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Living with cows, sheep and endemic disease in the North of England: Embodied care, biosocial collectivities and killability

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Abstract

This paper engages with debates surrounding practices of care in complex situations where human and non-human lives are entangled. Focusing on the embodied practices of care involving farmers, their advisers and cows and sheep in the North of England, the paper explores how biosocial collectivities fabricate care around endemic health conditions in specific farming situations. Based on in-depth research with farmers and advisers, the paper examines how Bovine Viral Diarrhoea (BVD) and lameness are made 'visible' and become cared about, what practices are mobilised in response to an evident need to care, and how some animals are, paradoxically, made 'killable' in the practising of care for populations of cows and sheep. The paper discusses how the perspectives of farmers and advisers are aligned in developing practices of care for animals, although there are some tensions and differences between these groups. Advisers focus on making endemic diseases important to farmers, so that they become enrolled into taking prescribed action. However, the sets of competing priorities farmers have to address, in complex on-farm situations, along with some resistance to taking prescribed action, produces other perspectives on and practices of care.

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The paper concludes by emphasising the problematics of practising care in farming, showing how care for endemic disease coexists with harm to some animals and the reproduction of modes of farming which make it more likely that endemic conditions persist.

Keywords
Farming, endemic health conditions, UK, farmed animals

Introduction

Debates about care in complex situations where human lives are entangled with those of non-humans in specific places and situations have become increasingly prominent. The ambiguities and problematics of care have been explored extensively, with early feminist critiques (Thomas, 1993; Tronto, 2020) leading to work addressing care for animals and the more-than-human world (Whatmore, 2002; Puig de la Bellacasa, 2017; Haraway, 2008). Attention has been paid to what it means to care, the relationships between givers and receivers of care, and how the work of care is done. In this paper, we extend these debates by focusing on situations where care is fabricated around a concern for specific endemic conditions affecting farmed animals, within heterogeneous biosocial collectivities (Holloway et al., 2009) including farmers, their advisers and animals. We address the framing, practices and spaces of care on farms. We focus on two endemic health conditions, Bovine viral diarrhoea (BVD) in cows, and lameness in cows and sheep. BVD and lameness are two contrasting 'production conditions', so-called because they are associated with modes of agricultural production and sets of on-farm relationships which can affect their incidence and severity, something Hinchliffe et al. (2016) refer to as 'disease situations'. BVD is a viral infection passed between cows or passed from infected mother to calf *in utero*. Transiently infected cows are ill but usually recover quickly. Calves infected *in utero* become Persistently Infected (PI) and are infectious for life. They may have significant symptoms, but not necessarily, and may be retained on farm, potentially infecting other animals. Lameness can result from a wide range of causes, including infectious diseases, elements of the environments animals live in, management practices, and animals' bodily and genetic qualities. Based on research with farmers and their advisers, we explore how farmers live with cows and sheep and their endemic diseases. The paper focuses on how farmers and advisers assemble care for cows and sheep in specific, messy farming situations in which there are competing priorities and often material constraints. We try to remain close to the 'trouble' (Haraway, 2016) which is necessarily part of care for farmed animals, where it might be being practised in circumstances which some might object to (Puig de la Bellacasa, 2017). This disturbs taken-for-granted notions of care, especially in the way that practising care for farmed animals has meant rendering some individuals 'killable' (Haraway, 2008) in the drive to protect wider populations.

We engage particularly with Eva Giraud's (2019) work on heterogeneous entanglements and the ethics of care, providing a new inflection on her discussion of hierarchies of care, which uses an example of activist groups protesting the treatment of animals in research laboratories. In Giraud's example, the expertise of those actually caring for the animals in the laboratories can become regarded as more legitimate than voices calling for the end of such uses of animals on the grounds of animal rights claims. Activists' anthropomorphism, their claims to empathise with animal suffering and the attempts to 'speak for' animals and their suffering, is regarded as ethically problematic partly because they lack proximity to the animals. As such, they may

be unable to engage in the embodied practices of care of laboratory staff, even though such practices of care are part of problematic human–animal relationships (Giraud, 2019). In this example, there is an antagonism between a case built on an abstract notion of universalised animal rights which would argue for the cessation of certain kinds of 'use' of non-human animals and claims to be able to provide effective and responsive care because of the embodied and proximate relationships characterising the use of animals. On farms, care for animals and their endemic diseases is also embodied, proximate and responsive. However, it presents a situation where, instead of conceptualising agonistic 'sides' (i.e. activists versus laboratory staff), we examine how different groups (farmers and advisers) work together to assemble a shared understanding and practice of appropriate care, from positions of different kinds of expertise which are sometimes in tension but which are in alignment with the discourses of (broadly) productivist agriculture and 'animal welfare'.

We draw on the concept of biosocial collectivity (Rabinow, 1999), 'intentional groupings that come together because members have a shared concern for a fundamentally biological issue' (Morris and Holloway, 2014: 152). Morris and Holloway (see also Holloway et al., 2009; Holloway and Morris, 2012) extend the concept beyond the human to include non-human animals, adopting the term 'heterogeneous biosocial collectivities'. The term reflects how such collectivities provide a nexus for the capacities, agencies and subjectivities of humans and animals, which coalesce around specific biological concerns. Although they acknowledge that extending to animals the 'intentionality' which characterises biosocial collectivities is problematic, the concept allows for the recognition of the presence and agency of animals, and exploration of how people become subjectified in their work on themselves *and* their non-human animals, in accordance with discourses which affect collectivities' assemblage, practices and effects (Holloway et al., 2009, see also Srinivasan, 2014). Although Morris and Holloway focus on the empirical example of 'genetic' techniques in animal breeding, collectivities might also coalesce around interventions in animals' lives in order to 'improve' health and welfare. This concept of improvement is thus central. As Srinivasan argues, drawing on Foucault (1980), collectivities become 'spaces of improvement' within which 'power operates in formations of care' (2014: 501), in its fostering of life in ways that are not necessarily benign for individuals, even where the aim is 'improvement' at population level. Developing these ideas, we focus on collectivities coalescing around specific endemic conditions as biological problems, or problems to do with the 'life itself' (Franklin, 2000) of animals, and which draw farmers, advisers and animals together. We ask what it means to care for individuals and collectives within heterogeneous biosocial collectivities.

The paper is structured as follows. First, we discuss endemic diseases and their problematic normalisation within dominant farming discourses. We then outline changing conceptualisations of care, focusing on understandings of care and debates surrounding relationships between people and farmed animals. We discuss how care is associated with farming identities, concepts of animal welfare, and with the ongoing processes of farming as 'tinkering' with material and non-material entities in an effort to hold a farm together and make it work (Mol et al., 2010; Singleton, 2010), and with (problematically) killing (e.g. Buller and Roe, 2018; Harbers, 2010). We then discuss our empirical work, outlining our research with farmers, advisers and their cows and sheep in the north of England. Taking three cuts through our material, first, we discuss what, from farmers' and advisers' perspectives, is being cared about. How are BVD and lameness framed in specific farming situations? Second, we consider how care for BVD and lameness is fabricated by farmers and advisers in specific, situated farming environments. Third, we focus on how caring produces killability in relation to BVD and lameness. We conclude by contrasting practices of care on farms with Giraud's example, arguing that although there is an alignment between the perspectives and practices of farmers and their advisers, care for cows, sheep and endemic diseases

is problematic because of the way it perpetuates modes of farming which remain associated with the production of disease.

'Production conditions', care and biosocial collectivity

Endemic conditions such as BVD and lameness are persistent problems. They have been relatively neglected by researchers compared to other diseases, especially those that risk becoming epidemics and/or are zoonotic (Rioja-Lang et al., 2020a; Rioja-Lang et al., 2020b)[1]. Despite this, they are important, because they affect animal productivity (e.g. weight gain, or milk yield) and thus have economic implications (e.g. Bennett and Ijpelaar, 2005). They also have implications for animal welfare (Rioja-Lang et al., 2020a; Mahon et al., 2021; Bell et al., 2006). Within veterinary science, it is recognised that conditions like lameness are significant welfare issues (see e.g. Archer et al., 2010; Bruijnis et al., 2013; Nieuwhof and Bishop, 2005; Rioja-Lang et al., 2020a; Wassink et al., 2005).

Researchers have identified several important issues regarding how production conditions are addressed in agriculture. There is acknowledgement that these conditions are complex, and that farmers face barriers in implementing measures to address them (see, e.g. in relation to lameness, Horseman et al., 2014; Best et al., 2020, and BVD, Yarnall and Thrusfield, 2017; Shortall and Calo, 2021). Although there is established veterinary knowledge, applying it on farms is challenging (Shortall and Brown, 2021; Webster, 1995). Further, the persistence of 'production' conditions in contemporary farming has led to them becoming normalised (Bellet et al., 2021). It is argued that research focusing on 'chronic animal disease management' (CADM) neglects to address problems inherent to production systems (Bellet et al., 2021). Instead, it attends to producing more resilient animals, and to reactive treatments, thus contributing to the persistence of endemic conditions and the farming practices which foster them (Bellet et al., 2021; see also Buller and Roe, 2018; Holloway and Bear, 2021; Turner, 2010; Porcher, 2006; Stoddard and Hovorka, 2019). Productivist farming, and the endemic conditions it engenders, thus becomes further normalised. This acknowledgment is important in recognising how alternative ways of doing things can be systematically marginalised in discussions about practices of care in specific situations (Giraud, 2019).

Care has long been critically examined by scholars who have approached it as complex and ambiguous. It should not be sentimentalised and is frequently associated with obligation, responsibility and hard, often undervalued, work (Tronto, 2020). Thomas (1993) emphasises that care is differentiated, not generic, focusing on the need to describe and analyse empirical instances of care, instead of seeing care as an analytical category in its own right. Lawson (2007) also examines care as produced within particular, historically emergent, social and institutional relationships, and as potentially riven with tensions because it involves a mix of emotions, social and power relationships as well as work (see also Rummery and Fine, 2012). Lawson describes how an ethics of care draws on 'a social ontology of connection … care ethics understands all social relations as contextual, partial, attentive, responsive and responsible' (2007: 3). For geographers, the situatedness of specific care relations also emphasises the importance of space and place to the ethics and practices of care (Lawson, 2007; McEwan and Goodman, 2010).

Focusing on spaces of care, then, Mol et al. (2010) argue that instances and practices of care cannot simply be categorised as 'good' or 'bad', but have to be thought of in terms of local, situated and contingent solutions to specific problems and within particular relationships (see also Puig de la Bellacasa, 2017). They make reference to care on farms and in other places as involving ongoing 'tinkering' with the materials, technologies and bodies involved, in the attempt to make caring work in particular moments and places. Law (2010, citing Cussins, 1996) refers to caring as choreographic, implying intertwined movements of attuned bodies. For Law, discussing veterinary care on UK farms affected by foot and mouth disease in 2001, '[c]are depends not so much on a

formula as a repertoire that allows situated action' (2010: 67). Law represents care as improvisational in its attempts to hold heterogeneous things together in challenging circumstances, demanding responsiveness and attunement. Donna Haraway (2008) thus argues for terminology of 'response-ability' in describing how relationships of care demand, from caregivers, a response to another's needs and a capacity to respond appropriately. For example, Brown and Dilley (2012) describe how in people's relationships with their dogs, response-ability emerges in an 'anticipatory knowledge' developed through close, embodied relationships. This sense of care being situated, specific, relational, differentiated and dependent on a connection has been adopted by analysts of farming contexts. Lundström and Lindblom (2021), for example, write that care has become a central concern of studies of farming. They use the example of automated milking systems to discuss how to care for cows is both technologically mediated through the milking machines and remains dependent on people's 'experiential and situated knowledge, an ethics built on attentiveness, responsibility and interdependent relations in practice' (2021: 388).

Care for farmed animals has increasingly been expressed through the concept of 'welfare' (Buller and Roe, 2018). Returning to Bellet et al.'s (2021) argument above, however, it has been suggested that welfare discourses can deflect attention from debating the ethics of farming animals at all (e.g. Cole, 2011). There has, nevertheless, been much recent interest in farmed animal welfare and its relationship to ideas of care. Interest in the concept of 'the good farmer', for example, suggests that part of such an identity is the ability to provide good care, welfare and 'stockmanship' (Burton et al., 2021; Burton et al., 2012; Harbers, 2010). As Singleton argues, '[g]ood farming emerges as embodied, located, collective, responsive practices that are crafted by care rather than control' (2010: 252). Although such a comment might create a binary understanding of care as opposed to control which can be countered by perspectives which see care and control as potentially co-produced when care is instrumentalised (see e.g. Martin et al., 2015), the sense that care for sentient beings involves embodied and intersubjective relationality is important. Buller and Roe (2018) focus on welfare, not as a fixed state, but as a relational achievement in the specific circumstances of particular farms. They argue that as animal agriculture has become intensified and is increasingly indoors, animals are less frequently encountered except by those who care for them. Care – as 'intimate and caring forms of co-existence' (p.16) – has been redefined in terms of welfare, as a way of making animals matter again. In this way, welfare permeates policy and veterinary discourses on farmed animal care. It is communicated to the public (e.g. through food labelling) as something assured and commodified (Buller and Roe, 2018; Evans and Miele, 2017).

Discussion of the situatedness of care and welfare in farming, and its embodied, responsive relationality, is suggestive of wider concepts of the entanglement of human with heterogeneous non-human entities in particular situations. Nading (2014: 202) refers to this as 'the ongoing coconstitution of people and (living and non-living) things'. Although acknowledging that such entanglements encompass antagonistic relationships alongside beneficent ones, there is a risk that writing on entanglement simply celebrates relationships of proximity and convergence. It risks neglecting the 'divergent' and ambiguous (i.e. neither simply antagonistic nor beneficent) relations evident in many human–non-human relationships, such as those in farming (Bear and Holloway, 2019). Giraud (2019) argues that simply acknowledging entanglement is insufficient: there is a need to respond to the problematic relationships sustained in specific entanglements. She argues for a focus on embodied practices of care but also draws attention to how within particular sets of human–non-human relationships their materialisation and practising necessarily excludes alternative relationships. Focusing on humans and animals in laboratories, she describes how proximate, embodied practices of care are accorded special value, linked to the expertise of those delivering care. Activists protesting against using laboratory animals can be represented as non-experts, not really knowing what good care looks like, and

drawing on an anthropocentric rights-based discourse which is counter to the complexities of situated, embodied care.

Giraud argues that those espousing a relational approach, focused on human–non-human entanglement, find it difficult to make interventions in troubling situations such as the use of animals in laboratory experiments precisely because they are critical of anthropocentricism. Instead, their focus is on how care actually happens in practice in specific situations. However, at the same time, the relational perspective, emphasising an embodied ethics of care which in theory allows people to respond to the needs of animals in particular moments, risks fetishizing moments of encounter and embodied proximity. It fails to acknowledge histories and geographies of entanglement which already exclude particular relationships. Where moments of care by humans for some non-human animals, even in laboratories, might be represented as 'convivial', Giraud argues, '[d]ue to valorising the moment of encounter itself … more-than-human approaches are less useful … in accounting for the longer histories and contexts that facilitate convivial engagements […] A focus on encounters themselves misses the role of particular histories of breeding and conditioning in enabling such encounters to occur objection-free'. In this way, 'a focus on bodily encounters … can neglect what has already been excluded from a situation, in order for an encounter to take place' (pp.129–130). In farming, there are similar examples, based on histories of producing animal bodies using different breeding techniques, to fit particular farming systems (see e.g. Derry, 2003; Ritvo, 1987; Bächi, 2016; Holloway et al., 2009; Holloway and Morris, 2008).

Thus, rather than an embodied ethics of care based on intimate encounters between humans and animals being innocent of the more troubling dimensions of particular human–animal relationships, care can become instrumentalised: care which is 'predicated on encounters cannot necessarily disrupt processes of "making killable"' (Giraud, 2019: 140) certain animals in certain situations. The concept of 'making killable' draws on Haraway's (2008) concern with how killing certain animals without ethical reflection becomes legitimatised. As Haraway argues (2016, p.2), questions need to be asked with regards to particular human–animal relationships about '[w]ho lives and who dies, and how …?' Categories of animals can be 'made killable' by the logics associated with specific techno-social relationships, such as farming. For Haraway, a process of 'making killable is more ethically problematic than the act of killing other species in itself' (Giraud, 2019: 186) because it represents certain categories of living beings as ethically inconsiderable. In farming, for example, this draws attention to the problematic coexistence of care and killing (see e.g. Gibbs, 2021), and of killing being practiced as *part* of caring (Buller and Roe, 2018; Mol et al., 2010; Roe and Greenhough, 2021). As Sneegas (2021) discusses in her work on the 'necropolitics' of agriculture, death is already a normalised part of farming. Farmed animals are rendered 'killable' as they are categorised as 'food animals', and premature deaths, including those related to disease, are regarded as 'predictable, governable and acceptable' within farming systems (Sneegas, 2021: 6). Similarly, Harbers (2010) focuses on the commensurability of the economy of his family's farm and the provision of care. He writes that '[e]conomy does not precede care, but care is a substantial component of the farming economy … our farm was an economy of care' (p.156). As such, good farming required good caretaking but also the death of some animals as they became killable for various reasons, including situations where euthanasia could be regarded as good care for a suffering animal.

We draw on the debates outlined above in discussing our empirical case studies of endemic conditions affecting farmed animals. They are important in allowing us to explore the complexities and problematics of care in the more-than-human situations on farms, and we extend the discussion by focusing on those situations where care is assembled by different groups of actors (e.g. farmers and vets), working closely with animals to provide embodied care, but drawing on sometimes divergent kinds of expertise and practice.

Caring for cows, sheep and endemic diseases

> 'A hoof trimmer … the cow that is in his or her crush, that's all that should matter at that moment in time. There is nothing else that matters, only that cow. It doesn't matter what the farmer says, or your customer, at the end of the day, the cow comes first […] you know, handling that cow with care and respect as well … So, yeah, the cow comes first' (A2)[2]

In the following sections, we first focus on how BVD and lameness are understood on farms, asking what it is that is actually being cared about. As the hoof trimmer in the quotation above suggests, this care is positioned as centring around individual animals who are the focus of expertise and embodied practice during specific moments during which care is performed. We then consider how BVD and lameness are responded to, discussing how embodied practices of care are enacted in specific farming situations. Finally, we discuss how practices of care make some animals killable in the drive to improve health and welfare at the population level.

We draw on research with farmers who raise cows and sheep in the north of England, and with their advisers. We conducted 29 interviews with farmers between September 2019 and March 2021, and 21 with (a group we collectively refer to as) advisers, between July 2020 and March 2021. Selected farmers had one or more of dairy, beef or sheep enterprises. To provide insight into a range of farming situations and human–animal relationships, farmer interviewees were selected to illustrate a range of farm types and environments, and included larger and smaller farms, in upland and lowland locations. Farmer interviews asked questions about the respondent's role and their history in farming, the specific farm layout and environment, their knowledge of and practices in relation to BVD and lameness, their knowledge networks and relationships with advisors and their overall 'philosophy' of farming. Advisor interviews focused on their knowledges and practices in relation to endemic conditions, and their experience of working on different farms to address farmed animal health and welfare. Research was affected by Covid-19 restrictions imposed in the UK from March 2020 (Holloway, 2020). Eleven farmer interviews were conducted on-farm; later farmer interviews, and all except two adviser interviews, were conducted online or by telephone. Interviews gave access to the discourses informing respondents' practices, and described practices in detail. They were recorded, transcribed and coded with Nvivo software, using a codebook developed to assist analysis of this particular dataset.

Knowing and caring about BVD and lameness

BVD and lameness become knowable to farmers and their advisers, in different ways related to their different symptoms and aetiologies. Advisers discussed how some farmers had to be persuaded to 'see' that the extent of the conditions was a problem on their farms, and then to see them as worth caring about. As one said, 'some farmers don't see it. In fact, it's quite common. It's normal for farmers to underestimate their lameness … no farmer thinks they've got a lameness problem' (A14). Lameness and BVD can thus become less visible, needing to be 'revealed' to farmers who become enrolled into caring about them. The examples below describe attempts to make first BVD, and second lameness, something that farmers should care about.

> 'What I would say to the farmer … BVD is a 2% disease. In that it will cost you 2% of your fertility, 2% of your neonatal deaths, 2% of your growth rate, 2% onto your pneumonia cases and actually, probably in that particular instance, more than that. So, it's a way of saying it's going to take 2% off lots of things about your business and they're all going to add up' (A20)

> 'I was watching a vet's meeting with farmers and he put a picture of a lame sheep on the screen, and he said to the audience: "Describe what you see there," and one man stood up and said: "Normality," and

> everyone laughed but it probably wasn't too far from the truth because every farm that has sheep has lameness in different degrees. It is probably the major problem in sheep farming is lameness. No matter how good the farming is, at some point during the year, someone will have lame sheep for whatever the reason is. It's just a fact of life and it's something that we all try and prevent … it has a huge welfare impact and a huge impact on profitability as well because a sheep that's lame and in discomfort isn't producing as it should be'. (F28)

How the conditions are made to matter is different. BVD is 'not a disease that's easy to see' (F10), argued one farmer. Although it may be suspected as a disease underpinning other diseases (e.g. pneumonia), it is formally revealed through testing. However, BVD can also be suspected as a direct cause of symptoms and experienced inter-subjectively. As one farmer said, infected cows can 'diarrhoea themselves to death' (F15), and others referred to evidence of BVD in cows' productivity: 'you'll see that they've got weight loss, malaise, loss of appetite, diarrhoea obviously, loss of condition. No weight gain. That's it really, and then some of them carry it and you don't know that they've got it, that's the other problem you've got' (F24). Describing an inter-subjective understanding of BVD which acknowledged cows' sentience and attributed to them an ability to suffer, another farmer said that:

> 'You can tell with an animal's face when they're ill, just like us. If you're not having a good day, you're like [sighs]. An animal is exactly the same. If you know your animals and you're walking past them, you can tell if they're not bright in their eye or if their ears are a little bit lax or if they're just stood there, "God, I'm fed up," they're not feeling well. That's what you see when an animal has encountered BVD … So it's like getting a bad cold' (F3)

BVD is anticipated within farm-scale collectivities, as a potential, but as yet uncertain, presence. As a vet said, 'the key question that starts us off is, is BVD circulating on this farm this year … Is there evidence actually significant to BVD this year on the farm?' (A8). BVD is then confirmed by antibody and/or antigen tests and, if present, it matters because of its effects. Another vet said, '[t]he virus is also immunosuppressive so it plays a big role in things like calf scour or calf pneumonia which is probably another big economic reason to consider it important. Then also PIs … almost always eventually succumb to mucosal disease … it's almost like an inevitable endpoint of having a PI infection. You just end up dying of an erosive enteritis, mucositis' (A10). Testing, and an ability to respond to symptoms and to inter-subjective engagements with cows, here holds together a collectivity of farmers, advisers and cows in which caring for cows and BVD becomes established as imperative, despite the initially 'hidden' nature of BVD.

Lameness, in contrast, is usually quite evident, although its prevalence can lead to it becoming 'unseen' through its normalisation. For vets, lameness has a technical definition; 'lameness is musculoskeletal compromise in cattle associated with pain, with pathology and lesions, with affected mobility, compromise to welfare, and potentially therefore compromise to other associated functions like production facility because of ability to express behaviour. So, I think it's all of those, lameness is a complex of pain, welfare, ability to actually move around and express behaviour' (A8). For farmers engaged in the embodied care of cows and sheep, it is visible first in how they move; they can be 'not walking right' (F19) or 'favouring a limb' (F8), they might 'carry' or shake painful feet, will kneel down to graze or will spend too much time lying down. Lameness can be just 'a slight hobble' (F17) or indicated by 'a slight raising of the head when they're dropping the affected limb' (F8).

Like BVD, lameness is responded to inter-subjectively as something painful. One farmer said, 'it's an animal that's suffering from sore feet of some kind, it makes them not walk how they should and can cause them pain and suffering and it can be a big thing' (F7). Becoming attuned to and

recognising both subtle changes in movement and behaviour, and animal suffering, accords with the idea of becoming response-able with cows and sheep. Embodied care for animals necessarily brings caregivers into very close, visceral relationships with the bodies of cows and sheep, and with the visible, olfactory and haptic signs of different kinds of lameness. Lameness can be observed, but infectious causes of lameness also produce distinctive smells, and heat. Footrot, a common cause of lameness in sheep, was described by a farmer as 'stinky, horrible and smelly, and nasty for the sheep and appalling for the person who is having to try and deal with it' (F11). Describing embodied encounters with footrot, a farmer said:

> 'It's horrible … when you trim it, you just use a big pair of scissors and you trim the whole flat away. You've got his foot in your hand with its claw sticking up and you trim but when you've got foot rot, the foot rot has gone in underneath the hard hoof. It makes it go white, pussy and horrible and the hoof starts to break off from the actual bone, I suppose, or the actual sheep. Often by the time you thin it, by hand you could just peel the bloody claw off, it's the whole outside and the flat bit that it walks on just comes away. It's generally just fastened on underneath where the hair stops, between the hair and the hoof and you just trim that off and that all pretty much comes away [….] I've never really looked into it but I presume it's some bacteria that gets in between the hoof and the bone of the sheep. It's quite messy when you see it …' (F7)

The visibility of lameness can depend on what resources are available to mediate embodied encounters between people and animals. A biosocial collectivity comprising farmers and advisers, and which enacts care for the feet and legs of cows and sheep, depends on a heterogeneous making lameness visible, in terms of trying to determine what is causing particular incidences of lameness. Advisers discussed how their investigation of lameness was facilitated by the availability of certain equipment. If, for instance, a crush[3] is available, 'rather than scrapping with ropes and getting kicked in the face and stuff, you can actually restrain the animal properly and have a look' (A10). As one adviser said,

> 'I would watch the cow walk, identify the limbs affected, put the cow in the crush, lift the worst affected limb first, clean the limb, clean the foot, I would perform a five step foot trim and if visible problems didn't leap out I would do further investigations and a diagnostic investigation which involves feeling for heat, pain, looking for swelling, smell, discharge and just doing my normal veterinary examination' (A9)

The coming together of farmers, vets, foot trimmers and cows, along with specific pieces of technology, enables the practice of caring about and for lameness. Lameness is associated with multiple possible 'causes', including infection and injury. Interviewees referred to the experiential knowledge that allowed them to assess specific causes underpinning an instance of lameness. A vet described identifying different causes of lameness through observation, saying that:

> 'when I watch a cow walk in the crush, I'm watching it walking towards me. Yes, we can pinpoint which foot it is lame on. That should be quite easy. But you can also kind of work out – by the way it is walking – as to what is probably wrong with it […] Well, if a cow is trying to take all its weight off the outside of its foot, there is generally a white line there. Sometimes if they are sitting up on their toe, you know that it's either didge or there's a sole ulcer there'[4] (A3)

Similarly, a farmer described distinguishing different causes of lameness in sheep:

> 'Experience … we just know what they are. When you have a sheep that's limping and you look at its foot and you say: "That's scald," because you can see that it's sore in its foot or you can see the proud

> flesh sticking out or you can see the gap between the outside of the hoof and the main part of the hoof. With CODD, the dermatitis tends to come from the top of the hoof on the coronary band down. That's how we know really.'[5] (F12)

In these examples, advisers and farmers discuss the embodied and proximate practices of living with and caring about cattle, sheep and their diseases. They further related this to a wider disease ecology, or set of relationships, surrounding particular conditions. For instance, farmers provided detailed lists and descriptions of what caused lameness:

> '…injury, disease, disease in the form of arthritis, it can be in the form of being caused by infection … knee and hock injuries, we used to call it cubicle hock, which is a great swollen hock, which would be caused by them rubbing the knee on the hard surface of the cubicle. Very common when the cubicles weren't long enough and the big cow would be rubbing its hock on the sharp angle of the concrete at the end of the step … Lameness, through the hoof, the hoof could be getting overgrown, getting cut, particularly in winter, whether it's the cubicles or just the manure they walked in, getting soft, getting a stone in the hoof which cut through it … Things getting caught between the two claws, if you like, infection living in there … bacterial infection getting in there. Overgrown hooves which mean that the animal walks on the back of its foot instead of the front. Cracks.' (F13)

Other farmers discussed different breeds of cattle and sheep, and their bodily conformation and genetic composition, in relation to susceptibility or resilience to lameness. To care about lameness thus means to be concerned about complex and multiple relationships between specific parts of animal bodies, particular breeds of animal, management practices, the complexities of specific farm environments (including buildings, facilities and the details of soil types, drainage, slopes, etc., and how these intersect with weather and vary seasonally) and microbial life forms, which together produce lameness as an effect of specific conditions in specific places.

Lameness, and BVD, then, become concerns, and matters of care, for heterogeneous biosocial collectivities of farmers, advisers and animals. In the next section, we move on to consider how care for BVD and lameness is fabricated by different groups of actors working in collectivities in which embodied practices and different kinds of knowledge and expertise are combined, but may also be in tension with each other.

Caring for BVD and lameness: Embodied practices of care

Embodied practices of care for BVD and lameness are fabricated by collectivities of farmers and their advisers, with cows and sheep, in specific farm situations. Advisers discussed a shift over time from 'firefighting' specific issues as they arise, to a more preventative health mode of operation. Vets increasingly saw their role as training farmers to be able to perform care practices themselves and to focus on whole herd/flock health. This change was associated with administrative devices such as annually reviewed herd/flock health plans, and with an enhanced responsibilisation of the farmer to enact care in particular ways. This is linked with a wider institutionalisation and certification of care influencing the functioning of collectivities. It includes the implementation of accreditation schemes (e.g. focusing on assuring high standards of animal welfare), industry-led programmes targeting particular conditions (e.g. the BVD Free England programme, which aims to eradicate BVD in England) and the deployment of institutionally-created, routinised programmes for farmers to follow in order to enact care relating to particular conditions such as lameness (e.g. the Healthy Feet programme, and the 'five-point plan', see e.g. Best et al., 2020).

As an infectious viral disease, BVD is commonly addressed through accepted biosecurity measures, summarised by Hinchliffe et al. (2016) as 'exclusion' (keeping your animals away from

potentially risky other animals), 'inclusion' (quarantining animals bought onto the farm) and 'normalisation' (e.g. testing and vaccination) (see also Stoddard and Cantor, 2017; Hinchliffe, 2013). There are, however, some complexities in implementing such biosecurity measures in practice. Some advisers discussed how farmers who were vaccinating their animals could 'misuse' vaccines, e.g. by incorrect storage or forgetting subsequent courses of vaccination. Although vaccines were described as being very effective, where they were used incorrectly the assumed 'biosecurity' of a farm became less coherent than anticipated, making such farms and their cows potentially more risky to others. Care for BVD is thus structured around the careful deployment of veterinary expertise, situated within national-scale BVD eradication programmes such as BVD Free England. But it is problematically dependent on individual farmer behaviour and the alignment of farmer and adviser knowledges and priorities.

Fabricating care for lameness, as a condition with many possible causes, some of them infectious, involves a complex mixture of biosecurity measures with other situated considerations, focusing on the relationships between specific animal bodies and the specific farm environments they live in. Key to embodied practices of caring about and for cows, sheep and lameness, for many interviewees, is a disease-ecological understanding of the farm. Interviewees referred to a wide range of issues here. These included management issues such as diet, the extent to which animals were 'pushed' to be productive, and the treatment of animals who have recently given birth as they are more susceptible to lameness. A reciprocal relation between lameness and nutrition was noted; undernourished animals are more susceptible to lameness, and lame animals are more likely to be undernourished. The management of the farm environment (e.g. farm tracks, cubicle size, bedding and grass length) and of the relationships between animal bodies and the environment is also important in fabricating care for lameness. Concrete is a particular problem, viewed as essential to the material structure of the farm but bad for animals' feet.

For lameness, the practicing of care becomes something involving both a set of close, embodied relationships which require becoming response-able with cows and sheep, and attempts to intervene in, or 'tinker' with, the farm environment, in ways akin to Singleton's (2010) descriptions of farming practice. Being responsive to specific bodies is important. A foot trimmer, for example, reflected on what is presented as standard approaches, in relation to the actual animal body being engaged with. As they said, referring to a standard for measuring the 'right' length to trim a cow's hoof:

> 'When I first started to trim, the measurement from the coronary band to the end of the toe was seven and a half centimetres as standard. Now, that has changed over the years. So, yes, it is seven and a half centimetres for a smaller cow, but the cows have got bigger over the years. So a big Holstein cow, you wouldn't trim it back to seven and a half centimetres. Now, if I see some farmers still using the seven and a half centimetres on a large cow, then I can pull them up and say, "Just hold on a minute. You're just doing this slightly wrong. All the data has changed, and we want to be leaving them a lot longer."' (A3)

This example illustrates the co-fabrication of care for animals within a collectivity assembled around lameness, involving a production of knowledge and practice based around embodied and responsive engagement with particular animals. At the same time, some farmers expressed hesitancies about some aspects of embodied care practices. Handling animals can be dangerous, so there could be a reluctance to intervene unless necessary. One farmer discussed a situation with a lame cow:

> '… they're much more harder to handle, so consequently you tend to wait a little bit and see what happens in the hope that if it's a stone in the foot or something or bruising that it might get better …

Table 1. Farmer and adviser interviewees.

Farmer (F) no.	Gender	Farm type	Adviser (A) no.	Gender	Adviser role
F1	Female	Sheep	A1	Female	Pharmaceutical representative
F2	Male	Dairy	A2	Male	Cattle hoof trimmer
F3 and F4	Female & Male	Beef and sheep	A3	male	Cattle hoof trimmer
F5	Male	Beef	A4	Female	Veterinary consultant
F6	Female	Beef and sheep	A5	Female	Levy board staff member
F7	Male	Beef, sheep, dairy	A6	Female	Livestock nutritionist
F8	Male	Beef and sheep	A7	Female	Vet
F9 and F10	Female & Male	Beef and sheep	A8	Male	Vet
F11	Female	Sheep	A9	Male	Veterinary consultant
F12	Male	Beef and sheep	A10	Male	Vet
F13	Male	Beef	A11	Female	Vet
F14	Male	Beef and sheep	A12	Female	Vet
F15	Male	Dairy	A13	Male	Farm consultant
F16	Male	Dairy sheep	A14	Male	Veterinary consultant
F17	Male	Dairy	A15	Male	Livestock auctioneer
F18	Male	Dairy	A16	Female	Vet
F19	Male	Dairy	A17	Female	Farm consultant
F20	Male	Beef and sheep	A18	Female	Farm consultant
F21	Male	Beef and sheep	A19	Female	Assurance scheme assessor
F22	Male	Beef and sheep	A20	Male	Vet
F23	Male	Beef and sheep	Adviser Group	2 Female & 1 Male	Provide services for vets
F24	Female	Beef and sheep			
F25	Male	Beef			
F26	Female	Sheep			
F27	Male	Beef and sheep			
F28	Male	Sheep			
F29	Male	Beef and sheep			

> The vet would be the last port of call, I would go for a foot trimmer. There was a cow that was carrying a foot outside for a few weeks, I decided I would wait and see happened and deal with her when she came indoors. Shortly after the cattle came in, I got the foot trimmer and he found a solar ulcer in the animal I'm referring to and he also trimmed the overgrowth on another three animals, one of them had cracked feet'. (F8)

This example illustrates a process of cautiously extending care around a particular cow, by taking into account the cow's embodied capacities (i.e. her potential to be dangerous to handle and to get better *without* intervention) alongside the eventual interventions in the cow's body by involving vets or foot trimmers.

Formal programmes can also be central to the performance of care in collectivities centered around endemic diseases. These act to incentivise the provision of care and structure how care is

given. They are thus a mechanism by which advisers such as vets can act on the subjectivity and practices of farmers who will be directly engaged in embodied care practices. As one adviser explained,

> 'I used a programme – which I have used for quite a lot of years – which is along similar lines to the Healthy Feet Programme, but it's called First Step. It basically will cover… if I think lameness is a big issue on the farm – in a herd, this is – it covers all aspects. So it covers walking surfaces, it covers lying areas, cubicles, it covers foot trimming … so I'll basically spend a fair amount of half a day, really, walking right around the farm, looking at anything that might be impacting, observing cow behaviour, and then quizzing the farmer on what they are doing regarding foot trimming, foot bathing, and that side of things. So it's really a case of just getting the whole picture, and then utilising that and any foot trimming records they might have, as to which are … the main causing issues on the farm. And therefore, off the back of that, then advising on, I suppose, a targeted action plan – so what's going to make the biggest impact first and what they should do'. (A6)

Implementing such programmes changes what is expected of farmers, affecting the administration of care by attempting to standardise responses to lameness and, in the words of one vet, 'to simplify what is a complicated set of processes' (A14). At the same time, advisers were responsive to specific farm situations. Alongside formalised programmes of action, their outsider's perspective on a farm could allow them to suggest small-scale tinkering with a farm environment, to address an identified problem. For example, a vet recommended a minor change to the management of cows in response to a significant lameness problem:

> 'I think what farmers find really challenging is actually practically implementing stuff … Sometimes it takes someone being on the farm to say, "Well can't we just put a gate up here? Can't we just make two lanes here?" Just having that conversation. Then, "Yes, we can do that." "Oh okay, yes. That's fine." So my farmer with 61% [lame cows], that is a classic example, cows were standing for four hours of milking. They're now down to an hour because we split the groups. We literally just put a feeder in one place and then two strips of electric wire. It didn't cost anything. It increases milk yield by three litres a cow.' (A11)

This exemplifies a focus on changing the situated on-farm relationships between animal bodies and other material elements of the farm. Further, it illustrates the alignment between an instrumentalising control of bodies and a notion of care which is aligned with maintaining agricultural productivity.

Fabricating care around animals and endemic diseases can also involve breeding practices which focus on producing animal bodies which are *already* less susceptible to conditions including, particularly, lameness (see also Star et al., 2008). This resonates with Giraud's (2019) discussion of the significance of breeding histories to the playing out of present, and in this case anticipated future, embodied practices of care. Breeding strategies can focus on producing individuals and populations with tougher feet, stronger legs, and good conformation, all of which act to resist lameness. This can be done by using breeds which are thought to be more resistant to lameness in particular environments, or by focusing on heritable traits within a breed which counter lameness. Breeding for resilience can be thought of as a process which normalises (what we might refer to as) 'lameness-ogenic' productivist farming systems. These *produce* lameness through, for example, concrete flooring or because of the pressures on animal bodies to be productive. The aim becomes to breed new animal bodies which are robust enough to withstand production systems without becoming lame. One farmer told us that their '… breeding is for health traits. So it's strong bulls, strong feet, foot health. I'm not worried about anything else' (F2), while an adviser referred to breeding robust

animals that 'can withstand a bit of lameness' (A2). Selective breeding strategies can thus be seen as part of a collective framework of care that attempts to produce robust populations, by selecting against those animals less resilient to on-farm conditions.

Selective breeding implies both selecting *for* and selecting *against*, and selection processes act along with other 'culling' practices to make certain animals more 'killable' in relation to the fabrication of care within biosocial collectivities. Although this generates populations of animals with certain characteristics, it involves the foreclosing of other possible futures (Giraud, 2019). We address this in the next section.

Killability: Normalising and contesting culling

How collectivities fabricate care around BVD and lameness is different in key respects. They are, however, connected through a biopolitical fostering of farmed animal populations, in which both sets of practices require that some individual animals become killable in the ways described above (Haraway, 2008). Biosecurity measures around BVD require the culling of PI cows, and culling of persistently lame animals is a key practice of addressing lameness along with a 'positive' selection of animals valued as resilient to 'lameness-ogenic' farming systems. Regarding BVD, a farmer said that once a PI cow has been identified, 'the only way to get rid of that disease in that animal, unfortunately, is to kill it …' (F3). In relation to lameness, a farmer said, 'If we had persistently overgrowing feet or anything like that, or a persistently lame cow, it would go' (F23), a perspective echoed by an adviser saying, 'You've got to keep selecting resilient animals … and culling out the susceptible ones' (A17).

Making certain animals killable in this way can be represented as the practising of good care, both in terms of ending the suffering of the individuals concerned, and as part of fostering populations of animals which are, overall, more healthy and have better welfare, because of reduced incidence of endemic conditions. Interviewees talked in this sense of histories of intervention that have effects in the present, and of the necessity of making interventions in the present in order to effect improvements in the future. One farmer described how resilience to lameness had been improved through making some animals, with 'corkscrew' feet[6] killable in certain conditions. As they recalled, 'a lot of the dairy cows had the corkscrew feet taken out when milk quotas came in, in 1983. So, consequently, people culled off the poor cows and it was primarily those' (F8). From a different perspective, an adviser discussed how part of fabricating welfare is having been through a process of culling those animals which would contribute to a population with poorer population-level welfare. They criticised farmers who don't adopt 'good' culling policies:

> '… what they're not doing is they've not got a decent culling policy, so they're keeping their ewes too long. In the short term, I have to convince them that they're going to have to spend more money and gradually get a younger flock and sort things out … Those are the sorts of things that will solve a lot of welfare problems as well because in keeping the old ewes they're going to have all sort of problems' (A18).

Making some animals more killable is, further, embedded in the formal, institutionalised programmes deployed as part of the embodied care centred around BVD and lameness. With regards to BVD, testing as part of a 'PI hunt' makes infected animals killable. As one farmer explained this, 'science' drives culling policies in this case by revealing something previously unknown about specific animals that makes them immediately killable; 'if there's something wrong, use the science to find out what it is. I think the BVD thing made us understand that there's science available so why don't you use it?' (F3). Similarly, the 'five point plan' for lameness has making animals killable built in, along with biosecurity measures. An adviser listed the five

points as 'avoid, cull, treat, vaccinate and quarantine' (A10). Culling certain animals in this way becomes a normalised administrative task, predetermined and performed in relation to protocols which make animals killable.

In these ways, as Giraud (2019) suggests, particular, intentional selections for, and against, qualities embodied in individual animals, have the effect of choosing certain futures (for both populations of animals and, relatedly, of particular farming systems) and excluding others. For instance, it could be argued that instead of breeding cows and sheep to be resilient in the face of lameness-ogenic systems, those systems should be changed to reduce lameness. Similarly, BVD is associated with a farming system that frequently mixes cows and subjects them to conditions which make them vulnerable to infection, enabling viral transmission. A route different from culling and biosecurity could be envisaged which involves altering this 'disease situation' (Hinchliffe et al., 2016) to, again, reduce or eliminate BVD.

We finish this section with two points which disrupt the narrative of killability as normalised and administrative, and as unproblematically accepted as an intervention that effects care for a population through culling some individuals. First, for some respondents, with reference to some animals, there was an acknowledgement of animal agency in the co-production of care. In such cases, the role of animal agency in collectivities puts a different inflection on the picture so far, of agency resting only with people (farmers and advisers), who decide on and enact the killability of some animals. Particularly in relation to lameness, there was an implication that some animals, at least, could care for themselves. One farmer said,

> 'There's a lot of our sheep like to self-heal. Almost always after big handlings … there's sheep that are lame with scald or something for a day or two and I think probably because we make an effort to try and cull repeat offenders or anything that gets really bad, there's loads of those sheep that take a wee piece of scald and actually self-heal and three days after a handling, there's a number of lame sheep in a mob and then a week to ten days after, 95% of those lame ones have sorted themselves out' (F20)

The argument made here is that animals' ability to 'self-heal' is in part the product of a history of selection and culling, but nevertheless, there is a simultaneous attribution of agency to those sheep whose presence is the effect of that history, in their capacity to care for themselves.

Second, differences in attitudes towards making killable, and culling, were evident between advisers and some farmers (as well as between farmers). Although for advisers, a 'hard culling' policy was regarded as *the* strategy for reducing the incidence of endemic conditions, for some farmers it was not so clear. They grappled with the paradox that caring for animals as a population might involve making some individuals killable. Many talked about how difficult they found rendering some animals killable in this way. In relation to the 'hidden' disease of BVD, for example, one farmer said '… you can't see anything and they're perfectly healthy in your eyes, it's very hard to kill something that's healthy, if that makes sense, for no reason' (F3). For farmers like this, there is a tension between their embodied encounter with a seemingly healthy cow, and the viral infection revealed by testing but remaining invisible in asymptomatic carriers. Advisers also discussed how some farmers were reluctant to cull certain animals. In some cases, this reluctance was in relation to animals farmers had a special relationship with. In this case, different inflections of care came into conflict, with the inter-subjective relationships of embodied care between humans and specific animals competing with the administrative protocol-driven framework for care which might stipulate the culling of those animals. In other cases, reluctance to cull might be because of animals' value as representatives of a particular pedigree, or because of the economically productive value of the animal even if it was affected by an endemic condition. Advisers discussed the complexities of such situations. For instance, vets said regarding dairy farmers and first, lameness, and second, BVD:

> '…there's a reluctance to give up because of an economic aspect but also, a denial about the fact that it's hopeless … there's just a kind of hope that it will improve. And I think finally, there's just also an economic aspect that cows will carry on milking and so there's a reluctance particularly as they look stoic actually and they're giving a lot of milk so it looks like they're ok' (A8)

> ' … it's mandatory, obviously, if we find a PI calf that that animal is euthanised. And that's what a lot of farmers can't get over … they look perfectly healthy … As far as he's concerned, other than a piece of paper that says positive, there is nothing wrong with those animals and that's fairly difficult for him to get his head around' (A7).

In relation to sheep, another adviser discussed what they referred to as the 'barriers' to making animals killable:

> 'what we do know is that we can through genetic selection and prompt treatment … minimise the amount of lameness on a farm. So, a lot of it has to do with the willingness to do that … It is about thinking of [lameness] as an infectious disease … and you reduce the disease reservoir by culling them out if they've got bad. And then we know that, why don't people do it? Time, resources, whether it's their priority, whether they're very used to seeing lame sheep and actually it doesn't bother them … and then, obviously, the barrier around culling them is that it's a perfectly good sheep, why do we want to cull it on just feet?' (A17)

Making animals killable is thus not always simply a reflexive response to an administrative approach to care. Instead, it can be contested, in ways which illustrate both competing priorities when it comes to animal health and welfare, and competing versions of practising care for animals and endemic disease.

Conclusions

In this paper, we have explored how care for endemic livestock diseases is fabricated within collectivities which bring together farmers, advisers, cows and sheep around a particular problem to do with the life of animals. As situated in specific farming conditions, collectivities are also embedded in disease ecologies, as endemic conditions are related to farm topologies and topographies: infectious diseases such as BVD are related to the connections farms and animals have with other farms and animals, and conditions like lameness are closely related to farm-specific physical environments and management practices.

In exploring our example, we build on previous work focused on situated, embodied relations of care and care practices. In particular, we have engaged with Giraud (2019) in discussing the problematics of care practices, and how in our empirical case study, particular farming systems and priorities, and histories of breeding animals to meet those priorities and be resilient to their demands, make relations of care troubling because they can be associated with an acceptance of harm being caused to animals, and with limitations on animals' 'freedoms' akin to Giraud's focus on the exclusion of alternative ways of relating. As one farmer said, 'I think welfare, you start to think about the degree of contentment or freedom from fear or freedom to display natural tendencies. Now, farming, by its nature, has to restrict those sometimes in order to be successful' (F29). Going further, responses to endemic conditions like BVD and lameness explicitly demand the killability of certain animals.

The particular example we have focused on contrasts with Giraud's case study in key ways, which open up further questions of what it means to care and to practice care in farming. First, where Giraud was able to position activists and laboratory workers as in opposition, the farmers

and advisers we interviewed were (broadly) allied in fabricating care practices around an ongoing, largely unquestioned, productivist mode of agriculture. Thus, although there were some differences of perspective and opinion, interviewees shared a common motivation centred on the continued practice of productivist farming, even though there was a drive to 'improve' this farming in terms of 'animal welfare' as well as economically.

Second, Giraud's work shows how the focus of activists on animal suffering has been represented as both ethically problematic and contrasting with the practising of embodied care by laboratory workers who are able to develop and practice expertise in caring for animals they are in proximate relationship with. The notion of 'suffering' evoked by the activists could be seen as an anthropocentric attribution of an experience to animals by a group who could not really know about the experience, wants and needs of non-human others. In our example, however, both farmers and advisers evoked notions of pain and suffering at the same time as being engaged in embodied practicing of care, having proximate relationships with animals, and having different modes of expertise in relation to those animals (e.g. as farmers, vets or foot trimmers). The attribution of suffering, or the potential to suffer, became something used to drive care and 'improvement'. This could be done directly as a response to suffering (e.g. in culling a particular animal that was deemed to be suffering), or in the name of reducing further collective suffering by making killable those animals which posed an anticipated risk of causing future herd/flock level suffering (by passing on BVD, or by breeding future generations susceptible to lameness). In this situation of entangled relations between humans, animals and complex farming systems, the dualism between different perspectives on care which Giraud emphasises becomes complicated because of the multiple simultaneous ways in which farmers and advisers engage with cows and sheep (e.g. as units of production and as sentient subjects), as they fabricate care around them.

In our example, farmers and advisers show empathetic engagement with animals by evoking suffering, but in situations where embodied care is being given. This occurs, nevertheless, within an anthropocentric farming system; there is thus too a paradox evident here where collectivities coalesce around problems of life and fabricate care around them, but because of the persistence of productivist impulses in agriculture are also involved in perpetuating the conditions producing those problems. Bio-insecurity and lameness-ogenic 'disease situations' persist despite the fabrication of care around BVD and lameness, and as such BVD and lameness are themselves persistent in cows and sheep, presenting ongoing health and welfare issues for contemporary farming.

Highlights

- Farmers, their advisers and animals coalesce in biosocial collectivities focused around specific endemic health conditions.
- Care for farmed animals and their endemic health conditions is fabricated around different understandings of the conditions in the specific circumstances of individual farms.
- Care for farmed animals and endemic health conditions is problematic because it necessitates harming some individuals or making them 'killable' in the drive to improve population health and welfare.
- Advisers and farmers are aligned in maintaining productivist farming, but there are differences in how care for endemic health conditions is expressed and practiced.

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Notes

1. A key exception is Bovine Tuberculosis, studied in detail by social scientists (e.g. Enticott 2008; Enticott and Franklin 2009; Enticott et al, 2015).
2. Table 1 provides interviewee details.
3. A crush is a device that holds animals securely, enabling them to be handled safely while being examined or treated.
4. White line disease, 'didge' (digital dermatitis) and sole ulcers are causes of lameness in cows.
5. Scald and contagious ovine digital dermatitis (CODD) are causes of lameness in sheep.
6. 'Corkscrew claw', a musculoskeletal condition leading to lameness.

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