Cattle and colonialism: an animal-centred history of southern Africa, 1652-1980s

Glover, M.J.

Chapter One: An introduction to cattle as subjects, and a brief history of cattle before southern African colonialism

Introduction

This chapter consists of three sections and has two aims. The first section aims to present cattle as subjects. To position cattle as beings with minds, emotions, experiences, social bonds, and social lives. Its objective is to present cattle as richly sentient, experiential subjects. To do so, it draws on diverse empirical literature from animal science, physiology, neuroscience, veterinary science, zoology, animal behaviourism, and animal welfare science. This is unconventional for a historical investigation. An orthodox human history, a history about humans, entails no need to make a case for humans as experiential subjects. This is because readers of such histories can be presumed to recognise that humans are experiential subjects. A cattle history, which conceives of cattle as subjects, cannot assume that cattle are recognised as experiential subjects, as beings with affect, sensory experiences, social lives, and psychological experiences. Thus, the first part of this chapter invokes diverse evidence to introduce cattle as subjects. The four empirical historical chapters which follow this chapter investigate the impacts of colonialism on the cattle's experiences, and are at times referred to in the discussions below. To understand these impacts from a cattle perspective, cattle are first positioned as the types of beings who can have experiences. This motivates the science-based discussions of cattle as subjects, which comprise the first half of the chapter.

The second aim is to historically locate cattle in southern Africa before the arrival of settler colonialism in the mid-seventeenth century. The evidence drawn upon includes genetic histories, archaeology, zooarchaeology, evolutionary anthropology, geomorphology, and comparative historical linguistics. It sketches a history of cattle since their domestication during the agricultural revolution, circa 10 000 BCE, and the movement of cattle from the north of Africa into the sub-Saharan region, and then later into southern Africa. It then draws on recent comparative historical linguistics research to indicate that from about 1 000 CE cattle in southern Africa became increasingly connected to the social, and economic worlds of Nguni-speaking human communities. In this sketch of cattle history before southern African colonialism, cattle's experiences are not explored in depth. The purpose of this pre-colonial historical narrative is to set up the four core empirical chapters which follow this chapter, so that they can examine how colonialism subjectively impacted cattle in southern Africa.

Cattle as experiential subjects

What follows is an interdisciplinary discussion of cattle as mind-possessing, biological, and social beings. Cattle comprise a group of bovine animals who are each unique individuals, with personalised and distinct experiences and lives. While there is variation between individuals, as with humans, and other mammals, birds and fish, there are some valid species-level descriptions.

Cattle are large vegetarian ruminant bovines who can live to over 25 years, weigh a ton or more, drink sometimes 150 litres of water a day, can be nocturnal, can be homosexual, in free-roaming contexts often move in matrilineal herds, choose best friends with whom to graze, engage in dopaminergic grooming, take anxiolytics and narcotics, and can sleep while standing up.[1]

For a history that recognises the subjective life of cattle, the most important thing to know about cattle is they have consciousness and are sentient. Sentience is the cognitive capacity to have felt experiences and perceptions.[2] Each individual cattle is a centre of experience, each has a subjective, felt experience of her life. We know this because cattle, and all mammals, birds, and reptiles have central nervous systems.[3] Each cattle has a periaqueductal grey, brain stem, limbic system, cerebellum, cerebral cortex, amygdala and hypothalamus.[4] These brain features are correlates of consciousness.

[1] M. Stewart-Burger, 'Water and Your Cows (blog)', *Farmer's Weekly*, 20 June 2012, https://www.farmersweekly.co.za/animals/cattle/water-and-your-cows/, accessed 15 November 2019; C. Phillips, *Cattle Behaviour and Welfare* (Malden: Blackwell Science, 2002), 7, 89, 91, 95; C. Phillips, *The Welfare of Animals: The Silent Majority* (Netherlands: Springer, 2009), 41; C. Lee *et al*., 'Anxiety Influences Attention Bias but Not Flight Speed and Crush Score in Beef Cattle', *Applied Animal Behaviour Science*, 205 (2018), 210; D. Anderson and W. Muir, 'Pain Management in Cattle', *Veterinary Clinics: Food Animal Practice* 21, 3 (2005), 623.

[2] D. Broom, *Sentience and Animal Welfare* (Oxfordshire: CABI, 2014), xiii–xiv.

[3] Low, 'The Cambridge Declaration on Consciousness', 2012.

[4] B. Cantrell *et al*., 'Global DNA Methylation in the Limbic System of Cattle', *Epigenomes* 3, 8 (2019), 1–4.

Cattle are also biologically governed by processes of homeostasis.[5] As soon as homeostatic states are marginally veered away from, as with humans, cattle presumably experience discomfort and pain, because maintaining homeostasis promotes organisms' survival and relieves distress.[6] But it is not easy to notice cattle's discomfort. As plains-living animals, disinclined to be seen as easy targets to predators, cattle try to be inconspicuous about pain.[7] Which 'means you don't get much by way of obvious behaviour – even for 10 seconds unless they are very unhealthy or very stressed' says animal behaviourist Jonathan Amory who studies cattle.[8] It is not that cattle are mute about their suffering, it is that we require different ways to recognise it. Some authors have studied cattle's visible eye whiteness to assess positive and negative emotional valences, and have found that decreased visible eye whiteness correlates to positive emotional states in cattle, suggesting that this eye whiteness may be a measure of emotional states in cattle.[9] Other studies have explored nasal temperatures, heart rates and ear postures as potential correlates of cattle's emotional states.[10]

Though they may not often disclose it in obvious ways, cattle suffer and they get scared. Cattle have amygdalae, which in humans, rats, goats, and sheep is the brain part associated with fear and memories of fear.[11] It is neurochemically legitimate to say that it can be scary and stressful to be cattle.[12]

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[5] H. Martens *et al*., 'Magnesium Homeostasis in Cattle: Absorption and Excretion', *Nutrition Research Reviews* 31, 1 (2018), 114.
[6] A. Craig, 'A New View of Pain as a Homeostatic Emotion', *Trends in Neurosciences* 26, 6 (2003), 303–4; C. Salcido, M. Geltmeier, and P. Fuchs, 'Pain and Decision-Making: Interrelated Through Homeostasis', *The Open Pain Journal* 11 (2018), 31.
[7] K. Adamczyk *et al*., 'Perception of Environment in Farm Animals–A Review', *Annals of Animal Science* 15, 3 (2015), 567.
[8] A. Frood, 'How Can You Tell If an Animal Is Happy or Sad?', *Phys.Org*, 11 May 2016, https://phys.org/news/2016-05-animal-happy-sad.html., accessed 9 January 2019.
[9] H. Proctor and G. Carder, 'Measuring Positive Emotions in Cows: Do Visible Eye Whites Tell Us Anything?', *Physiology & Behavior* 147 (2015), 6.
[10] E. Mohr, J. Langbein, and G. Nürnberg, 'Heart Rate Variability: A Noninvasive Approach to Measure Stress in Calves and Cows', *Physiology & Behavior* 75, 1 (2002), 251; H. Proctor and G. Carder, 'Can Ear Postures Reliably Measure the Positive Emotional State of Cows?', *Applied Animal Behaviour Science* 161 (2014), 20; H. Proctor and G. Carder, 'Nasal Temperatures in Dairy Cows Are Influenced by Positive Emotional State', *Physiology & Behavior* 138 (2015), 340.
[11] I. George *et al*., 'Comparative Neuroanatomical Study of the Amygdala and Fear Conditioning in Nigerian Breeds of Artiodactyla: Sheep (Uda) and Goats (Red Sokoto)', *The Anatomical Record* 304, 4 (2021), 698, 701, 702.
[12] N. Burdick *et al*., 'Interactions between Temperament, Stress, and Immune Function in Cattle', *International Journal of Zoology* (2011), 1–6.

When stressed, like humans, cattle's adrenal glands release catecholamines.[13] Catecholamines are neurotransmitters associated with physical and emotional stress. Three relevant catecholamines are dopamine, norepinephrine, and epinephrine. Norepinephrine restricts blood vessels and increases blood pressure and accelerates heart rates.[14] Epinephrine or adrenaline, functions as an 'alarm system', increases muscle strength and heart rate, or stress responses, and is associated with fear.[15] Cattle have the brain hardware and the neurotransmitters for experiences of fear. Cattle's anxiety-related behaviours correlate to increased cortisol levels.[16]

Cattle also have things to be scared and stressed about. Some have noted that extreme stress during transport and slaughter is for cattle 'unavoidable'.[17] This connects to my reading of historical sources about the development of slaughterhouses in South Africa, which are explored in Chapter Four. Cows also for example care intensely about their young and in free-roaming contexts can form long-term and likely lifelong bonds.[18] This is important for Chapter Five, where I investigate colonial breeding regimes, and note that these regimes were premised on breaking bulls and cows' kinship bonds. The image below depicts a free-roaming Nguni cow and her newborn calf. During fieldwork, I observed and photographed calves' close relations with adult cows.

[13] G. Mitchell, J. Hattingh, and M. Ganhao, 'Stress in Cattle Assessed after Handling, after Transport and after Slaughter', *The Veterinary Record* 123, 8 (1988), 201.
[14] Burdick *et al*., 'Interactions between Temperament, Stress, and Immune Function in Cattle', 3–4.
[15] *Ibid*, 4.
[16] D. Bristow and D. Holmes, 'Cortisol Levels and Anxiety-Related Behaviors in Cattle', *Physiology & Behavior* 90, 4 (2007), 626–28.
[17] L. Costa, 'Short-Term Stress: The Case of Transport and Slaughter', *Italian Journal of Animal Science* 8, 1 (2009), 241.
[18] Phillips, *The Welfare of Animals*, 33; Reinhardt and Reinhardt, 'Cohesive Relationships in a Cattle Herd (Bos Indicus)', *Behaviour* 77, 3 (1981), 144, 145, 147.

Image 1.1. Young calf and mother, 9 October 2019 Matjiesfontein

Source: Author.

When calves drink cows' milk from cows' udders by suckling, both cows and calves produce and release oxytocin.[19] In animals more broadly, oxytocin is connected to pair-bonding, maternal care, and generally promotes social connection.[20] In humans, oxytocin is released during orgasm, breastfeeding and childbirth, and is also associated with bonding.[21] Cattle have experiences that include oxytocin releases.

[19] B. Lupoli *et al*., 'Effect of Suckling on the Release of Oxytocin, Prolactin, Cortisol, Gastrin, Cholecystokinin, Somatostatin and Insulin in Dairy Cows and Their Calves', *Journal of Dairy Research* 68, 2 (2001), 175.
[20] M. Kosfeld *et al*., 'Oxytocin Increases Trust in Humans', *Nature* 435, 7042 (2005), 673, 676.
[21] M. Heinrichs, I. Neumann, and U. Ehlert, 'Lactation and Stress: Protective Effects of Breast-Feeding in Humans', *Stress* 5, 3 (2002), 195; J. Alley and L. Diamond, 'Oxytocin and Human Sexuality: Recent Developments', *Current Sexual Health Reports* 12, 3 (2020), 182.

Cattle also possess the organs and biology for sensory perceptions, including touch, smell, taste, sight, and hearing. Cattle see, hear, taste, smell, and think about the world around them. Recognising cattle as having sensory faculties bears on all of the following historical chapters, since these faculties enable them to experience historical shifts and processes. A recognition of these faculties informs the interpretation of how cattle experienced disease epidemics, wagon labour, breeding processes, and slaughterhouses. Since in their evolutionary past they were susceptible to predators, cattle's eyes are located on the sides of their heads. Their eyes on the sides of their heads are depicted below. Cattle have 330-degree vision, with a 30-degree blind spot behind their heads.[22] Imagine 1.2 depicts cattle with their eyes on the sides of their heads.

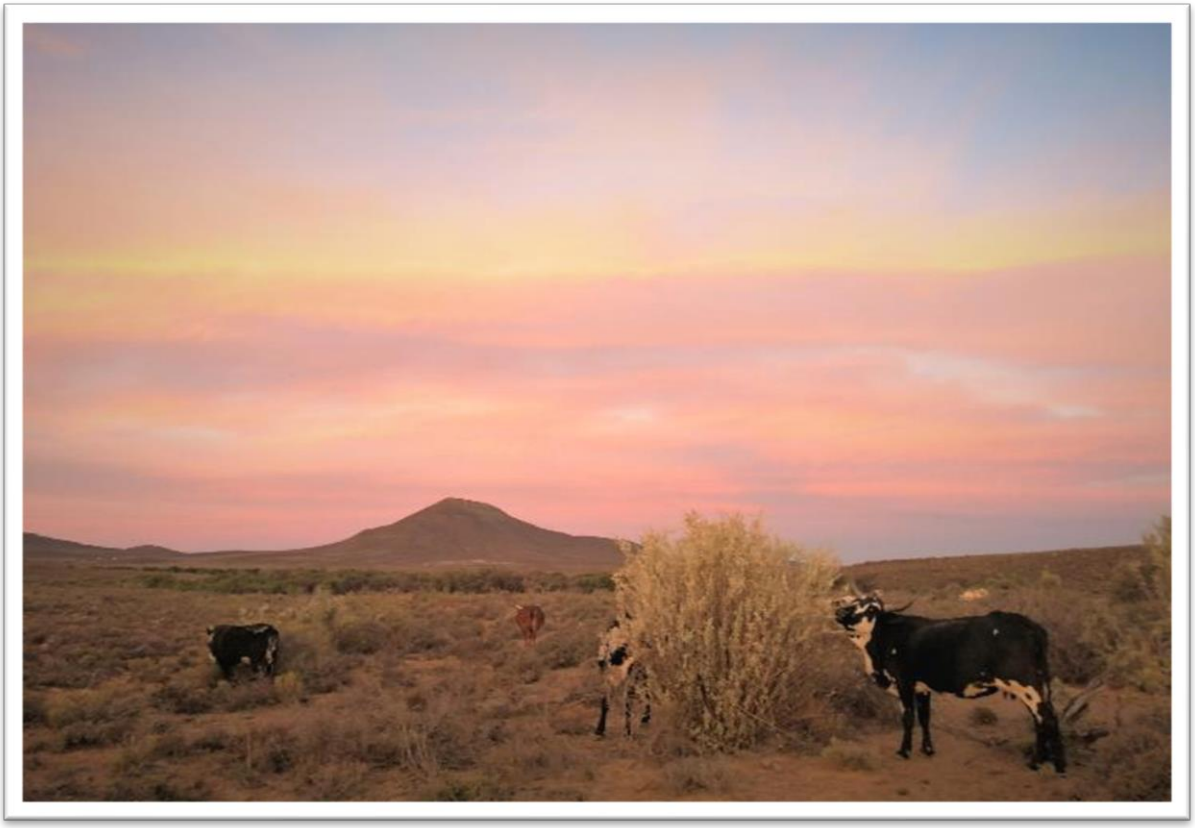
Image 1.2. Nguni adult female cow and calf, 30 September 2019, Matjiesfontein

Source: Author.

[22] L. Marino and K. Allen, 'The Psychology of Cows', *Animal Behavior and Cognition* 4, 4 (2017), 475.

Cattle's binocular vision ranges between 20 and 50 degrees.[23] Their vision focuses on moving objects less than stationary objects, which is likely why sudden human movements cause anxiety and even panic for cattle.[24] Sight is a dominant sense for cattle and they are estimated to receive 50% of their information visually.[25] Cattle can recognise 50 to 70 fellow cattle (conspecifics).[26] Cattle can also distinguish humans by their clothes and faces, and can distinguish between different humans wearing the same clothes.[27] Cattle can detect colours across the spectrum, but more acutely perceive warm as opposed to cold colours.[28] Thus, cattle's eyes can view sunsets such as the one depicted below.

Image 1.3. Nguni cattle at sunset in the Karoo, 22 October 2019, Matjiesfontein



Source: Author.

[23] *Ibid*.
[24] Adamczyk *et al*., 'Perception of Environment in Farm Animals–A Review', 567.
[25] *Ibid*.
[26] D. Broom and A. Fraser, *Domestic Animal Behaviour and Welfare* (Oxfordshire: CABI, 2007), 129.
[27] A. Taylor and. H Davis, 'Individual Humans as Discriminative Stimuli for Cattle (Bos Taurus)', *Applied Animal Behaviour Science* 58, 1 (1998), 13.
[28] Adamczyk *et al*., 'Perception of Environment in Farm Animals–A Review', 567.

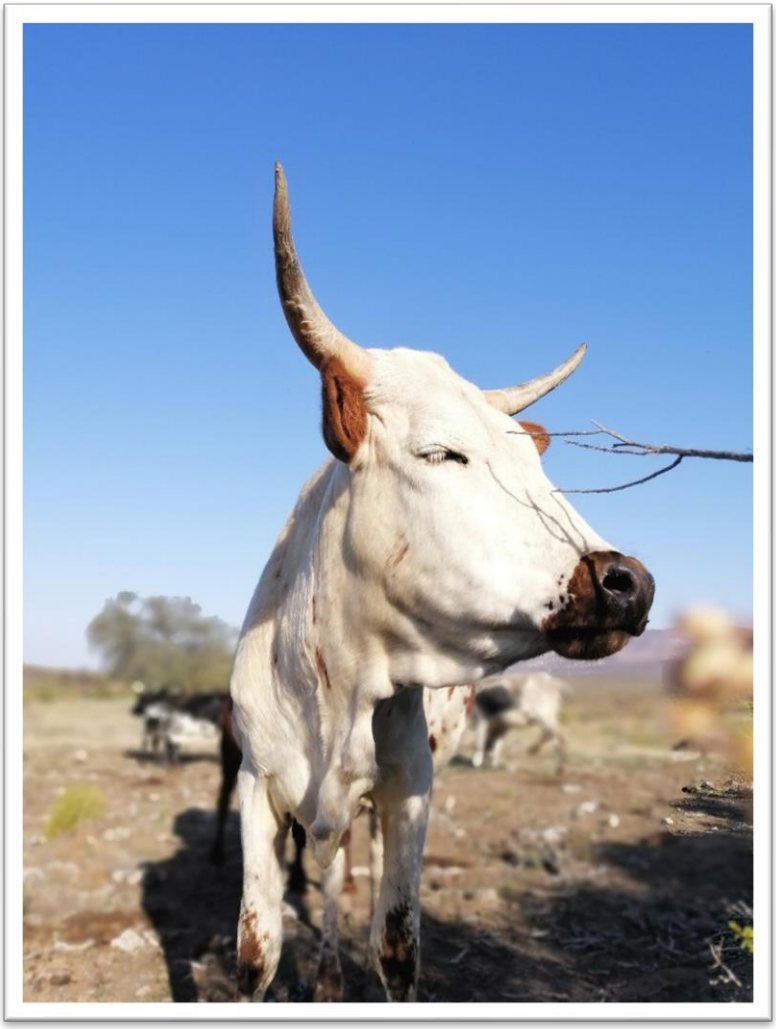
Cattle are more sensitive to low pitched sounds than humans and can detect sound between 20 Hz to 35kHz.[29] Cattle's noise localisation capacity, or ability to determine whence a noise comes, is poorer than humans', so that some speculate that this adds to cattle's fearfulness.[30] Cattle detect sounds well but locate sounds less well. Cattle's sense of taste is highly developed and can distinguish the four primary tastes; their taste desire correlates to their current nutritional requirements.[31] They prefer sweet foods for energy, and salty foods for maintaining electrolytes, while sour foods are chosen for ruminal pH balances.[32] Bitter foods represent harm to bovines. While humans have between 2 000 and 8 000 taste buds, cattle have 20 000.[33] Cattle have extremely sophisticated four-part multi-directional digestive systems, capable of transforming the calories in grass into energy to sustain 1 000+ kilogram bovine adults.[34] Such digestive systems have complex enzymatic ecosystems, that in processing plant matter release large quantities of methane. Interestingly, bovines can communicate their psychological states to one another via pheromones, in particular those related to states of fright or stress; they can smell stress hormones in each other's urine.[35] They have complex odiferous glands including interdigital, inguinal, sebaceous, and infraorbital.[36] This means that contexts in which cattle experience stress, such as when oxen perform wagon labour, as explored in Chapter Two, or while being dragged to slaughter poles, explored in Chapter Four, or when they are biomedically experimented on, as discussed in Chapter Three, cattle register and co-experience each other's stress.

Bovines are sensitive to tactile touch. Cattle can use their tails to swish away a fly in a particular place on their skin, which implies acute tactile sensitivity.[37] Cattle have

[29] R. Heffner and H. Heffner, 'Hearing in Large Mammals: Horses (Equus Caballus) and Cattle (Bos Taurus)', *Behavioral Neuroscience* 97, 2 (1983), 302–3.
[30] Adamczyk *et al*., 'Perception of Environment in Farm Animals–A Review', 567; Phillips, *Cattle Behaviour and Welfare*, 54.
[31] Phillips, *Cattle Behaviour and Welfare*, 57.
[32] C. Ginane, R. Baumont, and A. Favreau-Peigné, 'Perception and Hedonic Value of Basic Tastes in Domestic Ruminants', *Physiology & Behavior* 104, 5 (2011), 666; Phillips, *Cattle Behaviour and Welfare*, 57–58.
[33] Marino and Allen, 'The Psychology of Cows', 476.
[34] M. Clauss and R. Hofmann, 'The Digestive System of Ruminants, and Peculiarities of (Wild) Cattle', in M. Melletti and J. Burton (eds.), *Ecology, Evolution and Behaviour of Wild Cattle: Implications for Conservation* (Cambridge: Cambridge University Press, 2014), 57, 59.
[35] M. Bouissou *et al*., 'The Social Behaviour of Cattle', in L. Keeling and H. Gonyou (eds.), *Social Behavior in Farm Animals* (Wallingford: CABI Publishing, 2001), 117.
[36] Marino and Allen, 'The Psychology of Cows', 476.
[37] Thanks to Harry Wels for pointing this out to me.

mechanoreceptors, thermoreceptors, and nociceptors in their skin and muzzles, meaning they can feel mechanical pressure, temperature, and pain.[38] Like dogs and cats, cattle can be fearful of human touch or derive pleasure from scratching behind their ears.[39] A Nguni cow is depicted scratching her head on a branch, below.

Image 1.4. Nguni cow scratching her head on a branch, 26 September 2019, Matjiesfontein



Source: Author.

Cattle are highly social animals, with complex and multi-modal communication channels, who use allelomimetic behaviour – synchronous, mimetic, imitative behaviour – to facilitate group cohesion.[40] Herd cohesion or good social dynamics are important to cattle. Cattle select

[38] Phillips, *Cattle Behaviour and Welfare*, 58–59.
[39] Marino and Allen, 'The Psychology of Cows', 476.
[40] Bouissou *et al.*, 'The Social Behaviour of Cattle', 115–17, 129, 135; Phillips, *Cattle Behaviour and Welfare*, 84.

friends, next to whom they sleep and eat, and friends whom they lick (allogroom), while maternal bonds with calves are strong.[41] Allelomimetic behaviour of cattle can include synchronicity like lying down, walking, standing, grazing together, or urinating in response to alarm.[42]

Herds comprise social hierarchies with leaders and lower-ranking members.[43] Cattle recognise each other via sight, hearing and smell, which enables social interactions and recognition of the group structure.[44] They primarily recognise each other via vision but sound is important for maternal-juvenile recognition, while olfactory signals like pheromones are interpreted when at close quarters.[45] Bovines use vocalisations to elicit recognition and tactile contact, to greet, threaten or show fear, and during sexual arousal.[46] Shouting alarms cattle, they become fearful and their hearts race when they are shouted at.[47] In the next chapter on forced wagon labour, I show that oxen were frequently shouted at to impel them forward on arduous journeys.

Herds are hierarchical. Hierarchy in herds determines access to resources.[48] In intensive agriculture where food and water are provided, hierarchies confer access to space – dominant cattle have access to more space.[49] Bulls butt each other's heads or lock horns to establish or re-assert dominance, as do cows when needing to communicate their rank in a hierarchy, although aggression within matrilineal herds is rare.[50] Two images below depict two cows butting their horns as part of negotiating a social hierarchy, which I witnessed during my fieldwork.

[41] Phillips, *Cattle Behaviour and Welfare*, 94–96, 105, 177, 214.
[42] S. Stoye, M. Porter, and M. Dawkins, 'Synchronized Lying in Cattle in Relation to Time of Day', *Livestock Science* 149, 1 (2012), 71–72; Broom and Fraser, *Domestic Animal Behaviour and Welfare*, 100, 129–130.
[43] Bouissou *et al*., 'The Social Behaviour of Cattle', 123–29.
[44] Phillips, *Cattle Behaviour and Welfare*, 86.
[45] *Ibid*.
[46] *Ibid*, 96.
[47] D. Waynert *et al*., 'The Response of Beef Cattle to Noise during Handling', *Applied Animal Behaviour Science* 62 (1999), 27.
[48] Phillips, *Cattle Behaviour and Welfare*, 104.
[49] *Ibid*.
[50] Bouissou *et al*., 'The Social Behaviour of Cattle', 129.

Images 1.5 and 1.6. Nguni cows lock horns, 9 October 2019, Matjiesfontein

Source: Author.

The key predictors of ranking in a herd are age, weight, and experience, although cattle need to acquire social skills to gain a higher rank.[51] Once a hierarchy is established, aggression does

[51] Phillips, *Cattle Behaviour and Welfare*, 105; D. M Broom and J. D Leaver, 'Effects of Group-Rearing or Partial Isolation on Later Social Behaviour of Calves', *Animal Behaviour* 26 (1978), 1261–62.

not need to be enacted as frequently – a swing of the head, a nudge or bump from a higher-ranked bovine and a retreat from a lower-ranked bovine is often sufficient to confirm the hierarchy.[52] Locking horns, poking with horns, nudging, bumping, or butting heads can occur during social tension and disagreements, but these become less likely in established social arrangements. A bovine's station within a hierarchy is maintained through regular communication.[53] When young, cattle learn their station in the hierarchy via play, to prevent aggressive assertions of the hierarchy later.[54] Calves who are isolated from their herd have decreased cognitive learning abilities, are socially maladaptive, experience stress more often, and remain lower down in the social hierarchy.[55]

In modern domesticated cattle, preferred social arrangements are radically undermined and cows and growing cattle are divided into age and sex groups after about six months.[56] Bulls that are used for breeding programmes may be in solitary confinement for their entire lives. Calves are often taken from their mothers soon after birth to prevent them from drinking milk. Chapter Five on colonial breeding regimes is an investigation of how modern breeding began in South Africa and Botswana. It reads historical sources and shifts with an understanding that forced separations can be understood as destructive to herd dynamics and interpersonal relations, and also harmful to the social and cognitive development of calves.

Another way that cattle maintain their relationships with one another is via grooming. Cattle groom one another, allogroom, for bodily care – but grooming is also affiliative and performs nutritional, communicative, social, and psychological functions.[57] Grooming mostly involves licking the head and neck areas of other cattle. Grooming reinforces kin bonds and friendships, likely reduces tension, and is dopaminergic.[58] That is, psychologically, grooming

[52] Phillips, *Cattle Behaviour and Welfare*, 105.
[53] *Ibid*, 85.
[54] *Ibid*, 82.
[55] C. Gaillard *et al*., 'Social Housing Improves Dairy Calves' Performance in Two Cognitive Tests', *PLOS ONE* 9, 2 (2014), 1–5; Phillips, *Cattle Behaviour and Welfare*, 101.
[56] Phillips, *Cattle Behaviour and Welfare*, 85.
[57] Reinhardt and Reinhardt, 'Cohesive Relationships in a Cattle Herd (Bos Indicus)', 123, 126, 147; Phillips, *Cattle Behaviour and Welfare*, 33, 95.
[58] Phillips, *Cattle Behaviour and Welfare*, 95; Bouissou *et al*., 'The Social Behaviour of Cattle', 123.

releases dopamine, and produces an opiate effect.[59] Since self-grooming increases in intensive production environments, some hypothesise that cattle self-groom as a form of self-narcotisation.[60] Cattle comfort themselves and each other via dopaminergic grooming.

Among cattle, cows bond with calves.[61] Fathers, the bulls, are socially and psychologically distant, and do not bond with calves in the way mothers do. Bonding begins soon after birth and persists in matrilineal herds.[62] Bonding between mothers and calves occurs postnatally via imprinting and is 'permanent and irreversible'.[63] Social bonds between mothers and calves are maintained by grooming, vocalisations, and keeping near to one another. Calves learn their place in the social structure by learning the dietary and herd conventions from their mothers. The strength of a mother cow's bonds with her offspring is similar, notwithstanding the age and sex differences of her offspring.[64] Calves usually start to seek out peer relationships, peer to peer bonds, a week or two after birth.[65] Tight social cohesiveness has been observed in semi-wild herds, and often all members of the herd are affiliated with each other.[66] The foregoing discussions have sought to demonstrate that cattle have rich social lives and social and kin connections, that they have affect and sensory perceptions, and the hormones, neurotransmitters, and neurological structures which underpin rich and varied experiences.

Prior to current research and debates about cattle emotions and perceptions, thinking that animals and humans might experience emotions similarly or in cognate ways was sometimes dismissed as a form of anthropomorphism.[67] While these concerns have more recently lost their force, the term is popularly and pejoratively employed often enough to merit a discussion of it here.

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[59] Phillips, *Cattle Behaviour and Welfare*, 95; Broom and Fraser, *Domestic Animal Behaviour and Welfare*, 94.
[60] Phillips, *Cattle Behaviour and Welfare*, 95.
[61] Bouissou *et al*., 'The Social Behaviour of Cattle', 118.
[62] *Ibid*, 118–19.
[63] Phillips, *Cattle Behaviour and Welfare*, 101.
[64] *Ibid*, 101–2.
[65] Bouissou *et al*., 'The Social Behaviour of Cattle', 120.
[66] Reinhardt and Reinhardt, 'Cohesive Relationships in a Cattle Herd (Bos Indicus)', 147.
[67] C. Wynne, 'What Are Animals? Why Anthropomorphism is Still Not a Scientific Approach to Behavior', *Comparative Cognition & Behavior Reviews* 2 (2007), 125–35.

Anthropomorphism is the ascription of human experiences and emotions to animals. In Milton's *Paradise Lost* (1663) there is a form of anthropomorphism in which angels' minds are made comprehensible by being presented as on a continuum with human minds.[68] In response to Charles Darwin's blurring of the lines between species, in terms of natural selection and emotional and psychological similarities between humans and animals, in 1858 the term anthropomorphism was expanded by George Henry Lewes to include animals.[69] When ethology emerged in the 1930s to study animals in their natural environments, anthropomorphism was regarded with suspicion. In *The Study of Instinct* (1951), which defined the field of ethology, Niko Tinbergen wrote: 'Because subjective phenomena cannot be observed objectively in animals, it is idle to claim or deny their existence'.[70] Since then, there have been myriad discussions around the appropriacy of applying concepts like emotions and mental states to animals – whether anthropomorphism is legitimate or not.[71] Mindful of previous concerns of anthropomorphism, advances in disciplines like affective neuroscience, neurology and neuropsychology have enabled an informed ascription of emotions and minds to animals.[72]

Affective content accompanies stress. Those who say it is inappropriately anthropomorphic to ascribe emotional states such as stress to animals bear the burden of proof. If in a stressful environment a cow a) displays stressed behaviour like rapid breathing and an accelerated heart rate, b) releases cortisol and adrenaline, and c) has an amygdala where activity correlates with stress responses, it is plausible to infer that the cow is experiencing stress. If such an inference is illegitimate, the objector must say how it can be that the cow would not experience stress. But there is no such thing as a veterinarian who believes cattle cannot

[68] L. Daston, 'Intelligences: Angelic, Animal, Human', in L. Daston and G. Mitman (eds.), *Thinking with Animals: New Perspectives on Anthropomorphism* (New York: Columbia University Press, 2005), 37–38.
[69] Wynne, 'What Are Animals? Why Anthropomorphism is Still Not a Scientific Approach to Behavior', 126.
[70] N. Tinbergen, *The Study of Instinct* (Oxford: Oxford University Press, 1969 [1951]), 30.
[71] G. Romanes, *Animal Intelligence* (New York: D. Appleton & Co., 1883); C. Morgan, *Introduction to Comparative Psychology* (London: Walter Scott Ltd., 1914); J. Panksepp, *Affective Neuroscience: The Foundations of Human and Animal Emotions* (New York: Oxford University Press, 1998); M. Midgley, *Beast and Man* (London: Routledge, 2002); G. Bradshaw, *Elephants on the Edge: What Animals Teach Us about Humanity* (New Haven: Yale University Press, 2009); M. Bekoff, *The Emotional Lives of Animals: A Leading Scientist Explores Animal Joy, Sorrow, and Empathy — and Why They Matter* (California: New World Library, 2007); F. Karlsson, 'Critical Anthropomorphism and Animal Ethics', *Journal of Agricultural and Environmental Ethics* 25, 5 (2012), 707–20.
[72] Low, 'The Cambridge Declaration on Consciousness' 2012.

experience stress or fear. As some have noted, given the consciousness-generating neurological similarities between animals and humans, it would be a 'biological miracle' if humans alone were able to feel.[73]

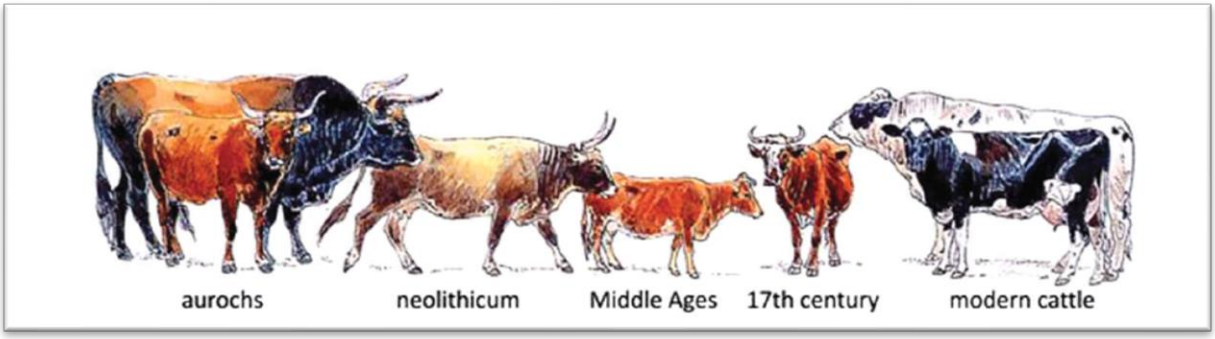
In sum, cattle share a wide range of neurochemicals and brain features with humans. Cattle can experience pain and pleasure, fear and stress, social connection, comfort and discomfort, anxiety, and panic; they see, taste, smell and feel. They have deep familial bonds with their kin. From these considerations, the next section sketches a history of cattle as experiential subjects from the agricultural revolution until they became increasingly connected to the lives of southern Africans from the second millennia CE.

From aurochs to cattle in southern Africa: a history of domestication until the eleventh century

Cattle history is usually conceived as having started ten thousand years ago, when herds of Aurochs, walked, grazed, and avoided or perished at the weapons of hunter-gatherers, on the plains of the Fertile Crescent and the Indian subcontinent. Aurochs, or *Bos primigenius,* were large bovines and are the forebearers of the two major cattle species Taurine (*Bos taurus*) and Indicine (*Bos indicus*), whose genes all modern cattle possess to some degree.[74]

[73] J. Masson and S. McCarthy, *Weep, When Elephants. The Emotional Lives of Animals* (New York: Delacorte Press, 1995), 15–16, 31.
[74] D. MacHugh, G. Larson, and L. Orlando, 'Taming the Past: Ancient DNA and the Study of Animal Domestication', *Annual Review of Animal Biosciences* 5 (2017), 330, 331; B. Arbuckle *et al*., 'Documenting the Initial Appearance of Domestic Cattle in the Eastern Fertile Crescent (Northern Iraq and Western Iran)', *Journal of Archaeological Science* 72 (2016), 1.

Image 1.7. From aurochs to modern cattle



Source: P. Ajmone-Marsan, J. Fernando Garcia, and J. Lenstra, 'On the Origin of Cattle: How Aurochs Became Cattle and Colonized the World', *Evolutionary Anthropology*, 19, 4 (2010), 149.

One of the most far-reaching and impactful events in the last 13 000 years has been the domestication of plants and animals by humans. The shift to human agriculture and farming, to sedentary human societies, over time radically transfigured animal and human lives. As domesticated animals, cattle came into existence via domestication and their history's chronology is thus tied closely to shifts in their relationships with humans. As we shall see later, when colonists used them for wagon labour, or developed veterinary regimes, or instituted industrialised slaughterhouses, or instituted modern breeding regimes, these human events marked transformations in cattle history.

Aurochs were likely first subjugated into domestic relations with humans in the Fertile Crescent, a region that includes parts of Syria and Turkey about ten millennia ago.[75] About two thousand years later, Aurochs were subjugated in South Asia.[76] Cattle emerged, and their culture and human culture was linked together, which fundamentally transformed the trajectories of both species. The domestication of cattle was of monumental importance for human and animal societies.

[75] Arbuckle *et al*., 'Documenting the Initial Appearance of Domestic Cattle in the Eastern Fertile Crescent', 1; MacHugh, Larson, and Orlando, 'Taming the Past: Ancient DNA and the Study of Animal Domestication', 331.
[76] MacHugh, Larson, and Orlando, 'Taming the Past: Ancient DNA and the Study of Animal Domestication', 331.

About 12 millennia ago, hunter-gatherers began to more vigorously pursue their control over plants and animals. The hunter-gatherers strove to domesticate plants and animals for resource acquisition and environmental reasons. The climate became unpredictable, big mammalian 'game' animal populations declined, and humans moved into viable habitats.[77]

In reply to food and climate unpredictability, and lower numbers of designated prey in connection to improved human hunting abilities, human diets broadened to include second and third choice foods such as smaller mammals, and plants that required some level of processing like grinding or soaking.[78] Humans later called this the 'broad-spectrum revolution'.[79] Wild plants, like wild cereals, for example, were taken into areas where humans could intentionally cultivate them.[80]

Cattle became domesticated by humans in two main separate events. Humpless *Bos taurus* cattle were domesticated in the Fertile Crescent around 8 350 BCE, ten millennia ago, and humped Zebu *Bos indicus* cattle were domesticated in South Asia 6 050 BCE, around eight millennia ago.[81]

According to Jared Diamond, there were 148 wild mammal species who weighed 45 kilograms or more and who may have been candidates for domestication.[82] But only 14 of these species were domesticated. It is remarkable that in the millennia following domestication in the Fertile Crescent, very few animals have since been domesticated, and despite sustained modern efforts, many species have proven practically impossible to domesticate. Examples include the eland, elk, moose, musk ox, and zebra.[83] By 4 000 BCE sheep, cattle, goats, pigs and horses were repeatedly domesticated. [84] Yuval Harari writes that:

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[77] J. Diamond, 'Evolution, Consequences and Future of Plant and Animal Domestication', *Nature* 418, 6898 (2002), 704.
[78] *Ibid*, 700–701.
[79] M. Zeder, 'The Broad Spectrum Revolution at 40: Resource Diversity, Intensification, and an Alternative to Optimal Foraging Explanations', *Journal of Anthropological Archaeology* 31, 3 (2012), 241.
[80] B. Gross and K. Olsen, 'Genetic Perspectives on Crop Domestication', *Trends in Plant Science* 15, 9 (2010), 530.
[81] D. MacHugh, G. Larson, and L. Orlando, 'Taming the Past: Ancient DNA and the Study of Animal Domestication', 3330–31.
[82] Diamond, 'Evolution, Consequences and Future of Plant and Animal Domestication', 702.
[83] *Ibid*, 706.
[84] *Ibid*.

> Even today, with all our advanced technologies, more than 90 per cent of the calories that feed humanity come from the handful of plants that our ancestors domesticated between 9500 and 3500 BC - wheat, rice, maize (called 'corn' in the US), potatoes, millet and barley. No noteworthy plant or animal has been domesticated in the last 2,000 years. If our minds are those of hunter-gatherers, our cuisine is that of ancient farmers.[85]

Jared Diamond proposes six features inherent to mammals who were not domesticated to explain why only 14 species were domesticated.[86] These features are: 1) a diet not readily and easily provided by humans (thus no domestic anteaters), 2) slow growth rate and long periods between birthing (elephants and gorillas), 3) propensity to use violence in self-defence (grizzly bears and rhinoceroses), 4) disinclination to breed in captivity (pandas and cheetahs), 5) absent follow-the-leader dominance hierarchies (bighorn sheep and antelope), 6) and proclivities for panic in enclosed captivity or when among predators (gazelles and deer, but not reindeer). The presence of any one of his six features is considered enough to prevent domestication.[87]

The Auroch possessed all six features. Cattle can eat a wide variety of plants and grasses, they mature quickly and have relatively short gestation periods, they are fearful and non-confrontational, meaning they do not readily engage in violent self-defence, they continue to breed in captivity, and they form herds and have leaders whom the herd follows. Further, from a human domination perspective, they are manageably calm in enclosures. Smaller, weaker, more passive and controllable Aurochs were likely selected for captivity and breeding. Their calm, non-confrontational, and easily fearful nature was thus used against them. Leaving plants aside, domestication of animals mainly involves captivity, control of sex and reproduction, and control of food supply. For the animals, domestication was therefore an institution of domination. In political philosophy terms, with the advent of farming, cattle and other domesticated animals were brought into human societies as a kind of subordinated caste group.[88]

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[85] Y. Harari, *Sapiens: A Brief History of Humankind* (London: Vintage Books, 2014), 88.
[86] Diamond, 'Evolution, Consequences and Future of Plant and Animal Domestication', 702.
[87] *Ibid*.
[88] S. Donaldson and W. Kymlicka, *Zoopolis: A Political Theory of Animal Rights* (New York: Oxford University Press, 2011), 101.

These captive and subjugated animals were then bred. Cattle were regarded as food (flesh), cows' secretions (milk) were extracted, their skin was used as forms of clothing or other items, and oxen were forced to perform labour. Cattle became regarded as one of the early forms of money and wealth; as the word livestock, living stock, indicates.[89] Albeit briefly, at least one historian has reflected on the agricultural revolution from the animals' perspectives. Contemplating the evolutionary success of domesticated animals, in terms of them presently existing in vast numbers, Yuval Harari argues that 'in the case of animals such as cattle, sheep and Sapiens, each with a complex world of sensations and emotions, we have to consider how evolutionary success translates into individual experience.'[90] In one of the most original claims in *Sapiens: a brief history of humankind* (2011), Yuval Harari writes that:

> from the viewpoint of the herd, rather than that of the shepherd, it's hard to avoid the impression that for the vast majority of domesticated animals, the Agricultural Revolution was a terrible catastrophe. Their evolutionary 'success' is meaningless. A rare wild rhinoceros on the brink of extinction is probably more satisfied than a calf who spends its short life inside a tiny box, fattened to produce juicy steaks. The contented rhinoceros is no less content for being among the last of its kind. The numerical success of the calf's species is little consolation for the suffering the individual endures.[91]

He speculates that animals like sheep were probably domesticated via one of two means.[92] Sheep communities were probably corralled into narrow gorges, where they could be observed and monitored. Old, sick sheep and adult rams were killed, while lambs were protected to promote the longevity of the herd.[93] Lions, wolves, and rival human tribes were repelled. Defensively aggressive sheep, who resisted human control, or, wandering sheep, whose curiosity led them away from the herd, were slaughtered first. 'With each passing generation', writes Yuval Harari, 'the sheep became fatter, more submissive and less curious.'[94] Alternatively, hunters could have trapped and then adopted lambs, fattened them, and then slaughtered them. Over time the number of sinister adoptions likely increased.

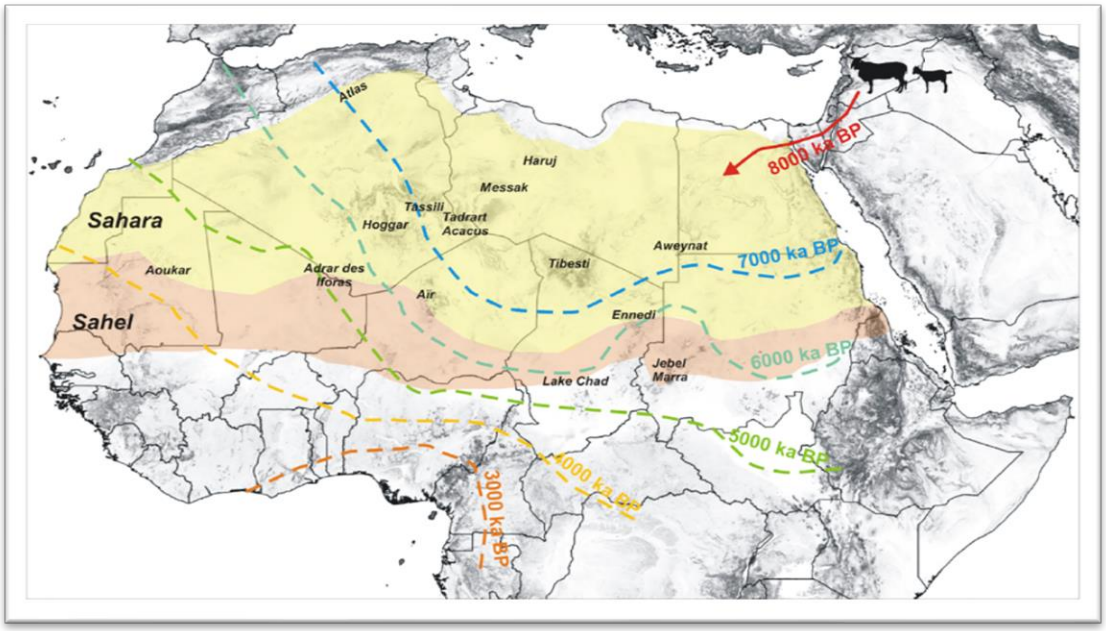
[89] See Introduction chapter.
[90] Harari, *Sapiens*, 109.
[91] *Ibid*.
[92] *Ibid*, 102–4.
[93] *Ibid*, 103.
[94] *Ibid*.

> Some of these [lambs] reached puberty and began to procreate. The most aggressive and unruly lambs were first to the slaughter. The most submissive, most appealing lambs were allowed to live longer and procreate. The result was a herd of domesticated and submissive sheep.[95]

He concludes that the 'domestication of animals was founded on a series of brutal practices that only became crueller with the passing of the centuries.'[96] For the few animal species who were domesticated, their trajectories changed dramatically for the worse.

Archaeological evidence suggests that cattle in herding relationships with humans moved from the Levant, the Eastern Mediterranean region of Western Asia, into North Africa, the Nile Valley, and the Sahara between circa 6 350 BCE and 4 050 BCE, while goats and sheep were likely herded in this region from around 5 850 BCE.[97]

Image 1.8. Cattle and ovicaprine movement in north Africa



Source: A. Zerboni and K. Nicoll, 'Enhanced Zoogeomorphological Processes in North Africa in the Human-Impacted Landscapes of the Anthropocene', *Geomorphology* 331 (2019), 24.

[95] *Ibid*, 104.
[96] *Ibid*, 105.
[97] A. Zerboni and K. Nicoll, 'Enhanced Zoogeomorphological Processes in North Africa in the Human-Impacted Landscapes of the Anthropocene', *Geomorphology* 331 (2019), 25.

Movements of humans into north Africa, from the Levant into the Nile Delta, and then into the Western Desert, likely occurred via the land barrier and through contemporary Palestine or across the Red Sea.[98] These cross-continent movements implied possibilities for exchanging animals and also learning methods for controlling and herding animals.[99] In Africa, the earliest known domesticated caprines, or goat-antelopes, were found at Sodmein Cave on the Red Sea coast in Quseer in Egypt, and it is presumed that they were probably introduced into the area around 6 200 BCE.[100]

Cattle in domestic relationships with herders, who spread across North-east and northern Africa, were descendants of *Bos taurus,* who were domesticated in the Middle Euphrates region of the Middle East.[101] Previously there were debates about a potential independent domestication of cattle in north Africa, but larger DNA sample sizes have suggested that there was no third domestication of cattle in Africa.[102] Herding operations extended intermittently across the region and manifested in 'spotty distribution[s]' of small pastoralist groups.[103] Cattle herding expanded across the majority of North Africa. By around 9 000 BCE cattle, goats, and sheep were evident over a large part of North Africa.[104] According to some archaeologists, an arid climatic phase around 8 000 BCE likely moved herders into ecologically viable areas in the region.[105]

In the Sahara, cattle pastoralism correlated with increased human populations.[106] Indicators from archaeological records like rock art, funerary institutions, settlements, pottery decorations, and radiocarbon dating suggest that cattle, goats, sheep, and humans had

[98] M. Brass, 'Early North African Cattle Domestication and Its Ecological Setting: A Reassessment', *Journal of World Prehistory* 31, 1 (2018), 108.
[99] *Ibid*.
[100] P. Vermeersch *et al*., 'Early and Middle Holocene Human Occupation of the Egyptian Eastern Desert: Sodmein Cave', *African Archaeological Review* 32 (2015), 487.
[101] Brass, 'Early North African Cattle Domestication and Its Ecological Setting', 81.
[102] *Ibid*, 81, 109.
[103] Zerboni and Nicoll, 'Enhanced Zoogeomorphological Processes in North Africa in the Human-Impacted Landscapes of the Anthropocene', 25; S. di Lernia, 'The Emergence and Spread of Herding in Northern Africa: A Critical Reappraisal', in P. Mitchell and P. Lane (eds.), *Oxford Handbook of African Archaeology* (Oxford: Oxford University Press, 2013), 527–40.
[104] di Lernia, 'The Emergence and Spread of Herding in Northern Africa: A Critical Reappraisal', 532.
[105] *Ibid*, 535.
[106] K. Manning and A. Timpson, 'The Demographic Response to Holocene Climate Change in the Sahara', *Quaternary Science Reviews* 101 (2014), 32–34.

spread across the Sahara and the Sahel by around 5 000 BCE.[107] Savino di Lernia notes that 'the spread of herding-related realities [were] of immense importance to the subsequent history of African societies'.[108] It took several thousand years for cattle, sheep and goats to reach southern Africa.

Sheep bones from around two millennia ago have been discovered in Namibia.[109] Cattle appeared in southern Africa, specifically in Toteng in Botswana, around 2 000 years ago and were in the Cape of South Africa about 300 years later.[110] Archaeological evidence suggests that cattle and human relationships started to develop in southern Africa from the fourth to the ninth century CE, with the movement of Eastern Bantu-speaking groups into regions including the Eastern Cape.[111] Evidence of pastoralism – defined as a human social system focused on controlling and using domesticated mammals like goats, sheep and cattle – in the southern African Late Stone Age in the first millennium CE is rare, arguably to the point of being absent.[112] Domesticated animals like sheep, goats and cattle were likely not the basis of human societies in the first millennium CE, and as 'food' unlikely contributed more than marginally to southern African human diets.[113]

Sanga types of cattle comprise the majority of southern Africa's cattle genetics.[114] It is thought that Sanga emerged from African taurine and zebu cattle breeding in Ethiopia in 700 CE.[115] The Sanga type includes the Nguni, Africander, and Drakensberger of South Africa, the Sanga

[107] D. Gifford-Gonzalez, 'Animal Disease Challenges to the Emergence of Pastoralism in Sub-Saharan Africa', *African Archaeological Review* 3, 17 (2000), 99.
[108] di Lernia, 'The Emergence and Spread of Herding in Northern Africa: A Critical Reappraisal', 527.
[109] D. Pleurdeau *et al*., '"Of Sheep and Men": Earliest Direct Evidence of Caprine Domestication in Southern Africa at Leopard Cave (Erongo, Namibia)', *PLOS ONE* 7, 7 (2012), 1.
[110] L. Robbins *et al*., 'The Advent of Herding in Southern Africa: Early AMS Dates on Domestic Livestock from the Kalahari Desert', *Current Anthropology* 46, 4 (2005), 673–74.
[111] Gifford-Gonzalez, 'Animal Disease Challenges to the Emergence of Pastoralism in Sub-Saharan Africa', 105.
[112] K. Sadr, 'A Short History of Early Herding in Southern Africa', in M. Bollig, M. Schnegg, and H-P. Wotzka (eds.), *Pastoralism in Africa: Past, Present and Future* (New York: Berghahn, 2013), 172.
[113] K. Sadr, 'A Short History of Early Herding in Southern Africa', 172–179.
[114] E. Gororo *et al*., 'Genetic Diversity in Zimbabwean Sanga Cattle Breeds Using Microsatellite Markers', *South African Journal of Animal Science* 48, 1 (2018), 128; S. Makina *et al*., 'Insight into the Genetic Composition of South African Sanga Cattle Using SNP Data from Cattle Breeds Worldwide', *Genetics Selection Evolution* 48, 88 (2016), 6.
[115] Gororo *et al*., 'Genetic Diversity in Zimbabwean Sanga Cattle Breeds Using Microsatellite Markers', 129.

of Namibia, the Nguni of Eswatini and Zambia, the Mashona, Nkone, and Tuli of Zimbabwe, and the Landim of Mozambique.[116]

The debate about how cattle came to southern Africa, the Kalahari debate, remains unsettled. Two main routes from two sets of scholars are proposed, although limited evidence for each route has meant neither group has presented a watertight case.[117] Jim Denbow and Edwin Wilmsen argue that Khoi and San speakers adopted cattle from Bantu groups in the Okavango Delta and made their way to southern Africa via the Kalahari.[118] While their evidence is slim, these scholars and others contend that the desert conditions imply that preserved archaeological evidence is unlikely. Jim Denbow's excavations at Nqoma and Divuyu and his reconstruction of networks that linked Toutswe sites in Botswana suggest circumstantially that political economies in the desert could have included nomadic pastoralists. This view may be called the Kalahari route. The other view is proposed by Karim Sadr, who argues that the Kalahari route's evidence is too thin, and suggests that cattle-keeping specialisations of contemporary Bantu-speakers implies that cattle were passed among Bantu-speakers who lived along the edge of the Kalahari Desert.[119]

Pastoralism in southern Africa, the eleventh to the seventeenth century

Sheep and goats appeared in southern Africa about two thousand years ago, and it has been argued that hunter-gatherers were using them to supplement their subsistence and not as primary forms of food.[120] Keeping such animals likely did not dramatically shift their culture to that of pastoralists. Archaeologist Karim Sadr has usefully tabled the number of cattle,

[116] *Ibid*.
[117] R. Jimenez, 'Rites of Reproduction: Gender, Generation and Political Economic Transformation among Nguni-Speakers of Southern Africa, 8th - 19th Century CE' (PhD Dissertation, Northwestern University, Illinois, 2017), 107.
[118] J. Denbow and E. Wilmsen, 'Advent and Course of Pastoralism in the Kalahari', *Science* 234, 4783 (1986), 1509–15; J Denbow, 'A New Look at the Later Prehistory of the Kalahari', *The Journal of African History* 27, 1 (1986), 3–28; C. Ehret, 'The Early Livestock-Raisers of Southern Africa', *Southern African Humanities* 20 (2008), 7–35; Robbins *et al*., 'The Advent of Herding in Southern Africa.'
[119] C. Cooke, 'Evidence of Human Migrations from the Rock Art of Southern Rhodesia', *Africa: Journal of the International African Institute* 35, 3 (1965), 263–285; J. Kinahan, 'A New Archaeological Perspective on Nomadic Pastoralist Expansion in South-Western Africa', *Azania: Archaeological Research in Africa* 29–30, 1 (1994), 211–226; K. Sadr, 'Kalahari Archaeology and the Bushman Debate', *Current Anthropology* 38, 1 (1997), 104–112; P. Mitchell, *The Archaeology of Southern Africa* (Cambridge: Cambridge University Press, 2002).
[120] Sadr, 'A Short History of Early Herding in Southern Africa', 171–172.

sheep, and goat bones from archaeological sites in southern Africa dating to the last 2 000 years.[121] What emerges strongly from his analysis is that in the Late Stone Age pastoralism was likely absent. In Iron Age sites kraals were central features but were not in Late Stone Age sites. The low proportion of bones in most southern African Late Stone Age sites suggest that goats, sheep and cattle contributed only marginally to the diets of Late Stone Age humans.[122]

There is some evidence that cattle-keeping human economies appeared in southern Africa from around 400 to 900 CE.[123] There is evidence from Namibia suggesting that from this time, cattle were in 'quite intensive' pastoral relationships, in that transhumance and cattle posts occur in the material record.[124] There is evidence of animal kraals in the Karoo in South Africa from the eleventh century, but they were not located at the centre of settlements and their ideological and economic significance to humans is difficult to determine.[125] By the seventeenth and eighteenth centuries CE, cattle appear to have been in pastoralist relationships across the Cape region of South Africa, in that kraals were at the centre of settlements and human movements followed the grazing needs of cattle, goats and sheep.[126] A site at the Vredenburg Peninsula in South Africa indicates that such pastoralists may have been using domesticated animals a few centuries earlier.[127] There is some scholarship on why and in what ways hunter-gatherers came to be in pastoralist relationships with cattle but overall little is known.[128]

Recent important work by Raevin Jimenez, which used comparative linguistics as a method to examine historical shifts among Nguni-speakers, has provided some insight into how cattle came to be increasingly part of Proto-Nguni speakers' worlds, particularly in the second millennium CE. Nguni speakers comprise among others Xhosas, Zulus, Swazis, and Southern

[121] *Ibid*, 172–179.
[122] *Ibid*, 179.
[123] Gifford-Gonzalez, 'Animal Disease Challenges to the Emergence of Pastoralism in Sub-Saharan Africa', 105.
[124] Sadr, 'A Short History of Early Herding in Southern Africa', 188; J. Kinahan, *Pastoral Nomads of the Namib Desert: The People History Forgot* (Windhoek: Namibia Archaeological Trust, 2001).
[125] Sadr, 'A Short History of Early Herding in Southern Africa', 188.
[126] *Ibid*.
[127] F. Fauvelle-Aymar *et al*., 'The Visibility and Invisibility of Herders' Kraals in South Africa, with Reference to a Possible Early Contact Period Khoekhoe Kraal at KFS 5 (Western Cape)', *Journal of African Archaeology* 4, 2 (2006), 253.
[128] Sadr, 'A Short History of Early Herding in Southern Africa', 188.

Ndebele.[129] Proto-Nguni are an 'intermediate subgroup' of the Southern Bantu, and the Southern Bantu are the ancestors of Sotho-Tswana, Shona, Tswa-Ronga, and Venda.[130]

Raevin Jimenez argues that Proto-Nguni speakers did not arrive in South Africa with a suite of specialised breeding-and animal controlling-related concepts.[131] Rather, such terms were innovated in relation to how the lives and roles of women and men and cattle were increasingly controlled in emerging political systems.[132]

At the end of the first millennium CE, when Proto-Nguni speakers moved from the Highlands of present-day South Africa, into the Grasslands, along the southern side of the Drakensberg escarpment, Proto-Nguni speakers had a set of root words and generic terms for cattle and goats, which implies their and their predecessors' familiarity with these animals.[133] On the basis that Proto-Nguni speakers and the Southern Bantu lacked a lexical range for cattle and goat breeding, Raevin Jimenez argues that it is doubtful that such people were actively breeding goats and cattle before they appeared south of the Drakensberg Escarpment. Animal breeding taxonomies, or the concepts associated with cattle-keeping and animal breeding, appear in the vocabularies of Proto-Nguni speakers after the 9th century.[134] If Proto-Nguni were breeding, herding, and extensively using domesticated animals before the ninth century CE, they did not have the concepts semantically linked to such practices and relationships. So, in the first millennium CE, while cattle and goats were conceptualised in Proto-Nguni speakers' language, such animals were unlikely purposively bred in anything like pastoral or animal keeping systems. This comparative historical linguistics evidence coheres with the low proportion of domesticated animals in archaeological sites.[135]

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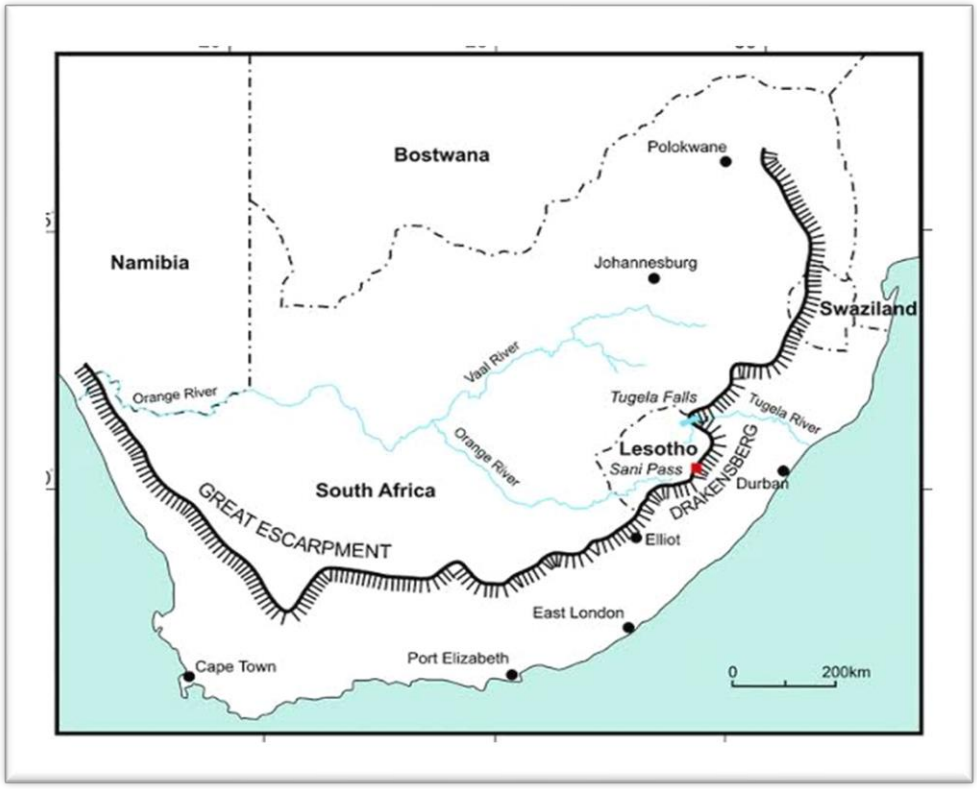
[129] I. Schapera, *The Bantu-Speaking Tribes of South Africa; an Ethnographical Survey* (London: Routledge & Sons, Ltd, 1937), 23; S. Bosch, L. Pretorius, and A. Fleisch, 'Experimental Bootstrapping of Morphological Analysers for Nguni Languages', *Nordic Journal of African Studies* 17, 2 (2008), 67.
[130] R. Jimenez, '"Slow Revolution" in Southern Africa: Household Biosocial Reproduction and Regional Entanglements in the History of Cattle-Keeping among Nguni-Speakers, Ninth to Thirteenth Century CE', *The Journal of African History* 61, 2 (2020), 161.
[131] Jimenez, 'Rites of Reproduction', 105.
[132] Jimenez, 'Rites of Reproduction' 12, 14–15, 31, 33–35; Jimenez, '"Slow Revolution" in Southern Africa', 160, 175.
[133] Jimenez, 'Rites of Reproduction', 105.
[134] *Ibid*.
[135] Sadr, 'A Short History of Early Herding in Southern Africa', 188–89.

Between 1 000 and 1 500 CE, Proto-Nguni speaking groups separated, and communities extended across the Grasslands area, which 'occurs mainly on the high central plateau (Highveld), the inland areas of the eastern seaboard, the mountainous areas of KwaZulu-Natal and the central parts of the Eastern Cape'.[136] Nguni-speakers developed a lexicon for signifying human and animal genders in terms of biological reproduction. These lexical items were semantically related to kinship and rites of passage, and included concepts for more intensive cattle-keeping and cattle breeding. For the Nguni-speakers, political systems were innovated and developed, and cattle were drawn increasingly and more intensively into the social, economic and political worlds of Nguni-speaking southern Africans.[137]

Image 1.9. Drakensberg Escarpment



Source: S. Grab, 'Drakensberg Escarpment: Mountains of Geomorphic Diversity', in P. Migon (ed.), *Geomorphological Landscapes of the World* (Dordrecht: Springer Netherlands, 2010), 134.

[136] L. Mucina *et al*., 'Grassland Biome', in L. Mucina and M. Rutherford (eds.), *The Vegetation of South Africa, Lesotho and Swaziland* (Pretoria: South African National Biodiversity Institute, 2006), 31.
[137] Jimenez, 'Rites of Reproduction', 31.

Drawing on Jan Vansina's concept of slow revolution, which he used to analyse the shift to farming in west Africa, Raevin Jimenez argues that especially from 1 000 to 1 200 CE, Nguni societies underwent a 'slow social revolution' towards becoming more intensive cattle-keeping societies.[138] As cattle increasingly became forms of social wealth, males' roles within the household and community shifted towards including herding responsibilities.[139] Raevin Jimenez writes that 'cattle-keeping became an institution through which Nguni-speakers reproduced social relations and practices'.[140]

From archaeological sources and comparative linguistic analyses, it is difficult to directly access the subjective experiences of cattle as they moved around southern Africa and became increasingly embroiled and significant in human societies. However, the concepts linked to human and cattle relationships indicate the respects in which cattle were conceived of among Nguni speakers. The concepts with which humans referred to cattle allow us to make some plausible inferences about shifts in cattle history, as they came to be central to many southern Africa human societies over the last thousand years. To this end, I selected a number of terms innovated by Proto-Nguni speakers, which Raevin Jimenez has reconstructed via a comparative historical linguistics approach.

The Southeast Bantu root words 'komo' for 'cattle' and '-vù' for sheep are shared by Khoekhoe herders and Proto Southeast Bantu speakers.[141] The transfer of the term 'komo' may have occurred between Khoekhoe herders and Southeast Bantu speakers, the former migrating from the Shashe-Limpopo Basin to the Cape.[142]

Nguni speakers share terms for the age and gender of animals. This suggests that these animals were intentionally bred and thus that their human masters were not totally reliant on trafficking such animals. Reconstructions of innovated root words such as 'kunzi', 'male animal', '-kabi', meaning 'steer, ox, bullock' and '-tole' which means 'heifer and unweaned

[138] Jimenez, '"Slow Revolution" in Southern Africa', 155, 160, 175; J. Vansina, 'A Slow Revolution: Farming in Subequatorial Africa', *Azania: Archaeological Research in Africa* 29, 1 (1994), 15–26.
[139] Jimenez, '"Slow Revolution" in Southern Africa', 157.
[140] *Ibid*, 160.
[141] Jimenez, 'Rites of Reproduction', 109. Compare this etymology to the etymology of the English word cattle in the Introduction chapter.
[142] *Ibid*, 109.

calf', suggest that these terms emerged during the Proto Nguni period.[143] The term 'kunzi' meaning male animal, domestic or free, and taxonomies for the terms are nearly identical for cattle, sheep and goats.[144]

Terms for steer and bullock imply that animals were castrated. Proto Nguni speakers inherited the term -pakul-', 'to castrate', implying some knowledge of animal keeping.[145] Herders castrated goats, sheep or cattle to restrict sex and reproduction and likely to reduce defensive aggression. Male animals were castrated by Proto-Nguni speakers. Some of their descendants, Proto-Southern Nguni speakers innovated a different form of castration, namely '*-thên' meaning to 'castrate (by cutting)'.[146] The root '*-thên' is derived from a prior Bantu root term '*-téen', 'to cut', which suggests that herders and animal keepers were innovating the ways they controlled the sexual lives of animals.[147] Domesticated male animals, including bulls, have likely been castrated for the last ten millennia.[148]

Proto-Nguni speakers innovated the root word '*-lus' meaning 'to herd; herder' which signals a dramatic shift for cattle, suggesting that cattle herds, their social systems, came to be controlled, 'herded', by specific human masters, 'herders'.[149] They also innovated the root word '*-hlambi', meaning 'herd of animals'.[150] So too did Proto-Ngunis innovate the term for kraal '*-baya'. The term 'kraal' is not species-specific so that a cattle-only kraal is 'isibaya senkomo'.[151]

Distinguishing between life stages of animals implies that Proto-Nguni speakers were conceiving of cattle as beings in time, beings who had distinct ages. 'Heifer, or unweaned calf, is signified by the innovated polysemic '*tole', which suggests an important distinction between bulls and smaller animals.[152] The innovation of the term 'heifer' may also suggest an

[143] *Ibid*, 110.
[144] *Ibid*, 110–11.
[145] *Ibid*, 112.
[146] *Ibid*, 118.
[147] *Ibid*.
[148] Harari, *Sapiens*, 448.
[149] Jimenez, 'Rites of Reproduction', 116; Jimenez, '"Slow Revolution" in Southern Africa', 164.
[150] Jimenez, '"Slow Revolution" in Southern Africa', 164.
[151] Jimenez, 'Rites of Reproduction', 112.
[152] *Ibid*, 110.

interest in the longevity of young animals and the reproductive capacity of mothers. Young calves who are weaned are called 'inkonyama', meaning small cows. [153]

In the eyes of their human masters, cattle also transformed into beings of value, control over whom comprised wealth for cattle's masters. Human masters, herders, and cattle, sheep and goat keepers, were described by the root word '*-fúyi', meaning 'to accumulate, be wealthy, to breed'.[154] That the term is polysemic and suggests that Proto-Nguni speakers saw that purposive breeding of herds was a prospective route to wealth. This connects to the etymology of the English word cattle, in that cattle initially meant money among English and Latin speakers.

Significant from a bovine perspective is that Proto-Nguni speakers used the root term '*phάwu' meaning 'to notch ear', which implies that cattle were conceived of as property who could be owned.[155] In combination with *-fúyi', meaning to be wealthy, to accumulate and to breed, a concept of ear notching, Raevin Jimenez argues, suggests that some form of property rights obtained, and that cattle goats and sheep were owned.[156]

Proto-Nguni-speakers innovated a new root '*-dle', which meant 'pastureland, wild place, parturition', but referred both to land that herded animals could graze and bodies of women who were soon to produce or had recently produced a human child.[157] Proto-Nguni speakers likely expanded their use of cattle 'products'. They derived the term *-bísì, 'milk' from the earlier Bantu word *-bÍcÌ, which meant 'unripe, uncooked, fresh' and innovated the word '*-senga' which means 'to milk an animal'.[158] They had inherited the term *-mâsi which meant 'sour milk'.[159] Proto-Drakensberg speakers innovated the root '*-tunga', meaning 'milking pail', in the eleventh century.[160]

[153] *Ibid*, 111.
[154] *Ibid*, 116.
[155] *Ibid*.
[156] Jimenez, '"Slow Revolution" in Southern Africa', 164; Jimenez, 'Rites of Reproduction', 116.
[157] Jimenez, 'Rites of Reproduction', 117.
[158] Jimenez, '"Slow Revolution" in Southern Africa', 164.
[159] *Ibid*.
[160] Jimenez, 'Rites of Reproduction', 114.

Proto Nguni speakers also innovated the root '*-sìnda', to smear a dung floor, which derived from an earlier root '*-cìng', which means to rub, to smear.[161] In the late second millennium CE, Swati, Zimbabwean Ndebele, Hlubi and Zulu-speakers developed an areal form that specified 'dry cattle dung' using the root '*-quba'.[162] Proto Ngunis also had root words for 'animal hide' and 'dried' meat. This means that Proto-Ngunis saw cattle as beings whose skin could be used and whose flesh could be eaten after either slaughter or natural death.[163]

Animals also came to be seen as beings who could be barren, suggesting that humans were becoming interested and invested in their reproductive capacities. 'Barren', for Proto-Nguni-speaking ancestors, was signified by the root '*-yùmbà', but Proto-Southern herders innovated the root '*-dlólo', which means 'barren animal'.[164] The emergence of this concept further suggests a heightened interest in the sexual and reproductive lives of goats, sheep, and cattle, indicating that attention was paid to the sexual control of these animals. Control of cattle led to unequal power dynamics that were common from the early- to mid-second millennium, and increasingly started to inform southern African political institutions.[165]

The conceptual tools innovated by Proto-Nguni, Proto-Drakensberg, Proto-Southern and Proto-Northern speakers indicate that Proto-Nguni speakers had a 'basic familiarity' with domesticated animals during the first millennium and in that period 'laid the ideological and practical groundwork for a livestock-keeping lifestyle that subsequent generations tailored to their needs.'[166] For cattle, goats, and sheep this meant that their sexual lives were increasingly controlled, and they became seen as property and reproducible assets. Nguni speakers developed tools and concepts for dominating cattle, sheep and goats, in breeding and herding regimes locally, or *in situ*, while adapting to their environments and incorporating animal subjects into their lifestyles and social and political systems across southern Africa.[167] They did not arrive in the region with 'livestock technology'.[168] Cattle became increasingly central

[161] *Ibid*, 114–15.
[162] *Ibid,* 115.
[163] *Ibid*, Jimenez, '"Slow Revolution" in Southern Africa', 164.
[164] Jimenez, 'Rites of Reproduction', 119.
[165] *Ibid*, 125.
[166] *Ibid*, 119.
[167] Jimenez, '"Slow Revolution" in Southern Africa', 156, 167, 171.
[168] Jimenez, 'Rites of Reproduction', 105.

to many southern African human communities over the next several centuries. As explored in Chapter Five, for cattle, shifts towards modernised breeding occurred especially from the early twentieth century in what became South Africa, and a few decades later in colonial Botswana.

From the fifteenth to the seventeenth century, political traditions in the region, writes Paul Landau, 'developed out of a wider, connective process bringing people and ideas together over long distances.[169] By the time the Dutch settlers arrived at the Cape the southern African region was home to many different cattle, and cattle were entrenched in social, political, economic, and spiritual systems of many groups across the region. In addition to the Sanga types listed earlier, there were Tswana, Damara, Ovambo, Bapedi, Bolowana, and Basuto breeds.[170]

Conclusion

This chapter comprised three parts. First, by drawing on diverse disciplines and literatures, it introduced cattle as social and experiential beings. This was undertaken because this thesis aims to approximate a cattle perspective of colonialism by presenting cattle as subjects, as beings with minds and experiences. Second, it sketched a history of cattle from the agricultural revolution until they appeared in southern Africa. Third, it drew on Raevin Jimenez' research to show changes in how cattle were conceived of and their positions in southern African Nguni-speaking societies, especially from the eleventh century CE. The next four chapters comprise the empirical core of this thesis. They examine the impacts of colonialism on cattle's subjective experiences, in terms of oxen's forced wagon labour, the impact of cattle diseases and veterinary regimes, the emergence of industrialised slaughterhouses, and colonial and modernised breeding regimes. I proceed now to explore a cattle-centred history of colonialism in southern Africa.

[169] P. Landau, *Popular Politics in the History of South Africa, 1400–1948* (Cambridge: Cambridge University Press, 2010), 72.
[170] A. Smith, 'The Origins of Domesticated Animals of Southern Africa', in R. Blench and K. MacDonald (eds.), *The Origins and Development of African Livestock: Archaeology, Genetics, Linguistics, and Ethnography* (London: UCL Press, 2000), 224.