *China Information* 19, 67–94.
- Silverman, D., 1985. *Qualitative Methods and Sociology*. Gower Publishing, Aldershot.
- Silverman, D., 1998. Qualitative research: meanings or practices? *Information Systems Journal* 8, 3–20.
- Spencer, L., Ritchie, J., O'Conner, W., 2003. Analysis: practices, principles and processes. In: Ritchie, J., Lewis, J. (Eds.), *Qualitative Research Practice: A Guide for Social Science Students and Researchers*. Sage, London, pp. 199–218.
- Stafford, K.J., Gregory, N.G., 2008. Implications of intensification of pastoral animal production on animal welfare. *New Zealand Veterinary Journal* 56 (6), 274–280.
- Te Velde, H., Aarts, N., van Woerkum, C., 2002. Dealing with ambivalence: farmers' and consumers' perceptions of animal welfare in livestock breeding. *Journal of Agricultural and Environmental Ethics* 15, 203–219.
- Tipples, R., Wilson, J., Edkins, R., Sun, X., 2005. Future dairy farm employment in New Zealand – An application of the human capability framework. *Employment Relations Record* 5 (1), 27–40.
- Tomasello, M., 2001. Cultural transmission: a view from chimpanzees and human infants. *Journal of Cross-Cultural Psychology* 2001 (32), 135–146.
- Vaarst, M., Alrøe, H.F., 2011. Concepts of animal health and welfare in organic livestock systems. *Journal of Agricultural and Environmental Ethics*. doi:10.1007/s10806-011-9314-6.
- Veissier, I., Butterworth, A., Bock, B., Roe, E., 2008. European approaches to ensure good animal welfare. *Applied Animal Behaviour Science* 113, 279–297.
- Waiblinger, S., Menke, C., Coleman, G., 2002. The relationship between attitudes, personal characteristics and behaviour of stockpeople and subsequent behaviour and production of dairy cows. *Applied Animal Behaviour Science* 79, 195–219.
- Whay, H., 2007. The journey to animal welfare improvement. *Animal Welfare* 16, 117–122.
- Wilkie, R., 2005. Sentient commodities and productive paradoxes: the ambiguous nature of human–livestock relations in Northeast Scotland. *Journal of Rural Studies* 21, 213–230.
- Williams, R., 1976. *Keywords*. Fontana, London.
- Wilson, J., Tipples, R., 2008. Employment trends in dairy farming in New Zealand 1991 – 2006. 2008. Agriculture and Life Sciences Division Research Report no. 2. Lincoln University, Canterbury, New Zealand.
- Würbel, H., 2009. Ethology applied to animal ethics. *Applied Animal Behaviour Science* 118, 118–127.
- Yarwood, R., Evans, N., 2006. A Llyn sweep for local sheep? Breed societies and the geographies of Welsh livestock. *Environment and Planning A* 38, 1307–1326.