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**Workers, mothers, pests:
Co-evolutionary perspectives on domesticated cattle in early twentieth
century North India**

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ABSTRACT

This thesis builds upon political, environmental and veterinary histories of domesticated cattle in South Asia, by offering the first study of animal husbandry in British Imperial and Hindu Nationalist discourses at the turn of the twentieth century. Drawing upon English and vernacular Hindi archives, comparative analysis demonstrates that the socio-cultural, material and environmental dynamics of animal domestication were influenced by perceptions of animal behaviour. It shows that in textbooks, reports and journals published by agriculturalists, cattle breeders and dairy farmers, four primary behaviours of cattle became the subject of competing ideas about the development and decline of cattle populations and agricultural society. These were the instincts to consume, rear, mate and live as a herd. North India offers a unique context in which to explore why colonial science and indigenous knowledge formed competing perspectives of how these behaviours contributed towards the coevolution of humans and cattle. Previous narratives shared the assumption that prior to the formalisation of animal husbandry in imperial institutions of the 1930s, human-cattle relations were unchanged from time immemorial. The purpose of this thesis is to challenge this assumption, to demonstrate that early twentieth century animal husbandry was shaped by a confluence of socio-cultural, environmental, and behavioural forces. Drawing on social, environmental, and animal histories, this thesis is able to demonstrate that changing norms of domestication were the product of compromise, interaction with and responses to, the physiology and behaviour of cattle.

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LIST OF ABBREVIATIONS

AAI	Allahabad Agricultural Institute
CTA	Cattle Trespass Act of 1871
CVD	Civil Veterinary Department
EIC	British East India Company
ICAR	Imperial Council of Agricultural Research
IVRI	Imperial Veterinary Research Institute
MDF	Military Dairy Farm
NWP	North-Western Provinces and Oudh (1878-1902)
RCA	Royal Commission on Agriculture
UP	The United Provinces of Oudh and Agra (1902-1947)

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GLOSSARY

<i>bacharā/bachiyā</i>	बछड़ा/बछिया	calf
<i>bail</i>	बैल	bull
<i>bhaisa</i>	भैंस	buffalo
<i>dahī</i>	दही	yogurt
<i>desh</i>	देश	country
<i>dōdh</i>	दूध	milk
<i>dōdhwālā</i>	दूध वाला	milkman
<i>gāya</i>	गाय	cow
<i>gau jati</i>	गौ जाति	cattle breed
<i>gau mātā</i>	गौ माता	mother cow
<i>gau rakshā</i>	गौ रक्षा	cow protection
<i>gaushālā</i>	गौशाला	cattle home
<i>ghī</i>	घी	clarified butter
<i>gauwālā</i>	गौ वाला	cattle herder/milkman
<i>gōbar</i>	गोबर	cattle dung
<i>khād</i>	खाद	fertiliser
<i>kisān</i>	किसान	farmer
<i>krishi</i>	कृषि	agriculture
<i>mātā</i>	माता	mother
<i>peshāb</i>	पेशाब	urine

Introduction

On my first walk to the Hindi language school in Jaipur, I encountered a cow (*gāya*) freely wandering in the street. Out of sheer wonder, I instantly took the photo shown below. For many months, I lived alongside a host of animals in some of the most densely populated cities of North India, known colloquially as the “cow belt”.¹ I gradually became accustomed to the sight of a cow, a bull (*bail*) and even a calf (*bacharā/bachiyā*) gracefully ambling through waves of traffic, grazing on scraps of food and resting unharmed in the middle of the road. Many cities across the globe co-habit with a host of animals that have adapted to the rhythms of urban life. However, for followers of India’s majority religion, Hinduism, cattle are sacred animals. As British linguist Monier-Williams observed in 1891, while there were no temples dedicated purely to the cow, Hindu people saw the ‘living animal’ as the ‘perpetual object of adoration’, worship and protection.² Indian culture has been commonly associated with principles such as non-violence (*ahimsa*) and vegetarianism. These ethical concepts are rooted at the core of Hinduism, Jainism and Buddhism, philosophies that encourage people to abstain from consuming or harming animals.³ Despite this deification, sacred animals have not sat in an eternal harmony with the landscapes and residents of urban and rural spaces. Many people balance their worship of animals with a tolerance of their behaviours, whenever they see a cow tearing apart bin bags, a monkey vandalising property or a threatening pack of dogs.⁴ But unlike the street dogs that are at times the outlets for aggression and pushed to the fringes, city life in many North Indian cities has accommodated the presence of cattle. In many areas cattle can

¹ Shraddha Chigateri, ‘Negotiating the ‘Sacred’ Cow: Cow Slaughter and the Regulation of Difference in India’, in Monica Mookherjee (ed.), *Democracy, Religious Pluralism and the Liberal Dilemma of Accommodation* (London, 2010), p. 146.

² Monier Monier-Williams, *Brahmanism and Hinduism* (New York, 1891), p. 319.

³ Catherine Robinson and Denise Cush, ‘Sacred Cow: Hinduism and Ecology’, *Journal of Beliefs and Values*, 18:1 (1997), p. 26.

⁴ For studies of South Asian animals and urban space, please see, Tristan Donovan, *Feral Cities: Adventures with Animals in the Urban Jungle* (Chicago, 2015); Yamini Narayanan, ‘Animals and Urban Informality in Sacred Spaces: Bull-Calf Trafficking in Simhachalam Temple, Visakapatnam’, in Yamini Narayanan (eds.), *Religion and Urbanism: Reconceptualising Sustainable Cities for South Asia* (Oxon, 2016), pp. 143-161.

wander confidently through the city without fear of being attacked or run over. While both species may compete for waste and scraps, cattle will often be greeted with food by devotees as they pass their houses. As I casually observed these animals on my daily commutes to archives and libraries across the region, I began to wonder whether I could locate this narrative of human-animal interaction within the colonial and vernacular archive. Despite the wealth of scholarship on India's sacred cows, studies have yet to investigate the history of the interconnection between the socio-cultural, material and environmental norms of domestication, and the presence and impact of animal behaviours in North India.



Figure 1: 'A cow wandering around a suburb of Jaipur' (Photo by Lloyd Price, 30/07/2015).

I *Context of thesis*

North India constitutes a handful of states that are currently part of the Republic of India. It is a region that stretches from the Gangetic plains of Uttar Pradesh to the deserts of Rajasthan, along the geographic boundaries of the Himalayas to the north and the man-made Pakistan border to the west (see Map 1). It is famous for its diverse environments and cultures, home to the ancient cities, temples and shrines of Hinduism, Buddhism and Jainism, as well as remnants of the Mughal Empire (1526-1756), a legacy symbolised most vividly by the Taj Mahal. From the sixteenth century, European traders and missionaries made their mark on the Indian subcontinent, a scramble for resources and power that culminated with the formal inauguration of the British Raj in 1858. The rail tracks, English language and planned streets of cities such as New Delhi are but a few examples of the impact of British colonialism on North India, before India attained independence in 1947.

This thesis provides an analysis of animal domestication in North India at the turn of the twentieth century. At the time, cattle were the backbone of what Hindi books, journals and newspapers called India's agricultural nation (*krishi pradhān desh*).⁵ As agricultural textbooks noted, working bullocks (castrated males) were vital to the success of the region's two main annual harvests, being autumn crops (*khariḥ*) such as rice, sorghum and millet sown at the beginning of the monsoon season in June, and winter crops (*rabi*) sown in October such as wheat and barley.⁶ Bullocks also powered irrigation systems to draw water from wells.⁷ The most common structure was the Persian wheel, a contraption which bullocks slowly rotated in order to extract water from underground reserves, often dispensing it into a system of pipes that tilted towards the fields. Furthermore, they were an important source of transport, towing carts of goods and carriages of people. In a common village, cow's milk (*dōdh*) was a staple source of protein, converted into long lasting dairy products such as clarified butter (*ghī*) and yogurt (*dahī*). The dung of cattle (*gōbar*) was also a prized resource, utilised as a fuel for cooking and a fertiliser, while their urine (*peshāb*) was valued for its medicinal properties.⁸

⁵ Centre for South Asian Studies (henceforth CSAS), *Bharat Jivan* (Indian Life), 'Raja ko chaye ki gauraksha kar deshdeshasudhare' (A ruler should protect the cow for progress of the country), (01/12/1902).

⁶ Vishārd Shitalprasānd Tiwāri, *Krishi Vigyān* (Agricultural Knowledge) (Allahabad, 1926), p. 278.

⁷ Babu Balram Das, *Kisān Vidya* (A Primer on Agriculture) (Benares, 1896), p. 20.

⁸ Pandit Tejshankar Kochka, *Krishi Shāstra* (Agricultural Science) (Bulandshahr, 1924), p. 78.

The two main regions of British India that form the focus of this thesis are the United Provinces of Agra and Oudh (UP) (see Map 2) and the Punjab. At times, the princely state of Rajputana is also discussed. With the largest cattle population of any region, UP accounted for approximately 31 million of the estimated 88 million cattle recorded in 1904 (see Appendix 1).⁹ Formed in 1902 to consolidate the administration of the North-Western Provinces and Oudh, UP's northern districts of sub-montane forests and meadows along the Nepal border were home to professional and village cattle herders, known to rear strong, hardy breeds of Kherigarh and Ponwar cattle. These bulls and bullocks were the foundation of the region's agricultural heartlands, the vast plains that spread out from the Ganges and Yamuna rivers, forming the cradle of North India's civilisation. Sitting along the western border of UP, the Punjab placed third in the table of cattle populations at the time, with approximately 4 million bulls and bullocks, 2.2 million cows, 2.4 million buffalo and 3.6 million young stock of calves and buffalo calves (see Map 3). The western districts of the Punjab, known as the Land of the Five Rivers, became a new centre of agriculture in British India during the late nineteenth century. In one of its most ambitious environmental projects, the colonial government used the rivers to build a network of canals that converted pastoral grazing lands into irrigated fields, ready for cultivation.¹⁰ To support this emerging agrarian society, the government utilised Hissar type cattle that originated in one of the last thriving cattle breeding centres in the region, the arid lands of the south-eastern corner of the Punjab.

At the turn of the twentieth century, many Hindu nationalists and religious leaders organised conferences, gave speeches and published newspaper reports that sought to 'open Hindu eyes' (*Hindu ānkh kholakar dekhe*) to the forces that were rupturing the material, environmental and socio-cultural foundations of humanity's relationship with cattle across North India.¹¹ While the origins of the philosophy remain divisive,¹² scholars have shown that since the late nineteenth century the cow protectionist movement became a central feature of politics and

⁹ National Archive of India (henceforth NAI), Department of Revenue and Agriculture (DRA) (312:5421), 'The United Provinces Cattle Census of 1915-1920'.

¹⁰ For studies of irrigation in North India, please see, Elizabeth Whitcombe, *Agrarian Conditions in Northern India: The United Provinces under British rule, 1860-1900* (New Delhi, 1971); Imran Ali, *The Punjab Under Imperialism, 1885-1947* (Princeton, 1988); Brian Caton, 'The Transition from Animal Capital to Land Capital in Colonial Punjab, 1850-1900', *Capitalism Nature Socialism*, 26:3 (2015), pp. 64-72.

¹¹ CSAS, *Hindu Sansar* (Hindu World), 'Gauaun ko Hatya' (Slaughter of Cattle), (17/06/1925).

¹² For studies of cattle and Indian culture, please see, A. Vaidyanathan and K. Narayanan Nair, 'On the Sacred-Cow Controversy', *Current Anthropology*, 21:3 (1980), pp. 380-384; Dwijendra Narayan Jha, *The Myth of the Holy Cow* (London, 2002); Carl Olson, *The Many Colors of Hinduism: A Thematic-Historical Introduction* (New Brunswick, 2007); Ludwig Alsdorf, *The History of Vegetarianism and Cow-Veneration in India* (Albington, 2010).

culture in North India. It emerged within the doctrines of Hindu revivalist and nationalist movements at the time, which argued that cattle should be protected from slaughter in order to revive the material and spiritual greatness of North India's ancient Vedic civilisation. At times, this belief led to tension between Hindu and Muslim communities, which boiled over into violence in 1893 when cattle were sacrificed during the Islamic festival of Bakri-Id.¹³ Cow protectionists also critiqued the British for their unwillingness to give legal protection to animals that they saw as walking loins of beef, whose hides were integral to the thriving leather trade that European businessmen had established in Cawnpore.¹⁴ Historian T. M. Mukurdhan stressed that these socio-cultural and political conflicts were exacerbated by the material destruction and insecurity wrought by the spread of drought, famine (*akāl*) and plague in the 1890s.¹⁵

As environmental historians have shown, the late nineteenth century was a watershed moment in the histories of agriculture, the environment and animals across the South Asia. While precolonial civilisations were known to exploit the landscape, it is widely agreed that the British Raj drained the subcontinent of its natural resources on an unprecedented scale, resulting in miasma, displacement, deforestation and the destruction of ecosystems and human settlements.¹⁶ In the Central Provinces of British India, Laxman Satya has shown that the colonial government's relentless demand for cash crops, such as cotton, drained the landscape of its nutrients and moisture. It forced farmers to put acres of land under the plough that were once grazing pastures, causing the region's cattle to become weak, malnourished and powerless to fight off disease and death.¹⁷ Satya also highlighted that many colonial officials

¹³ For studies of cow protectionism in colonial North India, please see, N. Gerald Barrier, 'The Punjab and Communal Politics, 1870-1908', *The Journal of Asian Studies*, 27:3 (1968), pp. 523-539; Anand A. Yang, 'Sacred Symbol and Sacred Space in Rural India: Community Mobilization in the "Anti-Cow Killing" Riot of 1893', *Comparative Studies in Society and History*, 22:4 (1980), pp. 576-596; Sandria B. Freitag, 'Sacred Symbol as Mobilizing Ideology: The North Indian Search for a "Hindu" Community', *Comparative Studies in Society and History*, 22:4 (1980), pp. 597-625; William Gould, *Religion and Conflict in Modern South Asia* (New York, 2012).

¹⁴ For studies of cattle and colonial policy, please see, A. N. Duckham, *Animal Industry in the British Empire* (London, 1932); Peter Robb, 'The Challenge of Gau Mata: British Policy and Religious Change in India, 1880-1916', *Modern Asian Studies*, 20:2 (1986), pp. 285-319; Manali Chakrabarti and Biswait Chatterjee, 'Business Conduct in Late Colonial India: European Business in Kanpur 1900-1939', *Economic and Political Weekly*, 41:10 (2006), pp. 904-911.

¹⁵ T. M. Mukurdhan, *Gau-Vadh aur Angrez* (Cattle Slaughter and the English) (New Delhi, 2003), p. 14.

¹⁶ For environmental histories of colonial India, please see, Madhav Gadgil and Ramachandra Guha, *This Fissured Land: An Ecological History of India* (Berkeley, 1992); Mahesh Rangarajan, *Fencing the Forest: Conservation and Ecological Change in India's Central Provinces, 1860-1984* (New Delhi, 1996); Arun Agrawal and K. Sivaramakrishnan, *Agrarian Environments: Resources, Representation, and Rule in India* (London, 2000).

¹⁷ Laxman D. Satya, *Ecology, Colonialism, and Cattle: Central India in the Nineteenth Century* (New Delhi, 2004), p. 67.

were reluctant to acknowledge the negative impact of colonialism. Instead, they felt that environmental issues affecting the subcontinent were the product of reliance on and subservience to the inconsistent forces of the wild, such as the monsoon and its tropical climate. Cattle populations were not degenerating because of colonial rule. It was “superstitious” and “primitive” customs such as cow protectionism that had allowed India’s ‘naturally diseased environment’ to produce ‘low forms of human, animal, and vegetable life’. In colonial discourse, overpopulation, desertification and miscellaneous types of cattle were problems caused by the taboo on slaughter.¹⁸

II *Focus of thesis*

As the previous historiography revealed, North India offers a unique context in which to conduct a comparative analysis of religious nationalist and colonial discourse. While studies have covered the socio-cultural, political and environmental dynamics of debates surrounding cattle, this thesis offers a hitherto unexplored analysis of an integral question that has yet to be answered. Namely, how were animal behaviours perceived to contribute to the development or decline of civilisation in North India? In each chapter of this thesis, it is shown that conceptions of how cattle interacted with the material, socio-cultural and environmental dynamics of human-animal co-evolution where shaped by perceptions of how cattle consumed food, reared their calves, mated and wandered as a herd. These four primary behaviours formed the crux of competing conceptions of animal husbandry, and its capacity to develop or degenerate the relationship between humans and cattle across North India. But how and why did such contrasting representations of animal behaviour emerge? Were they purely rooted in the cultural paradigms of religious nationalist and colonial discourses? Or, can it be argued that the behaviours of the animal were a historical force that influenced the nature of ideas and practices relating to domestication?

This thesis will fill this lacuna in the field of South Asian history by offering the first study of domesticated cattle in North India at the turn of the twentieth century. It develops our current understanding of animal domestication in South Asian history, which has mostly focused on colonial veterinary science during the nineteenth century. Saurabh Mishra has shown that

¹⁸ Satya, *Ecology, Colonialism, and Cattle*, p. 129.

during the 1890s cattle across North India were threatened by dearth and disease, which led to an estimated loss of half a million head of cattle in many regions, littering the landscape with the skeletons of cattle, forming a void in the rural economy that had a detrimental effect for decades. Despite these harrowing scenes and colossal figures, Mishra noted that the colonial government took a 'lukewarm' approach to problems facing cattle in the nineteenth century.¹⁹ This changed at the turn of the twentieth century, when the government began to invest in research and institutions that specialised in agriculture, veterinary science, dairy farming and cattle breeding. In addition, the period marked the emergence of vernacular works on agrarian life and animal husbandry in Hindi, an emerging textual form of a language spoken by the Hindu community across North India. The period represents the formative years of new approaches to animal domestication in both colonial science and indigenous discourse. As such, it offers a wealth of resources in which to compare and contrast the confluence of ideas that influenced methods and practices of feeding, breeding, rearing and herding cattle.

III *Theory and method*

The nature and influence of animal behaviours in the past has been a core focus of my work as a historian since I completed my MA dissertation, which unlocked the history of interactions between humans and snakes in India. In the reports, books and journals of colonial officials, venomous snakes were perceived to be violent and dangerous creatures that needed to be eliminated from the subcontinent. The British felt that the superstitions of the Indian people had allowed snakes to overrun the landscape, due to their reluctance to kill snakes and the prevalence of Hindu shrines dedicated to cobras. Using studies from ecology, animal behaviour and a range of other natural sciences, I argued that snakes were in fact reclusive animals by nature, that bite only when trampled on or disturbed. Colonial representations were exaggerations based on the statistical number of people killed each year.²⁰ When I commenced

¹⁹ For studies of veterinary science in colonial India, please see, Diana K. Davis, 'Brutes, Beasts and Empire: Veterinary Medicine and Environmental Policy in French North Africa and British India', *Journal of Historical Geography*, 34:2 (2008), pp. 242-267; Saurabh Mishra, 'Beasts, Murdrains, and the British Raj: Reassessing Colonial Medicine in India from the Veterinary Perspective, 1860-1900', *Bulletin of the History of Medicine*, 85:4 (2011), pp. 587-619; Saurabh Mishra, 'Cattle, Dearth, and the Colonial State: Famines and Livestock in Colonial India, 1896-1900', *Journal of Social History*, 46:4 (2013), pp. 989-1012; Saurabh Mishra, *Beastly Encounters of the Raj: Livelihoods, Livestock and Veterinary Medicine in North India, 1790-1920* (Manchester, 2015).

²⁰ This research has been published as, Lloyd Price, 'Animals, Governance and Ecology: Managing the Menace of Snakes in Colonial India', *Cultural and Social History*, 14:2 (2017), pp. 201-217.

this thesis, I again drew upon interdisciplinary resources in order to produce a comparative analysis of attitudes towards the behaviours of cattle in colonial and cow protectionist discourses. Seeking to access the cattle of the past, I studied archival documents for examples of animal behaviour, and I was duly rewarded. In both colonial and vernacular reports by veterinarians, agriculturalists, dairy farmers and cattle breeders, a host of contrasting representations of cattle emerged. Cow protectionists celebrated the vigorous nature of the wandering bull, the motherly instincts of the cow and promoted the right of old and infirm cattle to graze the land until they died of natural causes. By contrast, colonial reports presented India's bulls as ungoverned and aggressive, the cow as possessive and the wandering herds as unproductive "pests". The archive was replete with contrasting ideas about the impact of the behaviours of cattle. I set about analysing these documents, seeking to ascertain which perspectives offered an accurate representation of the influence of animals.

As I progressed with my work, I became confronted by key questions that challenged my initial assumptions about the animal and its relationship with history. Firstly, how could I choose which polarised representation of cattle reflected their impact on history? Secondly, was it possible to ascertain whether their behaviours actually benefitted or hindered society? I was immediately confronted by the notion that within the archival resources that I could access, the actions of the animal were always constructs of an anthropocentric lens.²¹ It became clear that both colonial and indigenous discourses presented ideas about animal behaviours that supported their political, economic and cultural agendas. If I chose to favour either colonial and cow protectionist representations as a true account of animal behaviours, I would ultimately fall foul of reproducing anthropomorphisations, ascribing human intentions, personalities and emotions to animals.²² To gain clarity, I turned to the pages of the natural sciences for some concrete understanding of the behaviours of cattle. However, the longer that I considered this evidence, the more I became sceptical of affiliating modern research on domesticated animals with those encountered in the archive. Such an approach threatened to

²¹ For discussion of the historical archives and access to animals in the past, please see, Erica Fudge, *Perceiving Animals: Humans and Beasts in Early Modern English Culture* (Basingstoke, 2000); Etienne Benson, 'Animal Writes: Historiography, Disciplinarity, and the Animal Trace', in Kalof and Montgomery (eds.), *Making Animal Meaning* (East Lansing, 2011), p. 4.

²² For discussions of animal and the humanities, please see, Steve Baker, *Picturing the Beast: Animals, Identity, and Representation* (Chicago, 1993); Eileen Crist, *Images of Animals: Anthropomorphism and Animal Mind* (Philadelphia, 1999); Nicole Shukin, *Animal Capital: Rendering Life in Biopolitical Times* (Minneapolis, 2009).

render the animal ahistorical, its behaviours static archetypes that did not change in response to either natural phenomena or the forces of domestication.²³

As Pär Segerdahl noted, conceptions of the “wild”, “natural” or “artificial” behaviours of animals are subjective, based on historically situated conceptions of culture, ethics and science.²⁴ Any representation or knowledge of an animal, or any natural phenomenon for that matter, is the product of what Tim Ingold defines as perceptual relativism. Namely, that ‘people from different cultural backgrounds perceive reality in different ways since they process the same data of experience in terms of alternative frameworks of belief or representational schemata’.²⁵ This hypothesis does not deny that the biophysical world and the behaviours of animals can influence the past. Archival representations of these phenomena may be cultural constructions. However, they are nevertheless a response to the phenomena in question, deciphered through the dynamics of human experience and perception. For evolutionary historians such as Edmund Russell, these relative cultural responses provide evidence of the intersections at which humans and domesticated animals have ‘evolved in response to each other’. Building upon Charles Darwin’s concept of co-adaptation, Russell challenged the classical understanding of domestication as a product of human mastery. As a symbiotic relationship situated within the biophysical and cultural histories of a society, domestication was instead product of the ever-changing dynamics of human-animal co-evolution. Its make-up in any given context has been shaped by the shifting nature of roles, known as niches, in which humans and animals interact.²⁶

This thesis offers a co-evolutionary perspective on the history of animal domestication in North India. It demonstrates that competing conceptions of the contribution of animal behaviours to North Indian civilisation emerged during the early twentieth century, due to the confluence of conflicting material, environmental and socio-cultural ideas about the role that cattle should perform within their co-evolutionary relationship with humans. To make this case, this thesis offers a qualitative analysis of representations of what ecologists define as the primary

²³ Benson, ‘Animal Writes’, p. 7.

²⁴ Pär Segerdahl, ‘Can Natural Behaviour be Cultivated? The Farm as Human/Animal Culture’, *Journal of Agricultural and Environmental Ethics*, 20:2 (2007), p. 168; Annabelle Beaver, Caroline Ritter and Marina A. G. von Keyserlingh, ‘The Dairy Cattle Housing Dilemma: Natural Behaviour versus Animal Care’, *Veterinary Clinics of North America: Food Animal Practice*, 35:1 (2019), p. 12.

²⁵ Tim Ingold, *Perception of the Environment: Essays on Livelihood, Dwelling and Skill* (London, 2000), p. 15.

²⁶ Edmund Russell, *Evolutionary History: Uniting History and Biology to Understand Life on Earth* (Cambridge, 2011), p. 2.

behaviours of cattle, namely their instinct to consume food, rear their young, mate and mobilise as a herd.²⁷ Turn of the century North India offers a particularly significant juncture at which to study animal history, a point at which the vast cattle populations of the region became subjected to comparative perspectives on their contribution to society. The socio-religious status of cattle gained political and cultural significance within Hindu nationalist discourse, at the same time that colonial sciences of animal husbandry sought to “modernise” cattle populations along western lines. Each chapter of this thesis demonstrates that the methods and practices of animal husbandry did not form due to the influence of either colonialism or nationalism. Both discourses were uniquely shaped by and responded to the socio-cultural, material and environmental dynamics of animal behaviour across North India. While political and cultural discourses informed many ideas, the history of animal domestication developed through compromise and interaction between humans and the animal. Building on animal histories, this thesis demonstrates that despite the polarity of discourses, changing methods and practices of animal husbandry in the early twentieth were grounded in the material, environmental and socio-cultural dynamics within which the physiological and behavioural nature of India’s herds of *Bos indicus* zebu cattle were historically situated. In sum, the behaviours of the animal became a site of both contest and collaboration that blurred cultural boundaries, as colonial officials and Hindu nationalists both sought to reform animal domestication. The representations and ideas that emerged within these discourses constitute co-evolutionary perspectives on the contribution of cattle to Indian society.

IV *Plan of thesis*

This thesis is structured into six chapters. The first chapter, *Cattle in colonial and religious nationalist discourse: A historiography*, explores historiographical approaches to the two main discourses that shaped conceptions of cattle in early twentieth century India. It begins by discussing ideas and attitudes towards cow protectionism within British Imperial texts, looking at how the religious beliefs and tropical climate of India were presented as socio-environmental forces that created a “primitive” civilisation. By contrast, colonial discourses proposed that western culture could modernise the colonies by utilising “rational” methods of science. The core concept that epitomised this notion in terms of animal domestication was the

²⁷ D. G. Bryant, ‘The Ecological Basis of Behaviour’, *Applied Animal Behaviour Science*, 22 (1989), p. 216.

“breed”, a physiological and cultural symbol of control over the evolution of the animal. In the second section, the significance of the “breed” in the history of animal domestication in North India is explored by looking at its influence upon representations of cattle within Hindu nationalist ideology. On the one hand, cow protectionists and Hindu nationalists presented the cow as an aspect of culture that should be protected from western interference, in order to reawaken the glories of India’s ancient Hindu civilisations. On the other, studies of dairying and animal domestication show that nationalists used colonial science to improve the material productivity of the animal, affiliating progress with the formalisation of a national herd of distinct “breeds”. Both Imperial and nationalist narratives share the assumption that the “breed” signified development and that prior to the formalisation of animal husbandry in imperial institutions of the 1930s, human-cattle relations were stagnant and unchanged from time immemorial. Drawing upon historical approaches that have deconstructed the discourses of imperialism and nationalism, this chapter demonstrates that these assertions were based upon Euro-centric conceptions of modernity and teleological narratives of nationalism, which subsumed social, environmental and animal histories. Contesting this approach, the third section shows that imperial and nationalist approaches to animal husbandry were grounded in the material, biophysical and agentic dynamics that shaped human-animal co-evolution during the opening decades of the twentieth century. As each chapter of this thesis demonstrates, the ideas and attitudes of veterinarians, agriculturalists, dairy farmers and cattle breeders were determined by their interaction with and response to the socio-cultural, environmental and material dynamics of how animal behaviours contributed towards domestication in North India.

In the second chapter, *Pests, producers and agricultural chemistry in late nineteenth century North India*, I investigate colonial and indigenous visions of agricultural progress, to understand how and why they sought to reform the consumption habits of cattle and the material contribution of the resources they produced. From the late nineteenth century, colonial officials began to pass legislation that sought to control the socio-religious impact of cow protectionism, the animal geographies of North India and how both dynamics interacted with cultivated lands. North Indian villagers were perceived to promote norms of domestication that allowed cattle to expand into a vast, unproductive population of “pests” that overgrazed the landscape. Within the discourses of chemistry that came to the forefront in the pages of government journals such as the *Agricultural Ledger* in the 1890s, colonial officials sought to

reform cattle into productive “converters” of resources, passive consumers that could be fed a controlled supply of fodders and concentrated foods, in order to produce nitrogen rich manure to be used for the land. While recognising the environmental challenge posed by North India’s monsoonal harvests, colonial officials argued that fodder supplies were low and cattle were weak and infirm due to unproductive and lax controls over the capacity for animals to graze, and the improper use of its dung as cooking fuel. To resolve these issues and appease both sides, many colonial and Indian agriculturalists chose instead a third option, urine, a sacred substance of the cow whose nitric qualities could be used to replenish the land, while alleviating the need to use dung.

Competing conceptions of animal behaviour come to the forefront in the third chapter, *Mother cow, milk and maternal behaviour*. As scholars have shown, the motherly role of the cow was both a symbolic concept linked to the rearing of the nation, and a belief that the maternal instincts of the cow were an invaluable physiological and emotional inheritance that was essential to rear healthy calves. As the military department began to seek to provide a dairy supply to its cantonments in the 1890s, colonial dairy farmers recognised that while they could control an animal’s desire to consume and mate, officials were increasingly confronted by the realisation that *Bos indicus* zebu cows asserted strong maternal instincts to rear their calves. Moreover, they were reluctant to be milked unless their calf was present. Government institutions increasingly promoted the idea that the cow was simply a converter of grasses into milk, and that its motherly behaviours were an example of the stubborn and possessive characteristics that Indian norms of domestication encouraged. In Europe it was customary to separate dairy cows from their calves immediately after birth. Across India, the act of separation was associated with corruption and cruelty. Moreover, many nationalists and cow protectionists felt that the cow’s maternal instincts were a physiological and emotional necessity to rearing healthy working and dairying calves. Such examples demonstrate that the capacity for animal behaviours to help or hinder domestication was a site of contest. Should domesticators seek to neutralise the role of animal behaviours? Or could behaviours also contribute to the material, socio-cultural and environmental development of society?

The fourth chapter, *Stud bulls, agency and the breeding (or rearing) of cattle*, builds upon this model by exploring how the government sought to use pure-bred stud bulls to improve both the government herds and the village populations of cattle. With the foundation of the

Civil Veterinary Department (CVD) in 1892, the government initiated its first concentrated effort to repopulate North India with healthy and strong working cattle. From 1899, the CVD of the Punjab used controlled methods of selective breeding to create pure-bred types of Hissar stud bulls at the Hissar cattle farm. It hoped to use the reproductive abilities of the bull as an agency that could impose its vision of a regionally homogenous breed, supplied by its centralised market. But rifts emerged within the CVD as officials realised the environmental, material and socio-cultural limitations of the Hissar breed, and instead proposed that the government should attempt to assist local cattle breeders by opening rearing depots, where bulls could be brought to feed. Officials in the United Provinces broke with the methods of the Punjab, seeking to design a rearing farm around the needs of local breeders in the sub-montane districts along the Nepal border, building on indigenous knowledge. As this chapter will show, this rift in colonial policy was emblematic of how the limits of the discourses of mastery were a site of contest within colonial thought. The stud bull was understood as the catalyst of change, its reproductive abilities viewed as an agency that could propagate the standards of domestication set by colonialism. However, CVD officials in UP recognised that a stud bull's ability to have this influence was contextualised by the socio-cultural, environmental and behavioural histories of a breed in North India.

Mating behaviours are also the subject of a comparative exploration in the fifth chapter, *The "carnal desires" of wandering Brahmani bulls*. For many colonial officials and cow protectionists alike, the Hindu ritual of branding and letting loose Brahmani bulls to honour the passing of a family member, had a significant impact upon North India's cattle populations and landscapes. The custom gained the attention of the colonisers in 1884, when the Allahabad High Court deduced that because these bulls were set free to wander, they were the property of nobody (*res nullius*) and thus unprotected by colonial law. For colonial officials, the freedom allowed by the custom meant that the reproductive abilities of "lustful", "greedy" and cheap bulls had a negative impact upon cattle populations, as it led to miscellaneous herds without specific breed characteristics. For many Hindu leaders such as Madan Mohan Malaviya, the High Court's decision set in motion the collapse of a custom in UP that was not only sacred to the Hindus of North India, but a vital foundation for the reproduction of cattle populations. Both sides clashed in their understanding of the behaviour of bulls. Should their reproductive abilities be controlled to produce pure breeds? Or, could their instincts to wander and mate support rural society?

The purpose of the sixth chapter, *Working bullocks, missionaries and machines*, is to explore the co-evolutionary implications of competing perceptions of animals. Throughout the early twentieth century, the physiological and behavioural abilities of working animals became embroiled in a comparative debate, as agricultural machines became viewed as a means of evolving beyond the limitations of the human-animal relationship. Situated in the North Indian city of Allahabad, Presbyterian missionary Sam Higginbottom felt that due to the impact of environmental, socio-cultural and behavioural factors, India needed to abandon its animal herds and embrace tractors, reapers and other mechanical contraptions that were imported from Western Europe and North America. However, his work at the Allahabad Agricultural Institute was confronted by many leading figures in Indian politics, such as Mahatma Gandhi, who argued that industry would only breed inequality and conflict. The body of the cow was perceived to be a more peaceful, sustainable and egalitarian means of development on the subcontinent. To what extent did the machine replace the animal? And how did these comparative forces shape North India as it moved into the post-colonial era?

V *Sources and Limitations*

In each chapter of this thesis, it is shown that animal behaviours emerge throughout the socio-cultural, material and environmental dynamics of the sources. These examples mark points of conflict and competing ideas about the role of the animal as consumers, producer, mother, mate and a social being attached to a herd. The enquiry launched in this thesis on animal behaviours, government based knowledge practices, missionary efforts and indigenous customs and methods has relied hugely on a range of primary sources from both the English and Hindi language archives. The sources gathered are documents I was able to access in the UK, India and USA. Throughout the thesis, Imperial Gazetteers have been consulted for contextual information about North India at the turn of the twentieth century. For information about the activities of the veterinarians, the reports of the Civil Veterinary Department in the United Provinces and the Punjab were accessed via the National Library of Scotland's digitised archives of the Medical History of British India. The life and work of Sam Higginbottom was accessed in a range of private letters, diaries and correspondences housed at the University of Virginia. These chapters are also supported by a wealth of government documents housed at

the British Library in London, the National Archives of India in Delhi, and the Uttar Pradesh State Archives in Lucknow. The thesis also draws upon range of English and Hindi books and journals that offer guidance about animal domestication in the early twentieth century. Many of the books published in Hindi were accessed at publishing houses and libraries such as the Hindi Sahitya Sammelan in Allahabad and the Nagari Pracharini Sabha in Varanasi.

Reports produced by colonial officials often offer a detailed study of the statistics and ideas gathered by the British Imperial government during the early twentieth century. They are useful as a tool for understanding the nature of colonial operations and methods, but the statistics and opinions they provide need to be understood as products of colonial discourse. Ideas about social welfare and the people need to be understood within this framework, as well as the racial and gendered concepts that spread throughout information gathered by the administrative tools of British Imperialism. In some cases, due to the limitations of the archive I was only able to attain a partial picture. For example, the long-term nature of operations at the Allahabad dairy farm could not be uncovered, as records were missing. In other instances, the precise records of the Allahabad High Court were off limits during my stay in Delhi. It is also important to recognise that the Hindi sources were produced by a specific section of North Indian society for political and cultural ends. Each was defined by political and cultural factors. To my knowledge, my PhD thesis offers the first foray into animal husbandry within the vernacular archive. As such, details about the specific authors and their intentions were not always available. Another issue was accessing the animal. While scholars have promoted new methodologies, my research relied on textual sources, framed within the discourses of colonialism and nationalism. As such, the animals represented exist within these discourses. That said, I have chosen to use pronouns his and her where applicable, rather than it, when referring to animals. Throughout the thesis, I have retained the original titles of Hindi books and journals. I have transferred these from the Devanagari script into the Roman alphabet, and translated them into English in order for them to be easily read as either transliterations of the original Hindi words, or English translations. All translations of Hindi books, journals and newspapers featured in this thesis are my own. Throughout the thesis, I have also deployed a range of terms and signage developed by Indian culture to represent animals, the gentry, peasantry and the unique caste system. I have made key terms accessible to the reader in the Glossary. Moreover, I have compiled and presented a host of statistics from the archive, pertaining to various aspects of cattle populations, breeders and markets referenced in the

thesis. These are available for easy reference as part of the Appendices. For statistics, I have utilised an Imperial scale of weights and measurements to convert figures into Litres. One statistic that is difficult to deduce is the international value of an Indian rupee (Rs.), subdivided into 16 annas and 64 pice. The rupee did not become part of the currency exchange until 1947, when £1 equalled approximately Rs. 13.3. Another area which continues to raise continuity issues for scholars of Indian history is the names of major cities, villages and towns. Many names for key locations in this thesis have recently become obsolete, due to renaming processes of the Indian government that seeks to restore the original Hindu names for key locations, which existed before the Mughal and colonial eras. For example, only a year after my research trip to the city, in October 2018 the Indian government renamed the city of Allahabad as Prayagraj. Other notable examples are Madras (Chennai), Calcutta (Kolkata), Bombay (Mumbai), Cawnpore (Kanpur). In this thesis, I have chosen to retain the colonial names for major cities and towns, in order to reflect the continuity within the archive and the historical context.

Chapter 1

Cattle in colonial and religious nationalist discourse: A historiography

At the turn of the twentieth century, cattle became intertwined with the political, socio-cultural, material and environmental histories of India. In the discourses of the colonial British rulers and the cow protectionist ideology of Hindu nationalists, the nature of how cattle were domesticated was affiliated with the development and decline of agriculture and society in North India. The purpose of this chapter is to outline the previous historiographical approaches to both colonialism and religious-nationalism, unearthing the factors that influenced ideas and attitudes towards cattle. While the political dynamics of each perspective offer competing representations of the animal, it is shown that both colonial and nationalist approaches to animal husbandry emphasised the significance of the “breed” as a centre of progress. As a marker of control over the feeding, rearing, mating and herding behaviours of cattle, the formalisation of a national herd of distinct indigenous and cross-bred cattle from the 1930s represented the beginning of progressive animal domestication in previous studies. The purpose of this chapter is to contest this assumption about the co-evolution of humans and animals, challenging the perspective that domestication was purely the product of control and mastery over the animal. As this thesis demonstrates, the behaviours of cattle were integral to the material, socio-cultural and environmental composition of North India. For colonial and religious nationalist discourses to change these dynamics to fit their models of productivity, their methods, ideas and approaches had to adapt to, and compromise with, the history of human-animal relations in North India.

1.1 *Colonialism, cattle and the discourses of mastery*

Cow protectionism was a quagmire for American anthropologists in the 1960s and 1970s. On the one hand, scholars followed the constructionist approach of Mary Douglas, by positing that the reason that people in India worshipped cattle was purely relative. On the other,

Marvin Harris proposed that the cow was sacred due to its functional significance to the people of India. Harris applied this ecological materialist framework to a host of taboos, rituals and beliefs across many cultures.¹ However, his hypothesis became branded as deterministic, because it suggested that there were predetermined laws about the connection between nature and culture. Moreover, this perspective inadvertently harkened back to the ethnocentric assumptions, embedded within the field of anthropology during the colonial era, that cultural customs were symbolic of a divide between civilisation and primitivism, progress and stagnation, modernity and tradition. As Edward Said highlighted in his seminal work *Orientalism*, western nations had justified their conquest and subjugation of Asia and Africa by creating a cultural division between the west and east. The occident was portrayed as enlightened, rational, scientific and morally upright. By contrast, the old world of the orient was depicted as a land governed by superstition and ritualism, a feudal sphere of emasculated natives that lacked morality, a degenerated culture living in the shadows of a hallowed past.²

By granting cattle the freedom to wander and to exist beyond their utility to humans, cow protectionism (*gau rakshā*) was branded as one of many beliefs that allowed the forces of the natural world to run wild, a custom that perpetuated the ungoverned instincts of cattle, leading to the degeneration of cattle populations and the land. A telling example of the colonial government's attitude towards cow protectionism was provided by the influential 'Royal Commission on Agriculture' (RCA). Conducted in 1927 under the leadership of the future Viceroy of India Lord Linlithgow,³ the RCA report offered an extensive review of agriculture in India, soliciting the perspectives of colonial officials, western missionaries and businessmen across the subcontinent. The RCA proposed that due to the taboo on slaughter, the Indian subcontinent was overpopulated with an unproductive but hardy population of domesticated animals that were caught in a vicious circle of decline. It stated that unlike Western Europe and North America where 'the stockowner is held responsible for finding food for his cattle', in India 'the custom is that the animal, when not working, should find its own food on the village common...uncropped land, or in the jungle'. The effects of these norms of animal husbandry were deemed to be compounded by the months leading up to the break of the monsoon season

¹ For anthropological debates about the sacred cow, please see, Frederick J. Simoons, *Eat Not this Flesh: Food Avoidances from Prehistory to the Present* (Madison, 1961); Marvin Harris, *Cows, Pigs, Wars, and Witches: The Riddles of Culture* (New York, 1974);

² For post-colonial studies of Imperialism, please see, Edward Said, *Orientalism* (New York, 1978); Edward Said, *Culture and Imperialism* (New York, 1993).

³ A. Vaidyanathan, *Bovine Economy in India* (New Delhi, 1988), p. 1.

in late June, when the ‘hardship endured’ by draught and milch animals in the scorching heat on sparse fodder created a ‘scarcity’ of productive animals.⁴ The RCA saw cow protectionism as one of many examples of traditional and superstitious ideas that perpetuated the negative effects of nature, as a wild, ungoverned force. To create a more productive cattle population, the report proposed ‘cardinal points in a policy of improvement’ to modernise bovine populations across India, stressing the significance of population control. It called for a reduction in the number of plough cattle and an increase in their efficiency, attention to all matters that would tend to decrease the number of bullocks required for cultivation, and an effort to secure better treatment of dry cows and cows in-calf. In sum, the RCA stressed that for cattle to contribute productively to society in India, the socio-cultural norms of domestication needed to view animals as material resources. Their capacity to consume, to mate, to rear and herd should be a site of control, geared towards agricultural progress. This entailed abandoning the cow protectionist belief that old and infirm animals had the right to live, as they consumed resources that could be used for working and dairying cattle.⁵ That said, the RCA feared that the ‘clearance of the rural population’ of cattle would be impossible, as the people of India would view it as a ‘sociological evil’.⁶

As the report of the RCA indicates, colonial discourse promoted a relationship between humans and domesticated animals that emphasised the need for control over the population. As environmental historians have shown, this need for control had been rooted in western culture since the early modern period. It was in part guided by the core assumption at the heart of monotheistic Christianity, that humanity had a divine right to make productive use of the flora and the fauna. It came to the fore during the colonisation of the new world in North America, where bringing the land under the plough was viewed as a sign of civilisational progress.⁷ As Keith Thomas elucidated, the tamed landscapes and thriving industrial and agricultural hubs of the British Isles were deemed to be symbolic of western civilisation’s mastery over the forces of nature. By contrast, the crumbling ruins of ancient forts and dense jungles in India were considered to be emblematic of a civilisation that was subservient to the wild.⁸ According to

⁴ *Royal Commission on Agriculture in India* (Calcutta, 1927), pp.199-201.

⁵ *Royal Commission on Agriculture*, p. 21.

⁶ *Royal Commission on Agriculture*, p. 202.

⁷ For key early environmental histories, please see, Donald Worster, *Nature’s Economy: A History of Ecological Ideas* (New York, 1977); Donald Worster, *Dust Bowl: The Southern Plains in the 1930s* (New York, 1979); William Cronon, *Changes in the Land: Indians, Colonists and the Ecology of New England* (New York, 1983).

⁸ For studies of Imperialism, colonialism and wild animals, please see, Keith Thomas, *Man and the Natural World: Changing Attitudes in England 1500-1800* (London, 1983); Harriet Ritvo, *The Animal Estate: The English and*

Benita Parry, many British believed that India's ancient civilisations had stagnated due to the oppressive tropical climate, which perpetuated the 'traditions of the ignorant' that produced what they saw as a 'deficient and decrepit population' of humans and domesticated animals.⁹ Across the globe during the age of empires, management over the carnivorous, venomous and unhygienic effects of wild and domesticated animal populations was a core aim of many imperial and national governments.¹⁰ The act of hunting and culling wild animals, pushing back the jungle, and finding cures for tropical diseases were used by the British to justify their right to colonise Asia and Africa. It formed part of the Imperial "civilising mission", an ethnocentric ideology that presented western civilisation as a force of rational, utilitarian modernity. Science and technology were presented as tools that could rescue non-European cultures from their fatalist mind-set, "backward" customs and the "degenerative" climatic forces, in a process synonymous with Rudyard Kipling's concept of the "white man's burden".¹¹

Cattle were living symbols of European structures of ownership and landscape in the New World,¹² symbolic markers of modern diet and agriculture in Meiji Japan,¹³ and examples of a population governed by the ideologies of state territoriality and global capitalist enterprise in South America and colonial regions of Africa.¹⁴ Their contribution to the industrial era was closely intertwined with new technologies, such as capacity for railways to facilitate the mass consumption and packing of meat from the slaughterhouses of Chicago,¹⁵ and the ability of refrigeration to normalise liquefied milk in diets across Europe, and even introduce milk

Other Creatures in the Victorian Age (Cambridge, 1987); David Arnold, *The Problem of Nature: Environment, Culture and European Expansion* (Oxford, 1996).

⁹ Benita Parry, *Delusions and Discoveries: India in the British Imagination, 1880-1930* (London, 1972), p. 12.

¹⁰ For studies of animals and Imperialism, please see, John Mackenzie, *The Empire of Nature: Hunting, Conservation and British Imperialism* (Manchester, 1988); Mahesh Rangarajan, 'The Raj and the Natural World: The War against 'Dangerous Beasts' in Colonial India', *Studies in History*, 14:2 (1998), pp. 265-299; Shafqat Hussain, 'Forms of Predation: Tiger and Markhor Hunting in Colonial Governance', *Modern Asian Studies*, 46:5 (2012), pp. 1212-1238.

¹¹ For studies of colonial science, please see, David N. Livingstone, 'Human Acclimatization: Perspectives on a Contested Field of Inquiry in Science, Medicine and Geography', *History of Science*, 25 (1987), pp. 359-394; Mark Harrison, 'Tropical Medicine in Nineteenth-Century India', *The British Journal for the History of Science*, 25:3 (1992), pp. 299-318; Mark Harrison, *Public Health in British India: Anglo-Indian Preventive Medicine 1859-1914* (Cambridge, 1994); Gyan Prakash, *Another Reason: Science and the Imagination of Modern India* (Princeton, 1999); Pratik Chakrabarti, *Western Science in Modern India: Metropolitan Methods, Colonial Practices* (Delhi, 2004); Nandini Bhattacharya, *Contagion and Enclaves: Tropical Medicine in Colonial India* (Liverpool, 2012).

¹² Natale A. Zappia, 'Indigenous Borderlands: Livestock, Captivity, and Power in the Far West', *Pacific Historical Review*, 81:2 (2012), p. 194.

¹³ Brett L. Walker, *The Lost Wolves of Japan* (Seattle, 2005), p. 141.

¹⁴ Thaddeus Sunseri, 'A Political Ecology of Beef in Colonial Tanzania and the Global Periphery, 1864-1961', *Journal of Historical Geography*, 39 (2013), p. 32.

¹⁵ William Cronon, *Nature's Metropolis: Chicago and the Great West* (London, 1991), p. 212.

consumption to regions such as Burma.¹⁶ To facilitate the rise of factory farms and slaughterhouses across North America and Western Europe in the late nineteenth century, a controlled and efficient structure of animal breeding, feeding, rearing and herding was perceived to be vital to mass produce meat and dairy for growing urban populations.¹⁷ As Robert Trow-Smith stated, it was a transitional period of history that marked the end of the ‘old era of the art of animal husbandry’. The close relationships shared by pastoralist cattle herders and their animals became romanticised embers of a dying age.¹⁸ In the factory farms of the twentieth century, animals became industrialised organisms, actualisations of the automatons that René Descartes envisioned.¹⁹ To justify his experiments in vivisection, the early modern enlightenment philosopher Descartes argued that due to their lack of speech, animals did not think and were incapable of feeling pain.²⁰ This Cartesian bifurcation between the human and the animal not only elevated humans above all other species, but legitimised a culture of dominance over the physiological and emotional lives of animals.²¹ One of the main avenues through which these principles were used in modern animal domestication was through the creation of the “breed”. According to Margaret Derry, the “breed” is a term used to describe the impact of natural and artificial forces of selection upon animal populations.²² It

¹⁶ Jonathan Saha, ‘Milk to Mandalay: Dairy Consumption, Animal History and the Political Geography of Colonial Burma’, *Journal of Historical Geography*, 54 (October, 2016), p. 5.

¹⁷ Carol Adams, *The Sexual Politics of Meat: A Feminist-Vegetarian Critical Theory* (Cambridge, 1990); Jason Hribal, “‘Animals are Part of the Working Class’: A Challenge to Labor History”, *Labor History*, 44:4 (2003), pp. 435-453; Mark R. Finlay, ‘Hogs, Antibiotics, and the Industrial Environments of Postwar Agriculture’, in Schrepfer and Scranton, *Industrializing Organisms* (New York, 2004), pp. 237-260; Jason Hribal, ‘Animals, Agency and Class: Writing the History of Animals from Below’, *Human Ecology Forum*, 14:1 (2007), pp. 101-112; Yoriko Otomo, ‘The Gentle Cannibal: The Rise and Fall of Lawful Milk’, *Australian Feminist Law Journal*, 40:2 (2014), pp. 215-228; Gabriel Nathan Rosenberg, ‘A Race Suicide Among the Hogs: The Biopolitics of Pork in the United States, 1865-1930’, *American Quarterly*, 68:1 (2016), pp. 49-73; Mathilde Cohen and Yoriko Otomo, *Making Milk: The Past, Present, and Future of Our Primary Food* (London, 2017).

¹⁸ Robert Trow-Smith, *A History of British Livestock Husbandry, 1700-1900* (London, 1959), p. ix.

¹⁹ Susan R. Schrepfer and Philip Scranton (eds.), *Industrializing Organisms: Introducing Evolutionary History* (London, 2004). Also see, Ruth Harrison, *Animal Machines: The New Factory Farming Industry* (London, 1964); Lewis Holloway, Christopher Bear, Katy Wilkinson, ‘Re-Capturing Bovine Life: Robot-Cow Relationships, Freedom and Control in Dairy Farming’, *Journal of Rural Studies*, 33 (2014), p. 133; Clemens Driessen and Leonie F. M. Heutinck, ‘Cows Desiring to be Milked? Milking Robots and the Co-Evolution of Ethics and Technology on Dutch Dairy Farms’, *Agriculture and Human Values*, 31:1 (2015), p. 4.

²⁰ For studies on Descartes, please see, Fred I. Dretske, ‘Machines, Plants and Animals: The Origins of Agency’, *Erkenntnis*, 51 (1999), pp. 19-31; Erica Fudge, Ruth Gilbert, Susan Wiseman (eds.), *At the Borders of the Human: Beasts, Bodies and Natural Philosophy in the Early Modern Period* (Basingstoke, 1999); Linda Kalof, *Looking at Animals in Human History* (London, 2007).

²¹ For studies of ideas of dominance, please see, Yi-Fu Tuan, *Dominance and Affection: The Making of Pets* (New Haven, 1984); James Serpell, *In the Company of Animals: A Study of Human-Animal Relationships* (Cambridge 1986); Joel Noveck, ‘Pigs and People: Sociological Perspectives on Discipline of Nonhuman Animals in Intensive Confinement’, *Society and Animals*, 13:3 (2005), pp. 221-244; Samantha Hurn, *Humans and Other Animals: Cross-Cultural Perspectives on Human-Animal Interactions* (London, 2012); Samantha Hurn, ‘Animals as Producers, Consumers and Consumed: The Complexities of Trans-Species Sustenance in a Multi-Faith Community’, *Ethnos*, 82:2 (2017), pp. 213-231.

²² Margaret Derry, *Masterminding Nature: The Breeding of Animals 1750-2010* (London, 2015), p. 3.

was in part a product of evolutionary forces, wherein each species gradually adapts, through generational inheritance, a set of unique characteristics shaped by environmental pressures. Within domestication, it was a means by which humans augmented and modified animals, using an ‘observation-based logic’ to identify ‘the conditions of breeding that affected resemblances between related individuals’.²³ By selectively mating, feeding, rearing and managing a herd, it was possible to impose gradual physiological and behavioural changes that support the aesthetic, economic and welfare needs of the domesticators. In sum, Derry asserts that whether by modern genetic techniques or customary selection practices, the concept of a “breed” remains grounded in the discourses of ‘science and culture’.²⁴

The significance of the “breed” as a physiological and cultural marker of human mastery over domesticated animals has been largely attributed to Robert Bakewell, an eighteenth century British livestock herder and agriculturalist. Seeking to increase the production of wool and meat amongst his herd, Bakewell used hybridisation and inbreeding to create superior producers whilst culling animals that lacked potential.²⁵ A core approach that he, and other ‘gentleman-farmers’ of Georgian Britain, used for the ‘comparison and improvement’ of breed types was the cattle fair.²⁶ Offering prizes to entice farmers to breed their animals according to the norms and standards set by breeding clubs and herd books, certain “breeds” became affiliated with conceptions of class, race and nationalism. In many countries, the production of specific types was viewed as a ‘patriotic service’ that contributed to uplifting a national herd, and thus the wider nation.²⁷ The homogenous herds of cattle and flocks of chickens utilised by animal production sciences were built upon the formalisation of a distinct breed, conducive to models of productivity that supported capitalist ventures.²⁸ As Bankoff and Swart have shown,

²³ Roger J. Wood and Vitezslav Orel, *Genetic Prehistory in Selective Breeding: A Prelude to Mendel* (Oxford, 2001), p. vii.

²⁴ Margaret E. Derry, *Bred for Perfection: Shorthorn Cattle, Collies, and Arabian Horses since 1800* (Baltimore 2003), p. ix.

²⁵ For key studies, please see, Margaret E. Derry, *Ontario’s Cattle Kingdom: Purebred Breeders and Their World, 1870-1920* (Toronto, 2001); Margaret E. Derry, *Horses in Society: A Story of Animal Breeding and Marketing Culture, 1800-1920* (Toronto, 2006); Margaret E. Derry, *Art and Science in Breeding: Creating Better Chickens* (Toronto, 2012).

²⁶ Emma Hart, ‘From Field to Plate: The Colonial Livestock Trade and the Development of an American Economic Culture’, *The William and Mary Quarterly*, 73:1 (2016), p. 110. Also see, F. E. Madalena, ‘Animal Breeding and Development - South American perspective’, *Journal of Animal Breeding and Genetics*, 129:3 (2012), p. 171.

²⁷ Enrique Ucelay Da Cal, ‘The Influence of Animal Breeding on Political Racism’, *History of European Ideas*, 15:4 (1992), p. 718.

²⁸ For studies of modern methods of breeding, please see, Roger Horowitz, ‘Making the Chicken of Tomorrow: Reworking Poultry as Commodities and as Creatures, 1945-1990’, in Schrepfer and Scranton (eds.), *Industrializing Organisms* (New York, 2004), p. 217; Sarah Franklin, *Dolly Mixtures: The Remaking of*

the breed was a cornerstone of colonial animal husbandry in Asia and Africa, a marker used by colonisers to rationalise the superiority of their techniques and methods.²⁹ Tropical environments were deemed to impose the effects of climate upon the body and landscape, in terms of racial difference and the capacity of humans, animals and plants to acclimatise or degenerate under different pressures.³⁰ Regional variations in animal breeds were testament to this phenomenon, their bodies living evidence of the unique conditions induced by natural selection in a region.³¹ Increasingly, sciences such as zootechy and animal breeding promoted the idea that through science the impact of natural laws could be manipulated and controlled.³² In British India, colonial officials judged the quality of cattle populations according to the attributes of a host of indigenous breeds that were reared by professional cattle herders. Resilient in climactic extremes and resistant to tropical diseases, *Bos indicus* zebu cattle were described as survivors. Many of India's breeds were held in high regard across the globe, where they were imported and cross-bred with cattle in the Caribbean, Australasia and other corners of the empire. For example, Gir types from Gujarat have been a staple of cattle in Brazil and a significant cornerstone of North American Brahman breeds.³³ Despite their merits, Indian cattle were also widely critiqued for their inability to attain a yield of up to 8000 pounds of milk (3628 litres) per lactation recorded by European *Bos taurus* breeds at the time.³⁴ While a European cow would normally yield over 30 lbs (13.6 litres) a day, the average Indian cow would yield between 12 to 16 lbs (5.5 to 7 litres), but only with good feed and care.³⁵

As this thesis demonstrates, from the late nineteenth century British Imperialism introduced methods of animal husbandry to North India, which emphasised the significance of the “breed”.

Genealogy (Durham, 2007); Sam White, 'From Globalized Pig Breeds to Capitalist Pigs: A Study in Animal Cultures and Evolutionary History', *Environmental History*, 16:1 (2011), pp. 94-120.

²⁹ Greg Bankoff and Sandra Swart, *Breeds of Empire: The 'Invention' of the Horse in Southeast Asia and Southern Africa, 1500-1950* (Copenhagen, 2007), p. 2.

³⁰ For histories of science and climate, please see, Warwick Anderson, 'Climates of Opinion: Acclimatization in Nineteenth-Century France and England', *Victorian Studies*, 35:2 (1992), pp. 135-157; Mark Harrison, '“The Tender Frame of Man”: Disease, Climate, and Racial difference in India and the West Indies, 1760-1860', *Bulletin of the History of Medicine*, 70:1 (1996), pp. 68-93; Kenneth Pomeranz, 'Political Economy and Ecology on the Eve of Industrialization: Europe, China, and the Global Conjunction', *The American Historical Review*, 107:2 (2002), pp. 425-446.

³¹ Sigrid Schmaizer, 'Breeding a Better China: Pigs, Practices, and Place in a Chinese County, 1929-1937', *Geographical Review*, 92:1 (2002), p. 6.

³² Greg Bankoff, 'A Question of Breeding: Zootechny and Colonial Attitudes towards the Tropical Environment in the Late Nineteenth-Century Philippines', *The Journal of Asian Studies*, 60:2 (2001), p. 415.

³³ Connell J. Brown, *Cattle on a Thousand Hills: A History of the Cattle Industry in Arkansas* (Fayetteville, 1996), p. 77.

³⁴ *Royal Commission on Agriculture in India: Abridged* (Calcutta, 1927) p. 20.

³⁵ James Mollison, 'Dairy Farming and Dairy Produce', *The Agricultural Ledger*, 5 (1895), p. 1.

This physiological and cultural marker of mastery over an animal population was the focal point of development within dairy farming and animal breeding. Within colonial discourse, many aspects of Indian culture and climate were perceived to hinder the possibilities of formalising specific types of cattle with shared aesthetic and behavioural qualities. The main practice critiqued was cow protectionism, depicted as a superstitious practice that allowed animals to behave in an uncontrolled manner. Colonial officials argued that only by controlling the feeding, rearing, mating and herding of cattle could progressive changes be instigated. Otherwise, the instincts of the animal would not support the material requirements of humanity, including labour and milk production. During the early twentieth century, these colonial perspectives clashed in many ways with the beliefs and values of Hindu nationalists, whose political ideologies were rooted in cow protectionism. That said, many nationalists also promoted the value of improving cattle populations, and wished to integrate colonial methods of breeding in order to uplift the quality of India's national herd of indigenous breeds. The next section will begin to explore this contrast within Hindu nationalist approaches to questions of animal domestication, investigating how the values of cow protectionism opposed and incorporated the discourses of colonialism.

1.2 *Cow protectionism, religious nationalism and the cow*

From the late nineteenth century, anti-colonial nationalism grew as a powerful political force in British India. World renowned figures such as Mahatma Gandhi, Jawaharlal Nehru and Mohammad Ali Jinnah became the faces of influential movements, which pushed for independence from the British Raj in 1947, leading in the same year to the partition of the subcontinent into two separate states, India and Pakistan. Throughout the decades leading to this event, a wide range of nationalist movements sought to challenge the legitimacy of the economic, socio-cultural and environmental nature of colonial rule. They did this by highlighting the immoral and exploitative nature of British Imperialism. The cow became a pillar and an icon within Hindu nationalist movements, a species that needed to be liberated from colonial rule in order to build the material and spiritual foundations of a Hindu nation. As this historiographical discussion demonstrates, cattle became a religious icon used to shape conceptions of community and indigenous nationalist efforts to resist colonial rule. But as scholars have shown, ideas and attitudes within religious nationalist discourses were defined

within the paradigms of colonialism. The purpose of this section is to explore the extent to which the ideological concept of the progressive contribution of the cow within nationalism was shaped by both indigenous traditions and colonial discourses of development.³⁶

During the nineteenth century, colonial officials and Christian missionaries posed ethical challenges to many of the values, customs and socio-cultural norms of Indian society. A range of Hindu customs were scrutinised by western eyes, from controversial practices such as the burning of widows (*sati*) and child marriages, to daily ritual aspects such as the worship of totems and shrines. A number of Hindu revivalist movements emerged to defend their faith from the labels of immorality, fatalism and backwardness that were branded by the colonial rulers. These movements began to reform aspects of Hinduism to be in-keeping with western values, but also drew upon the ancient scriptures to validate and legitimise key principles of their religion.³⁷ Since the late eighteenth century, British orientalist scholars such as William Jones had studied the Sanskrit texts of India's ancient societies, unearthing what they perceived to be the foundations of a rational, moral and progressive culture, dating back to 1500 BCE. The revivalist and the emerging Hindu nationalist ideologies of the late nineteenth century promised to restore this true essence of India's Vedic civilisation, a period that was said to have achieved all that European enlightenment and science had accomplished. The racial histories of Max Muller were also used by nationalists, as they argued that both eastern and western cultures were rooted in a common ethnic origin, being the Aryan civilisation.³⁸ Hindu nationalists challenged colonial conceptions of cultural and ethnic inferiority, by arguing that India had not fallen due to the nature of Hinduism, but instead due to the exploitation of invaders such as the Mughals and ruling British Raj.³⁹ The values and principles of the Sanskrit scriptures became the basis of Hindu nationalist visions of a "golden age", an 'ideological reinterpretation of the past' that challenged the 'sense of backwardness and decline' caused by European modernity.⁴⁰ As Uma Chakravarti noted, religious nationalists contested the

³⁶ Benedict Anderson, *Imagined Communities: Reflections on the Origin and Spread of Nationalism* (London, 2006), p. 7.

³⁷ For studies of Hindu revivalism, please see, Lata Mani, 'Contentious traditions: The Debate on Sati in Colonial India', in Sangari and Vaid (eds.), *Recasting Women: Essays in Indian Colonial History* (New Delhi, 1993), pp. 88-126; Ania Loomba, 'Dead Women Tell No Tales: Issues of Female Subjectivity, Subaltern Agency and Tradition in Colonial and Post-Colonial Writings on Widow Immolation in India', *History Workshop Journal*, 36 (1993), pp. 209-27.

³⁸ Friedrich Max Muller, *Ancient Sanskrit Literature* (Delhi, 2007), p. 10.

³⁹ Chetan Bhatt, *Hindu Nationalism: Origins, Ideologies and Modern Myths* (New York, 2001), p. 12.

⁴⁰ Christophe Jaffrelot, *The Hindu Nationalist Movement and Indian Politics, 1925 to the 1990s* (London, 1996), p. 13.

perception that Hindus were immoral, effeminate and superstitious, by using the imagined past to affiliate Hindu identity with 'vigour, conquest and expansion'.⁴¹

Protecting the cow from slaughter became one of the cornerstones of Hindu nationalist ideology, and its aspirations for restoring the glories of India's ancient civilisations. North India became a centre for the rise of cow protectionism (*gau rakshā*) during the late nineteenth century. As a political philosophy it was widely affiliated with Swami Dayananda Saraswati (1824-1883), a Brahman Hindu who formed the Hindu revivalist movement the Arya Samaj in Bombay in 1875. The city of Lahore in the Punjab became the regional base for Saraswati from 1877, where he propagated the idea that the cow needed to be protected from slaughter, in order to ensure the spiritual and material progress of India.⁴² In the texts, speeches and banners of cow protectionists, the cow was personified as mother cow (*gau mātā*), the 'nourisher' of the earth symbolically deified as Kamadhenu, 'the mother of life, the substance of all things'. She was the mother of the nation and provider of the five sacred substances (*panchagavya*) that were essential for a prosperous life, being milk, curds, yogurt, dung and urine. Nationalists argued that the immoral, corrupt and detrimental nature of colonial rule was highlighted by the unwillingness of the British Raj to give legal protection to cattle.⁴³ Protecting mother cow was an essential task in awakening Mother India (*bhārat mātā*), an ideological landscape depicted in romanticised images of the sacred rivers which flowed from the Himalayan mountains. These natural features were gifts of the mother, bringing life to the agrarian plains that cradled Hindu civilisation, exemplified by the countless holy sites dotted along river banks that represented locations of events from the scriptural and oral traditions of the Ramayana and the Mahabharata. As Jyotirmaya Sharma summarised, nationalists called for the people to 'love the soil of your motherland; the land where your ancestors sleep... your land is home because God has granted it to you... Give your country your blood and thought. Keep it united and prevent it from being fragmented'.⁴⁴ To demonstrate their commitment to mother cow, nationalists and

⁴¹ Uma Chakravarti, 'Whatever Happened to the Vedic Dasi? Orientalism, Nationalism and a Script for the Past', in Sangari and Vaid (eds.), *Recasting Women: Essays in Indian Colonial History* (New Brunswick, 1990), p. 47.

⁴² C. S. Adcock, 'Sacred Cows and Secular History: Cow Protection debates in Colonial North India', *Comparative Studies of South Asia, Africa and the Middle East*, 30:2 (2010), p. 298.

⁴³ For studies of the emergence of the cow as a symbol of Hindu nationalism, please see, Anthony Parel, 'The Political Symbolism of the Cow in India', *Journal of Commonwealth Political Studies*, 7:3 (1969), pp. 179-203; Peter van der Veer, *Religious nationalism: Hindus and Muslims in India* (Berkeley, 1994); Charu Gupta, 'The Icon of Mother in late Colonial North India: 'Bharat Mata', 'Matri Bhasha' and 'Gau Mata'', *Economic and Political Weekly*, 36:45 (2001), pp. 4291-4299; Charu Gupta, *Sexuality, Obscenity, Community: Women, Muslims and the Hindu Public in Colonial India* (New York, 2002).

⁴⁴ Jyotirmaya Sharma, *Hindutva: Exploring the Idea of Hindu Nationalism* (London, 2006), p. 155.

cow protectionists encouraged North Indian people to become devotees of the cow like Lord Krishna, one of the eight avatars of Lord Vishnu in the Hindu pantheon. Worshipped at the *Gopashtami* and *Govardhan Punj* ceremonies, Krishna's life and values became a model to emulate, symbolised in paintings, poems and crests, such as that of the Darbhanga Gaushālā Society shown below. Cattle sanctuaries (*gaushālā*) were one of the main avenues through which people could demonstrate their devotion to cattle, emulating the devotees that Krishna encountered during his childhood in Vrindavan.⁴⁵ These cattle sanctuaries were opened in great numbers during the late nineteenth century, spaces in which the traditional values of Hinduism were protected by offering veterinary care and lodging, so that old and infirm animals could reside until they died of natural causes.⁴⁶



Figure 2: ‘Crest of the Darbhanga Gaushālā Society,’ from Sharma Gaur, *Gaurakshā* (Cow Protection) (Darbhanga, 1937).

In many respects, the cow became a domain of Indian society that nationalists used to safeguard their customs from the influence of colonialism and Islam. Much like the bodies of Hindu

⁴⁵ For studies of cattle and Lord Krishna, please see, Deryck O. Lodrick, ‘Gopashtami and Govardhan Puja: Two Krishna Festivals of India’, *Journal of Cultural Geography*, 7:2 (1987), pp. 101-116; Steven Rosen, *Holy Cow: The Hare Krishna Contribution to Vegetarianism and Animal Rights* (New York, 2004); Dev Prasad, *Krishna: A Journey Through the Lands and Legends of Krishna* (Mumbai, 2010); Lisa Kemmerer, *Animals and World Religions* (Oxford, 2012).

⁴⁶ Deryck O. Lodrick, *Sacred Cows, Sacred Places: Origins and Survivals of Animal Homes in India* (Berkeley, 1981), p. 10. See also, CSAS, *Hindu Sansar* (Hindu world), ‘Gauraksha Mandal’ (Cow Protection), 06/04/1925’; CSAS, *Bharat Weekly* (India weekly), ‘Bharat me Gau-Badh’ (Cow Slaughter in India), 04/11/1929’.

women, the cow was recast as a repository of tradition that could not be touched by the modernist discourses of westernisation.⁴⁷ But as Partha Chatterjee stated, at the very moment that 'nationalism sets out to assert its freedom from European domination... in the very conception of its project, it remains a prisoner of the prevalent European intellectual fashion'.⁴⁸ The paradigms of colonial society meant that concepts of tradition and modernity within nationalism were defined within the 'limits set by the rulers'.⁴⁹ Conceptions of Hindu nationalism were redefined within what scholars call colonial discourse and knowledge, the information that the British Raj produced in order to govern and administer its territories in India.⁵⁰ The geographic boundaries, economic structure, demographic size and other key features of that defined India as a nation were reformulated in the pages of colonial topographical and cartographic studies, census reports and gazetteers. As Manu Goswami noted, 'the colonial production of space... made possible emergent territorially grounded conceptions of a national economic culture and identity'. Nationalist movements sought to unify populations defined by the religious, territorial and economic paradigms of colonial rule. Using symbolic religious concepts such as mother cow, they converted the geographic entity known as Hindustan in colonial discourse into the emotionally resonant Mother India.⁵¹ Language became one of the main arenas in which ideas about cattle integrated indigenous customs, traditions and values within the paradigms of colonialism. From the late nineteenth century, religious nationalists sought to create a national language that would represent the Hindu people of India. At the time, Urdu was the dominant written language of the courts in North India. Written in the Persian script, it was a language affiliated with the North Indian Muslims. To challenge its significance, Hindu nationalists sought to create another script for the people of North India, that would legitimise the Hindu community and distinguish it from both Urdu and English. As such, the language Hindi was formed using a script known as Devanagari, rooted in Sanskrit. While both spoken Urdu and Hindi remain very similar, the

⁴⁷ Partha Chatterjee, 'The Nationalist Resolution of the Women's Question', in Sangari and Vaid (eds.), *Recasting Women: Essays in Indian Colonial History* (New Brunswick, 1990), p. 249.

⁴⁸ Partha Chatterjee, *Nationalist Thought and the Colonial World: A Derivative Discourse* (Delhi, 1986), p. 10.

⁴⁹ Ashis Nandy, *The Intimate Enemy: Loss and Recovery of Self Under Colonialism* (New York, 2000), p. 3.

⁵⁰ For studies of colonial knowledge, please see, David Ludden, 'Orientalist Empiricism: Transformations of Colonial Knowledge', in Breckenridge and Van der Veer (eds.), *Orientalism and the Postcolonial Predicament: Perspectives on South Asia* (Philadelphia, 1993), pp. 250-278; Bernard S. Cohn, *Colonialism and its Forms of Knowledge: The British in India* (Princeton, 1996); Ann Laura Stoler, *Carnal Knowledge and Imperial Power: Race and the Intimate in Colonial Rule* (Berkeley, 2002).

⁵¹ Manu Goswami, 'From Swadeshi to Swaraj: Nation, Economy, Territory in Colonial South Asia, 1870 to 1907', *Comparative Studies in Society and History*, 40:4 (1998), p. 614. Also see, Manu Goswami, 'Rethinking the Modular Nation Form: Toward a Socio-Historical Conception of Nationalism', *Comparative Studies in Society and History*, 44:4 (2002), pp. 770-779; Manu Goswami, *Producing India: From Colonial Economy to National Space* (Chicago, 2004).

Hindu community published fictional works, political manifestos, texts on science, economics, mathematics and many other topics to educate and inform an emerging Hindi literary community of North India. In doing so, these authors and publishers sought to modernise the Hindu community through an education in western concepts, while grounding its culture in the ancient Hindu roots.⁵² Books and journals from the early twentieth century integrated both indigenous knowledge and colonial ideas, often translating notable western works of fiction and science into Hindi. As Charu Singh revealed, Hindi texts on meteorology, astrology and agriculture combined both Vedic knowledge, nationalist rhetoric, and the latest ideas from western science.⁵³ As this thesis demonstrates, the influence of both colonial and indigenous discourses can be seen in a range of Hindi textbooks within the vernacular archive, published by cow protectionists and Hindu nationalists at turn of the twentieth century.

As scholars have shown, the combination of colonial and indigenous practices of animal domestication shaped the history of the dairy industry in India. As an important source of spiritual purity and protein, milk became ‘a drink with nationalist ambitions’ across India, Western Europe and North America.⁵⁴ Within the gastro-politics of the colonial era, British colonists argued that Indian people were inferior due to their dietary norms, namely the lack of red meat. As the leading educator and founder of the Benares Hindu University Pandit Madan Mohan Malaviya noted,

National health depends very largely upon the national diet... The physical degeneration of the people of India has assumed alarming proportions, both among males and females... This is a national calamity. India was the first country of the world to condemn the use of a diet which included flesh, fish, fowl and eggs. It was the first to discover the great advantages of the natural food of man – consisting of cereals and milk and fruits. The staple diet of the country as a whole is vegetarian, and the people have lived for ages upon it, in health and prosperity. But the impact of the meat-eating west has been undermining the faith of some of our people.⁵⁵

The rejection of meat consumption became increasingly entrenched due to the process of Sanskritisation, a move towards conservative Hindu values such as vegetarianism that

⁵² For studies of languages and politics in North India, please see, Paul R. Brass, *Language, Religion and Politics in North India* (Lincoln, 1974); Francesca Orsini, *The Hindi Public Sphere 1920-1940: Language and Literature in the Age of Nationalism* (New Delhi, 2002).

⁵³ Charu Singh, ‘Science, Hindi Print and Agricultural Improvement in Colonial North India’, (Unpublished PhD thesis, New Delhi, Jawaharlal Nehru University, 2015), p. 5.

⁵⁴ Andrea S. Wiley, *Cultures of Milk: The Biology and Meaning of Dairy Products in the United States and India* (London, 2014), p. 41.

⁵⁵ Madan Mohan Malaviya, ‘Forward’, in N. N. Godbole, *Milk: The Most Perfect Food* (Delhi, 1936), p. v.

segregated upper castes from Muslims and “untouchables”, Hindu communities that handled flesh and waste.⁵⁶ Cow milk became a focal point of ideas of development and self-strengthening. For example, in 1936 the Professor of Industrial Chemistry at the Benares Hindu University, N. N. Godbole, argued that the value of milk derived from both its significance in Vedic scripture and Ayurvedic medicine, as well as western conceptions of nutritional science.⁵⁷ This dualistic influence of both indigenous knowledge and western science pervaded in nationalist efforts to improve the dairy industry. For example, scholars have extensively documented the famed events that took place in the Anand district of the Bombay Deccan in 1946. Supported by nationalist leaders such as Sardar Vallabhbhai Patel, Morarji Desai and Tribhuvandas Patel, for nine days the Kaira District Cooperative Milk Producers Union poured their milk into the streets. Their movement protested the monopoly granted by the British government to the Polson corporation over the refrigeration technologies, transport and markets to sell rurally produced dairy in the city of Bombay. Their effort to rupture the foundations of Polson’s business was seen as one of the first major steps in the national effort to ensure that the people of India could benefit from the produce provided by the cow.⁵⁸ As India entered its developmental phase in the 1950s, this goal would be facilitated using western technologies and methods. The most profound and influential example of this was Operation Flood (1970-96), also known as the White Revolution.⁵⁹ It was based upon ‘the idea that many drops make a flood’, devised by its founder Verghese Kurien (1921-2012),⁶⁰ former chairman of India’s leading dairy brand Amul. Using foreign aid and government resources, Kurien built an infrastructural network that could transport milk from ‘rural dairy producers to urban consumers through dairy cooperatives, trucking networks, chilling plants, refrigerated vans, railways wagons’ and so forth.⁶¹ In a foreword to Kurien’s autobiography, Indian entrepreneur Ratan Tata proclaimed that the policy ‘enabled India to nearly double its per capita milk availability’, making the nation’s ‘dairy industry the largest rural employment provider’ and a

⁵⁶ For studies relating to gastro-politics in colonial India please consult David Burton, *The Raj at Table: A Culinary History of the British in India* (London, 1994); Parama Roy, ‘Meat-Eating, Masculinity, and the Renunciation of India: A Gandhian Grammar of Diet’, *Gender and History*, 14:1 (2002), pp. 62-91; Shraddha Chigateri, ‘Glory to the Cow’: Cultural Difference and Social Justice in the Food Hierarchy in India’, *South Asia: Journal of South Asian Studies*, 31:1 (2008), pp. 10-35; Jakob A. Klein, ‘Afterword: Comparing Vegetarianisms’, *South Asia: Journal of South Asian Studies*, 31:1 (2008), pp. 199-212; Parama Roy, ‘A Dietetics of Virile Emergency’, *Women’s Studies International Forum*, 44 (2014), pp. 255-265.

⁵⁷ N. N. Godbole, *Milk: The Most Perfect Food* (Delhi, 1936).

⁵⁸ Ruth Heredia, *The Amul India Story* (New Delhi, 1997), p. 18.

⁵⁹ Bruce A. Scholten, ‘The ‘White’ Revolution and Dual Dairy Economy Structures’, in Guy M. Robinson and Doris A. Carson (eds.), *Handbook on the Globalisation of Agriculture* (Cheltenham, 2015), p. 472.

⁶⁰ Scholten, ‘The ‘White’ Revolution’, p. 478.

⁶¹ Kenda Cunningham, ‘Connecting the Milk Grid: Smallholder Dairy in India’, in Spielman and Pandya-Lorch (eds.), *Millions Fed: Proven Successes in Agricultural Development* (Washington, 2009), p. 118.

force of ‘social change in empowering women and in embedding democracy at the grassroots level’.⁶² The contribution of Kurien’s work to the objective of nationalist unity and progress inspired the 1976 film *Manthan* (churning), directed by the celebrated member of the parallel cinema movement, Shyam Benegal. Starring Smita Patil, the nationalist message of the film was conveyed by the plot and its unique crowd funding programme, which collected donations of Rs. 2 from five hundred thousand farmers across the state of Gujarat.

As this section has shown, during the late nineteenth century Hindu nationalism emerged as a response to colonialism. It challenged the hegemony and legitimacy of the British Raj by seeking to unite the Hindu people of North India. Protecting the cow from slaughter was one of many symbolic means by which nationalists revived the “golden age” of Vedic culture. Forming the Hindi language as a tool to unite and educate the Hindus of North India, nationalists aimed to demonstrate that they had the capacity to rule a modern, progressive nation, free from the superstitions and immorality identified by the British. In English and vernacular guidebooks on agriculture and dairy farming, both ancient Vedic knowledge and western scientific methods and technologies would be seen as an essential means to expand the national herd and fulfil nationalist visions of strengthening the nation. To close this chapter, I will begin to discuss the historiography on animal husbandry in colonial and nationalist discourses. Thus far, studies of Imperial institutions have argued that the history of animal domestication has been driven by the desire to formalise a national herd of indigenous “breeds”. As with the history of dairy farming, colonialism and nationalism were presented as the centrepieces of material, socio-cultural and environmental change to the norms of animal husbandry across North India. Drawing upon subaltern studies, environmental and animal histories, the aim of this closing section is to explore the limitations of current historical approaches. These approaches allow scholars to deconstruct colonial and nationalist narratives of conquest, and to reveal the influence of the people, the bio-physical world and animals upon history.

⁶² Ratan N. Tata, ‘Forward’, in Verghese Kurien, *I Too Had a Dream* (New Delhi, 2005), p. ix.

1.3 *The animal inside colonial and indigenous thought*

The formation of the Imperial Council of Agricultural Research (ICAR) in 1929 is widely represented as a pivotal moment in the history of animal domestication in India. Formed in response to the aforementioned RCA report of 1927, the ICAR utilised institutional spaces to improve the breeds of India's working animals and dairy cows through animal husbandry science, controlled experimentation and cross-breeding. Before its formation, the current historiography considered the opening decades of the twentieth century as a period when 'improvements in the condition of cattle were sought through the vaguely understood procedures of distributing of farm-bred "approved sires" and widespread castration of scrub animals'. Moreover, these approaches to animal husbandry were perceived to have been a failure, due to their inability to preserve and uplift 'pure strains of Indian breeds'.⁶³ This sentiment was echoed in one of the ICAR's main vehicles for research, *The Journal of Veterinary Science and Animal Husbandry*. Comparing European and Indian cattle, in 1931 the government researcher Lall Chand Sikka surmised that the majority of cattle across the provinces were 'only fit to be destroyed'. They were a mixture of miscellaneous country (*desi*) animals that lacked the distinct attributes of a "breed". Progressive changes were occurring on Government dairy farms and research institutions, where the goal of mass-producing dairy was being driven by efforts to improve the quality of 'two classes of animals', namely pure Indian and cross-bred Indo-European cattle. Seeking to harness high yielding breeds such as the Sahiwal from western-Punjab, the government deployed controlled methods of feeding, rearing, selectively mating and herding their animals in order to increase their physiological and behavioural capacity to yield larger volumes of milk.⁶⁴ The government also attempted to cross-breed the high production qualities of European breeds with Indian varieties, known for being 'without question the best tropical cattle in the world' due to their ability to 'withstand epizootic diseases and...a hot climate'. Schemes were attempted at government research centres in Lahore, Ferozpur and Pusa, where the most successful cross was what came to be known as the "Ayrshire-Sahiwal".⁶⁵

⁶³ *Research in Animal Husbandry: A Review of Work done during 1929-54* (New Delhi, 1962), pp. 3-5.

⁶⁴ Lall Chand Sikka, 'Statistical Studies of Records of Indian Dairy Cattle: Standardisation of Lactation Period Milk Records', *The Journal of Veterinary Science and Animal Husbandry*, 1:2 (1931), p. 96.

⁶⁵ Sikka, 'Indian Dairy Cattle', p. 66.

From its inception, the ICAR established Central-Herd Books to record ‘all the well-established breeds of cattle in the country, each of which has been carefully defined as regards its breed characteristics and productive capacities’. For an animal to qualify, they had to ‘conform’ to comparative conceptions of physical attributes, milk-yield and aesthetics.⁶⁶ As Himanshu Upadhyaya has shown, in North India one of the most prized “breeds” for the government was the Hissar or Haryana type from the south-eastern districts of the Punjab. It was valued as a dual purpose breed, renowned for the capacity of its bullocks to effectively plough the land, and for cows that produced up to 400 Imperial gallons (1818 litres) of milk per lactation.⁶⁷ The Hissar cattle farm itself would develop into one of Asia’s largest cattle breeding facilities, that supplied over a thousand stud bulls to the districts of North India by the 1930s.⁶⁸ As Chandrāvati Rādhāraman’s map shows, by the 1940s vernacular Hindi studies affiliated each region with a selection of the fifty most valuable indigenous cattle breeds (*gaujātiyon*). According to the map, each breed was prized for a utilitarian capacity. Females must yield large quantities of milk (*dōdh pradhān sakangi nasal*). Males must perform work (*vatsa pradhān sakangi nasal*). Breeds such as the Hissar type were known as dual purpose (*sarvāngi nasal*), as they could perform both tasks.⁶⁹

⁶⁶ *Research in Animal Husbandry: A Review of Work done during 1929-54* (New Delhi, 1962), pp. 3-5. For further studies of Indian Republic’s institutional response to cattle breeding, please see M. S. Randhawa, *Agriculture and Animal Husbandry in India* (New Delhi, 1958).

⁶⁷ Himanshu Upadhyaya, ‘Cattle Breeding Policies in Colonial India’, in Kumar and Raha, *Tilling the Land: Agricultural Knowledge and Practices in Colonial India* (Delhi, 2016), p. 250.

⁶⁸ M. M. Juneja, *Hisar city: Places & Personalities* (Hisar, 2004), p. 37.

⁶⁹ Chandrāvati Rādhāraman, *Sandulita Gau-Pālan* (Traditional cattle breeding) (Allahabad, 1949), p. 67.



Figure 3: 'Cattle breeds of India', from Chandrāvati Rādhāraman, *Sandulita Gau-Pālan (Traditional Cattle Breeding)* (Allahabad, 1949).

For both colonial officials and nationalists, the development of animal populations was symbolised by the imposition of the attributes of pure breeds upon the regional cattle of India. As another diagram below from Rādhāraman's work demonstrated, the "Characteristics of an Exceptional Bull" included aspects that meant the bull could produce healthy offspring fit for work or milk production. For example, it was stated that a bull should have strong horns (*mazbōt sing*), a big stomach (*barā pet*) and a long tail (*lambe pōcha*).⁷⁰ As Jhabarmal Sharma's study *Indian Cattle (Bhāratiya Gaudhan)* demonstrated in 1976, animal domestication in India during the twentieth century would increasingly focus on the breed as a site of control over the animal. Regional populations would be affiliated with pure-type breeds that were meant to symbolise the indigenous varieties that were best adapted to work in their environmental context. Hissar bulls stood alongside a host of Indian types that represented the best features and characteristics of their region, symbols of mastery over the animal, its physiology and its behaviour. These breeds became part of a collection of prized animals, that form the basis of India's national herd in the post-colonial era.⁷¹ These programmes have been widely critiqued for their animal centered approach, an emphasis upon the physiological composition and environmental adaption of the animal, rather than its socio-economic context of human-animal relations. For example, seeking to navigate the problem of low dairy yields amongst Indian cattle, during the 1960s the Indian government promoted cross-breeding with European Jersey, Holstein-Friesian, Red Dane and Brown Swiss varieties using artificial insemination. Initial trials offered promising results for lactation and production. However, cross-breeds relied upon large quantities of feed, controlled environments and close veterinary care to reach maximum productivity. As such, these animals were essentially useless for cultivators that required cattle that could withstand tropical climates, the threat of disease and periods of scarcity. As studies of the post-colonial era have demonstrated, these limitations created disparities in the nature of development and its impact. According to Pratyusha Basu, national programmes such as Operation Flood did manage to use technology to give market value to otherwise perishable dairy produce supplied by rural areas. However, the programme connected the dairy farmer and by extension the prosperity of villagers, to a network of transport, trade and urban demand.⁷² This centralised model limited the autonomy of rural producers, recasting their livelihood within an interconnected and perilous web of markets that Woods defined as the

⁷⁰ Radharmarna, *Santulit Gau-Pālan*, p. 67.

⁷¹ Jhabarmal Sharma, *Bhāratiya Gaudhan (Indian Cattle)* (Unknown, 1976), p. 76.

⁷² Pratyusha Basu, 'Success and Failure of Crossbred Cows in India: A Place-Based Approach to Rural Development', *Annals of the Association of American Geographers*, 99:4 (2009), p. 746. Also see, Pratyusha Basu, *Villages, Women, and the Success of Dairy Cooperatives in India* (New York, 2009).

‘global countryside’.⁷³ Thus, by reassessing the impact of “modernity” in relation to those that remain “undeveloped”, post independence studies have drawn attention to the divergent and often unequal ramifications of methods and techniques used to control the bodies and produce of animals and plants.

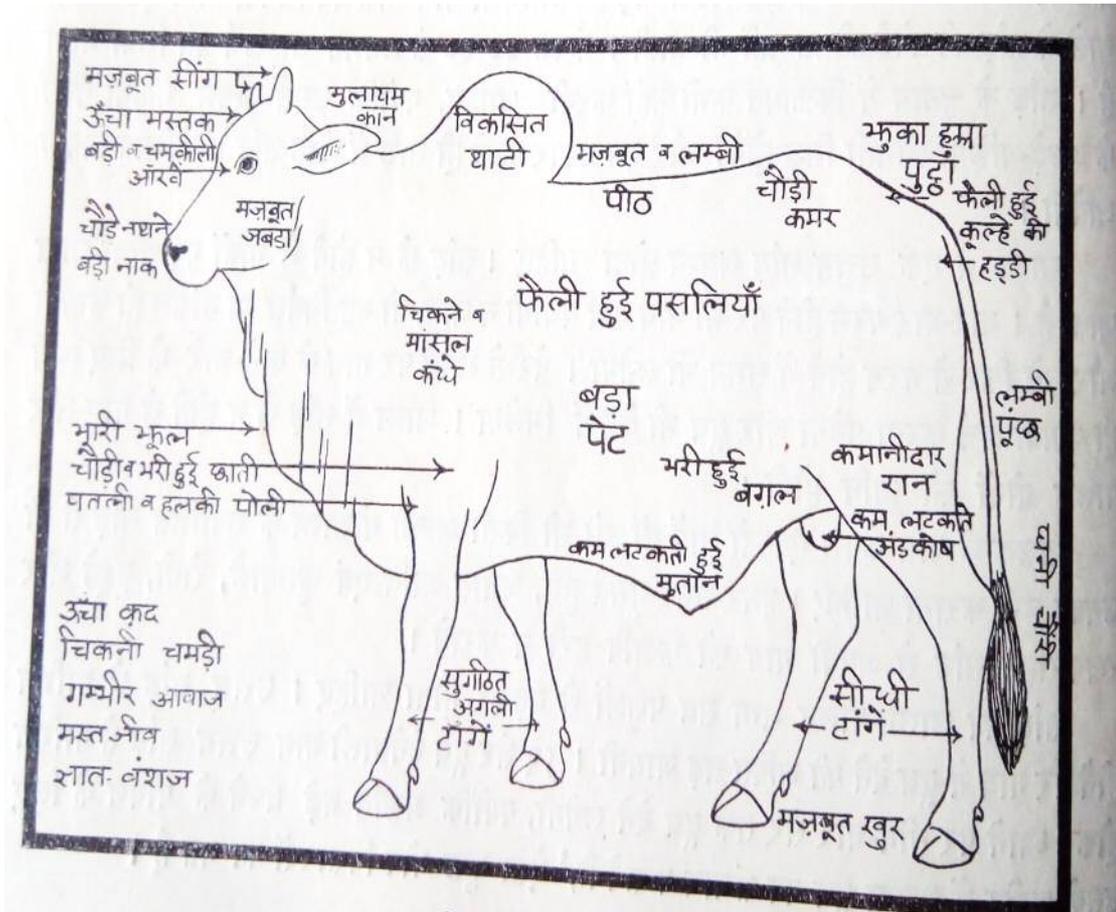


Figure 4: ‘Characteristics of an Exceptionable Bull’, Chandrāvati Rādhāraman, *Sandulita Gau-Pālan* (Traditional cattle breeding) (Allahabad, 1949).

Studies of the late twentieth century call for scholars to recognise the disparities within the centralised programmes of both the colonial government and the Indian Republic. While both colonial and nationalist rhetoric refer to the “breed” as a signifier of progress, the extent to which pure-bred animals could influence the socio-cultural dynamics of domestication was limited. Thus far, scholars have yet to look beyond the work of colonial cattle breeding institutions in the early twentieth century. While these institutions made significant changes to

⁷³ Michael Woods, ‘Engaging the Global Countryside: Globalization, Hybridity and the Reconstitution of Rural Place’, *Progress in Human Geography*, 31:4 (2007), p. 486.

their animals and the nature of cattle breeding,⁷⁴ to what extent were these formative years of colonial and nationalist conceptions of animal husbandry connected to the socio-cultural, environmental and material norms of domestication? Colonial efforts before 1929 have been viewed as a series of failures. But this notion itself was defined by the ability to formalise a “breed”. Is it possible to step beyond these teleological narratives of development? Was indigenous animal domestication entirely stagnant and unchanging before these centralised projects? How can historians assess and understand the possibility of forces beyond these paradigms, such as animal behaviour, and its influence upon history beyond these discourses?

In the first volume of work published by the subaltern studies collective of scholars in 1982, series editor Ranajit Guha argued that all previous approaches to history had subsumed the autonomy and agency of the people in the ‘making and development’ of India.⁷⁵ Imperial and nationalist historians had presented historical consciousness as a product of religious, racial, nationalist and class affiliations, homogenous categories that presented the nation as an ‘undivided subject’ possessing a ‘singular will’.⁷⁶ Guha noted that the main emphasis of nationalist histories had been to give the people of India ‘reason and humanism’,⁷⁷ in order to challenge the perception within colonial discourse that the people had erupted in a spontaneous outburst of pre-political agitation ‘external to the peasant’s consciousness’, rooted in religiously minded ideology of communalism that sparked violence between Hindus and Muslims.⁷⁸ But nationalist histories also presented the people ‘as merely an element’ in a larger historical narrative, whereby nationalist leaders awoke ‘a commonly shared antipathy towards colonial rule’, which formed a ‘patriotism and an ideology rooted... in India’s ancient tradition’.⁷⁹ To rescue the agency and autonomy of the people from imperial and nationalist

⁷⁴ For studies of cross-breeding in India, please see, B. N. Sinha, ‘Taylor Cows of Patna’, *The Indian Veterinary Journal*, 27:4 (1951), pp. 272-276; V. N. Amble and J. P. Jain, ‘Comparative Performance of Different Grades of Crossbred Cows on Military Farms in India’, *Journal of Dairy Science*, 50:10 (1967), pp. 1695-1702; R. M. Acharya, ‘Cross-Breeding of Zebu Cattle with Exotic Breeds for Milk Production’, *Indian Journal of Animal Sciences*, 40 (1970), pp. 110-119; Rajesh Wakchaure *et al*, ‘Development of Crossbred Cattle in India: A Review’, *International Journal of Emerging Technology and Advanced Engineering*, 5:10 (2015), pp. 75-77.

⁷⁵ Ranajit Guha, ‘On Some Aspects of the Historiography of Colonial India’, in Guha and Spivak (ed.), *Selected Subaltern Studies* (New York, 1988), p. 39.

⁷⁶ Gyan Prakash, ‘Writing Post-Orientalist Histories of the Third World: Perspectives from Indian Historiography’, *Comparative Studies in Society and History* 32:2 (1990), p. 389.

⁷⁷ Dipesh Chakrabarty, *Habitations of Modernity: Essays in the Wake of Subaltern Studies* (Chicago, 2002), p. 23.

⁷⁸ Ranajit Guha, ‘The Prose of Counter Insurgency’, in Guha and Spivak (ed.), *Selected Subaltern Studies* (New York, 1988), p. 47.

⁷⁹ Sekhar Bandyopadhyay, *From Plassey to Partition: A History of Modern India* (New Delhi, 2004), p. 185. For critiques, please see, Ranajit Guha, *Elementary Aspects of Peasant Insurgency in Colonial India* (Oxford, 1983), p. 3.

histories, subaltern studies deployed the method of tracking the ‘successful cognitive failure’,⁸⁰ to demonstrate that popular consciousness was not assimilated by foundational narratives of elite discourse. Scholars drew upon Gramsci’s challenge to the concept that collective development of mass political consciousness occurred at the level of the state,⁸¹ using his concept of the subaltern to refute that vertical nationalist methods of ideology, education and leadership deployed by the elite had guided the pre-political masses into a unified nationalism.⁸² Instead, scholars argued that the subaltern’s political consciousness formed from the multiple levels and horizontal ties,⁸³ which derived from the ‘vast areas in the life and consciousness of the people’ which stood outside colonial and nationalist hegemony,⁸⁴ such as locality, religion, territory, and ethnicity, components of an autonomous consciousness.⁸⁵ This would be achieved through deploying a post-colonial method of deconstructing colonial discourse, in order to identify agency as autonomous action, by retrieving the ‘subject effect’ as negative consciousness in language and strategically analysing essentialisms for signs of insurgency and resistance to domination.⁸⁶ Guha called this method ‘reading against the grain’.⁸⁷

Studying the cow protectionist movements in the eastern districts of UP and west Bihar, Gyan Pandey challenged the idea that the movement was a product of elite nationalist agitation, that instigated sectarian ideologies and at times violence. For Pandey, cow protectionism was not a product of communal conflict that led to the partition of India. Neither was the cow a symbol of an ancient Indian identity rooted in India’s Vedic customs that would forge a unified nation. Instead, agitation derived from local economic and socio-cultural problems, which led to unrest and conflict within specific social classes and geographical areas that integrated the cow as a component with this local dynamic.⁸⁸ Pandey’s deconstruction of cow protectionism sought to give agency to the local issues and actions that caused political change, rooting this history in a narrative that was removed from the overarching teleology of colonialism and nationalism.

⁸⁰ Gayatri Chakravorty Spivak, ‘Subaltern Studies: Deconstructing Historiography’, in Guha (ed.), *Subaltern Studies IV* (Delhi, 1985), p. 336.

⁸¹ Antonio Gramsci, *Selections from the Prison Notebooks* (London, 1971), p. 243.

⁸² Guha, ‘On Some Aspects’, p. 40.

⁸³ Gramsci, *Prison Notebooks*, p. 196.

⁸⁴ Guha, ‘On Some Aspects’, pp. 41-42.

⁸⁵ Ranajit Guha, ‘Preface’, in Guha and Spivak (eds.), *Selected Subaltern Studies* (New York, 1988), p. 35.

⁸⁶ Spivak, ‘Subaltern Studies’, pp. 341-344.

⁸⁷ Guha, ‘Prose of Counter Insurgency’, p. 47.

⁸⁸ Gyan Pandey, ‘Rallying Around the Cow: Sectarian Strife in the Bhojpuri Region c. 1888-1917’, in Guha (ed.), *Subaltern Studies Vol. II* (New Delhi: 1986), p. 62. Also see, Gyan Pandey, *The Construction of Communalism in Colonial North India* (Delhi, 1990).

A similar approach was taken by Shahid Amin to break down the assumed connection between Gandhi and the villagers, arguing that his nationalist message was incorporated and integrated into their local experiences and knowledge.⁸⁹ Like Pandey, Amin worked to unlock an autonomous rural history within specific localities, to which nationalist ideas and colonialism contributed but didn't dominate. In doing so, he took aim at assumptions about the nature of rural society within elite discourses. Commenting on the work of colonial ethnographers William Crooke and George A. Grierson, Amin contested their perception that the 'material culture of the peasantry' in the United Provinces and Bihar was evidence of the 'changelessness of the physical world' in rural spaces, beyond the realms of history.⁹⁰ Such efforts sought to 'provincialise' Europe in history, to separate change from the narrative of modernisation along western lines, to shift progress away from the encompassing notion that the "traditional" dynamics of the colonies would "modernise" along imperial or nationalist lines.⁹¹

Subaltern studies opened the doorway for scholars to deconstruct elite narratives of South Asian history, and unlock the autonomous histories of the people. During the early 1990s, numerous scholars deployed this methodology to provide post-colonial histories of colonial science and environmental policy. Many historians highlighted that the colonial government claimed that it had introduced scientific rationalism to India was justified with reference to gendered and pseudoscientific racial discourses shaping colonial ideas about disease and development.⁹² One of the major approaches to be contested was the impact-response model, exemplified by George Basalla's conception of modernisation as a teleology of progress driven by the introduction of 'western science, medicine, and technical skills into the interior of India'.⁹³ The notion of a linear pathway in colonial contexts has been widely contested by numerous scholars, who see colonial practices and methods as a product of experimentation and interaction with the colonial context. Many of these studies have critiqued the notion that the colonies were an extension of western scientific discourse, recognising the parameters of

⁸⁹ Shahid Amin, 'Gandhi as Mahatma: Gorakhpur District, Eastern U. P. 1921-2', in Guha and Spivak (eds.), *Selected Subaltern Studies* (Oxford, 1988), p. 313.

⁹⁰ Shahid Amin, 'Editor's Introduction', in William Crooke, *Materials for a Rural and Agricultural Glossary of the North-Western Provinces and Oudh* (Delhi, 1989), p. xxxiv.

⁹¹ Dipesh Chakrabarty, *Provincializing Europe: Postcolonial Thought and Historical Difference* (Oxford, 2000), p. 3.

⁹² For studies of colonial science, please see, David Arnold, *Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth-Century India* (London, 1993); Londa Schiebinger, 'Feminist History of Colonial Science', *Hypatia*, 19:1 (2004), pp. 233-254.

⁹³ George Basalla, 'The Spread of Western Science', *Science*, 157 (May 1967), pp. 618.

distance set by the institutions, methods and conclusions of science in the colonies.⁹⁴ Such studies challenge the totalising conceptions of elite narratives, making room for the possibility that scientific developments were the product of interactions and interconnections with the indigenous context and knowledge.⁹⁵ Many scholars have sought to uncover the impact of indigenous customs and knowledge upon the past, such as Ramachandra Guha's exploration of the attitudes of hill societies towards the environment. These localities were a context in which perceptions about the environment and animals emerged, signifying that the Indian village could be a location for the production of knowledge, as well as the imperial institutions.⁹⁶

During the twentieth century, a host of scholars across the humanities and the natural sciences provided many theoretical challenges to the elite narratives of history, by contesting the very notion that humanity was capable of asserting complete mastery over the natural world. One of the most influential movements of history to first challenge the dominance of such discourses was the Annales school. Founded in the 1920s, its leaders Marc Bloch and Lucien Febvre challenged that history was solely accessible through the government archive. Instead, the cultural and psychological changes affecting a society over the *long durée* could be ascertained by analysing social, cultural and other artefacts. In 1949, Fernand Braudel developed the movement by proposing that the economic and social composition of Southern Europe was shaped not by politics, but by the impact of geographic, climatic and ecological forces upon the culture and mentalities of a region.⁹⁷ Braudel's contest to the primacy of national discourses has ultimately been critiqued for deterministically arguing that specific ecological conditions would have a defined impact upon a culture or society. Nevertheless, his dedication to climatic forces proved to be an inspiration for a host of scholarly works in the late twentieth century, which aimed to ground humans and societies within their bio-physical environment, breaking down the disconnect between nature and culture. One of the first

⁹⁴ For studies of colonial science and indigenous knowledge, please see, Bruno Latour, *Science in Action: How to follow Scientists and Engineers through Society* (Cambridge: MA, 1987); Shula Marks, 'What is Colonial about Colonial Medicine? And what has happened to Imperialism and Health?' *Social History of Medicine*, 10, 2 (1997), pp. 205- 219; David Wade Chambers and Richard Gillespie, 'Locality in the History of Science: Colonial Science, Technoscience, and Indigenous Knowledge', *Osiris*, 15 (2000), pp. 221-240.

⁹⁵ Arun Agrawal, 'Dismantling the Divide between Indigenous Knowledge and Scientific Knowledge', *Development and Change*, 26:3 (1995), p. 414.

⁹⁶ Ramachandra Guha, *The Unquiet Woods, Ecological Change and Peasant Resistance in the Himalaya* (Delhi, 1989), p. 5.

⁹⁷ Fernand Braudel, *The Mediterranean and the Mediterranean World in the Age of Philip II* (Berkeley, 1995), p. 23.

scholars to use ecological evidence to explore the interconnections between the environment and culture within European colonialism was Alfred Crosby. In his 1972 work *The Columbian Exchange*, European colonists adapted to the plethora of diseases, insects, ecologies and animals of the diverse regions they encountered.⁹⁸ In many respects, this emphasis upon the forces of nature was inspired by Charles Sutherland Elton's (1900-1991) celebrated work *Animal Ecology* (1927), which argued that at certain junctures in the past, such as the Black Death in Medieval Europe, human history was shaped by its interconnection with a host of plants, animals and microbes.⁹⁹

The notion that the biophysical world forms a basis for human experience has been a central aspect of environmental histories since the emergence of the field in the 1970s. Many materialist studies have located history within the bio-physical world, arguing that more-than-human forces can influence the past.¹⁰⁰ It is commonly recognised that animals have been integral to the development of societies across the globe, as the building blocks that have glued together the material and cultural foundations of many civilisations. Their functional uses bind them to the economic, social and environmental histories of humanity, which change and alter the relationship between humans and a host of domesticated and wild animals.¹⁰¹ The preservation of their populations has been an integral part of these societies, exemplified by ancient customs of animal husbandry and veterinary sciences.¹⁰² When ecological forces, diseases and man-made factors have disintegrated these animal economies, scholars have shown that many landscapes of political power, cultural unity and human settlement have either had to adapt to life without them, or crumble with them.¹⁰³ The purpose of this thesis is to offer

⁹⁸ For ecological histories, please see, Alfred Crosby, *The Columbian Exchange: Biological and Cultural Consequences of 1492* (Westport, 1972); Alfred Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900-1900* (New York, 1986); James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition have Failed* (London, 1998).

⁹⁹ Charles Sutherland Elton, *Animal Ecology* (London, 1927), pp.52-53.

¹⁰⁰ Ted Steinberg, 'Down to Earth: Nature, Agency, and Power in History', *The American Historical Review*, 107:3 (2002), p. 800. Also see, Donald Worster, 'Toward an Agroecological Perspective in History', *The Journal of American History*, 76:4 (1990), pp. 1091-97.

¹⁰¹ Juliet Clutton-Brock, *Domesticated Animals from Early Times* (London, 1981), p. 26.

¹⁰² For studies of ancient and early modern animal welfare and husbandry, please see, Louise Hill Curth, 'The Care of the Brute Beast: Animals in the Seventeenth-Century Medical Marketplace', *Social History of Medicine*, 15:3 (2002), pp. 375-392; Housni Alkhateeb Shehada, *Mamluks and Animals: Veterinary Medicine in Medieval Islam* (Leiden, 2013); Dagmar Schäfer and Han Yi, 'Great Plans: Song dynastic (960-1279) Institutions for Human and Veterinary Healthcare', in Sterckx, Siebert and Schäfer (eds.), *Animals through Chinese history: Earliest times to 1911* (Cambridge, 2019), pp. 160-180.

¹⁰³ For histories of the role of the impact of human-animal relations upon ecological, political and technological change, please see, John Langdon, *Horses, Oxen and Technological Innovation: The Use of Draught Animals in English Farming from 1066 to 1500* (Cambridge, 1986); Jean Comaroff and John L. Comaroff, 'Goodly Beasts, Beastly Goods: Cattle and Commodities in a South African Context', *American Ethnologist*, 17:2 (1990), pp. 195-

a co-evolutionary perspective upon human-cattle relations in North India. This notion builds upon hypothesis of evolutionary historian's that domestication is not purely the result of narratives of human mastery. Domestication implies that the animal exists in a tamed and ordered category, an extension of civilised society that is controlled by a human master. But as both historians and natural scientists have shown, animal breeders, herders and producers ultimately rely upon the instincts of the animal to mate, to consume, to rear and to herd.¹⁰⁴ Humans do not control the instinct or desire that motivates an animal to act. Instead, humans have created socio-cultural norms of domestication, being practices, structures and methods, that guide these behaviours towards productive goals. For example, people use selective breeding to create fashionable pets or high yielding dairy cows, intensive feeding to fatten livestock for slaughter, manipulate the herd to navigate the landscape.¹⁰⁵ By removing domestication from the domain of dominance, co-evolutionary histories open up the possibility of accessing the more-than-human forces that shape human-animal interactions. Animals are no longer static archetypes, but actors that respond to and influence historical contexts. But this leads to another question, what is the nature of this impact upon history?

The possibility and nature of how animals have influenced the past has been the topic of extensive debate. Some scholars have sought to compare the difference between that which is living and non-living, between plants and animals, and ultimately between humans and animals, in order to define the nature of the animal and its impact upon culture.¹⁰⁶ Post-humanist studies have built upon post-colonial and gender studies to argue that human identity has always been a product of relational aspects, that more-than-human elements pervade the dichotomies of dominance in western discourse.¹⁰⁷ Since the rise of animal history as a sub-field in the 1990s, many studies have explored how animals have been defined within the

216; Alan Mikhail, *Nature and Empire in Ottoman Egypt: An Environmental History* (New York, 2011); Alan Mikhail, *The Animal in Ottoman Egypt* (Oxford, 2014).

¹⁰⁴ For evolutionary studies, please see, Kevin Laland, John Odling-Smee, Scott Turner, 'The Role of Internal and External Constructive Processes in Evolution', *The Journal of Physiology*, 11 (2014), pp. 2413-2422; Edmund Russell, *Greyhound Nation: A Coevolutionary History of England, 1200-1900* (Cambridge, 2018).

¹⁰⁵ For studies of animal behaviour and domestication, please see, Temple Grandin and Catherine Johnson, *Animals in Translation: Using the Mysteries of Autism to Decode Animal Behaviour* (New York, 2005); C. Ginane, M. Bonnet, R. Baumont and D. K. Revell, 'Feeding Behaviour in Ruminants: A Consequence of Interactions between a Reward System and the Regulation of Metabolic Homeostasis', *Animal Production Science*, 55 (2015), pp. 247-260; H. H. Cole and W. N. Garrett, *Animal Agriculture: The Biology, Husbandry, and Use of Domestic Animals* (San Francisco, 1980).

¹⁰⁶ Tim Ingold, *What is an animal?* (Abingdon, 1988), p. 2.

¹⁰⁷ For post-humanist studies of animals, please see, Donna J. Haraway, *When Species Meet* (London, 2008); Lynda Birke and Jo Hockenhull, 'On Investigating Human-Animal Bonds: Realities, Relatings, Research', in Birke and Hockenhull (eds.), *Crossing Boundaries: Investigating Human-Animal Relationships* (Leiden, 2012), pp. 15-36.

discourses of imperialism, nationalism and science.¹⁰⁸ Material and technological changes to the composition of domestication have had a profound impact upon attitudes towards many species, leading to many rival perceptions of their nature and contribution.¹⁰⁹ A number of case studies have moved beyond cultural dynamics seeking to assess how the animal itself influenced domestication and the material culture that developed around it. For McShane and Tarr, horses at markets in New York possessed a ‘biological individuality’, each animal’s unique physical and mental characteristics defining its value and functional role, while imposing ‘limits on commodification’.¹¹⁰ For Virginia De John Anderson, the wandering herds of domesticated cattle introduced by colonial settlers influenced the political and cultural boundaries between Europeans and Native Americans.¹¹¹ Emerging as a breed over 200 years through natural selection in the arid Southwest of North America, Joshua Specht contends that ‘ranchers appropriated...as well as encouraged’ the Texan Longhorn’s ‘adaptions as a kind of technology...ideally suited to transforming grass into commodity beef’, protecting the herd and ‘walking themselves to market’ across a long, perilous journey. In short, ‘Longhorns were vital to the labour of beef production’.¹¹²

In such instances, it is often argued that the animal has agency within a historical context, which shaped popular perceptions and the impact of its abilities upon the past. Initially, the concept was deployed as a means of ascribing animal behaviours with intentionality, such as the desire and conscious ability to escape captivity.¹¹³ Within this model, the behaviours of animals have been shown to adapt to allow animals to survive in changing environments and eras of history.¹¹⁴ Scholars have also used it to show how animals possess the ability to perform

¹⁰⁸ For studies of domesticated animals and Imperialism see Aaron Skabelund, *Empire of Dogs: Canines, Japan, and the Making of the Modern Imperial World* (Ithaca, 2011); Aaron Skabelund, ‘Animals and Imperialism: Recent historiographical trends’, *History Compass*, 11:10 (2013), pp. 801-807; Angela Cassidy, Rachel Mason Dentinger, Kathryn Schoefert and Abigail Woods, ‘Animal Roles and Traces in History of Medicine, c. 1880-1980’, *BJHS: Themes*, 2 (2017), pp. 11-33.

¹⁰⁹ Sam White, ‘From Globalized Pig Breeds to Capitalist Pigs: A Study in Animal Cultures and Evolutionary History’, *Environmental History*, 16:1 (2011), p. 96.

¹¹⁰ Clay McShane and Joel A. Tarr, *The Horse in the City: Living Machines in the Nineteenth Century* (Baltimore, 2007), p. 19.

¹¹¹ Virginia De John Anderson, *Creatures of Empire: How Domestic Animals Transformed Early America* (Oxford, 2004), p. 6.

¹¹² Joshua Specht, ‘The Rise, Fall, and Rebirth of the Texas Longhorn: An Evolutionary History’, *Environmental History*, 21:2 (2016), p. 345.

¹¹³ For key early studies of animal agency, please see, Sarah E. McFarland and Ryan Hediger (eds.), *Animals and Agency: An Interdisciplinary Exploration* (Leiden, 2009); Jason Hribal, *Fear of the Animal Planet: The Hidden History of Animal Resistance* (Petrolia, 2010).

¹¹⁴ Mahesh Rangarajan, ‘Animals with Rich Histories: The Case of the Lions of Gir Forest, Gujarat, India’, *History and Theory*, 52:4 (2013), p. 112.

emotive behaviours, such as play, building on studies that have sought to demonstrate the emotional worlds of animals, drawing on Darwin's later work, the *Expressions of Emotions in Man and Animals*.¹¹⁵ Moreover, scholars have shown how people have used the ability of animals to learn and be trained to perform unique roles in society. In these instances, their behaviours have been shown to positively contribute towards pivotal moments in history.¹¹⁶ As Chris Pearson has shown, police dogs were associated with loyalty and valour in early twentieth century France, as the Parisian force could harness aspects of 'canine instincts' such as 'intelligence, sensory skills, emotions, trainability, and physical strength', which under human guidance allowed them to 'act in socially-useful ways'. Such examples provide instances in which perceptions of animal behaviours were relative to changing socio-cultural perspectives. Moreover, they reveal that the abilities of animals can be deployed as an agency, that influences the dynamics of a society over time.¹¹⁷ In sum, these frameworks open up the possibility of understanding the nature of forces that influenced perceptions of cattle in colonial and nationalist discourses. They demonstrate that perceptions of animals and their behaviours are historically relative. As animals perform different roles in ever-changing contexts, ideas and attitudes towards their contribution also evolve.

1.4 Conclusion

Each chapter of this thesis explores the unique aspects of animal behaviour, cultural representation and the co-evolution of humans and animals that pervaded the early twentieth century. Throughout both imperial and nationalist visions of progress, animal behaviours were perceived to influence domestication. These chapters provide answers to key questions, such as why was the impact of animals perceived to cause the development or decline of agricultural society? How did ideas about animal behaviours compare and contrast? As this opening chapter

¹¹⁵ Studies of animals and emotions, please see, Charles Darwin, *The Expression of Emotions in Man and Animals* (London, 1872); Jeffrey Masson and Susan McCarthy, *When Elephants Weep: The Emotional Lives of Animals* (London, 1994); Jeffrey Moussaieff Masson, *The Pig who Sang to the Moon: The Emotional World of Farm Animals* (New York, 2003); Marc Bekoff, *The Emotional Lives of Animals* (Novato, 2007); Barbara J. King, *How Animals Grieve* (Chicago, 2013).

¹¹⁶ For recent studies of animal agency, please see, David Gray Shaw, 'The Torturer's Horse: Agency and Animals in History', *History and Theory*, 52:4 (2013), pp. 146-167; Chris Pearson, 'Dogs, History, and Agency', *History and Theory*, 52:4 (2013), pp. 128-145; Johnathan Saha, 'Colonising Elephants: Animal Agency, Undead Capital and Imperial Science in British Burma', *BJHS Themes*, 2 (2017), pp. 169-189.

¹¹⁷ Chris Pearson, 'Between Instinct and Intelligence: Harnessing Police Dog Agency in Early Twentieth-Century Paris', *Comparative Studies in Society and History*, 58:2 (2016), p. 466.

has demonstrated, within the discourses of imperialism, cow protectionism was viewed as a superstitious custom, rooted in the “fatalist” subservience of Indian culture to the forces of the wild. The British Raj legitimised its rule in Asia and Africa by arguing that western culture would bring rational order and progress to the colonies, a “civilising mission” that would instil mastery over the natural world. These paradigms of modernisation became a catalyst for research and practice in animal domestication during the late nineteenth century, pushing the “breed” as a marker of progress. Across the western world and in the colonies, distinct physiological and aesthetic qualities were considered to be symbols of scientific order and the productive functionality of the animal. As studies of animal production science in the west have shown, the construction of the “breed” was premised upon control over the behaviours of animals, namely their ability to consume, rear, mate and herd. Previous studies of animal domestication and husbandry in colonial India have argued that the formalisation of a national herd of indigenous breeds signified the beginning of progressive animal husbandry in India. As histories of dairying have shown, while cow protectionism emphasised the significance of creating a national supply of dairy, national programmes increasingly incorporated the international discourses and standards of dairying established by colonialism. Thus far, however, studies have yet to explore the cracks and fissures within this project, to reflect on the limits of colonial and nationalist discourses of mastery, and how the socio-cultural, environmental and behavioural dynamics of domestication formed the basis of historical change.

The main aim of this thesis is to build upon the literature by deconstructing colonial and nationalist narratives of animal domestication in colonial North India. It argues that the opening decades of the twentieth century provide an important context in which to understand how socio-cultural, environmental and behavioural dynamics of animal domestication intersected with elite narratives. Building upon the work of subaltern histories and history from below in unlocking the ideas and agency of the people, environmental and animal histories demonstrated that the animal has been subsumed by elite discourses. They also challenge this and write a new narrative, in which the socio-cultural, environmental and material dynamics of animal domestication were shaped by their relationship with the behaviours of animals. This thesis offers a deconstruction of these perceptions within the history of colonial India. As the next chapter demonstrates, one of the core aspects of animal behaviours that colonial officials and nationalist affiliated with development and decline was their consumption habits.

Chapter 2

Pests, producers and agricultural chemistry in late nineteenth century

North India

During the late nineteenth century, domesticated cattle became the focal point of colonial efforts to increase the productivity of agricultural society. The socio-cultural and environmental dynamics of animal husbandry across the villages of India were discussed and scrutinised in the legislative, scientific and agricultural discourses of the colonial rulers. Within these debates, colonial officials attempted to reform two aspects that connected cattle to the productivity of cultivation, namely their instinct to consume food and their ability to produce dung. This chapter explores how perceptions of cattle as consumers and producers were affiliated with ideas of the development and decline of agriculture in North India. This is achieved by deconstructing perceptions of cattle within colonial and vernacular discourses. It is shown that representations of cattle as unruly consumers were rooted in colonial conceptions of productivity. The government desired to reform ideas of cattle as property, fodder production and utilisation of dung, in order to instil new norms of domestication that supported the expansion of cultivation.

As the opening section shows, socio-cultural history is tied to the animal as a consumer and a producer. The nature of how animals consume has been associated with concepts of domestication and the wild in colonial discourse. A range of scholars have explored how these instincts have been portrayed, and why they have been affiliated with concepts of co-evolution in imperial, nationalist and wider discourses. In the second section, it is shown that these definitions were applied to the animal geographies and the socio-cultural norms of domestication in North India, which became viewed as detrimental to the productive use of cultivated fields, grasslands and forests. Agricultural officials and researchers proposed that cattle had to give back to society through the resources they produced. Otherwise, they were branded as stray or infirm, “pests” that drained the finite resources available. As the closing section shows, government journals such as the *Agricultural Ledger* and the *Bulletin of the Department of Land Records and Agriculture* used frameworks introduced by chemists in the 1890s to redefine the socio-cultural and behavioural dynamics of domestication, to ensure that

the animal was a productive converter of resources. The discourses, terminology and methods of chemistry became integrated into the growing body of vernacular literature discussing questions of agricultural progress and animal husbandry. These authors also aimed to maximise the productive use of cattle. However, they also recognised that colonial models of productivity were incompatible with the environmental, material and the socio-cultural dynamics of domestication across North India. The main point of contention was cattle dung, an essential source of cooking fuel used by Indian villagers. By studying both colonial and vernacular reports and books relating to the question of manure, it is shown that ideas about animal domestication were not purely the product of colonial or cow protectionist models. Instead, through compromise and exchange of knowledge, both Hindi and colonial textbooks began to recognise that optimal techniques needed to be developed to use urine, an alternative resource provided by cattle that offered a valuable source of nitrogen.

2.1 *Consuming fodder and producing dung: A socio-cultural history*

As complex life-forms, animals perform a range of activities in order to access energy and preserve their existence. These can be relatively straightforward, such as inhaling oxygen. Locating heat, shelter and water offer greater challenges. Arguably, the most difficult task that a species will face is to find and eat food. As Charles Elton stated,

Animals are not always struggling for existence, but when they do begin, they spend the greater part of their lives eating. Feeding is such a universal and commonplace business that we are inclined to forget its importance. The primary driving force of all animals is the necessity of finding the right kind of food and enough of it. Food is the burning question in animal society, and the whole structure and activities of the community are dependent upon questions of food-supply.¹

Ecologists define animals as consumers, a term used to describe any organism that acquires energy by absorbing other organisms. This process takes place because each life-form needs to acquire caloric energy, which plants absorb through photosynthesis from the sun, the basis of all life on Earth. Each species contributes to a complex food chain, which develops within a habitat. Herbivores consume plants, carnivores consume flesh, while omnivores consume a mixture of both. Each species has a unique physiological system of digestion, which releases

¹ Elton, *Animal Ecology*, p. 56.

energy from food. As ruminants that survive primarily on grasses, leaves, roots and other shrubbery, cattle have evolved a unique four chambered stomach which allows them to eat large quantities of forage. In addition to the process of consumption, animals have gradually attained many physical attributes and abilities that make the task to acquiring food easier. For example, cattle have a unique set of teeth that allow them to cut and chew blades of grass. Moreover, ecologists and animal behaviour studies have shown that the pressures of the food chain have had a significant impact upon the nature of behaviour and emotions in animals. Cattle have evolved the ability to explore their environment through foraging and browsing in order to locate food.² To evade a sharp and bloody death by the jaws of a predator, cattle have developed watchful eyes and ears, an alertness to changes in their environment and tendency to unify socially as a herd, to protect themselves from an attack.³ In sum, to acquire food animals navigate a complex web of forces which constantly utilise and shape their physical and behavioural traits within an animal's ecological niche.⁴

The history of how people access, consume and expunge resources has been defined by a range of material, cultural and environmental factors. Within the discourses of development, the strength and status of a nation state has frequently been defined by the stability and quality of its food supply, and whether it can produce a healthy population.⁵ Studies of religion have also shown how the act of giving food has been a key aspect of rituals and ideas of charity, often associated with spiritual reward. As the image below of devotees at the *Durgapura Gaushālā* (cattle sanctuary) in Jaipur indicates, in South Asia the act of feeding cows, monkeys, elephants, snakes and other holy creatures is associated with pious devotion.⁶ In material histories, the need to find and provide food for herds of livestock and working animals has created conflict between villagers, land owners, and even between the human domesticators

² R. R. Hofmann and D. R. M. Stewart, 'Grazer or Browser: A Classification Based on the Stomach-Structure and Feeding Habit of East African Ruminants', *Mammalia*, 36 (1972), pp. 227.

³ Clive C. Phillips, *Cattle Behaviour* (Ipswich, 1993), pp. 85-86. Also see, R. J. Putman, *Community Ecology* (Dordrecht, 1994), p. 5.

⁴ Marcus Clauss, Thomas Kaiser, and Jürgen Hummel, 'The Morphophysiological Adaptions of Browsing and Grazing Mammals', in I. J. Gordon and H. H. T. Prinns (eds.), *The Ecology of Browsing and Grazing* (Heidelberg, 2008), p. 47.

⁵ Darren C. Zook, 'Famine in the Landscape: Imagining Hunger in South Asian History', in Agrawal and Sivaramakrishnan (eds.), *Agrarian Environments: Resources: Representation, and Rule in India* (Durham, 2000), p. 108.

⁶ For studies of feeding animals, please see, R. Ganguli, 'Cattle and Cattle-Rearing in Ancient India', *Annals of the Bhandarkar Oriental Research Institute*, 12:3 (1931), pp. 216-230; Nanditha Krishna, *Sacred Animals of India* (New Delhi, 2010), p. 64; Amy L. Allocco, 'Fear, Reverence and Ambivalence: Divine Snakes in Contemporary South India', *Religions of South Asia*, 7 (2013), pp. 230-248; Anand Vivek Taneja, 'Sainly Animals: The Shifting Moral and Ecological Landscapes of North India', *Comparative Studies of South Asia, Africa and the Middle East*, 35:2 (2015), pp. 204-221.

and the predators that lurk at the fringes of the grazing lands.⁷ A large body of work has shown that the carnivorous habits of lions, wolves, crocodiles, sharks and other species have given them a renowned status in nationalist and imperialists discourses across the globe, as symbols of aggression and power.⁸ By contrast, many species have been branded as “pests” and “vermin” for consuming crops, grasses and other aspects of the land that were viewed as human property. Scholars have also explored how spatial discourses have influenced our attitudes towards animals as consumers. As David Arnold noted, ‘animal geography helped give fine-grain definitions to urban spatiality and to refine practices of urban inclusion and exclusion’ in colonial India.⁹ This is readily apparent in the case of animals defined by Terry O’Connor as commensal species, populations that have co-evolved alongside humans by thriving on the resources and shelter within our settlements, yet often not to our benefit or by our approval. In the United Kingdom, these are the seagulls that roam the skies, pigeons that forage the pavements, rats and mice that hide beneath us, and foxes that rummage our waste at night. In entering the metropolis they transgress our spatial boundaries, becoming “pests”, “vermin” and remnants of the wild that threaten the health of the human ecosystem by unsettling its civility, hygiene and safety.¹⁰ Pets and companion animals have been allowed to cohabit in exchange for their obedience, freedom of movement, while their capacity to consume is regulated through human structures. Although domesticated livestock have recently vanished from European cities, their bodies remain connected to humanity due to the need for caloric energy provided by their flesh and produce, and the sanitary regulations that surround animal products.¹¹ During the nineteenth century, many aspects of domestication were viewed as a drain on resources. For example, pastoralist communities were persecuted as a destructive

⁷ For studies of desertification as pastoralism, please see, A Kannan, *Global Environmental Governance and Desertification* (New Delhi, 2012); R. R. Prasad, *Pastoral Nomadism in Arid Zones of India: Socio-Demographic and Ecological Aspects* (New Delhi, 1994).

⁸ For studies of imperialism and hunting see William K. Storey, ‘Big Cats and Imperialism: Lion and Tiger Hunting in Kenya and Northern India, 1898-1930’, *Journal of World History*, 2:2 (1991), pp. 135-73; Joseph Sramek, ‘Face Him Like a Briton: Tiger Hunting, Imperialism, and British Masculinity in Colonial India, 1800-1875’, *Victorian Studies*, 48:4 (2006), pp. 659-80; Greg Gillespie, *Hunting for Empire: Narratives of Sport in Rupert’s Land, 1840-70* (Vancouver, 2007); Angela Thompsell, *Hunting Africa: British Sport, African Knowledge and the Nature of Empire* (New York, 2015); Peta Tait, *Fighting Nature: Travelling Menageries, Animal Acts and War Shows* (Sydney, 2016); Andrea L. Smalley, *Wild by Nature: North American Animals Confront Colonization* (Baltimore, 2017).

⁹ David Arnold, ‘Pollution, Toxicity and public health in metropolitan India 1850-1939’, *Journal of Historical Geography*, 42 (October 2013), p. 125.

¹⁰ Terry O’Connor, *Animals as Neighbours: The Past and Present of Commensal Animals* (East Lansing, 2014), p 7.

¹¹ For key studies of pet culture, please see, Katherine C. Grier, *Pets in America: A History* (Chapel Hill, 2006); Erica Fudge, *Pets* (Oxon, 2008).

force, associated with overgrazing and even desertification.¹² As Brett Walker highlighted, animals as consumers can unsettle the boundaries of mastery within the discourses of imperialism and nationalism. Whether it is the herd that drains the landscape of its nutrients or the predator seeking to eat our flesh, humans are locked into an at times gory yet ‘intimate’ relationship with their instinctual behaviours.¹³



Figure 5: ‘Cows being fed by devotees at the Durgapura Gaushālā (cattle sanctuary), Jaipur’ (photo by Lloyd Price, 14/09/2017).

As Bahadur Singh and Bhanupratap Singh’s diagram below outlined in 1961, the animal’s ability to consume and fertilise the landscape was integral to the success of agriculture. Three major factors formed a cyclical relationship upon which the Indian village was dependent, being humans, animals and the landscape. If one factor failed, the others would follow. Starting on the right hand side of the image, the authors depict a village where the land had become barren due to the lack of rain, causing minimal crops to grow (*kam paidāvāra*). Following the diagram clockwise, this also meant that there was less forage and fodder (*dāne-chāre ki kami*)

¹² For studies of pastoralism, stray animals and desertification, please see, David Western and Virginia Finch, ‘Cattle and Pastoralism: Survival and Production in Arid Lands’, *Human Ecology*, 14:1 (1986), p. 80; Paul Robbins, ‘Pastoralism and Community in Rajasthan: Interrogating Categories of Arid Lands Development’, in Agrawal and Sivaramakrishnan (eds.), *Agrarian Environments* (London, 2000), pp. 191-215; Diana K. Davis, ‘Desert ‘Wastes’ of the Maghreb: Desertification Narratives in French Colonial Environmental History of North Africa’, *Cultural Geographies*, 11 (2004), p. 360; A Kannan, *Global Environmental Governance and Desertification* (New Delhi, 2012), p. 24.

¹³ Brett L. Walker, ‘Animals and the Intimacy of History’, *History and Theory*, 52:4 (2013), p. 47.

leading to weak, hungry animals (*bhukhe kamazōr jānvara*) that were unfit to cultivate the land (*kam jutāi*) and produced low quality fertiliser (*khād ki kami*) that could not revitalise the earth.¹⁴ During the late nineteenth century, many colonial officials argued that any balance between the land and the animals was collapsing in North India due to its vast population of cattle, which wandered into fields and forests, destroying crops and natural resources. One of the major issues facing North India was a shortage of fodder, manure and other resources that were deemed to be necessary to agriculture. Many British officials felt that cattle did not give back to the land, because of the socio-economic practice across India of using cow dung (*gōbar*) as a source of cooking fuel, a building material and a ritual substance.¹⁵ Due to the general lack of wood or access to coal across vast stretches of the agrarian plains, dung was collected by villagers from the fields and cattle sheds, moulded into a circular plate shape, and left to dry in the heat. Once dried, it could be set alight and left to burn its clean, low heat under a pot or pan, allowing traditional foods to simmer for hours.¹⁶ While William Crooke's glossary of peasant life in North India indicated that fertilisers (*khād, khāt, khāo, pāns, sār*) were commonly used by farmers,¹⁷ Laxman Satya argued that cattle-dung was 'seldom used' as manure by the people of Central India. This changed in the late nineteenth century, when the colonial government pushed cultivators to use cow dung to rejuvenate the soil after each harvest, due to the depletion of nutrients in the land by rapid cultivation of resource-heavy cotton. These demanding agricultural cycles forced cultivators to plough more and more manure into the land, slowly leading the soils of Central India to become barren.¹⁸

This chapter builds upon Satya's study of the environmental and socio-economic dynamics of cattle domestication, by exploring how the ability of cattle to consume and produce was associated with the development and decline of North India. The next section begins this inquest, by exploring how and why a correlation emerged between the consumption habits and instincts of cattle, and the progress or decline of agriculture. It will do so by situating cattle within the animal geographies of North India, exploring how a range of species were perceived in the discourses of North India's elite vernacular newspapers, and that of colonial legislation

¹⁴ Bahadur Singh and Shri Bhanupratap Singh, *Kheti* (Fields) (Varanasi, 1961), p. 74.

¹⁵ For studies of the significance of cow dung, see, Upinder Singh, *A History of Ancient and Early Medieval India: From the Stone Age to the Twentieth Century* (Delhi, 2016), p. 123; K. S. Bharathi, *The Social Philosophy of Mahatma Gandhi* (New Delhi, 1991), p. 76.

¹⁶ Marvin Harris, 'India's Sacred Cow', *Human Nature*, 1:2 (1978) pp. 28-36.

¹⁷ William Crooke, *Material for a Rural and Agricultural Glossary of the North-Western Provinces and Oudh* (Allahabad, 1879), p. 68.

¹⁸ Satya, *Ecology, Colonialism, and Cattle*, p. 13.

and agricultural policies. By assessing these sources, this section begins to investigate the plethora of discourses that influenced ideas and attitudes towards a host of animals, and the interconnection between human-animal relations and ideas of agricultural productivity.

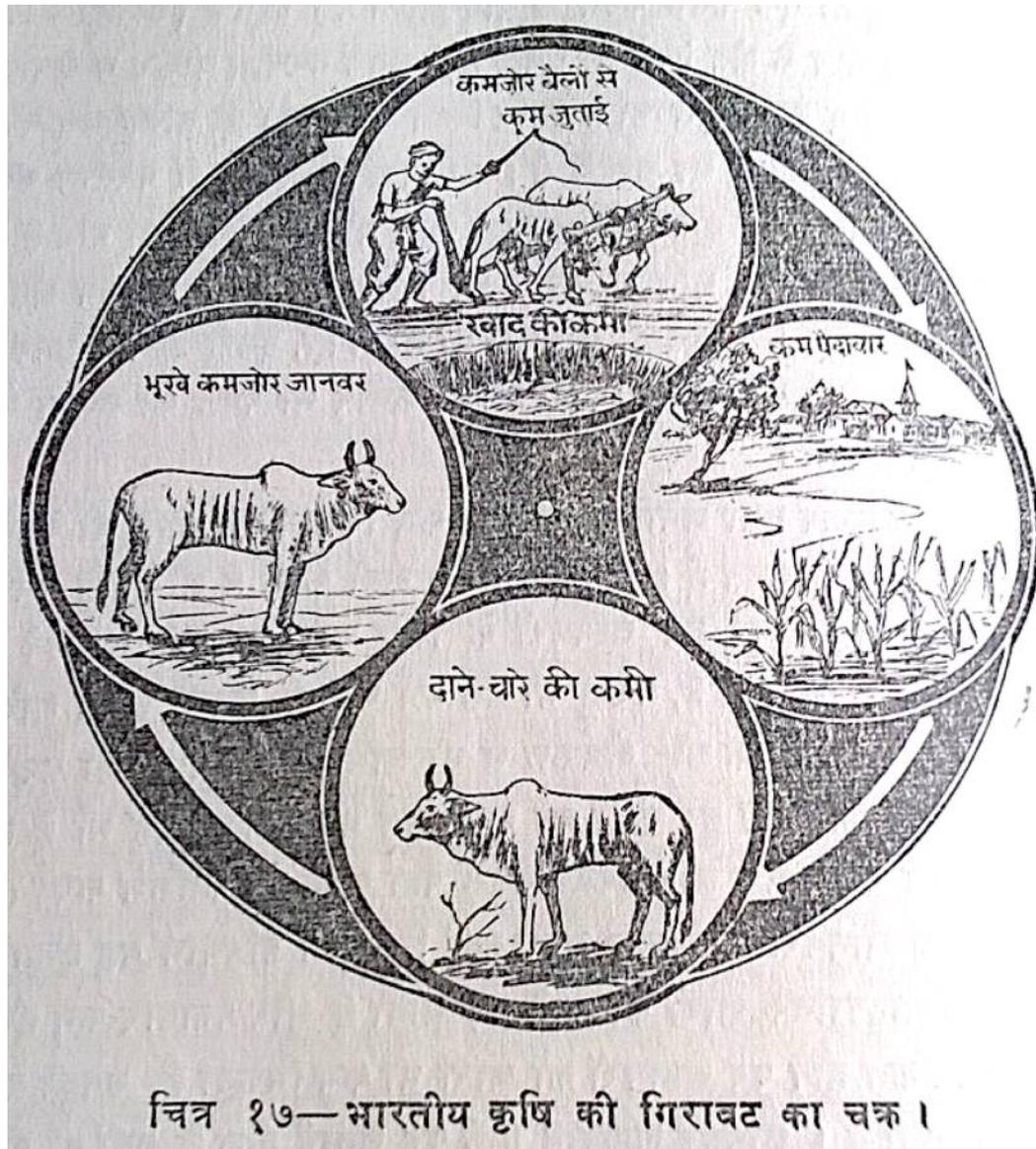


Figure 6: 'The Decline of Indian Agriculture', Bahadur Singh and Bhanupratap Singh, *Kheti* (Fields) (Varanasi, 1961).

2.2 *People, pests and the animal geographies of North India*

The presence and impact of a range of animals that were the residents of urban and rural spaces were the subject of many articles written by the elite Hindus and Muslims of North India throughout the late nineteenth century. For example, on the 15th November 1881 the Hindi newspaper the *Kavivachan Sudha* reported that on the day of Id, a number of Hindus in Mirzapur confronted a Muslim named Akbar Ali Khan who ‘drove a cow from his house to that of a butcher and beat her in order to make her run faster’. After unsuccessfully attempting to dissuade him or appeal to the law, that night ‘about one hundred Hindus entered the butcher’s house and took the cow by force’. Yet the following day Ali Khan simply purchased a different cow, and paraded her on the way to the butchers, repeatedly shouting, ‘in order to vex the Hindus, that she was going to be sacrificed’. This report is emblematic of many others in the archive, in which a Hindu publication condemns the act of slaughtering a cow as an injustice against the community, highlighting the Muslim as an enemy that choose to kill a cow to offend their religion. Similar divisions were also associated with the presence of the products of dead cattle. In 1880 Babu Harish Chander of Benares called for butchers to be removed from the city, and that ‘no one should be allowed to carry flesh exposed in the public streets and thoroughfares’.¹⁹ Demands were made for walls to be built around ‘the Durga temple in order that passers-by may not see the animals being sacrificed’, and for the abattoirs of the beef eating British troops to be concealed. Reports frequently discussed the offence and spiritual pollution caused by the sight and smell of flesh and dead corpses, both on religious and sanitary grounds. Often times people took advantage of Hindu sensitivities by polluting wells with flesh, throwing bones into temples and leaving freshly skinned hides out in the open. In November 1883, the Urdu paper the *Nasim-i-Agra* reported that for over a week middle class Hindus initiated an ‘entire suspension of trade in Agra’, shutting the doors of their shops and homes in an act of protest against a string of such offenses against their religion.²⁰

From reports discussing working animals in the city, it is clear that the treatment of cattle while divisive, only caused offence to a select group. Many cart drivers were accused of overworking their transport animals that carried goods and people around the city. In 1879 the *Samāchār*

¹⁹ India Office Record (henceforth IOR)/L/R/5/57, *Kavivachan Sudha* (Benares, 19/07/1880).

²⁰ IOR/L/R/5/60, *Nasim-i-Agra* (Agra, 11/11/1883).

Sār noted that ‘in Allahabad horses, buffaloes, oxen, and asses are often seen overburdened and cruelly beaten by the owners’. For one observer, the sight of a bullock being goaded in the street was as improper as women beating their breasts in public during the death of a relative, or the singing of indecent songs as part of marriage celebrations.²¹ Such reports demonstrate that on the one hand, the welfare of cattle was defined by their ability to function as a working machine in the movements of the city. They also show that conceptions of the mistreatment of animals were relative, potentially the concern of more conservative sections of society. Similar connotations pervaded in protests raised against people who organised, spectated and gambled on quail-fights, cock-fights and ram fights, popular pastimes for the people and rulers of Lucknow and Lahore. On the 10th March 1883 the Hindi paper the *Deshopkarak* called for the enforcement of the Police Act of 1867 to prevent cruelty to birds and animals, but also to object to the act of gambling in any form.²² In both cases, the mistreatment of working animals was not solely protested for welfare concerns, but manifested a number of tensions around ideas of behavioural and social norms in urban spaces. Many people complained that working animals caused active or inadvertent harm to the people of the city. Numerous reports discussed the broken bones, sprained ankles and even deaths caused by horse-drawn carts (*ekka*), while in Ludhiana reporters complained that ‘bulls... continually wander up and down the streets and are a great public nuisance’, as they destroy crops and attack people. Despite their potential to cause physical harm, along with diseases from their faeces and disruption through their scavenging, calls to banish the wandering cattle from the city streets were few and far between.²³

Similar attitudes were not always shown towards animals that did not serve a direct role in the smooth operations of the city. Langur and macaque monkeys were a common feature of Indian cities. The langur variety were unique to the Indian subcontinent, found inhabiting a variety of deserts, tropical jungles, and very often human settlements. For many Hindus, they were living incarnations of Hanuman, a deity from the sacred and popular Hindu text the Ramayana. Hanuman is said to have found Lord Rama during his exile in the forest, and rallied an army of monkeys to help him overthrow the demon King Ravana. According to Desmond Morris, ‘the black facial skin of the langurs strongly associates them with stories of Hanuman being burned in an act of heroism. For some people, therefore, feeding the langurs is a devotional

²¹ IOR/L/R/5/56, *Samāchār Sār* (Allahabad, 14/04/1879).

²² IOR/L/R/5/60, *Deshopkarak* (Lahore 10/03/1883).

²³ IOR/L/R/5/61, *Nūr Afshān* (Ludhiana, 04/12/1884).

act'. Their sacred status along with their non-aggressive tendencies have generally held them in better favour than macaque monkeys, the species found across Asia, north Africa and southern Europe. These rhesus macaques were the most populous species of monkey in North India. They had also adapted to different habitats, and can commonly be found living close to human communities in troops that can contain to up to 200 monkeys. They remain sacred, often celebrated with Hindu temples such as Galta Ji on the outskirts of Jaipur. As Morris noted,

These grey langur monkeys often become a serious pest, stealing food from gardens and raiding orchards, but no one dares to raise a finger against them. Anyone hurting or killing one would be liable to find themselves set upon by an angry Hindu mob. Even the cheeky rhesus monkey that also inhabit India in large numbers are protected because, although they are not themselves considered to be sacred like the langurs, they are clearly closely related to them and therefore gain some of their mystique.²⁴

Despite their religious significance, monkeys were commonly considered to be a nuisance during the nineteenth century. In 1880, the *Nairang Mazāmin* in Mathura stated that monkeys 'frequently assault the people and carry away everything that falls into their hands'. In Lucknow, the *Mashir-i-Qaisar* complained that monkeys 'carry away and tear up clothes, and frequently attack women and children'.²⁵ The *Shola-Tur* described the apes of Lucknow as 'very mischievous'. They damaged property, caused injuries and even killed a nobleman (*mahajan*) by throwing bricks from the rooftops. British officials were also concerned as monkeys damaged their property and broke telegraph poles. Speaking about the monkeys of Mathura, the *Nairang Mazāmin* proposed that 'no Hindu of Muttra is so stupid as to look upon their banishment as an interference on the part of the Magistrate with his religious affairs'.²⁶ The people of Mathura were persistent in their appeal, submitting several petitions to the 'Lieutenant Governor of the North-Western Provinces praying that monkeys be removed from the city' to the forest or jungle.²⁷ Some went further, arguing that 'all the apes should be...killed'.²⁸ The *Arya Mitra* in Benares suggest that 'people should poison them by giving them bread mixed with *Nux vomica*'.²⁹

Stray dogs were also persecuted in many instances, animals that were considered to be symbols of disease and degeneration of the urban ecosystem. These were pariah dogs, a term commonly

²⁴ Desmond Morris, *Monkey* (London, 2013), pp. 21-22.

²⁵ IOR/L/R/5/56, *Mashir-i-Qaisar* (Lucknow, 11/05/1879).

²⁶ IOR/L/R/5/57, *Nairang Mazāmin* (Muttra, 31/10/1880).

²⁷ IOR/L/R/5/56, *Nairang Mazāmin* (Muttra, 15/06/1879).

²⁸ IOR/L/R/5/56, *Shola-Tur* (Lucknow, 20/05/1879).

²⁹ IOR/L/R/5/57, *Arya Mitra* (Benares, 30/01/1880).

used to refer to outcasts, outlaws and vagabonds. Many canines roamed around the cities of North India, generally with medium builds, short light brown or faded coats, and curved tails. In 1832 streets dogs became a source of a riot in Bombay, when the community of Parsis, followers of the Zoroastrian religion, protested against the British government's indiscriminate killing of the animals during the summer months. Jesse Palestia has questioned whether protecting dogs was the main motive behind the riot, or whether they became symbols of a wider tension brewing between the people and the government.³⁰ Generally, newspaper reports from the late nineteenth century were mixed in their response to dogs. On the 17th May 1879, the *Rohilkhand Akhbar* complained that in Moradabad 'a mad pariah dog lately bit seven or eight men'.³¹ They were accused of snarling, growling and terrorising residents, and were also associated with disease and poor sanitation. In 1884 the city of Lucknow made plans to allow street sweepers to shoot dogs that they encountered. However, not all people supported their destruction. The *Bharat Bandhu* condemned those that killed and cut off 'dog's tongue... for medicinal purposes', or for simply for barking and inhabiting the city. It stated, 'what hard-hearted men are those who kills animals with their own hands!'³²

Throughout the late nineteenth century, many colonial officials were also troubled by the impact of North Indian animal populations and the lack of control over the animal geographies of the region. Their main concern was the relationship between animals and the expansion and stability of cultivation. In 1904 William Harrison Moreland (1868-1938) published a book titled, *The Agriculture of the United Provinces: An Introduction for the use of Landholders and Officials*. Before becoming a celebrated historian, Moreland was known as a committed servant in his position as an Assistant Settlement Officer for the NWP from 1889. His dedication to agrarian questions was further developed when he helped to open an agricultural college in Cawnpore in 1893, to train officers working for the Revenue Department.³³ In his role as the Director of Land Records and Agriculture for UP, he sought to provide insight and guidance on colonial agricultural policy and how it could handle animal populations. His book aimed to draw together knowledge from across the province, in order to offer guidance to even the most experienced land agents and officials, as well as using vernacular terms to reach Indian readers.

³⁰ Jesse S. Palestia, 'Mad Dogs and Parsis: The Bombay Dog Riots of 1832', *Journal of the Royal Asiatic Society*, 11:1 (2001), p. 14.

³¹ IOR/L/R/5/56, *Rohilkhand Akhbar* (Moradabad, 17/05/1879).

³² IOR/L/R/5/57, *Bharat Bandhu* (12/03/1880).

³³ Margaret H. Case, 'The Historical Craftsmanship of W. H. Moreland (1868-1938)', *The Indian Economic and Social History Review*, 2:3 (1965), p. 245.

Moreland was highly critical of what he saw as the ‘ignorance and thoughtlessness’ of the villagers, particularly in terms of animal domestication and its impact upon agriculture. His ideas mirrored the colonial government’s efforts to use legislation to reform the socio-cultural norms of domestication across India during the late nineteenth century.³⁴

The Cattle Trespass Act of 1871 (CTA) was passed by the colonial government in order to deter people from allowing their animals to wander without supervision, by giving landowners the power to capture and impound any animal that trespassed on their land. According to the act, any property owner had the right to seize and impound ‘cattle doing damage’ to private land, gardens, public roads, canals and other public spaces. The CTA referred to cattle as the collection of bulls, cows, goats, pigs, sheep and any other domesticated species in the animal geographies of India that were meant to have an owner, according to western norms. If any of these species was discovered to be trespassing, the CTA gave a landholder the authority to capture the animal and take it to a nearby cattle pound that was established for the purpose of the act. If an owner wished to reclaim their animal, they had to pay a fine for the damages caused and the cost of keeping the animal at the pound. However, if the animal was not claimed within seven days, it could be sold at a public auction to interested cultivators, butchers and tanners. The CTA aimed to discourage people from letting their animals loose in the day to wander and forage, by penalising those who allowed their animals to ‘stray and do injury’ to other people and crops. It also sought to dissuade the practice of abandoning ‘useless’ animals, especially cattle which were less frequently slaughtered due to the taboo. For a Commissioner in the Madras Presidency, releasing animals was ‘not accidental and causal, but habitual’. Wandering animals with healthy appetites were an epidemic that had compelled many people to give up garden cultivation. At its core, the CTA sought to use legal means to instil a new norm of how animals were understood to be property, by directly affiliating the actions of the animal with an owner. In doing so, it sought to distinguish domesticated herds from the stray and forest animals that were ‘too wild to be caught’. Moreover, it sought to redefine conceptions of the standards and values of domestication, in terms of ownership but also the presence and impact of animals and their behaviours upon human spaces. One of the most vivid examples was a description of the feeding habits of pigs, animals synonymous with people that were judged to be of the ‘lower classes’. When they were let loose to stray in towns and villages, colonial officials felt that they not only harmed gardens and grasslands, but their

³⁴ William Harrison Moreland, *The Agriculture of the United Provinces* (Allahabad, 1904). p. 3.

appetite for almost any waste scattered around human settlements made them ‘disgusting to the sight’, creating unclean towns while rendering their bodies ‘unfitted for the food of man’. If the law could compel people to keep them in their styes, they and their surrounding human co-inhabitants would be healthier and more hygienic.³⁵ Where the CTA sought to tackle cattle that stray, the Forest Act of 1878 also attempted to curb the impact of animals and reform domestication practices. It did so by aiming to prevent villagers and pastoralists from collecting wood and grazing their cattle in government forests, especially those that were reserved as prized stores of timber.³⁶

Reflecting on the situation at the turn of the twentieth century, Moreland stressed that without further legislation to reform the socio-cultural norms of domestication, a large number of productive cattle would die of either ‘sheer starvation or from illness’ due to environmental factors. When the monsoon finally arrived in late June, he felt that there were never enough healthy or strong animals to work the land. The villagers were accustomed to feeding their cattle on the parts of agricultural crops that were not required for human consumption. But after these stores of food ran out and the scorching summer heat descended, animals were forced to scatter and fight for non-nutritional scraps across waste and barren land.³⁷ As a result, across the districts of the United Provinces many cultivators were unable to feed and rear their animals, let alone access an adequate supply of food or space to raise a healthy bull, a hard working bullock or a high yielding dairy cow.³⁸ In addition to environmental factors, Moreland stressed that due to the lack of control over animal populations and the limited resources available to fence and protect cultivated land, “pests” such as pigs came from the lowlands into the fields at night, digging up the crops to snack on their roots. In a section titled as Plant Disease and Pests, pigs were just one of many domesticated, stray and wild animals that unsettled the boundaries of agrarian life. As he stated,

Among the animal pests there is first man, who steals the melons, the maize cobs and the fruit, and occasionally reaps part of someone else’s field. Then there are the cattle, which are apt in their hunt for food to graze on the growing crops; and the monkeys,

³⁵ NAI: Legislative Department, (A:49-64), ‘Cattle Trespass Act 1871’.

³⁶ For studies of forestry, please see, Berthold Ribbentrop, *Forestry in British India* (New Delhi, 1900), pp. 133-135; Arupjyoti Saikia, ‘Making Room Inside Forests: Grazing and Agrarian Conflicts in Colonial Assam’, in Mahesh Rangarajan and K. Sivaramakrishnan, *Shifting Ground: People, Animals, and Mobility in India’s Environmental History* (New Delhi, 2014), p. 156.

³⁷ Moreland, *United Provinces*, pp. 128-9.

³⁸ Moreland, *United Provinces*, pp. 124-5.

which religious sentiment allows to congregate in such numbers that they do a great deal of damage in the fields.³⁹

According to Moreland, a ‘pest’ was similar to a ‘weed’. It was anything unwanted that entered the land of a cultivator.⁴⁰ While expensive fences, thorn bushes and gated enclosures could help stem the worst effects of wild cattle, jackals and deer, many of the agricultural so called pests that Moreland listed were not inhabitants of the jungle. In fact, the government wished to protect cattle populations from the carnivores that lurked along the fringes of agricultural society. Between 1885 and 1894, as much as ninety thousand head of cattle were killed by wild animals in a year, leading to demands for greater efforts to purge wild animal populations (see Appendix 2).⁴¹ Moreland’s work stressed that the norms of domestication needed to be reformed, to instil concepts of ownership and property that could convert North India’s unruly consumers into productive contributors that were protected members of agricultural society.

During the late nineteenth century, knowledge and understanding of the problems facing cattle populations that Moreland addressed developed across multiple fields of colonial science. Research into agriculture across India had been conducted since the formative years of the East India Company, gaining impetus as tea, indigo and other crops became profitable ventures for European businessmen. In 1871, the government sought to consolidate and centralise these efforts by opening an Agricultural Department. While it was swiftly closed after only seven years, questions about the stability of the government’s agricultural revenue were again brought to the forefront in 1880, as the Famine Commission called for greater agricultural research in order to help prevent the devastating effects of famines that ravaged the landscape at the time. In 1881 agricultural research was reinstated as part of the Department of Revenue and Agriculture, tasked with dealing with all matters relating to Land Revenue Administration, Agriculture and Famine Relief. This interconnection between economics and agriculture was a core force shaping the aims and ideas of the agricultural department during the late nineteenth century. As numerous studies have shown, the primary purpose of agricultural research was to understand how to produce more resources, by reshaping the landscape, concepts of property and the contribution of humans and animals.⁴² But the nature of how agricultural sciences

³⁹ Moreland, *United Provinces*, p. 111.

⁴⁰ Moreland, *United Provinces*, p. 120.

⁴¹ *Statistical Abstract Relating to British India from 1885-86 to 1894-95* (London, 1896).

⁴² For studies of colonial agriculture in nineteenth century India, please see, Majid Hayat Siddiqi, *Agrarian Unrest in North India: The United Provinces, 1918-22* (New Delhi, 1978); John F. Richards, Edward S. Haynes and James R. Hagen, ‘Changes in the Land and Human Productivity in Northern India, 1870-1970’, *Agricultural*

would be introduced to India was believed by colonial officials to be fraught with tensions. For example, in the field of veterinary science, the efforts of colonial officials to manage cattle plagues were confronted by a range of issues and limitations. Reflecting on the initial struggles of introducing the rinderpest vaccine to India, imperial bacteriologist J. D. Holmes noted that ‘many methods of dealing with infective diseases, which have met with success and are in force in other countries, cannot be adopted in India’. Cattle could not be segregated or removed by police. Some people objected to bleeding and until its medicinal merits became apparent, vaccination was only consented to by a small number of farmers.⁴³

One of the most informative reports to connect socio-cultural issues to the fodder question was provided by John Firminger Duthie (1845-1922), the Director of the Botanical Department of Northern India. Duthie was a supporter of the Government of India’s Resolution No. 16A of 1883, which declared that cattle and goats were a huge hindrance to the reclamation of land and growth of new grasses. This perspective was explored in his 1888 work on the *Fodder Grasses of Northern India*, a guidebook that offered one of the first extensive taxonomies of grasses in the region.⁴⁴ The text described the ‘vast stretches of undulating meadows’ (*maidān*) along the slopes of the Himalayas. Building a regional picture, he stated that these grasses far surpassed the ‘nutritive properties’ of highly regarded but sparse desert grasses, as well as the monsoonal greenery that grew rapidly, but offered little substance.⁴⁵ To resolve the fodder question, Duthie proposed that farmers should plant a mixture of Gramineae and Non-Gramineae grasses, that could be distributed ‘promiscuously’ amongst the ordinary grasses. Plants such as *babul* (*acacia Arabica*), *jhand* (*prosopis spicigera*) and *ber* (*zizyphus nummularia*) were valued for their nutritious qualities, and for helping to shield the roots of the other grasses from the tongues of grazing animals.⁴⁶ Such examples demonstrate that Duthie not only provided advice on fodders, but horticultural solutions to what he saw as the unwillingness or inability of the people to manage the impact of the consumption habits of animals. As he stated,

History, 59:4 (1985), pp. 523-548; Prakash Kumar, *Indigo Plantations and Science in Colonial India* (Cambridge, 2012); Surendra Mohan Mishra, *Agriculture and Environment: Debates in the Central Legislature of India 1937-1957* (Delhi, 2015).

⁴³ Uttar Pradesh State Archives (henceforth UPSA), Revenue Department (henceforth RD) (384:1909), ‘Indian Civil Veterinary Department Memoirs, No. 1, Report of the Research Work of the Imperial Bacteriological Laboratory, Muktesar, 1908-09’.

⁴⁴ Author Unknown, ‘The Botanical Department, Northern India’, *Nature*, (1888), p. 522.

⁴⁵ John Firminger Duthie, *The Fodder Grasses of Northern India* (Roorkee, 1888), pp. i-ii.

⁴⁶ Duthie, *Fodder Grasses*, p. vi.

The people of this country take no care about the preservation of pasture land. Their one idea seems to be to let their cattle eat up or tread down every blade as soon as it makes its appearance, until at last nothing remains for them to eat. The threat of cattle is injurious at all times, but more especially when the young shoots are beginning to unfold. Reproduction is then literally nipped in the bud.⁴⁷

Duthie's research gained influence as the Agricultural Department began to seek solutions to the fodder problem in the 1890s. During this decade, colonial veterinary scientists began to tackle many of the diseases that were harming cattle populations, and thus agrarian productivity. But it was the 'belated' arrival of western chemistry in India that marked the beginning of efforts to manage the relationship between the consumption habits of cattle and the environment.⁴⁸ As these opening examples have demonstrated, cattle were one of many animals that participated in the animal geographies of urban and rural North India. Their presence was understood in both elite vernacular and colonial discourse in many competing manners. Due to their sacred status, many Hindu journalists supported their presence and challenged those that sought to curb their populations, whether this was for spiritual or material reasons. But colonial officials saw wandering cattle as a hindrance to the stability and development of cultivation. Without order and control, they believed that the grass lands and forests of the region were incapable of sustaining the vast population. This was in part due to the problems caused by the environment. But it was also believed to be a socio-cultural issue that broke down any sense of boundaries around land under the plough, and conceptions of ownership or responsibility for the habits of animals and their consequences. In the following section, this thesis now turns to discuss the rise of chemistry in colonial science, a field that increasingly sought to tackle both the fodder issue and the question of agricultural productivity. How could North India's people and herds be reformed fit into a productive rural society?

2.3 *Chemistry, manure and cattle as converters*

The introduction of chemistry as a branch of colonial science to India was in many ways initiated by the decision to hire the chemist John Augustus Voelcker (1854-1937), to

⁴⁷ John Walter Leather, 'Reclamation of Reh or Usar Land', *The Agricultural Ledger*, 12 & 13 (1893), p. 3.

⁴⁸ David Arnold, *The New Cambridge History of India: Science, Technology and Medicine in Colonial India* (Cambridge, 2000), p. 164.

complete a review of agriculture across India in 1889. Voelcker was trained in organic chemistry, a field that emerged in the eighteenth century. It was pioneered by influential figures such as Jean Baptiste Boussingault, who posited in 1834 that all organic matter could be understood by studying the chemical elements that they contained, such as oxygen, carbon and nitrogen. Voelcker studied chemistry at the University of Giessen, where his father John Christopher Augustus Voelcker had studied under Justus von Liebig. In his 1842 work *Animal Chemistry*, Liebig proposed that when an animal consumes a substance, its body changes the organic matter into carbon, hydrogen, oxygen and nitrogen, producing energy for the animal and also resources such as milk, dung and urine.⁴⁹ Voelcker studied soils with his father at the Woburn Experimental Station in Bedford, until his father's death in 1884. It was after this that he decided to accept the request of the Secretary of State for India to complete a report on the condition of agriculture across the subcontinent.

After travelling the length and breadth of the subcontinent, in 1893 Voelcker's extensive *Report on the Improvement of Indian Agriculture* was published, offering a detailed survey of the environmental, material and socio-cultural dynamics of agriculture. Voelcker concluded that conditions were so varied and diverse across India that a universal solution for the entire colony did not exist. In doing so, he contested the perception within colonial discourse that the issues facing agricultural society were the product of a "backward" or "traditional" culture of the colonised people. Instead, he argued that Indian peasants refused to abandon their tools and techniques, because their methods had been tried and tested in their localities for many generations. That said, his report did identify a number of problems facing agriculture in India, which the government would need to tackle by addressing the unique local manifestations of each problem.⁵⁰ Turning to the question of cattle, Voelcker recognised that cattle were the backbone of Indian agriculture and society, but due to climatic and cultural forces they were in a poor state. On top of this, the expansion of cultivation had led to a loss of grazing lands, further limiting the availability of feed for animals. As such, the government needed to find a way of increasing the fodder supply. Moreover, Voelcker stressed that the productivity of the land and its animals was not fully realised, due to the use of cow dung as a cooking fuel across India. As an agricultural chemist, he emphasised the importance of nitrogen an essential

⁴⁹ Justus Liebig, *Animal Chemistry or Organic Chemistry in its Applications to Physiology and Pathology* (London, 1842), p. xv; Frederic L. Holmes, 'Elementary Analysis and the Origins of Physiological Chemistry', *Isis: A Journal of the History of Science Society*, 54:1 (1963), p. 50.

⁵⁰ John Augustus Voelcker, *Report on the Improvement of Indian Agriculture* (London, 1893), p. vi.

substance that plants needed to quickly grow. People could access it through a range of means, from cow dung, to sheep-folding, green-manure, silt, soil-mixing, nitre, lime, bones and so on. But Voelcker understood that across the barren stretches of agricultural society where wood was highly scarce, dung was an essential fuel for cooking. If the government wanted people to use cattle dung as manure, it needed to help supply alternative forms of fuel for the household.⁵¹

To implement his proposed reforms, Voelcker recommended the English chemist John Walter Leather (1860-1935). Having worked with Voelcker as his senior assistant at the Royal Agricultural Society of England, Leather was appointed as an Assistant Chemist to the Department of Revenue and Agriculture for the government of India in 1892, making him the ‘only chemist attached to all the agricultural departments in India’.⁵² Along his way to attaining the rank of Imperial Agricultural Chemist in 1906, Leather opened the Cawnpore Agricultural College in 1893, as a centre for research and experimentation into agriculture at the heart of North India. To realise Voelcker’s ambition of building regional knowledge, Leather published his research at the agricultural college in the government’s bulletin the *Agricultural Ledger*. Founded in 1892 and edited during its formative years by the botanist George Watt (1851-1930), the journal compiled reports on regional research conducted at Cawnpore, Nagpur, Burdwan, Poona and other government agricultural stations across the subcontinent. Chemists along with botanists, veterinarians, horticulturalists and other established fields of colonial science contributed information and ideas on a wide array of topics, including the soils, manures, fodders, crops and the plough and dairy cattle of India. Within these reports, the animal’s instinct to consume was presented as both a key to agriculture progress, but also its potential degeneration. Officials aimed to provide cattle with the most nutritious fodders possible in each region, even during the summer months. However, they also tailored their research to ensure that any fodders that were grown would not hinder agricultural progress, by taking up land that could not be used for cultivation. In sum, the bulletin sought to promote methods that would ensure a productive and efficient relationship between the animal as a consumer and the landscape.

In the first edition of the bulletin Dr. Van Geysel, a chemical examiner in Madras, reported on a host of fodders that cattle could effectively consume. To complete his experiment, Geysel

⁵¹ Voelcker, *Indian Agriculture*, p. 10.

⁵² H. H. M., ‘Dr. J. Walter Leather’, *Nature*, 135:55 (1935), p. 58.

measured the different qualities of fodders that he fed to cattle. This was achieved by deducing the ‘proportion of nitrogen existing in the fodders as albuminoids’, being types of proteins. Due to their unique four chambered stomachs, Geyzel recognised that cattle could digest and unlock the albuminoids, fats and minerals that were ‘inaccessible as food’ for humans. A precise amount of each fodder would be fed to the animal. The analytical results were then devised from measurement and analysis of the nitrogen content in its ‘solid excrements’.⁵³ Building upon Voelcker’s comparison of lean cattle and cart bullocks, in the second edition of the bulletin Leather explored whether different modes of feeding cattle produced different nitric qualities in dung, by assessing grazing and farm-yard cattle at Poona. His experiment presented the animal in different situations, exploring how these contrasting methods of herding affected the quality of dung.⁵⁴ While the results were inconclusive, both experiments demonstrated how the discourses of chemistry presented cattle as physiological sites of chemical conversion. The relative value of each fodder was understood by measuring the amount inputted into the animal, and the quality of the resource it produced. Cattle were not active participants in these experiments. Instead, they were passive reciprocals for analysis, their bodies and behaviours being viewed as sites for the management and development of the material needs of humanity.

The goal of managing the relationship between cattle as consumers and the expansion of cultivation pervaded many reports on efforts to expand the fodder supply. In 1894 Leather used the albumen test to compare the effectiveness of growing, harvesting and storing hay and ensilage, being cut grasses stored and fermented in a sealed pit or silo. He sought to replicate the success of the Allahabad military farm, which since 1885 had used a rapid storage method of silage to feed its bullocks on a large scale. Leather hoped to utilise fodders that flourished during the monsoon, comparing his work to experiments using sorghum (*juār*) in Nagpur and prickly pear in Madras.⁵⁵ In addition to tackling the problems caused by the seasonal cycle in India, colonial chemists opted for fodders that would not encroach upon lands reserved for cultivation. For example, in 1897 the aforementioned W. H. Moreland submitted a report on lucerne grass to the *Bulletin of the Department of Land Records and Agriculture*, which began its circulation in 1894. Lucerne (*medicago sativa*) was known across Western Europe and

⁵³ C. Benson, ‘South Indian fodders’, *The Agricultural Ledger*, 1 (1892), pp. 1-3.

⁵⁴ John Walter Leather, ‘Silage-Making in India’, *The Agricultural Ledger*, 2 (1894), pp. 3-5.

⁵⁵ Leather, ‘Silage-Making in India’, pp. 3-5.

North America as alfalfa,⁵⁶ a ‘perennial shrubby plant’ that was capable of yielding eight cuttings of fodder per annum, for up to five years. According to Moreland, lucerne in Meerut could grow up to two feet on fertilised and well-drained loamy soil, yielding up to thirty tons per acre, per annum. It could also grow on unused ridges and furrows and was highly digestible for cattle. Another fodder crop that was tested to supplement lucerne during the summer months was Guinea grass (*P. Jumentorum*), a green fodder added to lucerne and hay when fed to horses. Valued for its long lifespan, Guinea grass set its roots down deeper than fodders such as sorghum, requiring less water when thriving in wet soil along the side of canals. Sown during May and June, its plants grew rapidly and spread out into huge tussocks of one to two feet in diameter, offering stalks and leaves that could be cut to within six inches of the ground.⁵⁷ In a later report, Leather would also discuss the government’s effort to reclaim *reh* or *usar* lands. These were areas where excessive irrigation had brought alkaline salts to the surface, turning the soil white, fine and unfit for agriculture. Since the report of the Reh Committee in 1878, a number of experiments had taken place at Amarmau in North India, where the government sought to replenish fifty-eight acres of land by ploughing in cart loads of manure produced by cattle and sheep.⁵⁸

Within the experiments of agricultural chemists, the animal’s ability to convert fodders into energy and resources was contextualised within its regional environmental relationships. Each research station experimented with a variety of local fodders, seeking to access a type that would prove resilient while it was grown and when it was stored. But the model of productive consumption presented by these reports was ultimately tailored to colonial objectives in each locality. The efficiency of fodders was measured according to two main criteria. Firstly, the extent to which the animal could physiologically convert each grass into energy, measured as nitrogen in excrement. Secondly, the capacity to grow these fodders on lands that were unused for cultivation. One of the main criteria that these reports lacked, was a knowledge or awareness of the socio-cultural dynamics of domestication. This oversight led to a clash between colonial conceptions of productive animal domestication, and the material realities of human-animal co-evolution in the Indian context. As the aforementioned experiments indicated, the quality of nitrogen in cattle dung was a key method by which colonial chemists measured the

⁵⁶ George W. Hendry, ‘Alfalfa in History’, *Journal of the American Society of Agronomy*, 15 (1923), pp. 171-176.

⁵⁷ W. H. Moreland, ‘Notes on the Cultivation of Lucerne and Guinea Grass for Fodder’, Department of Land Records and Agriculture, United Provinces, Bulletin No. 6., Agricultural Series (Allahabad, 1897), pp. 4-5.

⁵⁸ John Walter Leather, ‘Reclamation of Reh or Usar land’, *The Agricultural Ledger*, 12 & 13 (1893), pp. 1-2.

productivity of different fodders. Cattle dung was presented as an invaluable source of fertiliser, that could revive the land after each harvest. The government's desire to use cattle dung as manure was explicitly stated in reports such as Leather's *Note on the Value of Indian Cattle Dung*, in which the productive contribution of cattle as consumers was defined by both the fodders that they ate, and the dung they produced. Building on his research at Woburn, Leather conducted experiments in Cawnpore that sought to give monetary value to cattle dung as a fertiliser, using chemical evidence to prove its quality. He even promoted the possibility of creating a marketplace for its sale as a commodity in Indian villages.⁵⁹ In sum, the government proposed that for cattle to fully contribute to cultivation, their dung should be used to give back the energy they had consumed to the land. But as the vernacular studies discussed below will demonstrate, this use of dung was out of touch with the socio-economic realities of North India.

During the late nineteenth century, a number of Hindi publishers in North India began to expand into the fields of agriculture and animal domestication. These publications sought to legitimise the emerging language of the Hindu community by offering informative texts, to supplement fictional and political works. Crucially, these guidebooks were not purely products of indigenous knowledge and culture. Instead, many of these guidebooks sought to utilise the latest ideas and concepts provided by colonial science. However, unlike the work of colonial chemists, these vernacular authors sought to ground ideas about agricultural productivity within the socio-cultural and material realities of the North Indian context. For example, Babu Balram Das recognised that 'cow dung is very good manure'. Published in 1896 by the Chandraprabhā Press in the ancient Hindu city of Benares, his book *A Primer on Agriculture (Kisān Vidya)* stressed that despite its merits as a fertiliser, it would be difficult to convince the villagers of North India to stop using cattle dung as a fuel for cooking and a building material. This reluctance derived from both the norms of society, but more pressingly from the fact that other sources of fuel commonly used in western countries, such as wood, were very scarce across India. As such, seeking to find a compromise between the need to improve agriculture production and the material realities, Das proposed that another substance provided by cattle could be used as an effective fertiliser, namely urine (*peshāb* or *gaumutra*). Instead of challenging the customs of villagers and potentially jeopardising their livelihoods, Das drew upon Ayurvedic knowledge to argue that urine had medicinal qualities, such as cleansing the

⁵⁹ John Walter Leather, 'Note on the Value of Indian Cattle Dung', *The Agricultural Ledger*, 3 (1894), pp. 1-2.

body. He justified and rationalised the claims of indigenous knowledge by deploying terminology introduced by colonial chemistry. He deployed the term ammonia in the Devanagari script, in order to argue that it had the chemical properties of a ‘marvellous’ (*umadā*) fertiliser. Das also emphasised its value by highlighting that nutritious grasses grew along the banks of rivers, alongside lakes and water tanks, locations where cattle drink water and urinate. Even if their dung was collected to be used as fuel, cattle always contributed to the land through their urine. As such, to revive village grazing lands and also fertilise cultivated fields, Das called for his readers to take care to preserve the urine that they were potentially wasting, by adopting techniques that could accumulate and utilise the urine that was produced in cattle sheds. He proposed that when cattle return home from grazing at night, their sheds should be littered with dry grass that was ‘not worthy to eat’, which the animals could defecate and urinate upon and stomp into a mesh. Cow dung could be removed to be used as fuel, and the remaining grasses which absorbed the ammonia could then be used as green manure (*harā khād*) to fertilise the land. In sum, Das saw urine as a substance that could meet both the needs of the village and the agricultural discourses of colonial science. While he acknowledged the value of dung as manure, his understanding of its socio-economic value led him to seek an alternative method to fulfil the idea that the animal could be a productive converter of resources.⁶⁰

In 1901, the *Bulletin of the Department of Land Records and Agriculture* also explored the possibility of using urine as a source of fertiliser. In the report by P. V. Subbiah, the Principal of the Cawnpore Agricultural School, it was argued that although Indian cattle had a good level of nitrogen in their urine, ‘the cultivator in his ordinary practice... does not utilise it’. It was instead left to ferment into ammonium carbonate and evaporate, which Subbiah felt to be the main reason that a pungent smell was commonly associated with cattle sheds, causing ‘a nuisance to his cattle and the people living in the house’. To prevent this potent odour and loss of nitrogen, Subbiah argued that farmers needed to either place their cattle sheds on cultivated land after a harvest, or utilise a western technique known as the Box System. This involved placing a bed of grasses and leaves ‘well suited for absorbing urine’ on the floor of a cattle shed, leaving it to form into a ‘well rotted, rich farm yard manure’. Despite the want of bedding material in North India, Subbiah called for villagers to make use of the leaves of sugarcane, mangoes, jackfruit ‘and all other kinds of vegetable refuse’ that was freely available. Moreover,

⁶⁰ Das, *Kisān Vidya*, p. 12.

he stressed that animals needed to be provided with nutritious foddors in order for them to be converted into nitrogen rich manures. Food was considered to be the most 'important factor in determining the quality of the manure', more significant than the breed of an animal or its condition. Like in other reports by colonial chemists, cattle were presented as passive consumers, physiological sites that could be used to understand the effects of 'liberal feeding'. Subbiah presented their bodies as contraptions that should be given specific foods, such as cotton seed, mustard cake, sorghum seed, gram amongst others. Citing an experiment by Leather, Subbiah argued that cattle fed on these concentrated foods produced up to three times more nitrogen in their dung than village cattle, that only had 'grazing and the ordinary ration of straw'.⁶¹

The connection between feeding an animal, ideas of nutrition and the production of resources was present in a number of Hindi texts at the turn of the twentieth century. According to Hem Chandra Mishra's 1902 work *Reflections on Agriculture (Krishi Darpan)*, cattle should get ample grazing throughout the day, in order to exercise and utilise the landscape. But they also needed to be stall-fed a mixture of seeds, foddors and plants to supplement their diet in the morning and in the evening. These could include fruits from North India's native *mahua longifolia* tree and vegetables such as carrots (*gājar*) to improve the milk yield of dairy cows, and to rear fit and strong calves. But feeding these animals was not viewed simply in terms of inputting resources. For Mishra, the Proprietor of the Cossipore Agricultural Society (*krishishālā*) in Calcutta, feeding an animal was an important act of kindness that all noble people should emulate. It was not only essential to give an animal food in order to survive, but an act that would resonate through future generations by uplifting the quality of animals.⁶² As such, Mishra called upon animal shelters and cattle sanctuaries to ensure that they fed their animals an ample diet. Moreover, he stressed that feeding would improve the quality of both dung and urine. By cleaning and utilising the waste produced by animals in their cattle sheds, farms would become much more hygienic. Not only that, the resources provided by cattle could play a vital role in uplifting agricultural society. As the crest of the Cossipore society demonstrates below, bulls, bullocks and cows sat at the heart of agrarian questions, a key

⁶¹ P. V. Subbiah, 'Different Systems of Housing Cattle and Conserving Manure', Department of Land Records and Agriculture, North-Western Provinces and Oudh, Bulletin No. 14, Agricultural Series (Allahabad, 1901), pp. 2-7.

⁶² Hem Chandra Mitra, *Krishi Darpan* (Reflections on Agriculture), (Calcutta, 1902), pp. 76-77.

species situated alongside the buffalo (*bhaisa*) pictured overleaf, that needed to be efficiently utilised to support agriculture in North India.

Vernacular studies also drew upon their indigenous roots to justify and support different techniques of animal domestication and fertilisation of the land. For Thākur Purnsingh, the division of resources provided by domesticated animals into different tasks was an essential means of improving agriculture, promoted by India's ancient Vedic knowledge. His 1916 text *Saintly Agricultural Knowledge (Ārsh-Krishi-Vigyān)* purported to combine both ancient theories and new practices to create a definitive study of agricultural knowledge. In the text, manure was understood as an essential resource that was needed to revive lands used for cultivation and grazing. For Purnsingh, there were three main types of manure that could be utilized, namely green (*harā*), animal (*gōbar*) and chemical (*rasāyanik*). Nevertheless, he argued that each of these manures had different roles to play in rural society. Cattle dung was essential for cooking and other tasks, and thus efforts to improve agricultural productivity should not promote it as a fertiliser. Instead, Purnsingh recommended that farmers should keep a range of animals and use them to manure the fields. While the manure of horses, pigs and humans was deemed to be disgusting (*ghraniata*), he argued that the cleverest farmers were those that kept sheep and goats, as their droppings and urine replenished the fields. Throughout the text, Purnsingh presented an image of an agricultural landscape that existed in balance with the animal geographies of North India. While animals may consume vast quantities of grasses, the productivity and vibrancy of the land was contingent upon the animal to return the nutrients that they took out, by converting fodders into dung and urine.⁶³

⁶³ Thākur Purnsingh, *Ārsh-krishi-vigyān* (Saintly Agricultural Knowledge) (Etawah, 1916), pp. 35-36.

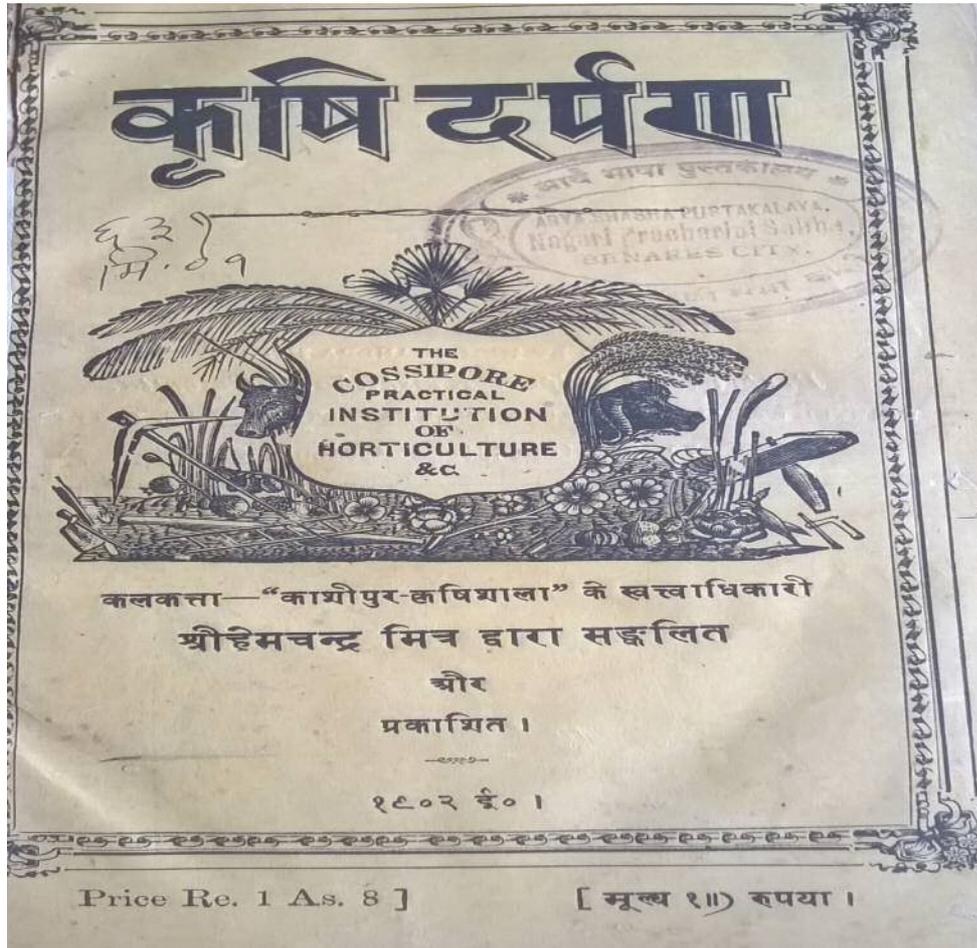


Figure 7: ‘Cossipore Agricultural Society (*Krishishālā*)’, from Hem Chandra Mitra, *Krishi Darpan* (Reflections on Agriculture), (Calcutta, 1902).

2.4 Conclusion

This chapter has explored how attitudes towards animals as consumers were shaped and defined in colonial India. The capacity for animals to consume was a key factor in the development of its population. The question of how to feed animals was also an essential feature of domestication. As the colonial government sought to improve agriculture in India, its attentions turned to the cattle population and its appetite. Within the emerging discourses of chemistry, the consumption drive of the animal became a site for control and order, a means by which resources could be converted into produce, such as dung and milk. At the same time,

the socio-cultural, economic and environmental dynamics of North Indian society also influenced how animals consumed and how their produce was used, leading to anxieties about the size of India's bovine herd and the collective impact of its thirst and hunger upon agrarian stability and progress. During the late nineteenth century, one of the major issues facing North India was a shortage of fodder, manure and other resources that were deemed to be necessary for agriculture to prosper. The colonial government began to invest in agricultural research and experimentation, in order to improve the productivity of its revenue stream from rural India. While a range of provincial efforts had been attempted since the eighteenth century, the 1890s marked a new era of colonial study into agricultural science sparked by the publication of a report by the chemist John Augustus Voelcker (1854-1937).

As this chapter has shown, government officials seeking to expand the frontiers of cultivation were engaged in a battle with both the elements and the norms of domestication. For many colonial officials, the popular practice of allowing animals to wander and consume without guidance threatened the stability of agrarian conditions, compounding the effects of North India's summer heat. With the rise of chemistry as a colonial science, the relationship between cattle and the landscape became the subject of experimentation and research. Throughout the *Agricultural Ledger*, chemists sought to increase the productivity of how cattle consumed. On the one hand, this entailed gaining a knowledge and understanding of the best regional fodders. On the other, efficiency was defined by the capacity for fodders to be grown on lands that were unused for cultivation. By analysing these experiments, this chapter has demonstrated that colonial science presented cattle as passive consumers and producers. While their research recognised the environmental variables in each locality across India, the socio-cultural and economic realities of the production and consumption of fodders were only partially recognised. This disconnect was exposed in the closing section, which revealed that the government's emphasis on using cattle dung as manure was out of touch with the nature of human-cattle co-evolution across North India. Instead, the concepts proposed by colonial science were grounded in the context by vernacular texts. Using a mixture of translated English principles and indigenous knowledge, these studies sought to develop scientific approaches to agriculture in North India, by emphasising that urine provided an alternative fertiliser that could be utilised by the people. In sum, colonial discourses recognised the environmental context of the animal and its capacity to consume and convert fodders into resources. It was vernacular texts that grounded these approaches in the socio-economic context of animal domestication.

As the next chapter will show, animal feeding was an integral feature of another key aspect of animal domestication, being the production of milk. From the 1890s, colonial dairy farmers began to assess the significance of fodders and devise methods that could more productively allow the cow to convert grasses into milk. However, as colonial officials sought to implement their approaches to dairying, they were confronted by physiological and socio-cultural significance of the maternal instincts that *Bos indicus* cows deployed in order to rear their calves.

Chapter 3

Mother cow, milk and maternal behaviour

The production of milk by cows and its consumption by humans remains one of the material and physiological cornerstones of human-cattle co-evolution. In the gastro-political discourses of the colonial era, milk was affiliated with the health of populations and the progress of nation states. At the turn of the twentieth century, many Hindu nationalists and colonial officials sought to reform the nature of how milk was produced in North India, in order to create an affordable yet nutritious supply of milk for government institutions and urban residents. At the time, the methods and practices of Indian dairy farmers (*gauwālā* or *dōdhwālā*) were deemed to be hindering the progress of the industry. To successfully induce a cow to produce milk, both Indian milkmen and British dairy farmers recognised the importance of animal feeding and rearing, especially when a cow was gestating and lactating. However, Indian cows were thought to yield much less milk than their European counterparts, due to the lack of feed and the practices of the milkmen, such as starving their calves. While many colonial dairy farmers agreed with this critique, they were also perplexed by the insistence of indigenous discourses that a cow should be allowed to rear her own calf. In European dairy farming, a calf would be immediately separated from its mother. In India, this act not only challenged the symbolic role of the cow as a mother in religious nationalist discourses, but it was believed that the emotional strain of segregation would cause the milk yield of a cow to deteriorate, and even cease completely. The purpose of this chapter is to analysis this debate, in order to understand how and why the maternal behaviours of cows were perceived to contribute towards or hinder the co-evolution of dairy farming in North India.

As government and private dairy farms opened from the late nineteenth century in India, would British dairy farmers seek to break the mother-child bond, emulating European practices? Did cow protectionists promote the maternal behaviours of the cow in order to support their cultural construct of mother cow (*gau mātā*)? Or, were both colonial and indigenous knowledge and practice influenced by the behavioural instincts of the cow and her calf? This chapter will

interrogate these questions by situating the maternal bond within the historiography, drawing on both the humanities and the natural sciences. It will then explore how the cow-calf bond was associated with ideas of dairying in India, focusing on representations of Indian milkmen and their treatment of the calf. In addition to condemning their practices, during the 1890s colonial dairy farmers sought to demonstrate the virtue of their methods, by supporting the idea that maternal behaviours should be included in dairy farming. However, the closing section of this chapter shows that the instincts of mother cow became a site of competing ideas about the contribution of the animal to the progress of domestication. While colonial military dairy farms increasingly discarded the maternal bond, vernacular sources provide a host of examples of how the cow-calf bond was perceived to be vital to the production of milk, and the successful co-evolution of humans and cattle.

3.1 *Milk, nationalism and the maternal bond*

Since the nineteenth century, the mass-production of cow milk has been a goal of many western nations, an aim that became intertwined with nationalist visions of a healthy and prosperous India.¹ Liberating the milk supply became the site of Hindu nationalist struggles for independence against the exploitation of businessmen. It was a substance thought capable of solving national questions of poverty, starvation and economic development. The development of dairying in India was a product of socio-cultural forces, but also the discourses of imperial and post-colonial efforts to increase the milk yield of dairy breeds in India. At the time, the milking capacities of Indian cows were considered to be very low by colonial officials, especially in comparison to European breeds. Indian villagers were also aware that local country cows were poor performers, often using them only as breeding stock. For milk, villagers increasingly turned to the water buffalo (*Bubalus bubalis*), a species that produced a consistent amount of milk on the sparse fodders available.² Due to the loss of grazing lands and intense tropical heat, India's herds of cows were deemed to yield low amounts of milk. Dairy farmers and industries across the globe have used animal feeding, breeding and rearing to

¹ For studies of milk and nationalism, please see, E. Melanie Dupuis, *Nature's Perfect Food: How Milk became America's Drink* (New York, 2002); Peter Atkins, *Liquid Materialities: A History of Milk, Science and the Law* (London, 2010); Deborah M. Valenze, *Milk: A Local and Global History* (London, 2011); Andrea S. Wiley, *Cultures of Milk: The Biology and Meaning of Dairy Products in the United States and India* (London, 2014); Mark Kurlansky, *Milk!: A 10,000-year Food Fracas* (New York, 2018).

² A. M. Stow, *Cattle and Dairying in the Punjab* (Lahore, 1910), p. 19.

increase the frequency of pregnancy, expand the storage capacity of udders and extend the lactation cycle.³ What scholars in the humanities have largely overlooked, however, is how the history of dairying has been influenced by perceptions of the maternal bond that forms between the cow and her calf. According to ethologists, a cow in the wild would form a close bond with her calf, performing a number of behaviours from the moment of birth that build a relationship between a mother and a child. After a cow is impregnated through mating or artificial insemination, it will gestate for nine to ten months before giving birth to its calf. Immediately after birth, a cow will seek to lick its calf, ‘a behaviour that is important in stimulating calf activity and may have physiological effects including stimulating breathing, circulation, urination and defecation’.⁴ It will also begin to lactate from its udders in order to feed the calf, in a cycle lasting around a year. The type of milk it produces during lactation changes gradually to suit the needs of a developing calf, beginning with a dense mixture of nutrients and antibodies known as colostrum.

The maternal bond between a mother and her calf has been a point of contention and concern for dairy farmers during the twentieth century. As Edwards and Broom observed, farmers in Europe have ‘selected against some aspects of maternal behaviour’ in cattle, seeking to break the bond between the mother and the child. The bond was considered both uneconomical and impractical. If a calf is allowed to suckle, a cow will not let down milk without the calf present. The practice with European *Bos taurus* cattle such as the Holstein breed, is that calves are removed from their mother ‘soon after birth, and reared artificially’. Some dairy farmers argue that if a bond is allowed to form, the cow will be emotionally scarred. Many believe that if a cow does not learn to bond with its first calf, it is less likely to feel maternal instincts in subsequent birthings.⁵ In a recent study, Carol Adams demonstrated that animal producers also sought to change the emotional nature of their animals, by attempting to break the bond

³ Michael L. Power and Jay Schulkin, *Milk: The Biology of Lactation* (Baltimore, 2016), p. 4. For studies of domestication practices and ideas of animal breeding, please see, Kristin Hagen and Donald M. Broom, ‘Emotional Reactions to Learning in Cattle’, *Applied Animal Behaviour Science*, 85 (2004), p. 204; Marek Špinka and Françoise Wemelsfelder, ‘Environmental Challenge and Animal Agency’, in Appleby, Mench, Olsson and Hughes (eds.), *Animal Welfare* (Wallingford, 2011), p. 28.

⁴ Marina A. G. von Keyserlingk and Daniel M. Weary, ‘Maternal Behaviour in Cattle’, *Hormones and Behaviour*, 52 (2007), p. 107.

⁵ S. A. Edwards and D. M. Broom, ‘Behavioural Interactions of Dairy Cows with their Newborn Calves and the Effects of Parity’, *Animal Behaviour*, 30 (1982), p. 525. For wider reading on maternal behaviour in twentieth century meat and dairy production, please see, Else Hermann and Nanny Stenum, ‘Mother-Calf Behaviour during the First Six Hours after Parturition’, in J. P. Sigornet (eds.), *Welfare and Husbandry of Calves* (London, 1982), p. 4.

between the mother cow and her calf.⁶ The significance of the maternal connection has been extensively studied by animal behaviour scientists, who argue that a mother's act of rearing her calf and providing it with milk creates a strong emotional bond.⁷ Adams drew the question of the cow as a mother into the humanities, which has mainly studied ideas about motherhood in humans,⁸ often discussing the significance of breastfeeding within political, health and cultural discourses.⁹

Unlike in the European context where the maternal instincts of *Bos taurus* cows have been largely bred out, even by the 1980s it was commonly believed that Indian cows will only let down milk 'when suckled by the calf'. Dairy farmers and villagers keep their male and female calves alive for at least a year, for it was commonly believed that if a calf was prematurely weaned or dies, an Indian cow will 'significantly reduce' its yield.¹⁰ As the image below shows, for the Hindi journal "Agriculture and Animal Husbandry" (*Krishi aur Pashu Pālan*), a key aspect of animal domestication and its progress during the 1950s in North India was the connection between the mother cow and its calf.¹¹ But what is the history of this perception of animal behaviour? The context of colonial India offers a distinctive case study in which to explore the relationship between dairying and animal behaviour. While numerous studies have

⁶ Carol Adams, 'Feminized Protein: Meaning, Representations, and Implications', in Cohen and Otomo (eds.), *Making Milk: The Past, Present and Future of Our Primary Food* (London, 2017), p. 27. For studies of domestication, language and exploitation, please see, Carol J. Adams, *The Sexual Politics of Meat: A Feminist-Vegetarian Critical Theory* (Cambridge, 1990); Kendra Smith-Howard, *Pure and Modern Milk: An Environmental History since 1900* (New York, 2014); W. Ombet and J. Van Robays, 'Artificial Insemination History: Hurdles and Milestones', *Facts, Views and Vision*, 7:2 (2015), pp. 137-143.

⁷ For studies of maternal behaviour in animals, please see, David P. Barash, 'Some Evolutionary aspects of Parental Behaviour in Animals and Man', *The American Journal of Psychology*, 89:2 (1976), pp. 195-196; David F. Westneat, 'Parentage and the Evolution of Parental Behavior', *Behavioral Ecology*, 4:1 (1993), pp. 66-67; Eytan Avital and Eva Jablonka, *Animal Traditions: Behavioural Inheritance in Evolution* (Cambridge, 2000); Marina A. G. von Keyserlingk and Daniel M. Weary, 'Maternal Behaviour in Cattle', *Hormones and Behaviour*, 52 (2007), p. 107.

⁸ For studies of motherhood, please see, Adrienne Rich, *Of Women Born: Motherhood as Experience and Institution* (London, 1976); Kathleen S. Uno, *Passages to Modernity: Motherhood, Childhood and Social Reform in Early Twentieth Century Japan* (Honolulu, 1999); Hilary Marland, *Dangerous Motherhood: Insanity and Childbirth in Victorian Britain* (Basingstoke, 2004); Maithreyi Krishnaraj, 'Motherhood, Mothers, Mothering: A Multi-Dimensional Perspective', in Krishnaraj (eds.), *Motherhood in India: Glorification Without Empowerment?* (New Delhi, 2010), p. 3.

⁹ For studies of breast-feeding and motherhood, see Rima D. Apple, *Mothers and Medicine: A Social History of Infant Feeding, 1890-1950* (Madison, 1987); Jacqueline H. Wolf, *Don't Kill Your Baby: Public Health and the Decline of Breastfeeding in the Nineteenth and Twentieth Centuries* (Columbus, 2001); Bernice L. Hausman, *Mother's Milk: Breastfeeding Controversies in American Culture* (New York, 2003); Chloé Maillat, 'More Than Food: Animals, Men, and Supernatural Lactation in Occidental late Middle Ages', in Cohen and Otomo (eds.), *Making Milk: The Past, Present and Future of Our Primary Food* (London, 2017), pp. 7-18.

¹⁰ A. Vaidyanathan, *Bovine Economy in India* (New Delhi, 1988), p. 70.

¹¹ Pitāmbar Datta Ghuliyā, 'Gaupāshmti sāptah kaise manāya jāya?' (How to celebrate Lord Krishna's birth week), *Krishi aur Pashu Pālan* (Agriculture and Animal Husbandry), 6:5 (1955), p. 22.

discussed the idea that the cow was a mother of the nation, scholars have yet to investigate the role of maternal behaviours in shaping ideas and attitudes towards the cow. How did British dairy farmers (familiar with breaking the maternal bond in European cattle) handle Indian cows and their desire to mother their calf? Were maternal behaviours appeased out of fear that the cow would have a negative emotional response, and dry up? Or did colonial and Indian dairy farmers alike consider there to be benefits to allowing the animal to perform its “natural” or instinctual desire to rear its calf? The following section will now explore these questions, by assessing ideas and attitudes towards dairying and maternal bonds at the turn of the twentieth century in North India.



Figure 8: ‘A cow grooming its new-born calf’, Pitāambar Datta Ghuliyā, ‘Gaupāshtmi sāptah kaise manāya jāya?’ (How to celebrate Lord Krishna’s birth week), *Krishi aur Pashu Pālan* (Agriculture and Animal Husbandry), 6:5 (1955).

3.2 Milkmen, calves and military dairy farms

Before major political and technological changes could sweep into the grass roots of dairying and reshape its national scope and scale, K. T. Achaya contends that ‘as with many other traditional activities’ during the colonial era, ‘dairying in India consisted of widespread but very local decentralised operations, individually small but enormous in the aggregate’.¹² Due to the humid climate of North India, liquefied milk was highly perishable. As such, the majority of the milk would be used at home, with a small portion possibly being sold as a fluid or as long lasting products such as yogurt (*dahī*) and clarified butter (*ghī*). Due to their lengthy shelf life, these dairy products were produced and sold at markets, their manufacture being one of the principal home industries of the Punjab, and also export trades by *bania* classes along the Delhi-Kalka railway line.¹³ Across the regions, many different cheap and effective tools and utensils were used to convert milk into long lasting dairy products. As James Mollison reported in the *Agricultural Ledger*, these dairy products were sealed in an air tight container and packaged in bulk often in ‘large narrow-necked vessels made of hide’, to be sold for around 5 to 8 annas (1 annas was equal to 1/16th of a rupee).¹⁴ Clarified butter was produced by using a flat pan, often using buffalo milk as it contained greater quantities of fat. To produce butter, many rural people use their own household churn, or travelled many miles to use what colonial officials called the ‘Old Indian Churn’ shown below, a tool that was simple and effective and very similar to the European Holstein churn. Dated back to the Aryan era by many colonial officials, the churn was popular across North India, with many variable names. In UP it was commonly known as the *Mathani*. In this region a household would often have a smaller churn, holding up to 8 gallons (36.6 litres) of liquid, costing around 6 to 10 annas. These churns were often operated by women, who twirled the churn stick (*rey*) between their hands without using the ropes seen below, while the larger churns used by milkmen held up to 35 gallons (159 approx. litres), and needed to be worked by two people.¹⁵ In the Punjab it was known as the *Madhani*, *Jhirna* or the *Rai* in the towns of Rohtak and Hissar. While households commonly used the standard type, in the Kangra district *Bosis* and *Gaddis* tribes obtained butter by ‘shaking milk in skinbags’ that were suspended from roofs of houses and trees with a string.¹⁶

¹² K. T. Achaya, *The Food Industries of British India* (Delhi, 1994), p. 62.

¹³ Stow, *Cattle and Dairying*, p. 38.

¹⁴ James Mollison, ‘Dairy Farming and Dairy Produce’, *The Agricultural Ledger*, 5 (1895), p. 16.

¹⁵ ‘The Indian Churn’, *The Agricultural Ledger*, 23 (1895), p. 12.

¹⁶ ‘The Indian Churn’, *The Agricultural Ledger*, 23 (1895), p. 13.

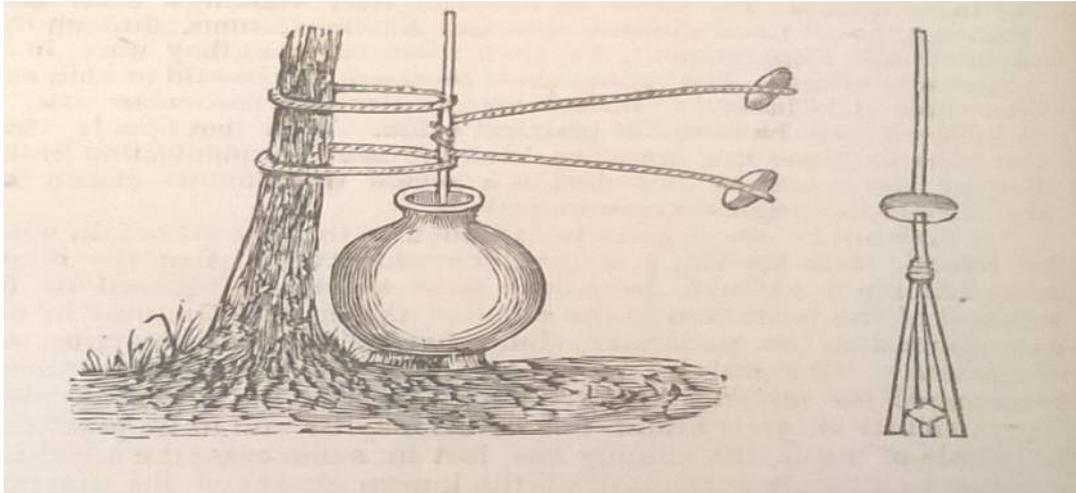


Figure 9: ‘The Indian Churn’, *The Agricultural Ledger*, 23 (1895).

At the turn of the twentieth century, colonial officials and cow protectionists turned their attention to the milk supply of urban centres across North India. In these cities, milk production became embroiled in debates about hygiene and animal welfare. Commodities influenced notions of how caste and class contributed towards and harmed what Mathew Gandy defines as the interconnected life-support system of the city.¹⁷ For example, the introduction of western sanitary systems into Bombay and Ahmedabad in the late nineteenth century reinforced divisions between middle class and lower caste waste handlers, on both spiritual and sanitary grounds.¹⁸ The consumption and use of animal products was another dynamic that perpetuated competing ideas of pollution and divisions, as cattle became associated with the material foundations of North India. For example, the *Rājputāna Gazette* of Ajmer argued that beef was not ‘very wholesome’. It limited the usefulness of cattle populations as cultivators and suppliers of dairy and dung.¹⁹ This materialist perspective was repeatedly proposed by the Lucknow based Urdu daily the *Oudh Akhbar*, which took the alarmist position that the ongoing slaughter of ‘thousands of cattle...every day by butchers for their flesh’ would lead to their extinction

¹⁷ Matthew Gandy, ‘Cyborg Urbanisation: Complexity and Monstrosity in the Contemporary City’, *International Journal of Urban and Regional Research*, 29:1 (2005), p. 27.

¹⁸ Colin McFarlane, ‘Governing the Contaminated City: Infrastructure and Sanitation in colonial and post-colonial Bombay’, *International Journal of Urban and Regional research*, 32:2 (2008), p. 417.

¹⁹ IOR/L/R/5/63, *Rājputāna Gazette* (Ajmer, 20/10/1884).

‘in the course of time’.²⁰ Other reports highlighted that indigenous knowledge considered beef to do ‘harm to the blood and produce many diseases’, such as cholera, which it perceived ‘generally originates in military camps where beef is largely used’. British army cantonments often situated around urban areas were not only associated with disease. According to a Hindi weekly in Udaipur, they were to blame for the rising price of milk, as many cattle were killed to supply beef to ‘European troops’.²¹ The European appetite for beef was well known, along with the vitality, vigour and masculine prowess the foreign rulers claimed that it provided.²² Suspicions of colonial desires to commoditise and profit by killing Indian cattle had been widely popularised since the rebellion of 1857, a huge uprising across North India sparked by the rumour that the Raj had ordered troops to use animal fat to grease their bullet cartridges. Papers such as the *Hindi Pradīp* distrusted the British, who in court cases often ruled that the cow was a commodity which ‘a man can, according to the law, do as he likes’ as it ‘belongs to him’.²³ Increasingly, lower castes further caught the brunt of these discourses, as lifestyles that relied upon and utilised the produce of animals became associated with colonial oppression. As the *Jaipur Gazette* noted, for centuries people in the arid tracts of Rajasthan had cured hides using *khari* salt to make a ‘charus for drawing water from the well’. Yet in many regions of India there was a ‘prejudice against all leather vessels, out of which no one will drink water’.²⁴ Papers such as the *Almora Akhbār* called for the registers of custom-houses to be examined, as it feared that ‘the number of hides exported’ had gradually increased in the 1880s, accusing lower caste Dom ‘hide-dealers’ of killing tens of thousands of stray and productive cattle by poisoning by their water.²⁵

As Saurabh Mishra has shown, the production of milk became intertwined in colonial and elite Indian discourses, often leading to condemnation of the Indian milkmen (*gauwālā*). To meet urban demand, Indian milkmen formed ‘satellite milk suburbs’ on the outskirts of cities in order to sell their perishable dairy produce to consumers.²⁶ However, ‘tales about the rapacity and dishonesty of milkmen thickened the city air’, stated Mishra, as they were scorned for their

²⁰ IOR/L/R/5/57, *Oudh Akhbār* (Lucknow, 23/04/1880).

²¹ IOR/L/R/5/59, *Sajjankīrti Sudhākar* (Udaipur, 20/02/1882).

²² Roy, ‘Meat-Eating, Masculinity, and the Renunciation of India’, p. 65. For work on colonial masculinity see Mrinalini Sinha, *Colonial Masculinity: The ‘Manly Englishman’ and the ‘Effeminate Bengali’ in the Late Nineteenth Century* (Manchester, 1995); Sikata Banerjee, *Make Me a Man! Masculinity, Hinduism, and Nationalism in India* (Albany, 2005).

²³ IOR/L/R/5/60, *Hindi Pradīp* (03/09/1881).

²⁴ IOR/L/R/5/59, *Jaipur Gazette* (Jaipur, 15/09/1880).

²⁵ IOR/L/R/5/61, *Almora Akhbār* (Almora, 18/12/1882).

²⁶ Mishra, *Beastly Encounters*, p. 103.

extortionate prices and accused of stealing milk. Their habit of adulterating milk with water, chemicals and animal fats was believed to be an epidemic so pervasive, that the government passed the United Provinces Prevention of Adulteration Act of 1912 to discourage the practice. They were affiliated with impurity and pollution, labels deployed by upper caste Hindus to define their own purity and denigrate the lower castes for their lifestyles, such as the Chamar leather tanners.²⁷ Milkmen were also criticised by advocates of animal welfare, who condemned the abuse they bestowed upon their animals and the lack of general hygiene or veterinary care that they provided.²⁸ Due to the low milk yield of Indian cows, many milkmen were believed to use methods that would temporarily extract more milk from their animals. One method that was widely condemned at the time was known as *phōka*, the practice of blowing air through a straw into a cow's vagina to induce the milk flow. It was believed that this would stimulate the cow to give a few more pints of milk, but it also caused the cow to become sterile and thus sold to a butcher.²⁹ Moreover, an affiliation between milkmen and starving calves was commonplace in colonial and Hindu nationalist discourses.

In a survey of cattle in the Punjab, Veterinary Superintendent G. K. Walker noted that Gujars in the city of Amritsar breed good animals. However, their stock was weak because they 'starve the calves to sell the milk'.³⁰ In his reflections on the 'Ethics of City Milk' (*Shahari dōdh kā nīṭishāstra*) for the All India Cow-Protection Society in Ahmedabad, the cow protectionist Yashvant Mahādev Pārnerkar offered a vivid and unsettling description of calves dying from hunger (*bhōkhon marte*). Cattle sheds in the western province of Gujarat were depicted as sites of cruelty, filled with destitute calves that were deprived of their mother's milk.³¹ Discussing the desert state of Rajputana, the Deputy Inspector of Schools in Ajmer, Pandit Ram Din Parashar, argued that although many milkmen were motivated by greed, they should not be entirely demonised. In his agricultural guidebook on field and gardens (*Kheti-Bāri*), Parashar

²⁷ IOR/L/R/5/57, *Lauh-i-Mahfūz* (Moradabad, 22/10/1880). For a detailed case study, see Mishra, *Beastly Encounters*, pp. 109-114.

²⁸ Samiparna Samanta, 'Cattle, Cruelty, Cow Doctors: Examining Animal Health in Rural Bengal, 1850-1920', in Kumar and Raha (eds.), *Tilling the Land: Agricultural Knowledge and Practices in Colonial India* (Delhi, 2016), p. 214. For further examples, see John Lockwood Kipling, *Beast and Man in India: A Popular Sketch of Indian Animals in their Relations with the People* (London, 1891), p. 133; Isa Tweed, *Cow-Keeping in India: A Simple and Practical Book on their Care and Treatment, their Various Breeds, and the means of rendering them Profitable* (Calcutta, 1900), p. vii.

²⁹ Nilananda Chatterjee, *The Condition of Cattle in India* (Calcutta, 1926), p. 39. See also Florence Burgat, 'Non-Violence towards Animals in the Thinking of Gandhi: The Problem of Animal Husbandry', *Journal of Agricultural and Environmental Ethics*, 17:3 (2004), pp. 223-248.

³⁰ G. K. Walker, *Cattle Survey of the Amritsar District* (Lahore, 1910), p. 10.

³¹ Yashvant Mahādev Pārnerkar, 'Shahari Dōdh kā Nīṭishāstra' (Ethics of City Milk), in Gandhi (eds.), *Gausevā* (Cow Protection) (Ahmedabad, 1949), p. 136.

felt that due to their lack of knowledge or resources to improve the yield of their animals, many milkmen were pressured to drain every last drop from their cows in order to meet the demands of exploitative moneylenders and landowners. As the below illustration demonstrated, one such practice was to tie a calf to the leg of its mother. The calf would be initially allowed to suckle, in order to induce the cow to let down its milk. After that, the majority of what the cow produced would be taken by the milkman and sold, leaving little for the calf.³² As Nilanada Chatterjee noted in his survey on the deterioration of cattle for the All India Cow Conference Association in 1926, many milkmen saw calves as an unwanted economic burden. While female calves would be valuable in the long run, males would only be kept while the mother was lactating, before being sold to a butcher. But Chatterjee argued that milkmen did not opt to keep calves in destitution purely to be cruel. Disposing of a calf during a lactation cycle was considered to be an unwise move. If a calf died, it was believed that a milkman would be in serious trouble. For it was commonly understood that if the cow was separated from her calf, she would become reluctant to give her milk and even, in the worst cases, completely dry up.³³



Figure 10: ‘A milkman (*gauwālā*) milking his cow’, Pandit Ram Din Prashar, *Kheti-Bāri* (Fields-Gardens) (Ajmer, 1930).

³² Pandit Ram Din Parashar, *Kheti-Bāri* (Fields-Gardens), (Ajmer, 1930), p. 22.

³³ Chatterjee, *Condition of Cattle in India*, p. 39.

Showing empathy for the welfare of a cow and her calf became a central aspect of dairying amongst Europeans living in India. Seeking to distinguish the value and ethical nature of their practices, the vernacular Hindi term *gauwālā* became a term commonly associated with Indian milkmen in colonial discourse, to describe the practitioners of corrupt and unhygienic methods that colonial residents and institutes would not abide. This narrative was explicitly projected in a textbook offering advice for English and Indian residents seeking to establish their own residential dairy farms, published in 1895 by the European author Landolicus, the pseudo name of W. Landale.³⁴ Comparing dairying in England and India, his work *Indian Amateur Dairy Farm* completely slandered the conditions on Indian dairy farms and the practices of the *gauwālā*. As he stated;

The few “Dairy-farms,” properly speaking, that there are in India, are chiefly confined to towns, and these are principally in the hands of natives, managed in a very unsatisfactory way, and their products much adulterated, so much so, and in such a way, as not only to be repugnant, but they are also deleterious to health, and a frequent cause of the spread of diseases of most serious character, such as typhoid fever, cholera, small-pox, etc.³⁵

The root of the problem for Landolicus was the ‘rascality’ of the milkmen, and the natural tendencies of the ‘native character’ to be lured to corruption and exploitative customs. His text used racial archetypes to emphasise their ‘cunning’ nature by describing a scenario in which Europeans, entrusting the milkmen with their animal, were gradually lured under his control. Unless colonial residents educated themselves and learnt techniques of weighing produce to recognise fraudulent actions, their cows and its milk would gradually be stolen by the milkmen, who would give them only as much milk from their cow as ‘he chooses’. That way, a milkman or milk buyer could not fall back on claims that ‘something or other will be wrong with this cow’ or that ‘her calf is getting old, or other reasons will be shewn why they do not give more milk’.³⁶ Landolicus highlighted his perspective on Indian milkmen by using an example of a case in which milkmen would tell residents of the plains that ‘a snake has been sucking the cows’, and that any cracks or damages to their udders were caused by teeth marks. He felt that

³⁴ Samuel Halkett, *Dictionary of Anonymous and Pseudonymous English literature, Volume 1* (New York, 1926), p. 148.

³⁵ Landolicus, *The Indian Amateur Dairy Farm* (Calcutta, 1895), pp. 1-2.

³⁶ Landolicus, *Dairy Farm*, pp. 7-8.

this popular myth from Indian folk tales could be plausible, if it could be verified by ‘reliable people’. However, Landolicus felt that it was more likely that the snake was a scapegoat for the milkman to further exploit milk from the cow, an issue that was hard to trace and thus less likely to be challenged.³⁷ His condemnation of the milkmen not only encompassed their use of milk, but what Landolicus perceived to be the ‘habit of viciousness’ that was ‘commonly in vogue’ in India. ‘Pernicious’ acts such as beating and maltreating the cow and her calf were not only considered to be ethically bankrupt, but Landolicus believed that the cow itself did ‘not easily forget’ the experience. He painted a picture of India’s cows as ‘fidgety and suspicious’ due to excessive beatings, something he did not see amongst European breeds. Moreover, the mistreatment of cows was viewed as a primary reason that Indian cattle yielded so little milk. After multiple beatings, a cow would be permanently ‘spoilt’ and would not let down its milk even if she was tempted with food and salt, or even with her calf by her side.

The physical and emotional well-being of cows was a central theme of Landolicus’s approach to dairy farming. ‘However curious it may appear to the amateur’, he stressed that if a dairy farmer wished to rear a healthy dairy cow that offered nutritious milk over a prolonged lactation cycle, it was necessary that ‘all sorts of kindness should be bestowed on her’.³⁸ One of the major considerations in this regard was the relationship between the cow and the climate of North India. One core question was whether a cow should be allowed to graze outdoors, or be stall-fed? In the tropical heat of India, Landolicus argued that a cow had to be of ‘hardy constitution’ to graze all day, such as a common Bengali or country type. For the ‘more delicate’ Hissar, Nagourie or English breeds, it was deemed best to keep them ‘in their stalls the greater part of the day’, with only an hour or two of exercise. In either case, grazing exposed cattle to mosquitos that ‘flock in swarms from the fields, grass and jungle around, to prey on the blood of the cattle’. It also brought them into contact with other herds that could be carrying cow-pox or foot-and-mouth disease. These factors ‘tease and annoy cattle beyond measure’, leading to a ‘loss in quantity and value of the milk’.³⁹ To successfully milk a cow, it was also necessary to consider the time of day and temperature. For Landolicus, the proper time for milking was at day-break during the cool of the morning, when the mosquito has become inactive’.⁴⁰ One practice of the Indian milkmen that he did praise was the method of lighting a

³⁷ Landolicus, *Dairy Farm*, pp. 87-88.

³⁸ Landolicus, *Dairy Farm*, pp. 22-23.

³⁹ Landolicus, *Dairy Farm*, pp. 17-21.

⁴⁰ Landolicus, *Dairy Farm*, p. 43.

‘fire close to the side of the animal he milks’, allowing the smoke to deter any pests despite the possible effect of the smoke on the milk. He also suggested that it might be best to ‘burn a certain amount of rosin over a charcoal fire at a doorway, through which a breeze is blowing’. The best time of day to do this was in the evening, when mosquitos were in their greatest numbers, and when cattle were returning from grazing.⁴¹

Another central tenet of Landolicus’s philosophy of welfare was the maternal instinct of the cow, which he described as an ‘almost hereditary habit of the country cows’, an evolved trait rooted in both the instinctual nature of the animal and the socio-cultural traditions of domestication in India. While he recognised that in England a cow was ‘very often not allowed to see her calf at all’, he described this method as a ‘most unnatural proceeding’, not to be recommended. Instead, a cow ‘should at once be milked’ after birthing, with the ‘calf being placed at her side’ to induce her let down her first milk. The calf should then be left with the mother during the first few hours, when the mother instinctually grooms and feeds its new born. After this, the calf should be allowed to suckle her mother at intervals, before being placed in the pen with the other calves.⁴² Landolicus thus argued that the maternal behaviour should be used to rear a healthy calf. While initially the calf would take a quantity of milk, he believed that a maternal relationship between the cow and her calf would induce a mother to produce greater quantities of milk to feed her child. In sum, dairying was not purely the product of feeding and breeding. It was instead a matter of the emotional nature and instinctual behaviours of the animal, her natural desire to protect her child, to develop techniques that would utilise a cow’s maternal instinct to ‘be cunning and try and hide away some of sustenance for her young’. By giving the cow a secure environment in which to experience its mother-child bond, Landolicus argued that a dairy farmer would yield more milk throughout the lactation cycle.⁴³ If the calf was neglected or died, the cow may drop her milk yield and be unable to milk at all. This would lead to a gradual decline each lactation, and, in the worst case scenario, to desperate measures to keep the cow happy, such as getting the ‘calf skinned and stuffed and placed beside her for her to lick’.⁴⁴

⁴¹ Landolicus, *Dairy Farm*, pp. 83-84.

⁴² Landolicus, *Dairy Farm*, p. 76.

⁴³ Landolicus, *Dairy Farm*, p. 82.

⁴⁴ Landolicus, *Dairy Farm*, p. 88.

The significance of the maternal bond as a symbol of welfare also pervaded the work of Captain A. C. Williams, the manager of the colonial government's flagship dairy farm in the city of Allahabad. During the colonial era, Allahabad was the colonial centre for both practical and educational models of grass growing and dairy farming, and an important hub of research and training for the military department. With Rs. 11,000, Williams took over the reins of the Allahabad dairy farm in 1891. To cover its overheads, the dairy farm at Allahabad was bound to the precarious 'fluctuations in the demands of the hospitals' and cheap fodder from an unspecified 'grass farm'. Captain Williams doubted that 'the Government Dairy Farm *per se* could ever be a success' without a cheap supply of fodder. The farm was stocked with inexpensive 'country utensils' and lacked a modern, expensive separator or creamer despite the recommendation of Mr Keventer, Calcutta's main dairy supplier. Williams questioned the value of these machines and debated whether the farm should produce popular and long lasting Indian dairy products. In the short term, the farm succeeded in producing a reliable and sanitary supply of liquefied milk. Providing 70,195 lbs of milk (31,839 litres) and 3,665 lbs of butter, its herd saved government institutions in Allahabad Rs. 2987 in its first annum.⁴⁵ To achieve this level of productivity, Williams built the farm's herd with what he felt were the best *Bos indicus* zebu cows that he could access, a mixture of northern breeds such as Haryana and Nagori cows, as well as murrh buffalos from Hissar, Rohtak, Hansi, Meham and Delhi. But his most prized and productive breed was the Sarinia, which could yield up to 34lbs (15.4 litres) of milk per day and as much as 7,380 lbs (3347 litres) per lactation. Williams ensured the productivity of his dairy cattle by imposing the 'strictest supervision' over his herd, a regimented pattern of lactation, sleep and feeding. Williams paid close attention to the 'constitution, size, form, productiveness to milk' of each animal, purchasing and selectively breeding animals with well-developed udders, 'smooth skin and a good lacteal gland (milk vein)'. To ensure that his cows produced large quantities of milk, they were provided huge quantities of green fodder, *bhusi* (seed), oilcake and salt.

One of the defining features of William's approach to dairying was his belief that cows and buffalos should be treated 'gently and kindly'. He encouraged his employees to 'humour any little whim or fancy they may display regarding food'. He believed that bovine were 'very sensitive creatures' that responded badly to 'over-driving, harsh treatment or rough usage'.

⁴⁵ IOR/V/24/1515 (1891-93), 'North Western Provinces and Oudh: Department of Agriculture: Financial report of the Allahabad dairy farm'.

They would yield more milk if they were milked at ‘regular hours’ by the same milker. Otherwise, a cow would ‘refuse to drop their milk and run dry quickly’, as well as retain her milk from strangers. These practices were deemed to be beyond the abilities of Indian staff. Williams proposed that while ‘cows may be milked by the “*gowalah*”’, the farm itself should be coordinated and monitored by an ‘experienced European’ with the knowledge, ability and temperament to control the herd. Providing animals with proper feed, care and supervision became affiliated with racial discourses. Williams felt that ‘natives of the country will not understand’ colonial animal husbandry. A key factor that Williams used to distinguish European managers from Indian milkmen was knowledge and understanding of the significance of the maternal bond. When he began to run the dairy in Allahabad, he experimented by using the European method of removing the calf from the mother immediately after it was born. However, this approach clashed with what he saw as the common Indian practice of allowing the ‘calf to suck a little of its mother’s milk during the whole season the cow is in milk’. Over time, he began to recognise that the maternal bond was an important component in dairy farming, vital to creating a new generation of strong and healthy calves. To utilise the benefits of encouraging its physiological and emotional instincts, Williams used a ‘slightly modified’ version of the country system at the farm, which allowed calves to suckle ‘a little of the first milk from the cows’, and also to receive 2 quarts (1.89 litres) of buttermilk and linseed cake each day. This continued for six weeks, when they were weaned onto a grain ration.⁴⁶ In sum, for Williams the physical and emotional well-being of the animal included a knowledge and understanding of its behaviours, which were needed to ensure the animal would provide the highest quality and quantity dairy possible.

As the aforementioned examples indicate, the relationship between the cow and the calf became a central aspect of colonial and Indian dairy farming in the 1890s. The Indian milkmen became condemned by colonial officials and Hindu elites for their perceived abuse of the calf. British dairy farmers, accustomed to segregating the cow from its calf, began to experiment with the maternal bond. This not only allowed them to distinguish their practices from the racialised archetypes of Indian milkmen, but to promote the importance of the cow-calf relationship as part of a healthy, modern system of dairying that included animal feeding and management. Knowledge about dairying developed in response to the socio-cultural context of ideas about the significance of animal behaviour. Moreover, in certain cases, colonial

⁴⁶ IOR/V/24/1515 (1891-93), ‘Allahabad Dairy Farm’.

knowledge was a product of a collaboration and compromise with the material impact of the behaviours of the cow. That said, the extent to which the relationship between the cow and her calf was incorporated into all aspects of colonial dairy farming remains unclear. During the 1890s, the military department also began to develop its dairy farms, by seeking to find a means of creating ‘a safe and reliable supply of pure milk, butter and cream to military hospitals and troops in cantonments’.⁴⁷ This venture was initiated in 1887, when a committee of representatives from across the Punjab and Bengal commands concurred that a satisfactory method of feeding transport animals and dairy cattle needed to be devised. Military officials were dissatisfied with the performance of allotted Indian ‘grass-cutters’ hired to find fodder, critiquing this largely female workforce for ‘stealing grass off village or other lands’, providing low quality or anthrax ridden swamp grasses, and even spreading ‘venereal disease among the troops’ of cantonments. To rectify this situation, it was proposed that each cantonment should begin to use its spare land to grow fodder crops. From 1889, gradually every cantonment under the Punjab and Bengal Commands would establish its own grass farm, growing a mixture of sorghum, maize, Rhodes grass and Guinea grasses during the autumn harvest (*khariif*), and Lucerne, oats, barley, shaftal and berseem for the spring crop (*rabi*).⁴⁸ In 1897 the Special Forage Officer of Bengal Captain D. J. Meagher was tasked with locating ‘suitable sites’ for dairy parlours and fodder production on the military cantonments in Lucknow, Cawnpore and Agra.⁴⁹ This impetus to support dairying with clean and steady fodder supplies was carried out across the subcontinent and even in the port of Aden, situated along the coast of what is now Yemen. The military department increasingly recognised that effective management of the relationship between plants and animals was a necessity for success.⁵⁰

Much like the approaches of Landolicus and Williams, the military department felt that without proper training and experience it was ‘impossible to expect’ the majority of officers to have the time to gain a knowledge of dairy farming, scientific grass cultivation or of ‘labour-saving machinery’. Its most important ‘measure of success’ in producing a consistent and high quality

⁴⁷ IOR/Q/12/2 (1926), ‘Memoranda for the Royal Commission of Agriculture on the work of (1) The Imperial Institute of Veterinary Research, Muktesar, (2) The Animal Husbandry Section, Bangalore, (3) The Military Farms in India, (4) The Animal Nutrition section of the Imperial Institute of Animal Husbandry and Dairying, Bangalore, and (5) on the Quarantine Arrangements for the Inspection of Animals Imported into India’.

⁴⁸ IOR/Q/12/2 (1926), ‘Memoranda for the Royal Commission’.

⁴⁹ IOR/L/MIL/7/1377 (1900-01), ‘Report on the working of the Dairies at Lucknow, Cawnpore and Agra, for the period from the 01/04/1899 to 30/09/1899’.

⁵⁰ IOR/L/MIL/7/1376 (1899-1901), ‘Proposals for the general management of grass and dairy farms’.

milk supply was the amount of ‘trained supervision’ at each dairy farm.⁵¹ To become a Special Forage Officer, Farm Manager or Overseer, European officials had to undergo training and pass a qualifying examination. According to the Bengal Command, the exam offered the ‘best testimony’ to ensure that only ‘men of superior capacity and qualifications can attain to the standard required’.⁵² An eighteen month course in dairy and grass farming could be taken by British non-commissioned officers and soldiers at Allahabad.⁵³ To train its students, the military department sought to hire fully trained and qualified staff and teachers from England, such as the appointment of a Miss Elizabeth Anne Humphreys in 1901 as the Dairy Teacher at the Government Dairy Farm in Allahabad.⁵⁴ The difficulty of the course can be deduced from the low pass rate. Of the twelve candidates that sat the first exam only three passed the course and were hired at farms in Cawnpore, Mhow and Agra.⁵⁵ In 1899 fifteen more students were enrolled on the course and sat three-hour exam papers in their respective specialist fields, including soils, harvesting, grasses and fodders, the purchase of cattle, milk, cream, as well as butchery and dairy farming. As the papers show, knowledge and understanding of the chemical composition of plants, animals and soils were an essential part of the test, as well as an understanding of how the three could be combined to productively convert energy into resources such as dairy. In each case, the students had to learn both European techniques and local knowledge of the socio-cultural, environmental and material dynamics of the Indian subcontinent. For example, in the paper on ‘Indian grasses and fodder crops and feed of cattle’, students were asked to provide vernacular and English names of Indian grasses. They were also asked to list six fodders that were ‘best suited as fodder for milch cattle’, to specifically describe the ‘action’ each of these fodders had on the animal to improve their yield. Question five of paper thirteen asked the students to give details on ‘the management of calves from birth to eight months old’. In the follow up for question six, candidates had to ‘consider the most economical method of breeding and disposal of young stock’, before comparing the ‘relative values of the English and Indian systems of rearing calves’. As these examples indicate, an awareness and understanding of indigenous knowledge and methods of dairying

⁵¹ IOR/L/MIL/7/1377 (1900-01), ‘Dairies at Lucknow, Cawnpore and Agra’.

⁵² IOR/L/MIL/7/1377 (1900-01), ‘Letter from General Officer, Commanding Allahabad District, to the Deputy Adjutant-General, Bengal Command, 01/11/1900’.

⁵³ IOR/L/MIL/7/1376 (1899-1901), ‘Rules regarding the appointment, training, pay, status, &c., of Special Forage Officers and of officers in charge of grass and dairy farms’.

⁵⁴ IOR/L/MIL/7/1376 (1899-1901), ‘Letter from Captain D. J. Meagher to the Bengal Command, 09/05/1900’.

⁵⁵ IOR/L/MIL/7/1377 (1900-01), ‘Despatch of the Military Department to Lord George Francis Hamilton, His Majesty’s Secretary of State for India, Simla, 03/10/1901’.

were considered to be important to formal training in the colonial institution. However, the extent to which either system was utilised or promoted by each candidate remains unclear.⁵⁶

3.3 *Mothers in colonial and Hindu nationalist discourse*

By 1905 there were approximately forty-eight special dairy farms across India run by military authorities, with eleven in the United Provinces alone.⁵⁷ These military farms would remain a pillar of dairying alongside the cattle sanctuaries (*gaushālā*) even after Indian Independence, each supplying dairy to cantonments, hospitals, universities, temples and in some cases the surrounding population.⁵⁸ The imperial gazetteer of the city of Allahabad noted that there was a great demand for clarified butter and a considerable export business, driven by the ‘great stimulus’ and ‘example’ set by the military dairy farm in the city. This farm boosted trade in dairying, and also ‘served to demonstrate the value of the superior breeds imported from the Punjab and other stock-raising centres’.⁵⁹ As a resident and founder of the Allahabad Agricultural College in 1911, the American missionary Sam Higginbottom noted that many British and Indian residents in Allahabad alike saw these new dairy farms as a source of high quality and hygienic milk, a safe and healthy alternative which affluent middle class families could trust to feed ‘their children’.⁶⁰ While government farms were able to produce an quantity of dairy, their impact was limited to local municipalities. Government dairies reached only an estimated 2% of the population by the end of the colonial era in 1947.⁶¹ As such, a gap began to emerge between the work of colonial institutions and the application of their knowledge and methods.⁶² This disconnect was felt not only in terms of the low number of people its dairies could supply, but also in relation to the ideas and techniques that were endorsed and used at government institutions. According to attendees at the First All India Cattle Conference in Bangalore in 1924, it was debatable whether the approach of the National Dairy Research

⁵⁶ IOR/L/MIL/7/1377 (1900-01), ‘Examination Papers of Agricultural Class, 1899 and 1900, Government Farm, Allahabad’.

⁵⁷ Achaya, *The Food Industries*, p. 62.

⁵⁸ S. S. Bhatiya, ‘Uttar Pradesh mein dōdhshālā Vikas ki Yojnayan’ (Program of Development for Dairy farms in Uttar Pradesh), *Krishi aur Pashu Pālan* (Agriculture and Animal Husbandry), July (1951), p. 14.

⁵⁹ Henry Rivers Nevill, *Allahabad: A Gazetteer* (Allahabad, 1911), p. 21.

⁶⁰ Sam Higginbottom, *The Gospel and the Plow or the Old Gospel and Modern Farming in Ancient India* (New York, 1921), p. 76.

⁶¹ Wiley, *Cultures of Milk*, p. 69.

⁶² For studies of dairying and national development see N. N. Godbole, *Milk: The Most Perfect Food* (Calcutta, 1936); Norman C. Wright, *Report on the Development of the Cattle and Dairy Industries of India* (Delhi, 1937); P. E. Lander, *The Feeding of Farm Animals in India* (Calcutta, 1949).

Institutes at Bangalore, Pusa and Karnal supported ‘the good of India as a whole’. Using expensive machinery and cross-bred Indo-European cattle, national research institutions and military dairy farms continued to be out of touch with the socio-economic, environmental and behavioural realities of domestication in North India.⁶³

The cow-calf relationship sat at the heart of debates about the relevance and applicability of colonial knowledge and methodology. While some sources indicated that the military farms promoted the relationship between mother and calf,⁶⁴ this was not the case according to B. K. Ghare, a retired lecturer from the Agricultural College of Cawnpore. Ghare hoped that his 1923 book *Manual of Dairy Farming for Indian Students* would educate the people in the ‘science and art of dairying’, in which it lagged behind other nations.⁶⁵ He intended to offer guidance to Indian students trained at colonial institutions about the best practices to emulate from the British, and also to avoid. In this light, he noted that at military farms many officials argued that if the maternal connection between the mother and her calf could be severed in Europe, it might also be disrupted amongst Indian cattle ‘if weaning is to be practiced...from the very first delivery and not later’. If the mother was allowed to even see her calf and know it was taken from her, she was ‘likely to become vicious and may not allow anybody to approach and milk her’. Ghare acknowledged that it was possible to attempt methods such as blindfolding the cow, as a means to break the bond. However, he also warned his students that this practice was not in tune with the common customs of the people of North India, who consider it ‘a sin to deprive the young one wholly of the food provided by nature’. From a scientific perspective, he argued that the maternal bond was created by the natural drive of the animal to rear its child. It was a healthy, hygienic and essential part of animal husbandry, that was vital for both the animal but also the progress of India as a nation.⁶⁶ As the image below shows, Ghare felt that milk played a vital role in both feeding humans but also rearing calves, the backbone of the nation’s future.

⁶³ *Proceedings of the Cattle Conference held at Bangalore on 22nd and 23rd January, 1924* (Calcutta, 1924), p. 6.

⁶⁴ Shri Rām Sharmā, *Hamāri Gāya* (Our Cows) (Calcutta, 1941), p. 21.

⁶⁵ B. K. Ghare, *Manual of Dairy Farming for Indian students* (Bombay, 1928), p. vii.

⁶⁶ Ghare, *Manual of Dairy Farming*, pp. 79-80.

MILK IS VITAL TO NATIONAL HEALTH

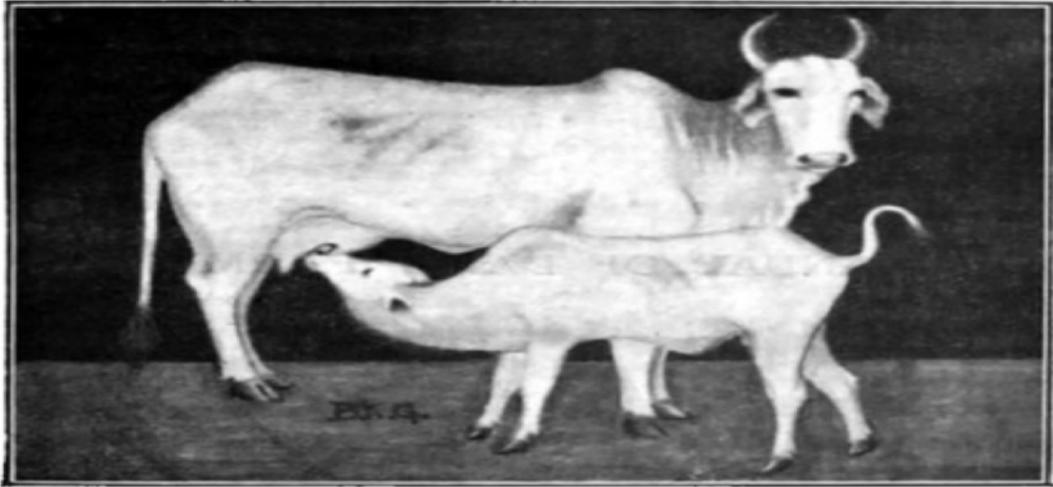


Figure 11: B. K. Ghare, *Manual of Dairy Farming for Indian Students* (Bombay, 1928).

In the discourses of Hindu nationalism, the significance of feeding the calf was also connected to perceptions of mother cow (*gau mātā*). Building on an essay that won second place in the Bombay Humanitarian League's essay scheme, Dahyabhai H. Jani's 1938 work *Romance of the Cow* opened with a tribute to mother cow written by Sarojini Naidu, a celebrated politician and poet from the Indian independence movement. In her poem *Awake, Mother!*, she calls for the Indians to serve their Motherland and awaken India's past glories;⁶⁷

O Young through all they immemorial years,
Rise, Mother, rise regenerate from thy gloom.
And like a bridge high-mated with the spheres,
Beget new glories from thy ageless womb.
The Nations that in fettered darkness weep,
Crave thee to lead them where great mornings break.

⁶⁷ Sativinder Kaur, *Sarojini Naidu's Poetry: Melodies of Indianness* (New Delhi, 2003), p. 153.

Jani depicted the cow as the mother of India whose glory needed to be reawaken to restore India's golden age. This argument was rooted in references to the significance of the cow in Aryan, Vedic and Mughal eras of Indian history, as well as through references to the speeches of nationalist leaders such as Gandhi.⁶⁸ Jani used these religious and nationalist references to offer a model of animal domestication for people to emulate, as well as a condemnation of the misery that plagued dairying in early twentieth century. He highlighted the greed of colonialism, big business but most notably the Indian milkmen who stole milk from the cow, which deprived new born calves of the milk they needed to be nurtured into a strong and healthy generation of cattle. The image below demonstrated that calves were even bullied out of their ration of mother's milk by street dogs, an image that reflected the cross-species competition for food in the cities and a stark sign of how little care or protection calves received.⁶⁹

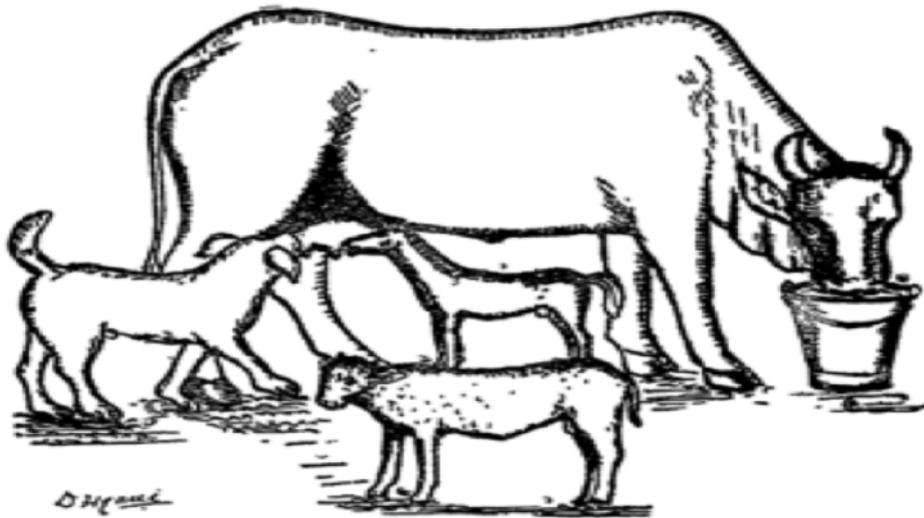


Figure 12: Dahyabhai H. Jani, *Romance of the cow* (Bombay, 1938), p. 188.

⁶⁸ Dahyabhai H. Jani, *Romance of the Cow* (Bombay, 1938), p. 5.

⁶⁹ Jani, *Romance of the Cow*, p. 188.

Nationalist endeavours to encourage the people to protect their calves were supported by a number of cow protection societies, which published works that used religious symbols and teachings to attempt to promote better methods of animal domestication. This message pervaded in Sharmā Gaur's 1937 book *Cow Protection (Gaurakshā)*, published by the Cattle Sanctuary Society (*gaushālā sabhā*) of Darbhanga, situated to the north of Patna in the eastern United Provinces. For Gaur, India's cattle populations were becoming weaker as people were giving less and less milk to their calves (*bacchā ātyanta nirbal ho jātā hai*). Deprived of the necessary nutrition, cows could not support the needs of their children and the people. It was every Indian's duty to ensure that a calf was fed enough mother's milk, before any was taken for human use. In sum, the bond between the mother and her child was fundamental to dairying and domestication (*gāya ke bacche ko uski mātā kā itnā dōdh avashaya piālnā chāhiye*).⁷⁰ In Kāshinātha Udgir Nārāyan's work *Cattle Protection: Animal Healing (Gau-Vansha Rakshā: Pashu Chikitsā)* published in 1939, the legitimacy and necessity of following pure and economic ways of treating cows was stressed from his opening chapter, dedicated to mother cow (*gau mātā*). Nārāyan was troubled that in a country where an animal was given the title of mother (*mātā kā pada*) and worshipped as a God (*bhāgvanā*), the cow was not correctly protected. Nārāyan celebrated the value of the cow by comparing it to the nurturing role of the human mother, who breast feeds her child for up to three years. This comparison was also used to stress the greater value of mother cow, who provided nutrition and nourishment for all people throughout her entire life. If treated correctly, mother cow could nurture India from its infancy as a nation, creating a healthier population that could rule independently in the future (*gau mātā kā dōdh manushya ājivan pān kartā hai*).⁷¹ But Nārāyan argued that humanity's desire to consume milk should not hinder a mother's capacity to feed her child. To create a strong new generation of cattle, calves should be fed on mother's milk for at least twenty one days after birth, before they were weaned onto a mixture of milk, green grasses, rice and so on.⁷² As the figure below illustrated, Nārāyan saw this bond as an essential part in guiding the cattle population to contribute progressively to the rise of India. This displayed by the cow shielding its calf, while looking to the future on the horizon.

⁷⁰ Sharmā Gaur, *Gaurakshā* (Cow Protection) (Darbhanga, 1937), p. 176.

⁷¹ Kāshinātha Udgir Nārāyan Sanāvada, *Gau-Vansha-Rakshā: Pashu Chikitsā* (Cattle Protection: Animal Healing) (Sanāvada, 1939), p. 2.

⁷² Sanāvada, *Gau-Vansha-Rakshā*, p. 18.



Figure 13: Kāshinātha Udgir Nārāyan Sanāvada, *Gau-Vansha-Rakshā: Pashu Chikitsā* (Cattle Protection: Animal Healing) (Sanāvada, 1939).

Hindu nationalist texts supported the idea that the cow-calf bond was a significant contributor to the co-evolutionary relationship between cattle and humans. Many Hindi texts utilised a mixture of cow protectionist discourse and western science to explain the evolutionary roots of the maternal instinct. In Shri Kamalkānt Pāndey's textbook from 1937 titled *Domesticated Animals (Pālatu Pashu)*, it was the sacredly ordained nature (*svabhāv*) of the cow to be peaceful (*shanti*), affectionate (*komala*) and to never show rage (*krodha*). While foreign cows produced more milk, the Indian cow was aesthetically beautiful (*sundar*) and spiritually virtuous (*bhali*), always willing to provide and be kind. She was also loyal to her master, becoming disconcerted (*ānmanā*) if she was away from home for a day or more. Although a cow may show an unwillingness to give up her milk, the cow was not perceived to be a reluctant servant. She did not feel forced to provide milk for her children, whether human or animal. For Pandey, the maternal love that Indian cows showed to their children had evolved as a means for cows to protect their calves from the threat of enemies (*dushman ke bhaya*). Before they were domesticated and watched by herdsman, cows endured the God-given hardship (*kashta bhagvān*) of finding and storing food for their young that pined from hunger and thirst (*bhōkh-*

pyās). This struggle moulded their bodies to store large amounts of milk and also build the strong maternal connection between the act of providing and the needs of the calf. In sum, Pāndey argued that the physiological aspects of dairying were intricately connected to the emotional dynamics of the bond between the mother and its child. A cow will give more milk when her calf was present, as its maternal instincts have evolved to only yield for its calf. Only by nurturing this emotional bond could more milk be yielded and Indian dairying improved.⁷³

A sense of the evolved connection between the mother and her child was further developed in Shri Rām Sharmā's work *Our Cows (Hamāri Gāya)*. Published by the prolific writer, social reformer and philosopher in 1941, the text offered an extensive discussion of the best way to practice what the English called the 'art of milking'. Exploring the climatic, socio-cultural and chemical nature of milk and dairying, Sharmā highlighted that the evolution of the mother-child bond had influenced the composition of milk. A calf should suckle milk from its mother before milking began, as at first there was not much protein (*ghratansh*) for humans, and instead more nutrients and bacteria that a calf needed.⁷⁴ Much like Pāndey's study discussed above, Sharmā's ideas were rooted in his understanding of the animal's original purpose, the natural instincts and behaviours it evolved before it was domesticated. Based on this logic, he stated firmly that it was not in the nature of cows and buffaloes to give milk to humans, but instead to their children. It was natural for an animal to resist the process of milking by humans.⁷⁵ This original desire was one of the factors that drove a cow to naturally increase her milk supply, a process rooted in her own wisdom and strength (*buddhi-bal*) that their wild ancestors utilised to feed their children. Thus, to induce a dairy cow to yield more, it was important to allow her to feed her calf, to fulfil her maternal purpose which, subsequently, increased her desire to let down all of her milk. As these examples show, the mother-child bond became viewed as an increasingly significant part of domestication amongst cow protectionists, an aspect defended by many as a crux of progress for the nation. This idea was in part rooted in cultural ideas about the value of the cow, but it was also linked to conceptions of evolution and the possibility of harnessing the animal's instincts for productive means. The cow's reluctance to give up her milk without the calf present was depicted in both a positive and negative light. It was in many cases a hindrance to accessing milk, but at the same time it was vital to feeding and rearing the next generation of calves.

⁷³ Shri Kamalākānt Pāndey, *Pālatu pashu* (Domesticated Animals) (Allahabad, 1937), pp. 79-82.

⁷⁴ Sharmā, *Hamāri Gāya*, p. 21.

⁷⁵ Sharmā, *Hamāri gāya*, p. 48.

3.4 *Conclusion*

Throughout the early twentieth century the role of the cow as a mother was connected to the nurturing and healthy properties of her milk, and the capacity for humans to feed. But it was also related to her maternal instinct to rear her calf. The cow's reluctance to give up her milk unless her calf was present was perceived as a sign of her commitment to rear her children, both human and animal. Many Indian nationalists and cow protectionists lamented the practices of Indian milkmen who were thought to neglect and starve their calves, keeping them around only to trick the cow into milking. Drawing upon scientific concepts and ideas of evolution, they saw the maternal connection as an essential physiological and emotional connection that needed to be encouraged, in order for a cow to produce and give up more milk. By allowing the cow to build an emotional bond with her child, they permitted her to tap into her evolutionary heritage and thus fulfil her material role and produce more milk. These studies of the evolutionary science of milking were in part shaped by colonial research into dairying from the late 1890s, wherein the government and military departments began to explore how to increase the yield of India's herds. As the evidence shows, the push towards professionalisation and grass farming led to a focus on control and management of the animal, with regimented ideas about the most productive methods of feeding, breeding and rearing. At times, these integrated the mother-child bond, demonstrating the impact of perceptions of animal behaviours upon dairying in North India.

This chapter has shown that the methods of the colonial government were largely detached from the realities of the Indian context. However, both colonial institutions and religious nationalist discourses demonstrated a combination of ideas about the best means of improving dairying. Cow protectionist literature argued that the maternal bond was in many respects essential for the development of dairying, a concept that many colonial officials also supported in order to stress their commitment to the welfare of the cow. This demonstrated that both western science and indigenous knowledge influenced perceptions of animal behaviours, and their contribution to the development of dairying. In the next chapter, I will take another look at the fraught relationship between colonial efforts and the dynamics of domestication in North India. The government's goal of using stud bulls to breed working cattle directly connected colonial priorities to the socio-cultural, environmental and behavioural dynamics of cattle breeding across North India.

Chapter 4

Stud bulls, agency and the breeding (or rearing) of cattle

From the Ghaggar grasslands in south-eastern Punjab, to the salt ranges in the north, from the plains of Bundelkhand, to the lush forest meadows at the foothills of the Himalayas, North India was home to a range of landscapes where herders and traders produced unique regional breeds of cattle. After the famines and plagues of the 1890s, the Civil Veterinary Department (CVD) began to argue that these indigenous breeders were incapable of supporting regional cattle populations, due to the loss of grazing lands and the lack of control over the mating of animals in the villages. As the previous chapters have shown, many colonial officials stressed that in order to improve animal populations in India, it was necessary to control the feeding and rearing of the herd. They presented the animal as a “converter” of resources, its body a controlled site where food could be offered, consumed by the animal, and produce extracted. However, the approaches it proposed were often only successful within the cultural and economic means of its government farms and the discourses of colonial science. Beyond these walls, many of these ideas clashed with the environmental realities, such as the use of manure as shown in the second chapter. They also clashed with the behavioural forces, such as the value of the cow as a mother, as the third chapter demonstrated. This chapter will further probe the boundary between the colonial institution and the socio-cultural, environmental and behavioural co-evolution of domestication in rural India, by assessing the government’s efforts to improve regional populations of cattle in the Punjab and the United Provinces during the opening decades of the twentieth century. Scholars have studied the effort of the military department to breed horses in the mid-nineteenth century, as well as the process of breeding cattle from the 1930s onwards. Yet, they have overlooked the significance of the opening decades of the twentieth century, when the CVD launched the government’s first concentrated effort to preserve indigenous breeds of cattle and utilise them to improve regional populations.

The purpose of this chapter is to explore how colonial officials approached the question of regional cattle populations. During the 1900s, this task caused many competing ideas to emerge

amongst CVD officials working for both the Punjab and the United Provinces. The central focus of this chapter is the role of the mating behaviours of cattle. For many colonial officials, the problem facing cattle populations was the lack of control over the capacity for animals to reproduce. Much like the condemnation of the milkmen, colonial officials believed that the only way to improve a regional population was to reform the culture of animal husbandry within Indian villages, to discourage what it perceived to be lax control over the mating behaviours of animals, which created what they deemed to be miscellaneous herds of unproductive cattle. This would be achieved by distributing government bred stud bulls to the districts of the Punjab, with the hope that their beneficial traits would gradually incentivise people to rely on the government supply and thus formulate a regional breed. As the opening sections will demonstrate, the Hissar type stud bull became the primary source of agency for the CVD of the Punjab. Its ability to reproduce was viewed as a force for productive change. Much like its effort to breed horses in the nineteenth century, the CVD of the Punjab sought to circumnavigate the pastoral traders and cattle breeders that had long herded these Hissar breeds, in an attempt to create a direct market between the government's Hissar cattle farm and the cultivators. Veterinarians believed that by building this direct link, the attributes of colonial animal breeding and its values of animal husbandry could be distributed to each district of the Punjab by the reproductive agency of the stud bull, to induce desired traits in future generations of North Indian cattle.

From its very inception this approach was marred with issues and challenges from within the CVD. Many colonial officials contested that breeding stud bulls was the most effective means of uplifting rural populations of cattle, arguing that the root of the problem was not the indigenous market or method of animal husbandry, but the dramatic loss of grazing lands which had led to the gradual deterioration of cattle across North India. CVD officials advocated the opening of a cattle rearing depot in the sub-montane districts along the Nepal border of the United Provinces, a home to dense forests and grass lands that were a centre for cattle herders from across the region. This government rearing farm would support local breeders by giving their bulls access to fodders and strengthen them into productive workers and bulls. In doing so, CVD officials in UP challenged the notion that the reproductive agency of any one type of stud bull could impose imperial methods of breeding and progress. They recognised that cattle breeding was a product of distinct and diverse environmental, socio-cultural and behavioural norms, which limited the physiological possibilities of each variety of stud bull. By supporting

the breeders from multiple localities in North India, the rearing farm proposed to help preserve indigenous customs and knowledge, encouraging established norms of domestication and husbandry. The clash between breeding and rearing provides an important case study in which to explore the limits of colonial discourses of mastery over the reproductive drive of the animal. By focusing on the ideas, values and beliefs of colonial cattle breeders, it is revealed that at the turn of the twentieth century the history of colonial animal domestication was instead a product of a continuity between colonial methods and the landscapes, cattle breeders and cattle breeds of North India.

4.1 *Cattle breeding in the Punjab*

In 1895, Captain H. T. Pease described the south-eastern districts of the Punjab as an invaluable ‘store’ of cattle, home to an ‘excellence’ of breeds. A rising veterinarian who became the Principal of the Lahore Veterinary College before attaining the post of Inspector General of the CVD, Pease published his report in the *Agricultural Ledger* as part of the government’s renewed impetus to improve agriculture, which was sparked by Voelker’s report of 1893. His work also contributed to the aim of the CVD to gain knowledge of India’s cattle populations, as part of the growing desire to understand and assist agriculture across the subcontinent. Pease praised a landscape of ‘rolling prairie of long grass’ and uncultivated land north of Delhi known as the Ghaggar. He illustrated how pastoralist herders from the Punjab, Rajputana and the North-Western Provinces gathered on the Ghaggar to graze their animals on the nutritious natural pasture of *khabbal* or *dub* (*Cynodon Dactylon*), *dhaman* or *anjan* (*Pennisetum cenchroides*) and *sanwak* grasses. While few villagers were able to settle in the region due to the scantiness and uncertainty of rainfall, the Ghaggar was valued as a natural source of Malthusian governance. Its grasses and climate assisted cattle breeding by thinning down the herds to ‘only a very hardy stock capable of enduring great hardships’, where the ‘weaker cattle perished whilst the more robust survived’.¹ For Pease, the crowning example of the quality of cattle produced by the climate and its breeders was Hissar or Haryana breed. Standing at up to 60 inches, the breed was renowned for its powerful back, thick skin, large and ‘intelligent’ eyes, short upward curving horns, a short fine tail and small, hard, well-shaped feet.

¹ H. T. Pease, ‘The Cattle of Harriana and Sirsa’, *The Agricultural Ledger*, 22 (1895), p. 15.

Due to the quality of the Ghaggar grazing lands and its well-worn networks of trade, there was plenty of opportunity for inter-breeding. Pease and other colonial officials reported that the attributes of the Hissar breed were mixed into a range of different local breeds across the region. To the south-west of the Punjab in the Princely State of Rajputana, the Rath and Mewati breeds were said to be a mixture of Hissar and the 'big, powerful and active' Nagori breed forged in the grazing lands of Jodhpur and Bikaner, where they were capable of heavy draught in the deep sand of the Thar desert.² To the east of Punjab around the ancient cities of Mathura and Vrindavan, the attributes of the Hissar breed were also intermixed by the local Jat pastoralists and cultivators to create the renowned Kosi breed. Rooting their ancestral lineage and cultural norms in the life and values of the cowherd Lord Krishna, these communities of Jats held many traditions that linked to their ancestors, such as placing milk in such high regard that it was a sin to sell it.³ The attributes of the Hissar breed would also stretch far and wide along the trade routes and markets, that formed the arteries that connected and sustained the population of animal labour across the north. These traders relied upon the vast numbers of cattle that people in the breeding districts could produce. For example, Pease reported that to the south of Hissar, the Rohtak district was home to nearly 40,000 bullocks and 41,000 cows in 1895, in addition to 18,000 water-buffalos and nearly 300 bulls. Surrounding districts of Gohana, Sampla and Jhajjhar were also home to tens of thousands of animals. Each spring and autumn, vast portions of the cattle would be sold at the Jahazgarh fair. In total, 26,000 cattle were sold at the spring fair, with the majority from Rohtak, but also some from traders as far south as Jaipur. Over the course of fourteen days from the 10th of September, around 6000 animals were displayed, with up to 3000 being sold at a rate of around Rs. 20 each. These events could amass up to 7 lakhs of rupees (Rs. 700,000). These animals were a mixture of Hissar, Mewati, Marwari and Nagori, which were largely sold to districts in the Doab of the western reaches of the United Provinces such as Aligarh, Muzaffarnagar, Meerut, Saharanpur and Bulandshahr. In addition, up to 20,000 cattle were sold each year to the north at the Sirsa Cattle fair in August and March.⁴

As Pease stressed, the bullock was the backbone of agricultural life, a worker that could plough the fields from the age of four until it reached nine. But to maintain its strength and vitality, cultivators had to ensure that their bullocks received plenty of chopped straw and green fodder,

² F. S. H. Baldrey, *The Indigenous Breeds of Cattle in Rajputana* (Calcutta, 1911), pp. 1-2.

³ Günter Tiemann, 'Cattle Herds and Ancestral Land among the Jat of Haryana in Northern India', *Anthropos*, 65: 3.4 (1970), p. 481.

⁴ Syed Mohammad Hadi, 'Breeds of Cattle in the Mathura District', *The Agricultural Ledger*, 19 (1895), p. 7.

as well as grazing during the off season. These tasks also affected cattle breeders, many of whom had adapted to the harsh climate of south-eastern Punjab by growing fodder crops on *barani* lands, which could sustain their animals during the dry months from April to July. But with the introduction of cultivation and the break-up of *shamilat* lands once reserved for cattle grazing and the threat of drought and famine looming,⁵ the supply of cattle provided by pastoral traders to the cultivated tracts could be affected. As Pease noted, traditionally the largest fairs of the year were held in autumn when traders sold bullocks that were fit to work and ready to cultivate the *kharif* harvest, while smaller spring fairs would generally sell young stock. The numbers in attendance and prices offered for each animal varied according to the nature of the season. If drought and famine were on the horizon, then anxious cattle traders would bring large numbers of animals that they were struggling to feed, leading to large numbers for sale, such as in 1879. A year later the abundance of rain and grasses meant that fewer cattle were brought to market. Prices also varied according to the conditions, with the cost dropping in bad years. The gravity of the situation was magnified as the nineteenth century drew to a close, when famines and plagues decimated up to 15,000 head of cattle in each district.⁶ Traders sold their cattle cheaply to tanners and butchers (*kaisai*), and the price of the remaining herds rose beyond the means of the cultivators.⁷

As Prem Chowdry has shown, by the early twentieth century the south-eastern districts of the Punjab became an important supply of human and animal labour for the colonial government. According to British military discourses, the region was home to one of the most valuable ‘martial races’ of Indian men that served in the army.⁸ The criteria of this hierarchy of ethnicities was rooted in the pseudoscientific conceptions that were perpetuated during the late nineteenth century, which viewed racial characteristics as a product of climatic forces, dietary norms and the cultural of reproduction. It was one of many theories of population control and “improvement” that were envisioned in the eugenic discourses of the early twentieth century.⁹

⁵ Pease, ‘Cattle of Harriana’, p. 2.

⁶ Mishra, ‘Cattle, Dearth, and the Colonial State’, p. 994.

⁷ National Library of Scotland: India Papers (henceforth NLS: IP), Medical: Veterinary, ‘Provincial Report of the Civil Veterinary Department Punjab, for the year 1898-99’.

⁸ Prem Chowdhry, ‘The Advantages of Backwardness: Colonial Policy and Agriculture in Haryana’, *The Indian Economic and Social History Review*, 23:3 (1986), p. 263.

⁹ For studies of reproduction and humans in literature, see Elana Gomel, ‘Science (fiction) and Posthuman Ethics: Redefining the Human’, *European Legacy*, 16:3 (2011), pp. 339-354; Martin Danahay, ‘Wells, Galton and Biopower: Breeding Human Animals’, *Journal of Victorian Culture*, 17:4 (2012), pp. 468-479; Chris Danta, ‘The Future will have been Animal: Dr Moreau and the Aesthetics of Monstrosity’, *Textual Practice*, 26:4 (2012), pp. 687-705; Nadine Attewell, *Better Britons: Reproduction, National identity and the Afterlife of Empire* (Toronto, 2014).

Comparative conceptions of environmental forces, dietary and cultural norms pervaded throughout the colonial slave trade, where humans and animals were marketed in terms of their physiological characteristics, behavioural attributes and breeding potential.¹⁰ In the south-eastern districts of the Punjab, Chowdry has shown that the British sustained a policy of ‘underdevelopment’ in the region, maintaining its ‘dry and healthy’ climate in order to reproduce more martial soldiers and pure breeds of cattle.¹¹ This policy ensured that the region’s climate would not be affected by the moisture and miasma that was devastating the health and strength of human and cattle populations, in regions where the colonial government conducted irrigation projects in order to increase the scale of cultivation, such as its canal colonies in the western Punjab.

Writing on the conditions of cattle across the Punjab in 1910, A. M. Stow lamented that the indigenous breed of Sahiwal dairy cattle, once celebrated and populous across the western districts of the Punjab, had nearly become extinct in its homeland. Stow stressed the gravity of the situation by reflecting that only twenty years prior, Pease’s report had stated that these long tailed, short horned and finely coated animals were abundant across its native lands in the Montgomery district, amongst the people living along the Ravi river.¹² The Sahiwal was just one example of growing number of local indigenous breeds that were under threat, such as the Kachi from Jhang and the Bhagnari from Dera Ghazi Khan.¹³ For Stow, the decline of these breeds signified a dramatic change in the region, since it was annexed by the British East India Company from the Sikh Empire in 1849. Known as the land of the Five Rivers (Jhelum, Chenab, Sutlej, Beas and Ravi), the western districts of the Punjab were once the basin of the ancient Indus valley civilisation. According to colonial administrations, these once thriving regions were classified as “wastelands”, a sparsely populated landscape renowned for desolate barren plains that sprung into a green carpet at the slightest drop of monsoon rains that infrequently fell. But as the forest officer Hugh Cleghorn (1820-1895) noted in his 1864 report on the region, these landscapes remained the home of roaming kingdoms of pastoral cattle herders known as the *jangli*, who inhabited the arid region of seasonal grasslands known as the

¹⁰ For studies of interconnections between breeding and the European slave trade, see Enrique Ucelay Da Cal, ‘The influence of Animal breeding on Political Racism’, *History of European Ideas*, 15:4-6 (1992), pp. 717-725; Philip D. Morgan, ‘Slaves and Livestock in Eighteenth-Century Jamaica: Vineyard pen, 1750-1751’, *The William and Mary Quarterly*, 52:1 (1995), pp. 47-76.

¹¹ Chowdhry, ‘The Advantages of Backwardness’, p. 263.

¹² A. M. Stow, *Cattle and Dairying in the Punjab* (Lahore, 1910), p. 17.

¹³ *Gazetteer of the Chenab Colony* (Lahore, 1905), p. 94.

bār.¹⁴ These animal economies were said to be built on herds of up to a thousand cattle, which grazed the landscape and provided the milk that was the primary basis of their diet.¹⁵ As P. J. Fagan noted in his 1900 gazetteer for the Montgomery district, herders and villagers across western Punjab had a range of terminology to describe the range of moods and behaviours that could overcome a mother cow. *Khātar* described a cow that was ‘savage, given to kicking or butting’. *Hathal* was used to refer to a cow that only allowed one person to milk her. *Pherwaan dodh-wāli* inferred that the cow performed the ‘trick’ of only letting their milk down for a short time after the calf has been sucking, so that the calf has to be brought back again.¹⁶

As the government installed its colossal network of waterways, canal colonies of migrants from the overpopulated central Punjab began to settle in the western Punjab and built a thriving new breadbasket of agriculture. As the grazing lands vanished under the plough, pastoral people were encouraged to either convert to arable farming or move to the farthest reaches of western Sindh. Due to their culture of raiding, cattle thieving, and constant battles for control over access to water wells and the banks of the rivers, these pastoral communities became affiliated with violence, barbarism and backwardness by the British throughout the late nineteenth century.¹⁷ A similar fate was bestowed upon many tribal and nomadic peoples of the forests and the deserts, who fell under the purview of the Criminal Tribes Act of 1871, which sought to detain and settle these wandering communities onto cultivated land.¹⁸ Many of these communities were associated with environmentally destructive forms of grazing and superstitious practices of veterinary science. Settling these communities was considered to be part of the government’s civilising mission, protecting the boundaries of cultivation and giving these communities the opportunity to contribute to British India.¹⁹ The government saw its irrigation projects in the Punjab as part of this civilising mission, rescuing people from the harsh nature of the landscape and their reliance upon the monsoon rains, the major source of

¹⁴ H. Cleghorn, *Report upon the Forests of the Punjab and the Western Himalaya* (Roorkee, 1864).

¹⁵ *Chenab Colony*, p. 19.

¹⁶ P. J. Fagan, *Gazetteer of the Montgomery District, 1899-90* (Lahore, 1900), pp. 164-165.

¹⁷ For studies of pastoralism in the western Punjab, please see, David Gilmartin, ‘Cattle, Crime and Colonialism: Property as Negotiation in North India’, *The Indian Economic and Social History Review*, 40:1 (2003) pp. 33-56; James L. Hevia, *Animal Labor and Colonial Warfare* (Chicago, 2018).

¹⁸ Sanjay Nigam, ‘Disciplining and Policing the ‘Criminals by Birth’, Part 2: The Development of a Disciplinary System, 1871-1900’, *The Indian Economic and Social History Review*, 21:3 (1990), p. 266.

¹⁹ For key studies of pastoralism, see Berthold Ribbentrop, *Forestry in British India* (New Delhi, 1900), pp. 133-135; Neeladri Bhattacharya, ‘Pastoralists in a Colonial World’, in Arnold and Guha (eds.), *Nature, Culture, Imperialism: Essays on the Environmental History of South Asia* (Delhi, 1996), p. 59; Arupjyoti Saikia, ‘Making Room Inside Forests: Grazing and Agrarian Conflicts in Colonial Assam’, in Rangarajan and Sivaramakrishnan (eds.), *Shifting Ground: People, Animals, and Mobility in India’s Environmental History* (New Delhi, 2014), pp. 156.

water for large portions of North India. By liberating people from the harsh nature of the land, they hoped to break people away from their superstitions and embrace the “rational” methods of colonial science.

Animal husbandry came under the purview of colonial discourses from the 1890s. Colonial officials saw the norms and methods practiced by the people of North India as the root of the degeneration of cattle. With the spread of disease, plagues and famines during the decade, the CVD Department would take on the role of ‘preserving’ and improving the quantity and quality of indigenous breeds of working and dairy cattle. Its answer was the stud bull. Founded in 1892 as a branch of the Department of Revenue and Agriculture (DRA), the CVD employed veterinarians to prevent cattle diseases and devise methods of animal breeding that could improve village herds. In 1899, it took over management of the Hissar cattle farm and began to distribute pure-type Hissar stud bulls to the districts, hoping that they would service village cows and uplift regional populations. In many respects, the capacity of the stud bull to reproduce multiple times and its ability to store genetic qualities in its semen, were viewed as a key agency that the colonial government could use to impose its imperial norms of domestication. A prized bull could be an agent for imperialism, if its instinct to mate was controlled and utilised to selectively breed valued animals. The bull was a tool for change, a centre of animal agency that breeders and governments hoped to use to manufacture improvement in the health, strength and productivity of cattle populations by formulating a regional breed. For many colonial officials, the majority of North India was home to miscellaneous herds of cattle, only loosely connected in their ancestry to some semblance of these pure-breeds. Colonial officials at the Cattle Conference in Lucknow in 1909 felt that across most of the districts in the United Provinces there was ‘no recognised breed’. Officials at the conference explored the ‘desirability of castrating unsuitable young stock’,²⁰ which it felt were the degenerative remnants of once pure-bred ancestry whose progressive features had been distilled by intermixing of village cattle, tropical malaise and a lack of nutritional fodders.

Colonial animal breeding in North India dated in many respects back to 1809, when Major James Lumsdaine founded the Hissar cattle farm on forty miles of Bir grazing lands. The farm became the base for the military to supply quality equine, ordinance bullocks and camels to the military. The farm would perform this duty until 1901, when the breeding of horses and camels

²⁰ UPSA, RD (222/1910), ‘Districts in which there is no recognised breed of cattle’.

was transferred to the newly formed Jhelum canal colony and Rawalpindi to the north along the Afghan border. Drawing upon regional knowledge, the government would begin to use *biloch* tribes to create a self-sustained supply of military transport animals.²¹ Before this transition, the East India Company had hoped that the Hissar cattle farm would supply cavalry that mirrored the quality and style of a European stallion, which it felt far exceeded any local or Arabic types. At the same time, it also attempted to create a marketplace for selling its horses to local princes (*raja*), landholders (*zamindari*) and other classes that could afford equine. While the government would chalk up its failures to a ‘malaise afflicting horse-breeding’, Mishra asserts that the main reason that the colonial marketplace struggled was due to the government’s insistence on imposing its values by pushing out what it saw as “middle men”, traders, breeders and other aspects of Indian equine husbandry.²² Moreover, CVD officials recognised that horse breeding was not relevant to the majority of the population. The question of whether to consult or work with indigenous cattle breeders became a source of debate and discussion as the CVD began its efforts to revive cattle populations. As this next section will show, in the Punjab the CVD attempted to build a centralised market of stud bulls. As we shall see, from the 1890s a range of methods were trialled in a bid to promote the stud bulls. The government’s main approach was to produce and distribute stud bulls. Thus far, scholars have yet to scrutinise their efforts, overlooking a significant moment in the history of animal domestication in North India.

4.2 *Breeding stud bulls at the Hissar Cattle Farm*

The extent to which the government could use Hissar stud bulls to uplift regional populations was a constant source of debate amongst CVD officials and agriculturalists in the late nineteenth century. One of the major limitations was the physical suitability of the Hissar bull to districts beyond the climatic norms of the south-east. In 1895 CVD superintendent for southern Punjab Mr Cranford noted that cultivators in the north and western areas of Peshawar, Rawalpindi, and Jhelum Districts considered Hissar bulls to be ‘too big and cumbersome’ for the region. Instead, the cultivators demanded animals of a breed that was smaller, more

²¹ Brian P. Caton, ‘The Imperial Ambition of Science and its Discontents: Animal Breeding in Nineteenth-Century Punjab’, in Mahesh Rangarajan and K. Sivaramakrishnan, *Shifting Ground: People, Animals, and Mobility in India’s Environmental History* (New Delhi, 2014), pp. 139-140.

²² Mishra, *Beastly Encounters*, pp. 14-16.

compact and with ‘plenty of bone’, a local breed that was ‘better suited to the average cow seen in the district’.²³ If the government focused purely on one type of breed, it would neglect the range of local breeds that were better suited and favoured in different districts. Even in regions where the bulls were suited, the possibility that a stud bull could have a lasting impact was hindered by the socio-cultural and environmental norms of domestication. Reporting for the *Agricultural Ledger* in 1895, J. W. Leather noted that Hissar bulls had the capacity to cause a ‘vast improvement’ in a local herd, such as in the town of Bara Banki in the United Provinces. Yet regardless of the bull’s quality, Leather felt that local cattle would always ‘gradually deteriorate’ due to ‘promiscuous breeding’.²⁴ If young stock, wandering bulls and older animals were not segregated from the herd, then a stud bull’s impact would be negligible. Castration was not uniformly practiced on calves across the north. Ungelt steers (*bhara*) would be sold by traders at two years of age, giving the animal time to grow into strong and power workers before they were castrated at three or four years of age.²⁵ If animal mating was unmonitored it would lead to miscellaneous herds, undefined by ancestry or distinguishable features, making it impossible to know the kind of offspring a stud bull would produce when mating with local cows. This issue would be recorded in the district of Mathura in the western United Provinces, where Assistant Director of Land Records and Agriculture Syed Mohammad Hadi argued that it would be impossible to improve the leggy, white and grey coated Kosi cattle reared by “Mewatis” pastoralists. Officials were unable to effectively choose cows to be serviced by bulls as the Kosi herd had not been ‘specially reared’.²⁶ Cattle breeding was influenced by social and religious customs that did not control the mating of animal herds, meaning that a bull could freely mate with any cow regardless of ‘his age, size, shape, strength’, and the ‘future ill consequences arising from such a practice’. The idea of directly owning a bull was rare. Many bullocks and cows were present in all villages, yet despite the presence of distinguished breeds, ‘few bull-calves’ were ‘allowed to grow up as bulls’ across the regions.²⁷

According to the CVD, for the government’s plans were to succeed it would need to reform not only the types of animals available, but also popular practices and attitudes towards control over animals, to create the conditions and norms that would make the bull a centre of sustained

²³ NLS: IP, Medical: Veterinary, ‘Provincial Report of the Civil Veterinary Department Punjab, for the year 1894-95’.

²⁴ J. W. Leather, ‘Improvements on the court of wards’ estates in the Bara Banki district’, *The Agricultural Ledger*, 17 (1895), pp. 1-2.

²⁵ Townsend, C. A. H., *Punjab district gazetteers: Hissar* (Lahore, 1916), p. 149.

²⁶ Hadi, ‘Cattle in the Mathura’, pp. 1-2.

²⁷ Hadi, ‘Cattle in the Mathura’, p. 6.

change by formulating a distinct breed. In the opening decade of the twentieth century, the CVD trialled and experimented with a range of methods and techniques that it hoped would encourage greater interest in cattle breeding along colonial lines across India. One of the first methods utilized by the government to encourage regional forms of breeding was prize money at cattle fairs. In 1901, the Department of Revenue and Agriculture (DRA) split a pot of Rs. 9000 between the provinces of British India, to be distributed as prize money for the ‘encouragement of cattle-breeding’ at cattle-fairs across the districts each year.²⁸ The prize approach sought to generate an interest across the provinces in cattle breeding, and to provide a means for the government to outline the qualities that it valued in terms of cattle breeds. Veterinary superintendents in the Punjab and United Provinces assessed whether the ‘giving of substantial prizes for breeding stock’ could encourage and improve local cattle breeding.²⁹ Colonial military representatives and veterinarians already sat as members of ‘Judging Committees’ at large Horse Shows, offering prizes to breeders that produced equine of aesthetic, behavioural and functional quality suited to military service, travel and leisure activities such as polo.³⁰ For cattle, awards were offered for animals of the best quality in the following categories:

Class I. - Bulls	Fit for breeding. Any age. Under three years of age
Class II. - Cow	Cows in calf or with calf at foot. Milch cows.
Class III. - Heifers	Three years of age. Two years of age.
Class IV. - Buffalo Bulls.	Fit for breeding. Under three years of age.
Class V. - Buffalo cows.	In calf or with calf at foot. Milch cows.
Class VI. - Bullocks	(a) A pair of bullocks 6 teeth and over. (b) Do. 4 do. (c) Do. 2 do. (d) Single bullock 6 do. (e) Do. 4 do. (f) Do. 2 do.

²⁸ UPSA, Revenue Department: 814/1904, ‘Award of prizes at cattle fairs with the object of improving the breeding of cattle’.

²⁹ NLS: IP, Medical: Veterinary, ‘Provincial Report of the Civil Veterinary Department Punjab, for the year 1901-02’, p. 9.

³⁰ NLS: IP, Medical: Veterinary, ‘Provincial Report of the Civil Veterinary Department Punjab, for the year 1900-01’, p. 8.

In 1902, the Department of Revenue and Agriculture assessed the results of previous prizes offered in the provinces, judging whether prizes offered at markets and fairs could improve the quality of animal populations across North India (for statistics see Appendix 3). Its initial conclusion was that prizes showed little evidence of encouraging people to take up animal husbandry, one of its main goals. As such, it felt that prizes should be tailored to established 'breeding districts',³¹ localities where a 'good indigenous breed exists' in the hope of encouraging 'competition amongst the animal breeders of the neighbourhood'.³² In order for the prizes to foster improvements in these localities, from 1904 a set of rules of participation were laid down. Rules 1-3 established that competitors needed identification to prove they were local. Another factor was that prize money should be given to breeds that were of the distinct local type. It surmised, 'by "distinct breed" it is meant animals that have acquired distinct or fixed characteristics through years of local breeding and influences. By "true to type" is meant that cattle must not only be thoroughbred of their sort, but they must also have all the characteristics of the best of their special breed'.³³ Combined with Rs.1000 from the provincial funds, in the Punjab a total pot of Rs. 3000 was split into prizes across breeding districts such as Rohtak and Hissar.³⁴ To the north prizes were encouraged at Lyallpur, Amritsar, Ferozepore and a newly established show in Choa Saidan Shah, to attract Dhanni cattle breeders from Sargodha in the Jhelum district.³⁵

Discussion of the impact of cattle fairs frequently took place in the annual reports of superintendent G. K. Walker, a veterinary superintendent for the CVD of the Punjab hired in 1901 in order to deal specifically with matters relating to cattle breeding.³⁶ One of the major issues Walker highlighted with the structure of shows was that 'money prizes are usually snapped up by a few wealthy breeders', who had little competition and the means to produce better animals. Another problem was that fairs were used for the sale of bullocks by dealers from far afield, who mainly attended fairs in 'localities where there is either a demand to be met, or a supply to be obtained'. As such, it was 'very exceptional for bulls to be brought in'

³¹ NAI, DRA (93/1901), 'Encouragement of cattle-breeding by the award of prizes at cattle fairs'.

³² NLS: IP, Medical: Veterinary, 'Provincial Report of the Civil Veterinary Department Punjab, for the year 1905-06', p 12.

³³ UPSA, RD (814/1904), 'Prizes at cattle fairs'.

³⁴ NLS: IP, Medical: Veterinary, 'Provincial Report of the Civil Veterinary Department Punjab, for the year 1900-01'.

³⁵ NLS: IP, Medical: Veterinary, 'Provincial Report of the Civil Veterinary Department Punjab, for the year 1904-05'.

³⁶ NAI, Department of Revenue and Agriculture: Civil Veterinary Administration (henceforth DRA: CVA) 127/1903.

to ordinary fairs, or by the breeders themselves. Furthermore, even when they were brought in for ‘competition, owners are, as a rule, unwilling to sell’.³⁷ Another draw-back was the economic limits of the people and the cost of the animal. Charging an average of Rs. 200 for a bull, the government stud was far beyond the means of regular villagers. As the statistics of the CVD show, in affluent areas around Delhi in the south east and near the major cities of Central Punjab such as Ferozepor and Amritsar, bulls could be sold for over Rs. 200 per head. But in less affluent regions of the western Punjab, prices were often discounted by up to forty percent.

To build his vision of a centralised stud-bull supply, from 1902 Walker declined all indent orders for stud bulls submitted to the Hissar cattle farm for bulls for three years, and began to rebuild the farm’s herd.³⁸ Through selective breeding, the Hissar cattle farm would become home to ‘high class bulls for sale to cattle breeders and for distribution to district councils’.³⁹ Returning from hiatus in 1905 with a supply of 36 stud-bulls, Veterinary Superintendent E. W. Oliver stated the past three years had been spent trying to ‘find and select’ bulls and cows from local traders and breeders, animals ‘whose character and shape approach most closely to our idea of what should be’. At the time in 1905, Oliver was the second superintendent for the Punjab. For Walker, ‘the greatest service’ that the CVD could provide to residents of the Punjab and its surrounding regions, was the use of ‘judicious breeding’ to ‘fix a type or strain’ of cattle breed that was ‘likely to be permanent’. By improving the ‘best indigenous’ type of cattle, the Hissar farm could offer stud bulls that were ‘shapely and suited’ to the ‘locality for which they are required’.⁴⁰ Under the administration of superintendent of the Government Cattle farm Colonial J. Farmer, Walker’s vision was gradually laid down by using controlled methods of breeding to produce a distinct breed of Hissar bulls. This was achieved by gradually disposing of ‘bad’ bulls and cows from the herd, separating new male calves from the herd until they could breed at three years old, and castrating those that were unfit to be bulls.⁴¹

When the farm returned from its hiatus in 1905, it immediately began to answer indents and distribute bulls to all corners of the Punjab. Thirteen bulls were sent to the north-eastern district

³⁷ NLS: IP, Medical: Veterinary, ‘Provincial Report of the Civil Veterinary Department Punjab, for the year’.

³⁸ NLS: IP, Medical: Veterinary, ‘Provincial Report of the Civil Veterinary Department Punjab, for the year 1901-02’.

³⁹ NAI, DRA: CVA (127/1903).

⁴⁰ NLS: IP, Medical: Veterinary, ‘Provincial Report of the Civil Veterinary Department Punjab, for the year 1904-05’.

⁴¹ NLS: IP, Medical: Veterinary, ‘Provincial Report of the Civil Veterinary Department Punjab, for the year 1912-13’.

of Siālkot along the Kashmir border, while in 1906 the Montgomery, Multan and Dera Ghazi Khan districts to the far west would receive ten between them. However, it was the Chenab colony in the district of Lyallpur that received the most attention, expanding from sixteen bulls in 1906 to forty-eight within three years. Lyallpur sat at the heart of the government's main agricultural colony, and represented one of the main centres where it sought to propagate the Hissar cattle breed. Hissar cattle already had a name for themselves in the province, where a wealthy landowner might spend up to Rs. 300 for a 'good yoke of bullocks' of the Hissar breed.⁴² Rising numbers of Sikh Jat traders also formed 'co-operative credit societies in Lyallpur and elsewhere utilize their surplus funds in buying up high class bullocks in Hissar, and selling them again at a considerable profits to neighbouring villages of their districts'. Lyallpur became the centre of the Chenab colony's cattle fair in March 1904, attended by 100,000 people who bought and sold nearly 5,000 animals, generating a total of Rs. 122,392 in sales, with government levying three pies on each sale. It was also the centre of veterinary activity in the region, where Walker pushed for his assistants to prevent disease and 'encourage the breeding of good cattle'. Walker himself selected the bulls that would be distributed to the District Boards, who had the responsibility of placing a veterinary assistant or other responsible person in charge of the bull, bringing its services to keen agriculturalists and inspecting the bull and the stock to record its successes.⁴³ The farm received up to a hundred indents each year, its prestigious breed of Hissar cattle gaining interest from breeders from as far afield as Brazil (see Appendix 4). By 1911 the Hissar cattle farm would directly support the western United Provinces, distributing bulls across the Upper Doab region.⁴⁴ By 1915, there were over 765 Hissar bulls supplied by the farm that were active and working across the Punjab alone, not including those produced and sold by pastoralists and other local breeders (see Appendix 5).⁴⁵

Despite the numeric growth in the distribution of stud bulls, the success of the Hissar bulls as an agency for imposing colonial norms of domestication was unclear during the 1900s. In his 1910 report *Cattle and Dairying in the Punjab*, A. M. Stow complemented the work of the farm, noting that during the 1890s the Hissar bulls used at the farm were 'sluggish' due to its 'extremely mixed breeding', resulting in the production of an inefficient and 'old mongrel

⁴² *Chenab Colony*, p. 94.

⁴³ *Chenab Colony*, p 96.

⁴⁴ NLS: IP, Medical: Veterinary, 'Annual Report on the Civil Veterinary Department, United Provinces, for the year ending 31st March 1912'.

⁴⁵ NLS: IP, Medical: Veterinary, 'Provincial Report of the Civil Veterinary Department Punjab, for the year 1914-15'.

stock'.⁴⁶ Stow praised the work of the farm for using the hot but 'generally healthy' qualities of the region's sandy hillocks and nitrogenous grasses, forcing the animals to roam to strengthen them into powerful, durable and milk yielding breeds.⁴⁷ However, Stow also questioned the extent to which stud bulls were capable of improving regional populations, due to their ill-adaptation to the regional norms. Commenting upon the impact of the stud bulls in the previous decade, Stow reflected that Hissar variety was not 'uniformly appreciated even in Haryana itself'. On a physical level, people commonly disliked their 'large and pendulous ears' and their 'excess weight'. Moreover, their behaviour was not appreciated by villagers, who complained that they had a tendency to stray from their herd unless closely monitored.⁴⁸ Stow utilised this evidence to challenge the government's desire to manufacture a centralised market place of bulls. One of the major limitations he highlighted was that the stud bull program did not reform, or adapt to, the pre-existing dynamics of domestication across the Punjab. Stow emphasised that the government was right to critique the prevalence of immature animals under three years old that were mating, due to the non-segregation of young stock from the herds, as well as the decision to castrate bullocks at a late age in many districts.⁴⁹ However, it did not support regional methods, such as the controlled system of mating in northern Punjab, where private individuals charged fees for the service of their breeding bulls. Another issue was the government's unwillingness to grapple with the practices of 'well-to-do banias or zamindars' of letting loose bulls as a 'religious duty', allowing them to 'follow village herds... graze with them', and 'bull the cows promiscuously'.⁵⁰ Another key issue that the stud bull did not help to tackle was the dramatic loss of the grazing lands across the region, leaving cattle to be 'driven along dusty lanes' to 'seldom extensive' grazing grounds that were perpetually encroached upon by the plough. For cattle breeding to be successfully revived, Stow argued that people needed to make an 'area available for the animals to wander in', for them to forage for their food and gain ample exercise to increase their strength.⁵¹

The Hissar cattle farm aimed to become a central hub for supplying stud bulls to the districts, where agriculturalists could directly access their services. Skipping the cattle trader and the local breeder, Walker envisioned a system whereby the government would have direct control

⁴⁶ Stow, *Cattle and Dairying*, pp. 49-50.

⁴⁷ Stow, *Cattle and Dairying*, pp. 6-7.

⁴⁸ Stow, *Cattle and Dairying*, pp. 6-8.

⁴⁹ Stow, *Cattle and Dairying*, pp. 10-12.

⁵⁰ Stow, *Cattle and Dairying*, pp. 5-6.

⁵¹ Stow, *Cattle and Dairying*, p. 20.

and influence over the qualities of the regional herd. The farm would fill in a missing gap by introducing pure-type bulls to the districts. From its very inception, the decision to focus on one breed and seek to use its reproductive abilities as a means to propagate colonial agency limited its potential to impact a wider region. Moreover, it directly refuted the notion that regional varieties and local breeders were significant, instead seeking to build its own central supply. In sum, it sought to use indigenous breeds to impose colonial norms of domestication. However, as Stow indicated, many colonial officials questioned the viability or necessity of breeding stud bulls. As the closing section of this chapter will show, during the 1900s the CVD became embroiled in a debate. While some officers supported breeding, others argued that a more pressing issue, animal feeding, needed to be tackled by opening cattle rearing depots to preserve regional breeds by supporting their herders.

4.3 *Rearing bulls in the sub-montane grazing lands*

According to Stow, from the very moment that horse breeding was transferred from the Hissar cattle farm to Jhelum colony in north western Punjab in 1901, many CVD of the Punjab began to argue that a second cattle farm should also be opened at the heart of the colony in Sargodha. As previously noted, colonial officials had long known that the rocky ridges and ravines of the Chakwal and Talagang salt range were the home of a handful of ‘compact and active’ breeds of cattle, the ‘pride’ of local breeders.⁵² The main focus of colonial attention was the Dhanni breed, which stood at 50 to 56 inches with flat foreheads, short horns and coats that were mostly black and white or red and white, and long tails with big tufts of hair that touched the ground.⁵³ Sharing many qualities with the hill cattle of the United Provinces, the Dhanni types were smaller than the Hissar breed yet famed for their short thick necks, deep chests and a well-developed hump that made them effective and ‘willing’ workers used chiefly for ploughing and working the wells. Castrated at the late age of three or four by local breeders, Dhanni bullocks closely resembled the physical size and strength of bulls, reared gradually into hardy workers on a mix of terrain grazing and stall-feeding. While the ‘inaccessibility’ of the northern breeding tracts limited trade in Dhanni types, the breed was often sold at the Amritsar fair in the central Punjab, and the western canal colonies through the Lyallpur fair.⁵⁴ Its direct and

⁵² Stow, *Cattle and Dairying*, p. 8.

⁵³ *Chenab Colony*, p. 94.

⁵⁴ Stow, *Cattle and Dairying*, pp. 9-10.

pre-established significance in the canal colonies made it a logical choice to support the breed, to ensure that plenty of numbers could reach the cultivators. Towards this end, in 1903 the CVD submitted a proposal for 850 acres of grazing land to open an institution. However, unlike the Hissar Cattle farm, the aim was to establish a bull rearing depot where it could raise local cattle of a 'promising character for 6 to 12 months of age', to 'run and rear them under the most advantageous conditions' for people living in the north-western districts of the Punjab.⁵⁵

The proposal for a cattle rearing depot in Sargodha became embroiled in a department wide debate within the CVD, sparked by its Inspector General John William Akerman Morgan. Building his name as a veterinary Superintendent in the CVD of the Bombay Presidency, Morgan stated in a report to the Department of Revenue and Agriculture in 1904 that the only way to improve regional cattle herds was to establish 'bull-rearing depots' across India. Such institutions would purchase local bull-calves, selecting those that were 'pure bred and true to type', and rear them 'until fit for issue to the districts'. To support his argument, Morgan produced statistics that estimated that it was cheaper to rear bulls over four years than breed them. In addition, by selecting calves from herds that were local to the depots, bulls could be reared 'with a view of meeting the requirements of the particular districts'.⁵⁶ The approach addressed the goal of improving indigenous herds directly at the source, as it allowed officials to utilise the supply already available to local populations, rearing the characteristics that were valued in each region. Unlike breeding farms, the main focus of rearing was the 'first year or 18 months' an animal's life, with humans acting primarily as guardians and nurtures. Attention shifted away from the idea of reproduction and selection, and instead to the problems people faced in rearing cattle such as the shortage of grazing land and lack of veterinary knowledge and remedies.⁵⁷

In its response, the Department of Revenue and Agriculture indicated that it supported the idea of rearing farms, because it was a cheap and fast method of producing and distributing 'a large number of good bulls' from the country's best stock. Breeding farms, by contrast, were deemed to provide only a 'small number of first class bulls after the lapse of several years'. Seeking to learn regional opinions about the debate, the department distributed Morgan's proposal in a

⁵⁵ NAI, DRA: CVA (19/1904), 'From A.H. Diack, Chief Sect. to Gov. Punjab, to Sect. Gov. of India, Rev. and Agri. Dept., Lahore, 01/12/1904'.

⁵⁶ Uttar Pradesh State Archives (henceforth UPSA), Revenue Department (302/1904), 'Extract, paragraphs 51 to 59, of letter from the Inspector General, Civil Veterinary Department, no. 107-387, 20/07/1908'.

⁵⁷ NAI, Department of Revenue and Agriculture: Civil Veterinary Administration (henceforth DRA: CVA) (19/1904), 'From the Inspector-General, C.V.D., to Sect. to Gov. of India, Meerut, 24/01/1904'.

circular to all provinces of British India. Responses were highly varied. Officials in North Western Frontier Provinces felt that the region lacked any impetus to rear, as it was common to import bullocks from the Punjab.⁵⁸ Similar doubts were raised in Rajputana, where perpetual cycles of famine had turned local breeds into ‘puny animals’ in a deplorable condition’.⁵⁹ Other responses challenged the validity of Morgan’s statistics, asserting that his fiscal estimations were ‘sanguine’, based upon a rearing farm running without the impact of famine, drought or disease. On the other hand, some officials agreed with Morgan, proclaiming that ‘better food and more attention’ for cattle was superior to breeding ‘bulls true to type’.⁶⁰ Colonial administrator and author Denzil Ibbetson highlighted that rearing would help to revive pre-established breeding tracts, by utilising ‘good calves from parts of the country where village herds are good and distribute them as bulls to other parts of the country where they are poor’.⁶¹ To highlight the local advantages of rearing, Ibbetson paraphrased Morgan’s statement that in ‘certain tracts villagers are well acquainted with the points of a good calf, and that no one appreciates a high class bull more than the native of India’. In sum, those supporting cattle rearing did not consider the collapse of breeding to be rooted in the socio-cultural dynamics of domestication. It was not a problem deriving from the methods or techniques of animal husbandry across the districts. Instead, they sought to resolve the economic, social and ecological factors that caused breeders and villagers to raise ‘stunted, miserable beasts’ due to the ‘want of care and insufficient food’.⁶² In proposing to rear as opposed to breed cattle, Morgan raised a number of debates regarding the nature of animal husbandry and the factors colonial officials associated with bovine degeneration across India.

Morgan’s proposal to convert the Hissar cattle breeding farm into a rearing depot found little support. However, the Dhanni breed opened a rift in the CVD of the Punjab around the question of improving cattle, and the root cause of the problem at hand. In 1905, Veterinary Superintendent Walker recognised that Hissar bulls ‘have not been appreciated’ in many regions, and that steps should be taken for ‘a serious endeavour...to supply the Northern

⁵⁸ NAI, DRA: CVA (19/1904), ‘From Lieutenant-Colonel H. A. Deane, Chief Commissioner NWF, to Sect. Gov. of India, Peshawar, 24/03/1904’.

⁵⁹ NAI, DRA: CVA (19/1904), ‘From Captain W.O. Dawson, Superintendent, C.V.D. Rajputana, to the Commissioner of Ajmer-Merwara’ . 22/03/1904’.

⁶⁰ UPSA, DRA (302/1904), ‘From R.E.V. Arbuthnot, Rev. Agri., to Inspector General, CVD, Simla, 16/10/1903’.

⁶¹ NAI, DRA: CVA (19/1904), ‘Establishment of bull-rearing farms in India, 15/02/1904’.

⁶² NAI, DRA: CVA (19/1904), ‘From the Inspector-General, CVD, to Sect. to Gov. of India, Meerut, 24/01/1904’.

Districts for which Hissar bulls are not suitable'. However, in 1905 his plans for new a cattle farm clashed with Superintendent E. W. Oliver, who disputed 'whether the object of this farm should be to breed bulls or to rear purchased calves'.⁶³ For Oliver, the indigenous cattle and their breeders were not the primary issue. A new market framed around colonial stud bulls was not needed. Instead, famines and plagues were compounded by the loss of grazing lands, leading to the decline of cattle breeds. The environmental challenges of animal feeding were the root of the issue, not the socio-cultural dynamics of mating. Despite the submission of multiple proposals, by 1909 the scheme for a rearing depot in the Jhelum colony was dropped, due to disputes over rights to grazing land in a region where grazing was reserved for government horse and camel breeders.⁶⁴ Three years before this, Oliver transferred from the Punjab and became a superintendent for the CVD in the United Provinces. He began to lay down plans to open a rearing depot amongst the forests along the Nepal border, the cattle breeding heartland of the United Provinces.

At the turn of the twentieth century, colonial veterinarians and agriculturalists became increasingly aware that the cattle populations of the United Provinces were in a precarious position. Despite the impact of famines and plagues, cattle populations in the United Provinces were fairly stable throughout the opening decades of the twentieth century. Despite this numerical consistency, the Assistant Director to the Department of Land Records and Agriculture Saiyid Muhammad Hadi noted in 1895 that the region's cattle herders were struggling to maintain their renowned types of cattle, due to the loss of grazing lands to cultivation and colonial forestry.⁶⁵ As in the Punjab, from 1901 the CVD would attempt to revive cattle breeding in the region by using Rs. 2000 of prize money for notable animals at local cattle fairs. Reflecting on the impact of this program, in 1905 the Director of Agriculture W. H. Moreland noted that the money had done little to stimulate cattle breeding. The scheme was plagued with inconsistent attendances, shows abandoned due to epizootics, and exhibits that were 'so poor' the government felt reluctant to part with its money. To resolve these issues, Moreland suggested that future shows should turn their attention to the 'real breeding tracts'

⁶³ NLS: IP, Medical: Veterinary, 'Provincial Report of the Civil Veterinary Department Punjab, for the year 1904-05'.

⁶⁴ NLS: IP, Medical: Veterinary, 'Provincial Report of the Civil Veterinary Department Punjab, for the year 1908-09'.

⁶⁵ Saiyid Muhammad Hadi, 'A note on breeds of cattle in the district of Bahraich (Oudh)', *Department of Land Records and Agriculture: North-Western Provinces and Oudh Bulletin No. 2. Veterinary Series* (Allahabad, 1895), p. 1.

of the provinces.⁶⁶ As Henry Rivers Nevill documented in his extensive body of imperial gazetteers, cattle breeding in the United Provinces was split into three core areas. Along its western border with the Punjab, lush lands between two rivers (*doab*) and irrigated tracts were home to a large number of Hissar cattle, who had adapted to the province and were favoured. Many of cattle in the west were the property of renowned Rajas and Ranis in the region, who left their herds in the hands of cattle herding communities of Jats, Singhs and Ahirs.⁶⁷ Shifting east to the ancient cradle of agriculture known as the Gangetic plains, cattle were primarily derived from two sources. To the south of the river, cattle breeds were produced in the grazing lands of Bundelkand. But the main focus of the CVD and the location of Oliver's cattle rearing depot would be the sub-montane districts in the north of the provinces, in the former kingdom of Oudh that followed the Gogra, or Karnali, river along the Nepal border, namely the districts of Puranpur, Bijnor, Kheri and Pilibhit.

For Nevill, in the 1900s Puranpur was the town in the north-eastern district of Pilibhit that marked the dividing line between the low basins (*khadir*) and open agrarian plains (*des*) to the south, and the densely forested sub-Himalayan tracts (*mar*) that stretched to the north. A 'scanty and shifting population' of cattle herders reared their animals amongst the belt of forest, which were divided into grasslands by numerous streams that drizzled from the Sarda river. The breeders of Puranpur offered their services each year to breeders in Saharanpur, Moradabad and Bijnor districts to the south west, a mixture of highly cultivated valleys and open, naturally irrigated plains and forests that could support up to 75,000 of the regions large population of cattle of a 'higher stamp'. But each year, many of the renowned Rajas and Ranis that owned these herds employed the herders in Puranpur to take their cattle to the grazing lands of Nepal, from the beginning of the cold weather in December until the commencement of the rains in June.⁶⁸ At the time, up to 10,000 cows were sent north each year, with cows and calves left to strengthen upon the nutritious grass, and prized bullocks receiving special diet. For their services, herdsmen were paid in a rough (*kachcha*) maund (37kg) of grain for each buffalo and 15 seers for each cow per season. While the trip would incur heavy losses, around a fifth of the numbers of cows and bull-calves could be put to sale each year, fetching a high price amongst the dairy traders and Rs. 45 per head when sold the Hadies of Eastern Oudh and

⁶⁶ UPSA, RD (378/1905), 'Award for prizes at cattle fairs'.

⁶⁷ Henry Riven Nevill, *Moradabad. A gazetteer* (Allahabad, 1911), p. 274.

⁶⁸ Henry Riven Nevill, *Shahjahanpur: A Gazetteer* (Allahabad, 1910), p. 20.

Gorakhpur.⁶⁹ As Nevill stated, ‘the best cows of all five breeds are driven thither and kept for eight months in the year, returning home for the rains. The male calves are left behind after the rains to be sold, when the herds return to the northern pastures’.⁷⁰

For Nevill, the growing demand for herders to take their animals north into Nepal was a sign of the gradual collapse of forests and grazing lands in the United Provinces, as the expansion of cultivation increasingly encroached upon sources of fodder. While forests in the northern reaches of Pilibhit were preserved by the government, at the agrarian frontier the breeders of Purnapur were threatened by the government’s desire to reduce the area of forest along the Sarda river, which it considered to be ‘a hindrance to the extension of cultivation’.⁷¹ A similar story was unfolding in the district of Kheri, a vast alluvial plain with wide stretches of forest, each filled with ‘channels of numberless rivers and watercourses’.⁷² While some cattle herds could be found in the grassy waste lands to the south along the Shahjahanpur border, the majority of breeders lived in the vast stretches of forest to the north of the Sarda river, a dense and lively ecosystem home to wild elephants, buffalo, leopards and dwindling numbers of tigers. While these wild cats had long posed a threat to the region’s herds of celebrated Kherigarh and Pareher type cattle, the approximately 6,000 professionally herded cows were facing trouble due to the British government’s decision to fence the forests in order to cultivate its timber and resin.⁷³ As they witnessed in Bijnor, the cattle population and trade was under threat due in part to the restrictions on cattle grazing in the Chandi forest to the north of the district. Since the forests were managed by the Forest Department, it had worked to curb access to the near 20,000 acres of the Chandi, seeking to create a profitable timber supply. To ensure this success, the forest manager F. B. Bryant contended that no felling should occur, and the forest should be closed to grazing. Northern portions of the forest were closed to cultivate *sal* trees. In southern areas cattle grazing still took place, housing large herds brought from Bijnor and Saharanpur.⁷⁴

Professional breeders from Khairgarh, Parehar, Palia and Nighasan were increasingly turning to Nepal, where animals were able to graze without restriction. A similar dilemma faced breeds

⁶⁹ Henry Riven Nevill, *Pilibhit: A Gazetteer* (Allahabad, 1909), p. 27.

⁷⁰ Henry Riven Nevill, *Kheri District Gazetteer* (Allahabad, 1905), p. 27.

⁷¹ Nevill, *Pilibhit*, p. 16.

⁷² Nevill, *Kheri*, p. 2.

⁷³ Nevill, *Kheri*, p. 23.

⁷⁴ Nevill, *Bijnor*, p. 23.

in Bahraich, where since 1879 the government had split the forests around the Gogra river into classes, the first being where valuable trees predominate, and thus protection from fire and cattle was taken. The second class was grass jungle that was only valuable for pasture. In Parehar, breeders were said to produce the most purebred cattle of the Parehar type, named after the stretch of countryside that lay between the Kathna and the Gumti rivers, whose waters are deemed by popular belief to give the animals their prestige. The Parehar type cattle were moderately sized grey animals, with symmetrical bodies, glossy hair, small ears and long pointed horns. Another distinct breed was the Bhur, much larger and slower animals produced between the Sarju and Chauka rivers. In Kheri the Khairigarh breed roamed between the Sarju and Mohan rivers, although its distinction as a breed was not clear. Another admixture of local cattle was the Majhra Singahi breed in Palia, as well as the Dhaurahra. But while these pastures in Kheri were fruitful for cattle, they were also rife with diseases such as cholera and malaria due to the vast amount of water. Kheri was known to be hit by epidemics at all times, carrying away large numbers of animals. Nevill noted that people blamed the British for the spread of disease. As he stated,

It is generally stated by the people that disease was unknown before annexation, although this appears incredible. The popular belief is probably due to the fact that no violent epidemics were remembered of equal intensity to that of 1871, when it was calculated that about one-fourth of the whole cattle stock of the district perished.⁷⁵

A common disease was rinderpest, known as *pokna* or *rez*, also foot and mouth. Poisoning in Kheri occurred from grazing on rank grass and dangerous plants in the marshes, known to natives as *chaundhiana*. The CVD opened hospitals and employed assistant veterinarians to prevent and attempt to cure these diseases.⁷⁶ Nevill felt that the spread of cultivation would do much to curb these diseases, which festered in the hot weathers and wet landscapes. These outbreaks were said to depopulate regions almost, notably in 1907 when plagues and disease spread across the region, sparking the government's attention and decision to host cattle conferences. Another issue for Nevill was the extensive intermixing that took place on the plains of Nepal, as cattle from multiple herds and breeds came into contact. As he noted,

There is ordinarily little care observed in breeding, and much might be effected by the selection of pure-bred bullocks and their location in the more important villages. The people of Parehar and of Manjhra, however, who are more careful in this respect than

⁷⁵ Nevill, *Kheri*, pp. 26-28.

⁷⁶ Nevill, *Bijnor*, p. 33.

other breeders, usually keep private bulls which have been selected as calves and are never broken to the plough. They accompany the herds to the pastures of Nepal, and while there the owners take all possible measures to prevent any breeding between their animals and those of the Malwara and Kanchanpur breeds of Nepal... The congregation of herds of all breeds in Nepal is an undesirable factor in the situation, as there is a constant danger of cross-breeding. The grazing areas, too, and especially in the Parehar tract, have so decreased of late years that many of the herds are kept in the jungles throughout the year – a measure which is gradually reducing their numbers.⁷⁷

In 1907 Oliver would seek to rectify and address many of the issues affecting the supply chain of cattle in districts that were suited to ‘industries other than agriculture.’ Touring with S. H. Fremantle, the pair assessed the nature of breeding in the United Provinces, conducting extensive research into the breeders of the sub-Himalayan region. Travelling to the Kheri district and the adjoining Pilibhit, they identified that cattle were kept in large herds of up to five hundred head, called *langars*. Each region contained different strains of the same breed that had been ‘modified by local conditions’ into a ‘large number of good working cattle’ by professional breeders who understood their craft ‘very well’. By comparison to Hissar cattle, the Kherigarh breed were considered to be ‘small but sturdy stamp’, of ‘great bone and strength’ that were ‘preferred locally’ for draught work.⁷⁸ Another report was produced to address the issues relating to cattle disease and breeding raised at the Cattle Conference of 1909. Two subordinate tax collectors (*naib-tahsildars*) working for the Revenue Department, Kunwar Lal Bahadur and Munshi Muhammad Usman Khan, were tasked with completing a survey of the cattle-supply of the United Provinces. While their original report was unpublished, in 1912 W. H. Moreland produced a summarised version of their reports, outlining the depth and breath of cattle and breeders across northern India. As tax collectors, the pair were primarily employed to collect government taxes from sub-districts (*tehsil*). At times, the Revenue department also used tax collectors to conduct reports on the stability of its revenue, by assessing the land, the people and in this case, the cattle population. Because of their status as tax collectors, Bahadur and Khan were aware that their report would be somewhat inaccurate, as people would attempt to conceal the size of their land and herds in order to avoid more taxation. However, their report provides an extensive and detailed study of the nature of cattle breeding in the United Provinces, the factors that were leading to its

⁷⁷ Nevill, *Kheri*, pp. 26-27.

⁷⁸ NAI, Foreign Department: External (1908), ‘Report on cattle breeding in the north of Oudh. Question of the preservation of grazing grounds on the Nepal side of the United Provinces border’.

decline, and the means of improving.⁷⁹ One of the most unique and fascinating aspects of their report was the close analysis of both “professional” and “village” breeders. While both practices could not be considered mutually exclusive, the report distinguished professional breeders as those whose main occupation was the ‘production of agricultural cattle’ to be sold at market. Village breeders were a patchwork of landowners and villagers that sold young stock they could not afford, or did not require. Bahadur and Khan list a number of breeders across the sub-montane districts, a mixture of Ahirs, Naths, Banjaras amongst others. As Appendix 6 indicates, these breeders were from a mixture of castes and communities across the region.⁸⁰

Commenting upon the condition of the breeding tracts and its capacity to support regional herds, Bahadur and Khan reflected the major problem facing the United Provinces was the lack of bulls. Purebred bulls were expensive and hard to come by, while local bulls were flawed and bad for agriculture. Some villagers took ‘special pains’ to find a good quality bull, such as in Pilibhit, where it was common for professional breeders to allow amateur village breeders to service their cows with the best bulls.⁸¹ But further away from the breeding tracts, villagers were not able to afford bulls individually and had to band together to purchase and maintain a bull. From time to time wild bulls came from the forests to cover cows, often producing excellent offspring. But the supply was erratic and it was not possible to ‘systematise’ it.⁸² Moreover, many villagers did not follow the practice of the professional breeders, who reared strong bullocks by providing their calves with the majority of milk from their mothers, fully enacting their maternal connection, even if herdsmen did take some milk from time to time.⁸³ But undoubtedly the most pressing issue for Bahadur and Khan was the demand for grazing lands. For example, they noted that each winter these herds would be sent to graze in Nepal, Pilibhit and the Kheri forests, at four annas per head per season.⁸⁴ As they noted, in the northern tracts the district pastures were ‘generally insufficient for the number of cattle’, and were annually diminishing. As such, breeders had to rely on Nepal, taking longer and further journeys to find good grazing. This need for an annual ritual led to the intermixing of herds, and it also caused other problems such as the exposure of cattle to diseases in the jungles, the loss of calves and the risks of travel.

⁷⁹ UPSA, RD (478/1912), ‘The cattle-supply of the United Provinces’, p. 2.

⁸⁰ Nevill, *Kheri*, p. 226.

⁸¹ UPSA, RD (478/1912), ‘The cattle-supply of the United Provinces’, p. 16.

⁸² UPSA, RD (478/1912), ‘The cattle-supply of the United Provinces’, p. 9.

⁸³ UPSA, RD (478/1912), ‘The cattle-supply of the United Provinces’, p. 3.

⁸⁴ UPSA, RD (478/1912), ‘The cattle-supply of the United Provinces’, p. 16.

With the aim of providing its first batch of bulls by 1913, in 1910 Oliver established the Manijhera farm. Situated deep in the forests near Lakhimpur Kheri along *pucca* and *kuchha* (dirt) roads, the farm could be accessed by crossing a stream that was only traversable by boat during the rains.⁸⁵ The purpose of the Manijhera farm was to provide these herders a place where their cattle could be reared. Taking young stock of one to two years of age, Oliver and his staff felt that by providing ample grazing and exercise in a disease free environment, the stability and the quality of cattle populations across the province would improve.⁸⁶ They would also take excess stock and, like in the Punjab, issue ‘bulls into the herds of groups of villages’ where professional breeding took place, so that they could rear cattle for market.⁸⁷ Within two years the farm supplied twenty-five bulls of the celebrated Khairigarh and Parehar breeds of cattle, expanding its herd within a year to 268 head.

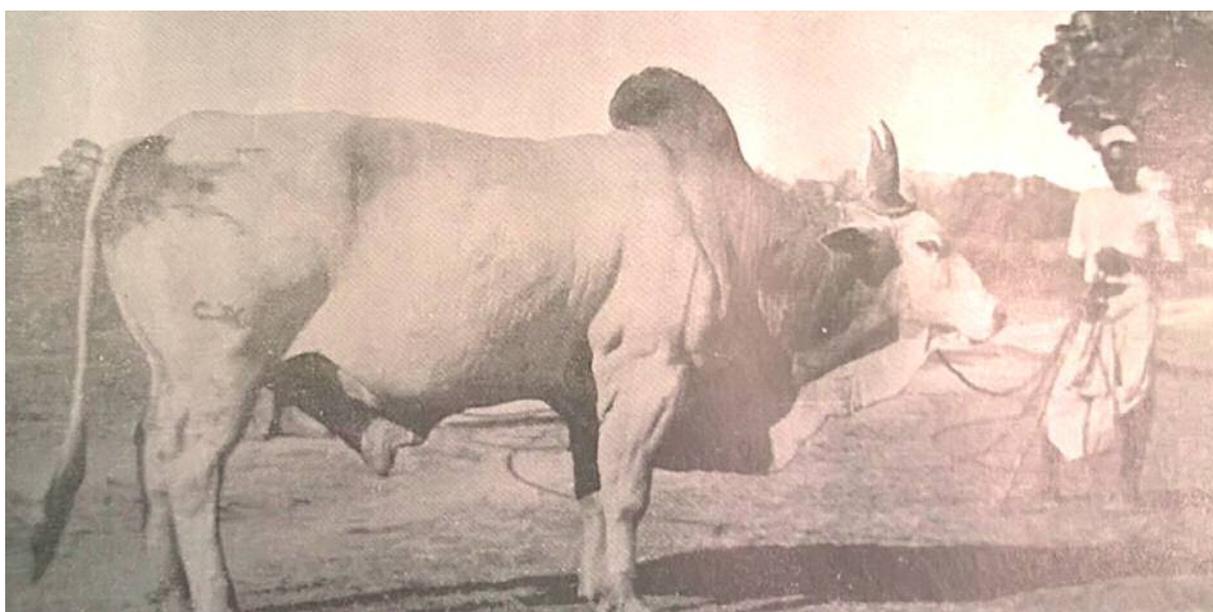


Figure 14: ‘Kherigarh bull’, from E. W. Oliver and C. W. Wilson, *Breeds of Indian cattle: Notes on the indigenous cattle of the United Provinces* (Allahabad, 1911).

⁸⁵ NLS: IP, Medical: Veterinary, ‘Annual Report on the Civil Veterinary Department, United Provinces, for the year ending 31st March 1912’.

⁸⁶ NLS: IP, Medical: Veterinary ‘Annual Administration Report of the Civil Veterinary Department for the official year 1910-1911’.

⁸⁷ NLS: IP, Medical: Veterinary, ‘Annual Report on the Civil Veterinary Department, United Provinces, for the year ending 1913-14’.

The CVD did not follow the exact customs of animal rearing practiced by Indians across the north. To rear their stud bulls, the farm manager allocated one bull to every thirty to fifty cows, making ‘arrangements...to ensure that the cows are covered only by him’. If the herd expanded, a second bull would be introduced. The social dynamic and mating rhythms of the herd remained a core backbone of the programme, however officials took closer care to replace a bull after three years, to avoid inbreeding. By this process, Oliver and W. H. Moreland believed that a ‘locality will have a pure breed of its own, which may be expected gradually to extend and replace most of the miscellaneous cattle within it’. Despite utilising their own methods on the farm, unlike in the Punjab the CVD was less critical of the animal husbandry methods of these professional breeders. Herdsmen were praised by Oliver for selecting young animals with potential and good qualities to be ‘dedicated to breeding’. One bull would remain with a herd of eight or ninety cows, to service these animals. While selective control over which bulls were allowed to mate was practiced, the herders allowed mating to take place according to the rhythms of the herd and their desire to mate. They also used the protective and possessive instincts of the bull as a means of preventing other males from accessing the herd. Furthermore, old and immature bulls ‘which might beget weakly calves’ were not separated from the herd.⁸⁸ Allowing a young bull to remain with a herd not only built up its sense of social connection and loyalty to the herd, but premature mating was prevented by hierarchical dominance behaviours of the older males. As Oliver notes, a younger bull would be ‘prevented in his attempt at covering by the older bulls and so it is not until he is able to defend himself that this occurs’.⁸⁹ Social herd behaviours thus helped to rear strong and healthy bulls, as the challenges of the older bull pushed the younger candidate to mature until it was able to reproduce fit offspring. Such examples led Oliver and C. W. Wilson to conclude that although the ‘animals live in practically a natural state it is not probable that there is much deterioration from this cause’.⁹⁰ In sum, the animal as a mate and a member of the herd could have a place in the process. Moreover, the farm demonstrated that progress in domestication could be shaped by a combination of colonial and indigenous ideas of animal husbandry, and perceptions of behaviours within them.

⁸⁸ Department of Land Records and Agriculture: U.P. of Agra and Oudh, Bulletin No. 25, Agricultural Series, ‘Notes on the improvement of cattle in the United Provinces’ (Allahabad, 1910).

⁸⁹ E. W. Oliver and C. W. Wilson, *Breeds of Indian cattle: Notes on the indigenous cattle of the United Provinces* (Allahabad, 1911), p. 9.

⁹⁰ Oliver and Wilson, *Cattle of the United Provinces*, p. 9.

4.4 *Conclusion*

Ultimately, this chapter has shown that the development of animal breeding in North India was rooted in many competing ideas and practices. The central focus of the colonial government remained the stud bull, a site of agency and change for both the CVD in the Punjab and the United Provinces. Yet, perceptions of how the bull should be encouraged and also utilised clashed, as some officials focused on manufacturing an entirely new marketplace, while others sought to boost local breeders. At the heart of this competing image of how to progress sat the question of control, and its place within animal domestication. CVD officials in the Punjab emphasised the significance of order as a means of producing a universal breed for the region, while in UP officials contextualised this reproductive drive within the wider environmental, socio-cultural and material norms of each indigenous breed. The idea and value of the concept of the breed was a focal point of each programme, and as such some sense of the human as a guide to advance the breed as a pathway of change that met productive goals was a key guiding force. However, the root of the issue was not purely the lack of bulls, but also the conditions that caused the decline in the first place. Without addressing the question of fodder, stud bulls would only have a limited impact. Moreover, the rearing farms challenged the notion that the cattle breeding methods of the government were superior to indigenous knowledge and customs. CVD officials at the Hissar cattle farm felt that their bulls could transcend the diverse environmental, socio-cultural and behavioural dynamics of cattle populations across the Punjab and its surrounding regions. The reproductive abilities of the stud bull were deemed to be a form of agency through which imperial norms and standards of animal domestication could be imposed on North India. By contrast, CVD officials in UP argued that colonial methods of breeding did not work outside of the purview of these conditions. Instead, North India's deep heritage of cattle breeders and herders could be encouraged in order to produce cattle that suited multiple localities.

As this chapter has shown, the question of breeding cattle in Northern India was fraught with tension from the start. At the heart of many complaints and issues with local customs and methods sat the concept of animal behaviour. In order for the stud bull to successfully complete its role, many other aspects of animal behaviour needed to be controlled. But beyond the colonial farm, these were often difficult to manage, due to socio-cultural and environmental

factors, in addition to the animal's desire to mate. As the next chapter will show, one custom was frequently criticised in colonial reports for causing great harm to regional populations, and for preventing the stud bulls from asserting their agency in creating a breed. This was the custom of letting loose what were known as Brahmani bulls, which were deemed by many officials to unsettle the boundaries of civilised society and the possibilities of progress, due to the lack of control over the animal and its behaviours.

Chapter 5

The “carnal desires” of the wandering Brahmani bulls

At the turn of the twentieth century colonial officials became fixated upon a custom practiced by Hindus during funeral rituals (*shraddh*), which the government believed to be preventing its stud bulls from improving regional populations. This custom was known as *vrishotsarga*, whereby a bull would be dedicated, branded and set free to wander the land. These bulls were commonly known as Brahmani bulls. A handful of scholars have studied the religious significance of this custom within the Vedic scriptures.¹ Despite the wealth of historical explorations of cow protectionism, historians have yet to explore the impact of the Brahmani bull upon colonial, nationalist or religious discourses. This chapter will provide a comparative analysis of the debates about the Brahmani bull, in order to understand how animal behaviours were perceived to influence the socio-cultural, material and environmental dynamics of domestication in North India.

To begin, I will discuss the contrasting ways that Brahmani bulls were represented in colonial and religious nationalist discourse. These debates came to the fore from 1884, when the Allahabad High Court adjudged that the Brahmani bulls were *res nullius*, the property of nobody. Many cow protectionists decried this ruling, as the spiritual sanctity of the animal and its capacity to support rural society through wandering and mating with village cattle was not recognised, and no longer protected by colonial law. Within these debates, perceptions of the bull as a vigorous and virile animal that could support domestication contrasted with images of lustful, carnal and aggressive beasts, a chaotic and destructive force of the wild. As the second section demonstrates, these perceptions were rooted in comparative ideas about the possibilities of how the behaviours of an animal should contribute to a society. In 1908, Hindu lawyers, landholders and other religious leaders from across the United Provinces of Agra and

¹ Rajendra Pradan, ‘Sacrifice, Regeneration and Gifts: Mortuary Rituals among Hindu Newars of Kathmandu’, *Contributions to Nepalese Studies*, 23:1 (1996), p. 162; Jonathan Parry, ‘Death and Digestion: The Symbolism of Food and Eating in North Indian Mortuary Rites’, *Man*, 20:4 (1985), p. 612.

Oudh responded to a government circular, which sought to assess whether the custom of letting bulls loose was a help or hindrance to cattle breeding. Furthermore, in 1913 the government sent out another circular to regional colonial officials seeking to understand the impact of Brahmani bulls upon both urban and rural spaces across the United Provinces. As the closing section of this chapter will show, many officials affiliated the revival of orthodox Hinduism with the emergence of the custom, viewing it as an invented tradition. Their evidence was based upon the understanding that across the majority of districts Brahmani bulls were not a nuisance, nor dedicated in great numbers. However, certain key holy sites of Hinduism along the Ganges and in the eastern district of Gorakhpur became examples of the destruction that untamed bulls could cause, when let loose to wander the land by religious decree.

5.1 Brahmani bulls and breeding in North India

Animals of all kinds rove over the soil as if they were the landlords. It is true that every thrifty farmer drives them from his crops; yet he would scarcely dare to question their claim to a portion of the food he eats and the house he occupies; while everywhere in the towns they are admitted, so to speak, to the privileges of fellow-citizens. Bulls walk about independently in the streets, and jostle you on the pavements; monkeys domesticate themselves jauntily on the roof of your house; parrots peer inquisitively from the eaves of your bedroom into the mysteries of your toilet...

As this vivid quotation from Monier-Williams's 1891 study of animals in Hinduism exemplified, during the late nineteenth century many animal species lived and adapted to the socio-cultural norms of Indian society. The roots of this co-habitation were the religious norms of society, which impelled people to allow animals to act and live according to their behaviours and to take a portion of human food. According to Monier-Williams, one of the customs 'fraught with the highest merit' that gave many bulls a heightened socio-cultural status was performed during funeral rituals (*shradda*). On the eleventh day after the death of a relative, many Hindu families would solicit a Brahman priest to let loose bulls to roam (*vrishotsarga/brishotsarga*).² The bull was 'stamped with Shiva's trident', the God of generative powers that flowed through the bull in a spiritual and material way. The custom marked a crucial stage in the journey of the deceased to the 'abode of the ancestors'. According to Hindu lore, it was on this day that the deceased, 'driven forward with unremitting cruelty by the messengers of death,

² Monier-Williams, *Brahmanism and Hinduism*, pp. 317-319.

must cross the terrifying Vaitarni river which is described as flowing with blood, excrement and other foul substances... The calf which is given at Vrishotsarga helps the soul across'. The ritual of letting loose a bull symbolised that the bull had crossed the river, and that the ancestor was free (*moksha*) from the cycle of reincarnation (*samsara*).³

The prevalence and impact of the wandering Brahmani bulls came to the attention of colonial officials in the late nineteenth century. In 1884, in the Allahabad High Court case of Queen Empress versus W. N. Jamura, it was adjudged that according to colonial law, Brahmani bulls were *nullius in terra*, unprotected by the law. Let loose to wander, the bull was no longer considered to be private property. As such, the accused could not be punished under section 429 of the Indian penal code for shooting a bull that had damaged his crops. Despite the socio-cultural significance of the brand of Shiva's trident, according to colonial law these bulls could not be considered to be part of human society, as they had no direct owner. In 1917, the nationalist and cow protectionist Kamini Kumar Chanda (1862-1936) argued that the High Court's decision had caused a number of problems. In a petition calling for the government to reassess its stance, Chanda argued that the practice of dedication was fading into obscurity across the United Provinces, and with it the main source of bulls available for 'breeding purposes'. Protecting and reviving the custom was essential to support Indian agriculture, as the bulls were 'practically the only sires for cattle-breeding' that many impoverished villagers could access. Chanda felt that this situation not only offended Hindu sentiments, but had led to several decades of bulls being captured, put to work and slaughtered for their hides without fear of retribution. Due to the High Court's judgment, the bull was no longer protected by socio-religious sanctions and thus incapable for asserting the material benefits of its reproductive abilities.⁴

Challenging Chanda's petition, in 1918 the Agricultural Adviser J. MacKenna stated that the Brahmani Bull was an 'unmitigated nuisance and a most serious obstacle to...any widespread improvement of Indian cattle'. For MacKenna, the crux of the issue was not simply the quality of the bulls that were dedicated. Instead, it was the freedom that the animal was allowed to enjoy, which he felt had led to a situation that was the antithesis of progressive animal husbandry. As MacKenna stated,

³ Parry, 'Death and Digestion', p. 619.

⁴ NAI, Home Department: Political (4/1918), 'Demi-official letter from Kamini K. Chanda, Esq., to the Hon'ble Mr. Lowndes, dated 04/04/1917'.

As a rule, nothing is known of his pedigree and he wanders aimlessly about the country sleek, fat and well-favoured, indulging his carnal desires according to his mood and pleasure. Unless propitiated with a gift, he is a truculent and savage brute and I should be sorry for any official who is detailed to record his performances if he becomes by law the property and concern of Government.⁵

MacKenna's emotive and boisterous response portrayed the bull in an anthropomorphic light, giving it a lustful and irresponsible character. Such representations of the mating behaviours of bulls were not unique to colonial discourse. They were also prevalent in the culture of North India. However, these images often celebrated the vigour of the bull, presenting its desire to mate as a symbol of health and prosperity. For example, seeking to rebuke his wife's taunt that he had lost the zest of his youth, Hori, the protagonist in Premchand's celebrated Hindi novel *Godan* (The Gift of the Cow), used the bull as a metaphor to exemplify that he still had his vim and vigour. As Hori stated, 'So you consider me an old man, do you? I'm not even forty yet. And men are still lusty as bulls at sixty'.⁶ As these sources indicate, the reproductive abilities and drive of the bull to mate were widely understood.

As the previous chapter indicated, many colonial officials felt that without some control over a bull's capacity to reproduce, cattle populations would only decline in quality as a distinct breed could not be formed. Without the breed as a cultural marker of governance over the animal's body, many colonial officials felt that progressive improvement was impossible. As CVD Superintendent Oliver noted in 1905, much 'difficulty...is experienced in fixing types', as it was 'almost impossible to describe or lay down correct points for a typical animal of any particular breed as all the so-called breeds seem to be hopelessly mixed'.⁷ If animals were allowed to freely choose who to mate, the possibility of knowing the outcome or recording the ancestry of a herd was very limited. Lacking a record of ancestral lineage, it was unclear what characteristics the progeny of a stud bull provided by government would inherit.⁸ In this light, in 1911 the CVD surmised that stud bulls had 'but little influence on the breed of the cattle among...the miscellaneous bulls, - pun cattle, immature bulls, village selected bulls, and the

⁵ NAI, Home Department: Political (4/1918), 'Demi-official letter from J. MacKenna, Agricultural Adviser to the Government of India, 02/07/1917'.

⁶ Munshi Premchand, *Godan*, translated by Jai Ratan and P. Lal, (Delhi, 1936/1957), p. 8.

⁷ NLS: IP, Medical: Veterinary, 'Provincial Report of the Civil Veterinary Department Punjab, for the year 1904-05'.

⁸ Hadi, 'Cattle in the Mathura', p. 6.

rest'.⁹ In one unique instance, Henry Riven Nevill, author of district gazetteers for the United Provinces of Agra and Oudh in the 1900s, argued that the composition of cattle populations across North India was out of control, with 'breeding being left to the agency of the so-called Brahmani bulls'. This unprecedented example of the term agency being deployed in the archive demonstrates that the behaviour of the animal was understood to impact the past. However, the nature of this impact was a source of contention, based on competing ideas about the socio-cultural norms of domestication.¹⁰ For example, not all colonial officials agreed with the negative depictions of the mating behaviours of cattle. Commenting on the cattle populations of south-eastern Punjab, in his 1895 report Pease contested the opinion that Brahmani bulls represented 'carelessness in management'. He argued that it was a custom which offered 'the 'best possible' means for villagers to secure a 'good sire for the village cattle', a system that had been subjected to 'extensive trial' over centuries, creating the excellence of indigenous cattle that only of late 'deteriorated' due to economic and environmental factors.¹¹ His report noted that 'at that time Brahmani bulls provided practically the only sires for cattle-breeding', and that 'a good many officers urged that it was necessary to take steps to protect these animals for breeding purposes'. However, Pease was sceptical of cow protectionist claims, stating that there was 'no evidence to show then that the supply of bulls was insufficient on account of their lack of protection'.¹²

The socio-cultural and behavioural dynamics of the clash between Brahmani bulls and government's stud bulls was potently expressed in the work of the American Presbyterian missionary William Wiser (1890-1961) and his missionary wife Charlotte Wiser (1892-1981). In the autobiography of their thirty years living in the North Indian village of Karimpur, east of Agra in the United Provinces, they provided an anthropological study of the relationship between people and cattle during the colonial era. Seeking to find a means of improving the material conditions of the villagers, one of their core beliefs was that uplifting the quality of cattle was essential to reviving the village economy.¹³ The main source of agency at their disposal to generate change was the reproductive abilities of the bull. At the time, one of the

⁹ NLS: IP, Medical: Veterinary, 'Provincial Report of the Civil Veterinary Department Punjab, for the year 1910-11'.

¹⁰ H. R. Nevill, *Allahabad: A Gazetteer* (Allahabad, 1911), pp. 20.

¹¹ Pease, 'Cattle of Harriana and Sirsa', p. 25.

¹² NAI, Home Department: Political (4/1918), 'Demi-official letter from Kamini K. Chanda, Esq., to the Hon'ble Mr. Lowndes, dated 04/04/1917'.

¹³ David G. Mandelbaum, 'Forward', in William Wiser and Charlotte Wiser, *Behind Mud Walls, 1930-1960* (Berkeley, 1964), p. ix.

only ways that people could access bulls was by soliciting the attention and favour of Brahmani bulls as they wandered the landscape. As the Wisers noted;

The only animals who wander unhindered over fields and threshing floors are the Brahmani bulls – set at large as an act of religious merit, usually at the death of a prominent Hindu. They are the only full-grown bulls available for the service of village cows. One such bull spends a great deal of time in our grove. Sometimes we do not see him for weeks. Then he returns to stay in our neighborhood for a month or two. While here, he wanders off every morning to convenient fields, where he grazes on the best at leisure. Every evening he returns, following the herds of cows on their way home. Having no fixed abode and belonging to no one in particular, he is in everyone's keeping and entitled to a share of everyone's food supply.¹⁴

According to the Wisers, 'theoretically' the farmers of the village depended upon the Brahmani bull for 'propagation purposes'. However, as these bulls only rarely ventured to the village, the farmer usually used a bull-calf to service his cows. As such, the Wisers felt that they could help local people by acquiring one of the ninety 'pure-bred bulls' that the government of the Punjab offered as a free gift to each district of North India. Villagers in Karimpur generally did not keep bulls due to their cost but also their unruly nature. As the Wisers noted, due to their reluctance to castrate their young stock, male calves reared in the village herd would be kept until they became unmanageable at the age of three or four, before being traded for castrated bullocks sold by 'wandering drovers'. To uplift local cattle populations and improve their dairy yield, the Wisers proposed that a Punjabi bull from the government stud farm should mate with the local herd. He could be fed and housed at night by the locals, and let out during the day to graze with village animals. The integration of the bull into environmental, socio-cultural and behavioural dynamics of the village was initially thought to be successful. However, as the bull began to mature and 'wandered off after some of the cows', the villagers did not accept him as a valid member of the herd. Recounting his interactions, the Wisers noted that,

In his wanderings, he grazed where he chose like the Brahmani bulls. This was not acceptable to the villagers. Had he been a Brahmani bull, they could say nothing. He would have been no one's responsibility. But this bull belonged to the Sahib. Therefore, the Sahib was responsible for its waywardness. The farmers who complained most loudly did not stop to think that they might be the first to benefit by the service of the bull when it matured. Their eyes were fixed on the present, and the unfenced fields which an unruly bull might sample.¹⁵

¹⁴ William Wiser and Charlotte Wiser, *Behind mud walls, 1930-1960* (Berkeley, 1964), p. 65.

¹⁵ Wiser and Wiser, *Behind mud walls*, p. 66.

As this example shows, the notion of how a bull could participate and wander about the village was tied to religious concepts. The mark of Shiva's trident was a symbol of the Brahmani bull's right to wander, to use the land, and that it was the shared responsibility of the people. By contrast, the government bull was viewed as simply one of many uncastrated animals that would steal crops. Recognising this contrast, the Wisers began to question whether it was possible to use the custom of branding and dedicating as a dynamic for the successful mediation of the stud bull within Indian society. While the aforementioned stud bull had been rejected and died shortly after, a year before they noted the curious case of a government bull in the possession of a big landholder (*zamindar*),

One of the exhibition officials sent a request to the zamindar for the animal, only to find that no one knew at the time where the bull was. He was serving the countryside according to the traditional custom. It seemed strange to us at the time that a government bull should be treated in the same way as Brahmani bull. But when we began to face the solid opposition of the village, there was only one choice other than that of losing the bull for our village, and that was to do what the big zamindar did – and what most other recipients have been obliged to do – release him and treat him as a Brahmani bull... Thus has the first step been taken toward a better breed of cattle in the neighborhood of Karimpur, not at all as we thought it would be done, but as custom prescribes.¹⁶

This vision of the Brahmani bull custom as an outlet for the services of government bulls posed a hybrid of concepts that merged two seemingly competing forces. As the previous chapter demonstrated, the breeders of the Hissar bulls sought to control the bull's reproductive instinct, in order to produce a breed. Without a socio-cultural precedent for this kind of use of a stud bull, the process of dedication became one of the only ways to integrate the bull within the socio-cultural norms of domestication. The Wisers raised a significant point about the relationship between society and the animal, how the perceived impact of its behaviours were defined by political, cultural and religious dynamics. The villagers themselves only gave freedoms and allowances to bulls defined within the spiritual paradigm. But, in making this recommendation, the Wisers challenged the notion that uncontrolled animal behaviours were purely destructive, and instead opened up the possibility of harnessing the custom.

¹⁶ Wiser and Wiser, *Behind mud walls*, p. 67.

At the turn of the twentieth century, Brahmani bulls sat at the heart of a significant debate about the nature of animal behaviours and their contribution to the progress or decline of agricultural society in North India. Lacking a direct owner, many colonial officials labelled them as wild, feral and stray beasts, a destructive force that needed to be tamed by the shepherds of humanity. Left to their own accord, animals will mate in order to reproduce their populations. Rules of courtship and mating vary between species, often in patterns that if mirrored by human society would not equate to ethically or morally equal practices.¹⁷ The custom of dedicating Brahmani bulls gave cattle populations some freedoms to act according to their instinctual rituals. This raised a core question that sat at the heart of discussions of the custom during the colonial era, namely, to what extent should animals be allowed to mate according to these evolved dynamics? Would these patterns contribute to or hinder the co-evolutionary relationship of domestication? While it is beyond the scope of this study and available evidence to deduce whether the custom was significant in the pre-colonial era, it is clear that the practice of dedicating bulls was in vogue during the revival of orthodox Hinduism in the late nineteenth century, coinciding with the resurgence of cow protectionism. As the next section will show, many Indian religious figures in the United Provinces contested the perception that these bulls were causing the degeneration of cattle populations. Instead, they argued that the loss of grazing lands and the Allahabad High Court's decision of 1884 had caused the deterioration of the custom, leading to the collapse of cattle breeding. In their eyes, the act of dedicating needed to be supported in order to uplift cattle populations and the material and spiritual fabric of North Indian society.

5.2 Colonial law, Hindu nationalists and the wandering bull

In September 1908, the Chief Secretary of the United Provinces sent out a circular to fifteen lawyers, princes (*raja*), aristocrats and landowners (*talukdar*), as well as other 'Hindu leaders' from across the United Provinces. His questions for them were inspired by debates that had taken place at the Lucknow Cattle Conference of 1908, which was organised to address

¹⁷ For studies of reproduction in domesticated animals, please see, Perry T. Cupps (eds.), *Reproduction in Domestic Animals* (San Diego, 1959); Jennifer L. Verdolin, *Wild Connection: What Animal Courtship and Mating tell us about Human Relationships* (New York, 2014); Marianne T. H. Heberlein et al, 'A Comparison between Wolves, *Canis lupus*, and Dogs, *Canis familiaris*, in showing Behaviour towards Humans', *Animal Behaviour*, 122 (December 2016), pp. 59-66; Sarah Marshall-Pescini et al, 'Integrating Social Ecology in Explanations of Wolf-dog Behavioral Differences', *Current Opinion in Behavioral Sciences*, 16 (August, 2017), pp. 80-86.

the spread of famines and cattle plagues in the preceding years.¹⁸ Each respondent was asked to consider whether it was viable to restrict the ‘dedication of bulls by legislation’ in the region and beyond, as a means of improving the ‘existing breed of village cattle’ in the United Provinces. The Lieutenant Governor of the United Provinces was wary of ‘adopting any measure to which Hindu sentiment as a whole may be opposed’. That said, for the government the ongoing ‘considerable deterioration’ in the quality of village herds was directly caused by the ‘inferiority of bulls...employed for covering purposes’, the majority of which were considered to be, ‘as a rule Brahmani bulls’. The government implied that the problems facing cattle populations were caused by the practice of dedicating and letting loose bulls to wander.¹⁹ The Hindu leaders that corresponded with the government mostly concurred with the statement that cattle populations had declined. Moreover, they often agreed that the low quality of Brahmani bulls being dedicated was a key issue that led to the propagation of weak and inferior animals. However, many correspondents argued that the root cause of this decline was not the custom itself, nor the fact that bulls were allowed to wander, feed and mate according to their instinctual whims. Instead, they argued that the quality of the bull was connected to problems that were affecting all aspects of animal husbandry at the turn of the twentieth century.

As the aristocrat and landowner Raja Ram Partap Singh noted, in the Allahabad district there was no doubt that village oxen, the ‘chief instruments’ for cultivation, were ‘daily becoming weaker and weaker’. Brahmani bulls were no exception to this rule. The first major issue was the lack of a good arrangement for the pasture of cattle. Bulls and cows were starved of nutritious or even ample quantities of fodder, each day growing more ‘feeble’, producing offspring that continued this trend. In times of scarcity, these bulls had to rely upon the charity of the public for food, which wasn’t always freely given. Much like the stock of government farms, Singh noted that the ‘growth’ of Brahmani bulls into strong animals depended upon the capacity of the land to provide them with adequate ‘nourishment’ from a young age.²⁰ Bulls were considered to be more than capable of feeding and rearing themselves into a healthy animal. The recent decline in quality was not due to a lack of a herder, but instead the deterioration of the landscape and loss of grazing lands, which prevented bulls from finding

¹⁸ Ganeshi Lal Verma, *Party Politics in U.P., 1901-1920* (Delhi, 1978), p. 187.

¹⁹ UPSA, RD (821/1908), ‘From J. W. Hose, Chief Secretary to Government, United Provinces, 25/09/1908’.

²⁰ UPSA, RD (821/1908), ‘From Raja Ram Partap Singh, of Manda, district Allahabad, to Chief Secretary to Government, U.P., 03/11/1908’.

ample fodder.²¹ The second factor that exacerbated this situation was the Allahabad High Court's decision of 1884, which denied these wandering animals the protection bestowed by Shiva's trident. Singh argued that the decline of these bulls was a product of the colonial government's unwillingness to make cattle slaughter a crime in the Indian Penal Code. He stated that because of this, many people including men of 'substance' had increasingly abstained from dedicating bulls. Rumours spread that since 1884, bulls had been maimed and slaughtered, seen dragging night-soil carts and working the fields. Singh questioned why the government should allow these people to 'kill at all bulls set free by other people'.²²

Due to the competition for sparse resources offered by the land in the summer heat, it was commonly recognised that by the turn of the twentieth century the stock of bulls available for dedication had deteriorated. As demand drove up the cost of an average animal, many people gave up on the custom. But problems arose as people continued to dedicate bulls regardless of their quality. As such, many of the correspondents supported the government's proposal that restrictions should be imposed to ensure the quality of animal dedicated. In the sub-montane regions, Suraj Bakhsh Singh, head of the Rajput house (*thakur*) of Kasmanda, proposed that the government should expand upon its trial in the Kheri district of using a controlled system of dedication, under the 'guidance of sympathetic and popular district officers' that could convince the Hindu public of the benefits of inspection.²³ As Lal Ratansen Singh of Bansi noted, if the bulls acquired by people within eleven days did not reach government standards, they should be encouraged to dedicate a totem of silver or golden colour in the shape of the bull, 'which several bodies are accustomed to do in these parts of the district'.²⁴ That said, the imposition of controls and restrictions upon the custom was not universally supported. Writing from the Hindu heartland on the banks of the Ganges, the king (maharaja) of the Princely state of Benares Sir Prabhu Narayan Singh called for the government to empathise with the people, before imposing restrictions. He stressed that a family would find it 'harassing' to have to deal with an inspector, especially at a time when people were 'unhinged' in mourning and thus 'not in the proper frame of mind to satisfy all the niceties of laws'. This last statement was also framed as a threat to the government, harking back to the cow-protectionist violence that

²¹ UPSA, RD (821/1908), 'From Raja Rukmangad Singh, of Katiari, Hardoi, to Chief Secretary to Government, U.P., 10/10/1908'.

²² UPSA, 'Raja Partap Bahadur Singh'.

²³ UPSA, RD (821/1908), 'From Thakur Suraj Bakhsh Singh, of Sitapur (son of Jawahir Singh), to Chief Secretary to Government, U.P., 03/10/1908'.

²⁴ UPSA, RD (821/1908), 'From Lal Ratansen Singh, son of Raja Ram Singh, of Bansi, to Chief Secretary to Government, U.P., 05/12/1908'.

erupted during the 1890s. As he elaborated, with the ‘present state of the country’ it would be unwise to impose any ‘unnecessary interference on the part of the Government with their religious rites’.²⁵

Many correspondents sought to emphasise that controls over the system and the capacity for bulls to wander would not benefit those that needed the bulls for cattle breeding. As the high ranking and distinguished lawyer Rai Bahadur Sunder Lal stressed, inspection would be a grievance to those that ‘cannot afford to purchase and emancipate a more valuable animal such as the veterinary officer will pass as suitable for breeding purposes’.²⁶ These restrictions would lead to fewer bulls being dedicated, and thus the collapse of a system that was the primary way that the people accessed bulls for mating. As Partap stressed, the people should be ‘entitled to derive benefit from them for breeding’.²⁷ The custom was valued for its philanthropic element, which derived from the capacity of the bull to wander freely between the villages, ungoverned and unrestricted by any economic or legal barriers. The animal as a wanderer was integral to this charitable aspect. According to the landowner (*talukdar*) Raja Sheorah Singh of Rae Bareli, these utilitarian principles were central to the rules of the custom of dedicating a bull that were in theory followed by each a priest during dedication. He stated that according to Hindu law, the bull to be dedicated should be free from all diseases and bodily defects, be neither a calf nor an old animal, and be of good breeding stock. Singh felt that government intervention was ‘undesirable and uncalled for’.²⁸ Despite the potential merits of the custom, many respondents noted that due to environmental factors and the socio-cultural impact of 1884, the capacity for these bulls to be beneficial was limited. For the custom to regain its value and merit, a handful of respondents from western districts along the Punjab border called for the government to support the practice of dedication, by supplying quality animals from their stud bull farms. Citing Voelcker’s report on agricultural improvement of 1893, Kunwar Kushal Pal Singh highlighted that Brahmani bulls were already rare in the non-breeding tracts of Agra. Instead of restricting the custom further, he contended that the government should use its stud bulls from the Hissar cattle farm to fulfil the duties listed under section 42 (K) of the District

²⁵ UPSA, RD (821/1908), From his Highness Maharaja Sir Prabhu Narayan Singh, Bahadur, G.C.I.E., of Benares, to Chief Secretary to Government, U.P., 02/10/1908’.

²⁶ UPSA, RD (821/1908), ‘From the Hon’ble Rai Sunder Lal Bahadur, Advocate, High Court, Allahabad, to Chief Secretary to Government, U.P., 07/10/1908’.

²⁷ UPSA, RD (821/1908), ‘From Raja Ram Partap Singh, of Manda, Allahabad, to Chief Secretary to Government, U.P., 03/11/1908’.

²⁸ UPSA, RD (821/1908), ‘From Rana Sheoraj Singh, of Thalrai, (Khajurgaon), Rae Bareli, to Chief Secretary to Government, U.P., 16/10/1908’.

Boards Act. These stated that breeding and medical treatment of cattle were the duties of a district government.²⁹ To the north of Agra in Muzaffarnagar, Rai Nihal Chand Bahadur argued that the government should ‘improve the present custom’, by using stud bulls as dedicated animals. Moreover, he stressed that any bull branded with the trident of Shiva should be exempt from being impounded by authority of the Cattle Trespass Act of 1871, as they were a valued spiritual and material stock of breeding animals.³⁰ In sum, Hindu leaders stressed that the custom itself created the socio-cultural dynamics of domestication that allowed for the behaviour of the animal to benefit the wider population. If the animal was directly owned, like the stud bull, it could be subjected to corrupt practices and hidden behind economic barriers. The branding of Shiva’s trident symbolised that the bull was performing its sacred duties, and that all villagers could reap the benefits of the bull as a wandering source of reproduction.

One correspondent sought to revive the custom by challenging colonial understandings of the nature and influence Brahmani bulls that informed the High Court’s decision in 1884. This was the celebrated social reformer, teacher, journalist, lawyer and nationalist Pandit Mahan Mohan Malaviya (1861-1946). Born in Allahabad to a modest Brahman family of Vaishnavites (worshippers of Vishnu), Malaviya was educated in English, Hindi, Persian and trained in Sanskrit at Muir Central College, Allahabad. He was a staunch advocate of Hinduism with a deep knowledge of the scriptures, which he attained from his Pandit father. Malaviya was renowned as an outspoken proponent of cow protectionism, giving his first public speech on the topic in 1877 at the age of sixteen. Beginning his professional life as a teacher, he became an editor for Raja Rampal Singh’s Hindi paper *Hindusthan* and later would start the Hindi weekly *Abhyudaya*. Throughout his work he promoted Hindu education, pushing for a vision of a modernised Hindu people which he sought to realise by opening the Banaras Hindu University in Varanasi in 1913. His renowned debating and vocal skills were honed during his career as an Advocate in the Allahabad High Court from 1893 until 1911. Situated in Allahabad at the time of writing, Malaviya concurred with the government’s hypothesis that the health and vitality of cattle populations had declined in recent times. However, he did not feel that the prevalence of Brahmani bulls was the root cause. Like the majority of correspondents, he rooted the overall deterioration of cattle in the ‘dearness of fodder, the absence of common

²⁹ UPSA, RD (821/1908), ‘From Kunwar Kushal Pal Singh, of Kotla, Agra, to Chief Secretary to Government, U.P., 07/10/1908’.

³⁰ UPSA, RD (821/1908), ‘From the Hon’ble Rai Nihal Chand Bahadur, Muzaffarnagar, to Chief Secretary to Government, U.P., 30/10/1908’.

grazing land in cities and towns and villages'. This resulted in a decline in the quality of bulls available and possible for people to dedicate, which, with few exceptions, derived from 'the cattle of the provinces', not 'superior' imports. Malaviya contested the claim that these problems were solely caused by the rise of 'persons of inadequate means' dedicating bulls. He felt that wealthier landowners were also unable to afford the necessary bull and four cows. He argued that most people simply did not perform the ceremony if they could not find a bull, as opposed to finding inferior varieties. Moreover, it was the government's responsibility to 'take timely action' to prevent grave public calamity that was emerging from the practice of liberating bulls from falling into 'general disfavour or disuse'. As Malaviya noted, up until 'until twenty-four years ago', Brahmani bulls across the United Provinces 'enjoyed...protection' due to the significance of scriptural values within the socio-cultural norms of society. Since these had been undermined, bulls were dedicated across the United Provinces 'with much less frequency than used to be the case twenty years ago'. Across the region, 'Brahmani bulls may be stolen, maimed, injured and killed with impunity'. The root of the issue was the High Court's decision of 1884.³¹

In a detailed and thorough study, Malaviya argued that the crux of the decline of Brahmani bulls was the aforementioned landmark case of *Queen-Empress v. Jamura, W. N.*, 1884 at the Allahabad High Court. Offering an extensive analysis, Malaviya stated that the accused had shot the Brahmani bull because he had damaged the farmer's crops. The accuser hoped to punish the accused under section 429 of the Indian Penal Code (IPC) of 1860. According to this section, a person could be punished for causing mischief by killing, poisoning, maiming or rendering useless any elephant, camel, horse, buffalo, cow, bull or ox with a value of fifty rupees or more. For Justice Brodhurst, the accused was 'not justified in acting as he did'. However, he could not be punished under section 429 of the IPC. For Brodhurst, the crux of the issue was that 'the bull referred to had been branded and let loose'. As such, in his eyes 'ownership over it then ceased' and thus any harm caused to the bull was not punishable by the IPC, as the bull was *res nullius*, the property of nobody and thus not liable for damages. A similar judgment was replicated the following year at the Allahabad High Court, in the case of *Queen Empress v. Bundhu* 1885. According to Justice Straight, a Brahmani bull could not be criminally misappropriated under section 411 of the IPC. Once a bull was branded and let

³¹ UPSA, RD (821/1908), 'From the Hon'ble Pandit Madan Mohan Malaviya, B.A., L.L.B., Allahabad, to Chief Secretary to Government, U.P., 18/12/1908'.

loose, the owner had ‘surrendered all his rights as its proprietor, and had given the beast its freedom to go whithersoever it chose’. The term used in this case was *nullius proprietas*, meaning that the bull was no longer property and thus it was unprotected by the law from ‘larceny’, of being the subject of criminal misappropriation or theft of personal property. Moreover, Straight argued that once dedicated, the bull was left to its *feræ naturæ*, meaning its wild nature in Latin. Used in Roman Law, the term described an animal that no one can legally claim as their property, whose actions were no longer punishable by law. They were now wild beasts, ungoverned and irrational, without the mastery of a human to control it. Because they were no longer property, colonial law did not support the argument that they could contribute constructively to society. In sum, their instinct to wander, consume and mate was not perceived to be beneficial to the people. Colonial law drew a line between the domesticated animal as property, closing the door on the Brahmani bull.³²

For Malaviya, the decision of the Allahabad High Court was both offensive to the customs of Hindus and also ignorant of the role that dedicated bulls could play in the agrarian economy. The implication that a bull became wild once it was let loose clashed with perceptions of the impact of the animal’s behaviour in Hindu scripture. To support the need for the judiciary department to reassess its verdict, Malaviya highlighted that an alternative conclusion had been drawn by Justice Henry Plowden (1840-1920) in a case at the Punjab High Court. In the trial of Bahadur Singh and others v. the Empress in 1888, Plowden concurred with the ‘sound and logical’ argument of Allahabad High Court, that an animal that was ‘not property within the meaning of the Indian Penal Code can no more be the subject of mischief than of theft or criminal misappropriation’. However, he contested the finality of the idea that once a ‘thing’ became *res nullius*, it ceased to be private property. Appealing to Roman law and other codes, Plowden stated that the Brahmani bull continued to exist as property in the eye of the law ‘notwithstanding it has no human or visible owner’. Thus, an object or an animal could belong to an owner who ‘exists as mere fiction, but who does exist in the contemplation of the law’. In sum, the Brahmani bull was dedicated with a defined reason and intentional purpose. The ‘mental condition’ of the liberator was ‘clearly distinguishable from that of the person who simply gets rid of a thing’. The bull was not *feræ naturæ*. Once dedicated, its actions and behaviours continued to contribute within the material and socio-cultural paradigms of domestication that established its position in society, recognising that ‘these bulls wander about

³² UPSA, ‘Madan Mohan Malaviya’.

and are treated by the Hindus with great respect. No one can claim any redress for the injury they do. No Hindu dare destroy them'. To give emphasis to the concept that these bulls continued to contribute, Plowden drew upon studies and translations of scriptural law as a means of understanding the purpose and significance of the custom. Utilising this information, he concurred that the Brahmani bull contributed to a structure of common use, within which its reproductive instincts continued to support cattle breeding across the province. With this rationale, he convicted the accused under section 429 of the Indian Penal Code, for causing mischief by killing the bull let loose by Arjan Singh. Summarising his reasoning, he stated that the bull was 'let loose some time before for the public benefit, and was stated to have been used for serving the cows of the village'.

Plowden's case exemplified for Malaviya that colonial legal discourse could recognise the spiritual and material value of the Brahmani bull. The root basis of its validity was not a statistical indication of the impact of the animal, but instead whether the scriptural laws of Hinduism could be interpreted to proscribe standards and regulations, that ensured that the animal would support a modernised structure of cattle breeding. To support this argument and demonstrate the material and spiritual significance letting bulls wander, Malaviya outlined how a number of Hindu scriptures emphasised the significance of the custom. Commenting on the Shastras, Malaviya noted that it was written that 'non shall restrain (or tie) a bull so dedicated, none shall use him (or make him work) as a beast of burden'. This idea was repeated in the Laws of Manu, which stated that if any damage is done by these wandering bulls, 'no fine shall be imposed for such damage, and whether any herdsman attended the bull or not'. According to the scripture and those that followed it, it was vital that a bull should be allowed to wander. This was in part to support the spiritual significance of the custom, but also a key to the bull's capacity to 'benefit of the community in the matter of cattle breeding'. Thus, on the one hand the act could improve the quality of the deceased life when they were reincarnate, and eventually to allow them to break from the cycle of reincarnation (*samsara*) and achieve salvation (*moksha*). As the text the Grand Purana stated,

The man on the eleventh day of whose death a bull is not liberated, is certain to be (or to remain) in the condition of an evil spirit (a preta)... However it may be, a bull must be liberated either in a sacred place (a tirtha) or in a town. A man is emancipated (from sin) by the release of a bull, not by other means.

The ritual value and significance of the custom was also addressed in the Slokas, which provided the holy words that need to be recited during the dedication ceremony. In these chants it was stated that ‘when a bull is to be released, he was addressed as Jagadanand Dayakah, the giver of joy to the world, Pitri Bhutarshi Poshakah, the maintainer of the ancestors, the sages and of men’. This symbol stressed the significance of the bull as a source of material benefit. That it should help both the deceased and the living. Malaviya drew on these examples to argue that the government and ‘men of light and leading in the Hindu community’ could do much to encourage more people to dedicate better bulls. The Shastras discouraged the dedication of bad bulls, laying down ‘with great clearness the description of the bulls which should, and which should not be, dedicated’. These teachings could be spread amongst the people to encourage dedication of the right kind of animal, especially if the government and Hindu gentlemen printed Hindi translations of the texts and broadly circulated them across the provinces.

Despite his support of the scriptural rationalisation of letting bulls to wander, Malaviya and a number of correspondents acknowledged that environmental and socio-cultural factors had led to a decline of the custom in the late nineteenth century. Moreover, the extent to which people continued to acknowledge the scriptural proclamations about the material role of the custom was a subject of extensive debate. Malaviya felt that people mostly practiced the custom for the religious merit that ‘accrues to the individual for whom the bull is liberated’. This was the main, ‘if not the only’, consideration that motivated most dedicating bulls. They also wished to avoid the condemnation that might take place if the custom was overlooked. Despite his own scriptural knowledge, Malaviya stressed that ‘the people at large do not take a merely utilitarian view of the ceremony’.³³ This current state of affairs would also be highlighted by Rai Sri Ram Bahadur (M.A.), who felt that the original purpose of dedication was to ‘benefit the community in the matter of cattle breeding’. However, he felt that,

in the course of time, this practice, like many others, though originally based on secular conditions has acquired the sanctity of a religious rite. The performance of this ceremony is now considered obligatory by every Hindu of the orthodox class. Almost all the Hindus who have the means and whether they reside in towns or in villages do it.

For Ram, the custom had been appropriated by the revival of an orthodox Hinduism, which took place in the late nineteenth century. The wandering bull was being used as a symbol of

³³ UPSA, ‘Madan Mohan Malaviya’.

Hindu power and territory, rather than material purposes. To utilise the custom for material benefit, Ram felt that restrictions could be imposed, although they might be subject to corruption. Instead, district boards continue to keep bulls of superior breeds and quality to principal villages. Over time, these bulls would replace the weaker animals, due to the 'principle of the survival of the fittest', as they would gradually influence the local population, their offspring integrating their good qualities into local populations over time replacing those dedicated.³⁴ Much like Malaviya and Ram, the feeling that people had 'lost sight of the main object' of dedicating a Brahmani bull pervaded in the correspondence of Maharaja Sir Bhagwati Prasad Singh of Balrampur. As he noted, in the Dharma Shastras it was proclaimed that the main reason that people dedicated bulls was 'undoubtedly the benefit of the community in the matter of cattle breeding'. However, in the early twentieth century the practice had become viewed as an obligatory custom that everyone had to perform as a religious sacrifice. As the value of the bull was secondary to the spiritual aspects the process bought, 'people of inadequate means dedicate what they can get cheap enough, viz. young calves and bulls of inferior type'. The overriding spiritual significance of the custom was further emphasised by the fact that those that cannot afford or access a bull would instead 'brand a gold or silver image of a bull in place of the bull itself'. The act of dedication was thus of no benefit to breeding, but purely a spiritual consideration in the minds of the people.³⁵

As this section has demonstrated, for Hindu leaders the wandering bull could be a central feature of progress in North India, its instinct and ability to mate a force of animal behaviour that should be encouraged. However, the merits of this widespread assumption were tested by the debate with colonial law, which questioned whether an animal could remain property once dedicated. This discussion opened up the question of whether animal behaviours could be beneficial to society, or if the custom led bulls to cross from domestication into a semi-wild status. But more pressingly, these discussions revealed that perspectives upon the function and purpose of the custom were torn. Most correspondents agreed that the custom was declining due to the gradual deterioration of the grazing lands and legal protection. However, others argued that spiritual benefit was the main purpose of dedication for most Hindus, regardless of the material sanctions proposed within the scripture. As the closing section will show, in a

³⁴ UPSA, RD (821/1908), 'From The Hon'ble Rai Sri Ram Bahadur, M.A., B.L., C.I.E., Lucknow, to Chief Secretary to Government, U.P., 12/10/1908'.

³⁵ UPSA, RD (821/1908), 'From Maharaja Sir Bhagwati Prasad Singh, K.C.I.E., of Balrampur, to Chief Secretary to Government, U.P., 27/11/1908'.

report on the impact of Brahmani bulls in 1913, the colonial government confirmed in some pockets of the country that the majority of Brahmani bulls were dedicated for purely spiritual considerations. Many temples, riverside step ways (*ghat*) and sacred cities had become centres for dedicating bulls, leading to an influx of animals that wandered the adjacent area, causing damage to the land and danger to the people. However, beyond these centres, many officials recognised that the general dearth of wandering bulls left a large gap in animal domestication, that stud bulls were only partially capable of filling.

5.3 *Sacred spaces, “wild” bulls and colonial governance*

The question of the Brahmani bull resurfaced across the United Provinces in June 1913. A new investigation was led by the Lieutenant Governor James Scorgie Meston, who argued that it was ‘high time’ that the British government took measures to detain Brahmani bulls, fining those who ‘perpetuate and encourage the ridiculous custom of turning loose bulls as a religious duty’. He called for the government to review the impact of the custom upon the United Provinces, by soliciting information from district officers. In his response ten days later to Meston’s report, the Director of Land Records and Agriculture H. R. C. Hailey proposed that a new approach needed to be undertaken to control the problematic Brahmani bulls, as the method of inspecting bulls suggested in 1908 by the CVD was ‘impracticable’. In the new proposal, Meston recognised that people could not be stopped from dedicating bulls without a response of outcry and resistance, as the Hindu leaders had stated. However, could local landowners and villagers be induced to take responsibility for the bulls? Moreover, if a district Collector felt the bulls were doing too much damage to local crops and decline of the breed, should they be ‘empowered to take steps to catch’ and detain them? Hailey complied with Meston’s request to send out a query to all commissioners of the Division of the United Provinces, to ascertain the scope and scale of the Brahmani bull issue across the region. During the autumn and winter of 1913, regional officials would respond with demi-official letters. Most of the respondents came under the banner of Land Revenue and General Administration for the United Provinces, working as Magistrates and Collectors.³⁶ Each respondent was asked to reflect on the following: the extent of the nuisance; the present practice in dealing with it, and the powers which existed for doing so; what further powers were desirable; what use could be made of the animals if they were captured and confined?

³⁶ *The India List and India Office List for 1905* (London, 1905), p. 55.

In most of the districts, the commissioners reported that there were few if any problems with the Brahmani bull. Officials reported only one or two bulls per village across Agra, while around the town of Mat there were only 40 known bulls across 157 villages. In Mainpuri there was only 73 known Brahmani bulls to the region's 56,087 cows.³⁷ Beyond the cultivated tracts in the open country of Bundelkhand, Brahmani bulls could wander the open terrain without crossing paths with the boundaries of civilisation.³⁸ Many officials also reflected that the custom was in a state of decline, due in part to the practice among Eurasians and Muslims of putting cattle to work, slaughtering them and chamars using their bodies for bones and leather.³⁹ In Rohilkhand, collector Harrison recorded a story of an animal dedicated by an elite Hindu that was impounded by a Muslim landowner, only for the Hindu to buy it and 'let it loose again'. However, if the bull was considered to be a 'nuisance to the neighbourhood' or it was dedicated by low caste Hindus, then it was common in Rohilkhand to turn a blind eye to the slaughter of the animal.⁴⁰ In Fatehpur, the collector A. Yusuf Ali reflected that due to these factors the practice was on the decline, in terms of quantity and quality, as the practice no longer held the value as 'in the old days, when faith was alive, really good bulls were released, which gave good progeny'.⁴¹ This feeling would also be reflected around the city of Cawnpore, where the practice of turning bulls loose was considered to be something 'only old fashioned people indulge in'. Commissioner Tyler felt that over time, even if no action was taken the 'evil' was likely in time to right itself.⁴² Many colonial officials saw the custom as a dying ember of a traditional practice in most of the districts. That said, certain districts with large Brahmani bull populations remained, and became viewed as examples of the destruction and havoc that animal behaviours could unleash if uncontrolled by socio-religious norms.

From the reports of colonial officials, it is clear that the main catalyst and reason for the prevalence of large populations of Brahmani bulls was the Ganges river. It was a material and cultural centre of North Indian society, flowing from the spiritual centres of Rishikesh and

³⁷ UPSA, RD (516/1913), 'Confidential Notes and Orders: Correspondence regarding Brahmani bulls'.

³⁸ UPSA, RD (516/1913), 'Demi-official letter from H. C. Ferard, Collector for Jhansi, 07/08/1913'.

³⁹ UPSA, RD (516/1913), 'Copy of a confidential demi-official letter dated 12/08/1913, from S. H. Fremantle, Esq., Collector of Allahabad, to the Commissioner, Allahabad division'.

⁴⁰ UPSA, RD (516/1913), 'Extracts from demi-official letters from Collectors of the Rohilkhand Division, to Commissioner (P. Harrison, dated 13/08/1913).

⁴¹ UPSA, RD (516/1913), 'Copy of a confidential demi-official letter no. 109; dated 18/07/1913, from A. Yusuf Ali, Esq., Collector of Fatehpur, to the Commissioner, Allahabad division'.

⁴² UPSA, RD (516/1913), 'Copy of a confidential demi-official letter dated 17/07/1913, from H. G. S Tyler, Esq., Collector of Cawnpore, to the Commissioner, Allahabad division'.

Hardwar in the north-west, to the ancient cities of Allahabad and Varanasi in the south-eastern reaches.⁴³ Countless holy sites were dotted along its banks, places of worship where people gathered after pilgrimages to wash away their sins, ask for blessings and pray to their gods. One town identified as a hub of ‘mischief’ by Meston was Ramghāt, located west of Aligarh on the banks of the Ganges. As E. Humphries, the collector of nearby Bulandshahr, confirmed, the ‘nuisance’ of the Brahmani bull was ‘most keenly felt’ in the landscape between Ramghāt and Rajghāt, approximately fifteen kilometres north along the river, where approximately forty-seven or so bulls were reported to be ‘at liberty’. In these ‘places of pilgrimage on the Ganges’, people bathed along the steps (*ghat*) during festivals and let loose branded bulls as part of their vows. These bulls were supplied by local traders (*pandas*), who made good money selling animals to be dedicated. Humphries was highly critical of these pilgrims. After dedicating the bull and accruing their spiritual benefit, he felt that they went ‘on their way rejoicing without thinking or caring for the damage which is done by them to the fields, not merely of Muhammadan cultivators, but also of their own co-religionists’.⁴⁴ After corresponding with landowners living in Ramghāt, Meston deduced that those he scathingly called ‘pious Hindu’ priests had extended their prevalence in recent years. Their neglectful disregard for the quality of the animal had led the Brahmani bull to become a ‘bye-word’ for the ‘weakest and poorest’ animals. Meston argued that the ‘havoc’ that these bulls could play was not only perpetuated by the priests and traders, but also by local villagers who allowed their cows to ‘forage for themselves’ when not in milk, and thus mate with the inferior stock of wandering bulls.⁴⁵

For Hailey, the situation in Ramghāt was a shocking but isolated phenomenon in the cultivated tracts of the western United Provinces, along the Punjab border. Farmers in this region were generally deemed to be ‘keen on maintaining the standard of their cattle’, driving away ‘stunted and feeble bulls’, even killing them for their skins. For colonial officials, these rational norms of domestication became less commonplace in the eastern districts of the province, where Brahmani bulls were a ‘most serious’ nuisance. One district in particular became an example of the nightmare that could unfold if the custom was not curbed. As in the Census of Cattle in

⁴³ For studies of rivers and culture, see Peter Coates, *A Story of Six Rivers: History, Culture and Ecology* (London, 2013).

⁴⁴ UPSA, RD (516/1913), ‘Extract from a demi-official letter dated 29/08/1913, from E. D. E. M. Humphries, Esq., Collector of Bulandshahr, to the Commissioner, Meerut division’.

⁴⁵ UPSA, RD (516/1913), ‘Correspondence regarding Brahmani bulls, J. S. Meston, Lieutenant Governor of the United Provinces, 10/06/1913’.

the United Provinces reported in 1915, this district stood out as a location where cattle populations had grown exponentially, despite multiple famines and plagues in the previous decade. The renowned district of Gorakhpur towered above all other areas in terms of cattle populations, despite its lack of local breeds (Appendix 7).⁴⁶ Situated south of the Nepal border in the flood plains along the Rapti river, Gorakhpur was portrayed by colonial officials as the home of truculent, violent bulls, whose aggression and excess were protected by zealous religious protestors. Gorakhpur became an example to colonial officials of how the custom of dedication could unleash a wild and destructive force, an example to all of the danger and degeneration that would ensue if the situation was not policed. Throughout colonial reports on Gorakhpur, tales spread of anxious farmers guarding their fields with barricades as if they were at the 'edge of reserved forest', despite being many miles from the nearest jungle. Ironically for the Commissioner of Benares E. A. Molony, Brahmani bulls were 'practically everywhere except in the jungly parts of the country'. They were a force of the wild that was not produced by the frontier. Instead, the custom of dedication was deemed to be a socio-cultural norm of domestication that allowed animals to wander ungoverned in the towns and villages, unsettling cultivation and the boundaries of civilisations.⁴⁷ Given the freedom to wander and act out its natural behaviours, many officials perceived that these bulls would become like wild animals, gradually crossing the threshold from tamed animals governed by the human hand, into aggressive, violent and uncontrollable wild beasts.

Seeking to prevent the replication of the situation in Gorakhpur, many colonial officials outlined the socio-cultural norms of domestication that allowed Brahmani bulls to unleash the forces of the wild. They outlined the kind of problems they caused and the challenges they faced in policing their behaviours, and how they could legitimately address the situation without offending religious nationalist sentiments. One of the major 'mischiefs' they believed that Brahmani bulls were causing was damage to crops. Many colonial officials argued that the capacity for bulls to wander onto cultivated land, consume and trample over the plants was a clear sign of the problems that the custom created. It was recognised that people generally took steps to drive these animals from their crops. However, the Collector of Muzaffarnagar noted that in the densely cultivated tracts of the western Punjab ordinary villagers were 'disinclined to complain' if a bull simply destroys crops and gardens. Instead, they saw this inconvenience

⁴⁶ NAI, DRA (312/5421), 'The United Provinces Cattle Census of 1915'.

⁴⁷ UPSA, RD (516/1913), Copy of a confidential demi-official letter dated 21/07/1913, from Commissioner E. A. Molony, Benares'.

as a 'tax for the maintenance of a bull for his cows'.⁴⁸ In cities such as Cawnpore, at the heart of North India's booming leather industry, the Collector H. G. S. Tyler reflected that there was a 'considerable number of these bulls roaming', where they 'help themselves to whatever they want and shopkeepers and others have no means of redress'.⁴⁹ As the collector of Jhansi noted, while he felt that the bulls were a 'universal' nuisance causing great damages to crops, the local villagers did not complain or look for government assistance until a bull takes to 'attacking human beings'. This sentiment was reflected even in the aforementioned Ramghāt, where between 1908 and 1912 Humphries received twenty-seven complaints about Brahmani bulls, of which only one referred to crop damages. Twenty-three were cases of attacks on men and animals, with five causing general injuries and one a broken arm which became a mortal wound.

While the consumption habits of bulls were seemingly tolerated, efforts to control bulls gained legitimacy in instances where bulls were perceived to be 'vicious' and dangerous. In these moments, the animal transcended its controlled domesticated nature because it harmed humans, like a wild animal. In such examples, there was a sense that the 'bulls have turned savage', an issue that arose over time due to the freedom they were allowed.⁵⁰ Humphries recounted the tale of a police constable in Dibai, where one of the twenty-five or so bulls inhabiting the town had become 'particularly dangerous', terrorising the officers on patrol. He also noted the story of Mr. Standley, an Executive Engineer of the Narora who 'complained...of a bull which attacked his wife when driving along the canal bank and, in fact, the whole of that length of canal is infected with these animals'. Throughout their reports, colonial collectors recall instances where Hindu villagers ran in fear, 'begged for relief', and even asked for a gun license to frighten away a 'fierce' bull.⁵¹ Unprotected by colonial law, many officials called for them to be hunted like wild buck and nilgai (South Asian antelope).⁵² Others captured, gelt (castrated), and sent them to work in prisons, cantonments and asylums.⁵³ When bulls wandered

⁴⁸ UPSA, RD (516/1913), 'Copy of a confidential demi-official letter dated 11/07/1913, from J. M. Clay, Esq., district officer, Garhwal, to the Commissioner, Kumaun division'.

⁴⁹ UPSA, RD (516/1913), 'Copy of a confidential demi-official letter dated 17/07/1913, from H. G. S Tyler, Esq., Collector of Cawnpore, to the Commissioner, Allahabad division'.

⁵⁰ UPSA, RD (516/1913), 'Copy of a confidential demi-official letter dated 29/07/1913, from H. K. Gracey, Esq., Collector of Farrukhabad, to the Commissioner, Allahabad, division'.

⁵¹ UPSA, RD (516/1913), 'Demi-official letter from H. C. Ferard, Collector for Jhansi, 07/08/1913'.

⁵² UPSA, RD (516/1913), 'Copy of a confidential demi-official letter dated 18/07/1913, from E.F. Oppenheim, Esq., Collector of Meerut, to the Commissioner, Meerut division'.

⁵³ UPSA, RD (516/1913), 'Demi-official letter signed J. S. Campbell, Naini Tal, dated 16/07/1913, to the Hon'ble Mr. R. Burn, chief Secretary too Government, UP'.

into towns where colonial officials were in residence, they were often branded as a nuisance, captured with a lasso and either put to work or transported to the jungle.⁵⁴ In one instance, this led a landowner to take his bull away to a river basin (*khadir*), where it could not harm people or crops.⁵⁵ According to Sub-Divisional Officer Ganga Prasad, in Gorakhpur people were constantly driving bulls away from their land. Because the bulls were too numerous', they were 'chased from field to field, and from village to village'. But due to the taboo on slaughter, they were sent back and forth, over and over. In other instances, villagers drove bulls across rivers, only for people 'living on the other side of the river drive them back to this side'. In some cases, big operations were conducted to move bulls into the forests, far from the villages. This was the case in 1910 in Rudarpur, when villagers asked the District Magistrate to help send 100 bulls to a remote forest. Another 80 bulls were caught in Gauri bazar and sent to the jungle, much to the resentment of the forest officers. While poisoning was rare, the beating of animals was common, with some violent attacks maiming and blinding the animals.⁵⁶

Despite the lack of official legal protection, within the socio-cultural norms of North India the Brahmani bulls toed an ambivalent line in the hierarchy of animals, between the status of the sacred cow and a feral nuisance that could be dealt with. This dichotomy informed the tales of instances where colonial officials sought to deal with bulls, without offending 'religious sentiment'. To resolve this matter, some officials worked with local Hindu landowners and sub-inspectors to quell local unrest, seeking out the dedicators to warn them of the bull's impending execution. Others ordered local police superintendents to catch and shoot the animal in a secluded area.⁵⁷ Responses to these controls varied. Numerous stories tell of outbursts at times when bulls were culled, such as the widespread resentment and agitation against a police officer in Meerut that claimed to have killed a bull in self-defence.⁵⁸ When the aforementioned police officer in Dibai killed an aggressive bull with a spear, his actions caused 'considerable excitement in the town; shops were closed and subscription raised to prosecute'.⁵⁹ Protected by a police and watchmen (*chaukidar*) escort, colonial officials battled through waves of Hindu

⁵⁴ UPSA, RD (516/1913), 'Extracts from demi-offiical letters from Collectors of the Rohilkhand Division, to Commissioner (G. W. Ingram, 07/07/1913)'.

⁵⁵ UPSA, RD (516/1913), 'Copy of a demi-official letter, dated 20/07/1913, from A. C. Holmes, Esq., Collector of Muzaffarnagar, to the Commissioner, Meerut division'.

⁵⁶ UPSA, RD (516/1913), 'Resume of the replies received from the District Officers of the Agra division as regards Brahmani bulls, D. Dalnan, Commissioner's Office, Agra, 11/09/1913'.

⁵⁷ UPSA, RD (516/1913), 'Demi-official letter from H. C. Ferard, Collector for Jhansi, 07/08/1913'.

⁵⁸ UPSA, RD (516/1913), 'Demi-official letter from the Commissioner of Meerut A. L. Saunders, 11/09/1913'.

⁵⁹ UPSA, RD (516/1913), 'Extract from a demi-official letter dated the 29/08/1913, from E. D. E. M. Humphries, Esq., Collector of Bulandshahr, to the Commissioner, Meerut division'.

protests in Benares, as they attempted to deport what they saw as fifty violent bulls to the jungles in the north.⁶⁰ Despite these infrequent outbursts, many officials were convinced that the people were mostly glad to see the animals gone once they became a 'dangerous beast', even 'where Hinduism was 'specially orthodox'.⁶¹ For example, in Lakimpurkheri villagers had become exacerbated by the practice of low caste Chamars, known for the 'maiming of these pests'. But Hailey felt that despite the outcries, the villagers 'were only too glad for it to be done and it is generally the work of the Chamars for the sake of the skins'.⁶² Despite the religious sentiment attached to the animal, Hailey felt that the cultivators generally were mostly 'willing to get rid of these pests'. He deduced that people regarded the bulls in the 'same light as the monkeys', animals they wanted to be 'relieved' from but would not take action themselves due to religious stigma.⁶³ A potent example of this provided in Allahabad, where a Muslim police chief (*thanadar*) borrowed a rifle and ammunition from Commissioner F. W. Brownrigg in order to shoot a Brahmani bull that had become 'dangerous' and injured people. In front of an assembly of villagers, 'practically all Hindus', he despatched the bull to the 'great relief and satisfaction' of the crowd. Brownrigg 'forgot how many bullets he put into it'.⁶⁴

Despite the prevalence of bulls that became violent and aggressive, the notion that Brahmani bulls were wild animals was not universally agreed upon by colonial officials. Many of the examples provided also highlighted to colonial officials that the Brahmani bulls were not wild animals, but rather nomadic elements attached to village society. Raised and released within the villages and towns of North India, these bulls were not accustomed to the wilderness. As officials quickly discovered after deporting a herd to the jungles, these bulls would quickly fall prey to wild dogs, leopards and other beasts that inhabited the forests.⁶⁵ This factor was understood in the forest hill slopes of the Kumaun region, where bulls were not let loose as they would be targets for the 'leopards and so forth would also tend to keep them from developing into a serious nuisance'. It was the common practice for people to instead 'obtain

⁶⁰ UPSA, RD (516/1913), Copy of a demi-official letter dated 14/07/1913, from R. Oakden, Esq., Superintendent of Dehra Dun, to the Commissioner, Meerut division'.

⁶¹ UPSA, RD (516/1913), 'Demi-official letter from H. C. Ferard, Collector for Jhansi, 07/08/1913'.

⁶² UPSA, RD (516/1913), 'Demi-official letter of the Director of Land Records and Agriculture, H. R. C. Hailey, 06/05/1914'.

⁶³ USPA, RD (516/1913), 'Correspondences regarding Brahmani bulls, Lieut-Governor J. S. Meston, 10/10/1913'.

⁶⁴ UPSA, RD (516/1913), 'Demi-official letter from F. W. Brownrigg, Commissioner of Allahabad, 13/08/1913'.

⁶⁵ UPSA, RD (516/1913), 'Copy of a confidential demi-official letter dated 11/07/1913, from J. M. Clay, Esq., district officer, Garhwal, to the Commissioner, Kumaun division'.

and brand a calf' at the death of an ancestor, keeping them close to home.⁶⁶ In another instance, Fox and Aitchison found that after deporting over two hundred bulls in seven years from around the Ghazipur civil station, many bulls survived and returned from the Bhabhua hills in the Kaimur range, forming large herds of cattle with stray cows, a phenomena that was also occurring around Ramghāt.⁶⁷ The bulls did not turn to the wild, but attached themselves to other wandering animals that were the castaways of domestication. Moreover, the Deputy Commissioner E. H. H. Edye felt that on the hill slopes of the Naini Tal district, 'the practice adopted in some places of driving bulls out into the jungle is useless, for they will always return to the cows'. Even after being sent to the jungles, these bulls would seek to find a way back to village society, and the herds of domesticated cows to which they were accustomed.⁶⁸ As these examples show, the bulls were products of their upbringing in the villages and towns of North India. They were not wild at heart.

In some reports, colonial officials queried whether the act of letting bulls loose would lead to destructive and wild behaviour. Despite having the same freedoms as 'pariah' dogs and monkeys that co-habited the landscape, Commissioner of Meerut A. L. Saunders felt that they were 'not nearly such a nuisance'. Instead, he argued that they were 'very gentle as a rule, considering that they are entire males, and are often petted'.⁶⁹ For Superintendent R. Oaken of the northern hill slopes of Dehra Dun, the crux of the issue was that while bulls were mostly 'docile and can be used to draw water', many of them were 'intractable'.⁷⁰ Under the skilled work of animal husbandry experts, such as the Jail Superintendents of the Naini Central Jail in Allahabad, these bulls could be tamed and put to work on municipal carts and in the jail gardens.⁷¹ However, many felt that their wandering lifestyle had not made them wild. Instead, it had turned them into 'pampered beasts' that were reluctant to work. Unlike the working animals that had been bred and reared to plough the fields, many officials perceived that the freedoms enjoyed by the Brahmani bulls had made them soft and lazy. It was their life of leisure and donations of food that spoiled them for work. Such perceptions detracted from the idea of

⁶⁶ UPSA, RD (516/1913), 'Copy of a confidential demi-official letter dated 07/07/1913, from C.E.D. Peters, esq., Deputy Commissioner, Almora, to the Commissioner, Kumaun division'.

⁶⁷ UPSA, RD (516/1913), 'Copy of a confidential demi-official letter dated 17/07/1913, from T. W. Morries, Esq., Collector of Ghazipur, to the Commissioner, Benares division'.

⁶⁸ UPSA, RD (516/1913), 'Copy of a confidential demi-official letter dated 06/07/1913, from E. H.H. Edye, Esq., Deputy Commissioner, Naini Tal, to the commissioner, Kumaun division'.

⁶⁹ UPSA, RD (516/1913), 'Demi-official letter from the Commissioner of Meerut A. L. Saunders, 11/09/1913'.

⁷⁰ UPSA, RD (516/1913), 'Copy of a demi-official letter dated the 14/07/1913, from R. Oakden, Esq., Superintendent of Dehra Dun, to the Commissioner, Meerut division'.

⁷¹ UPSA, RD (516/1913), 'Demi-official letter from F. W. Brownrigg, Commissioner of Allahabad, 13/08/1913'.

wilderness, but instead found flaws in the system of dedication, by questioning how animals that did not work and thrived on unemployment could be fit to breed strong future offspring.⁷²

As a result of the contrasting perceptions of the custom and the impact of Brahmani bulls, colonial officials proposed a range of methods to handle the presence of wandering animals. For example, in a number of districts officials felt that Brahmani bulls were ‘superior to the general run of village bulls and therefore help in maintaining the breed of cattle’.⁷³ Moreover, officials felt that because they were ‘about the only bulls’ the cultivator could acquire, people were reluctant to complaints even when they caused damages.⁷⁴ In one instance, F. C. Chamier recorded that when bulls caused a nuisance in the city of Mirzapur, they were captured and sent to estates where they were ‘badly needed to improve the stock’.⁷⁵ By contrast, many officials felt that the majority of bulls were ‘useless for breeding’, and unable to contribute to agricultural society. In Jaunper, A. C. Williams deemed that this was because the ‘original object’ of breeding’ had been ‘lost sight of’. People only dedicated bulls for religious reasons, disregarding unwanted animals.⁷⁶ This led to the decline of local populations, due to the low quality of the animal and the intermixture of bulls and cows on common grazing lands.⁷⁷ Stressing the need for control, many looked to the example set in the native State of Patiala in the Punjab, where there had been a strong prohibition against the branding of any bulls, except those which are supplied by the State that were considered to be of a ‘good stamp fit for breeding’.

Due to their fear that Maha-Brahmans would be agitated, colonial officials would not curb the custom. Unlike the stray or village animals that could be captured using the Cattle Trespass Act, according to Judge W. J. D. Burkitt the Brahmani bull posed a unique challenge to colonial law as it was neither strictly owned nor fully wild. As he summarised, the Brahmani bulls were on the one hand *res nullius* and thus could be ‘treated like wild animals’. However, due to

⁷² UPSA, RD (516/1913), ‘Copy of a confidential demi-official letter dated 11/07/1913, from J. M. Clay, Esq., district officer, Garhwal, to the Commissioner, Kumaun division’.

⁷³ UPSA, RD (516/1913), ‘Copy of a confidential demi-official letter dated 12/08/1913, from S. H. Fremantle, Esq., Collector of Allahabad, to the Commissioner, Allahabad division’.

⁷⁴ UPSA, File 516/1913, ‘Copy of a confidential demi-official letter dated 14/07/1913, from C. M. Collett, esq, collector of Ballia to the Commissioner, Benares division’.

⁷⁵ UPSA, RD (516/1913), ‘Copy of a confidential demi-official letter dated 12/07/1913, from F. C. Chamier, Esq., Collector of Mirzapur, to the Commissioner, Benares division’.

⁷⁶ UPSA, RD (516/1913), ‘Copy of a confidential demi-official letter dated 07/07/1913, from A. C. Walker Esq., Collector of Jaunpur, to the commissioner, Benares division’.

⁷⁷ UPSA, RD (516/1913), ‘Copy of a confidential demi-official letter dated 11/07/1913, from J. M. Clay, Esq., district officer, Garhwal, to the Commissioner, Kumaun division’.

‘religious susceptibilities’ any government body had to be wary of using the same powers and methods they used to ‘deal with dangerous animals, e.g. wolves’. At the same time, because the government branded them as wild, they could not legitimately impound the bulls, as they were not property according to colonial law, and were ‘therefore beyond the pale of the Cattle Trespass Act’. Yet others felt that the government should revoke its prohibition of impounding Brahmani bulls using the Cattle Trespass Act of 1871, as listed in Rule 2 of the Pound rules on page 229 of the District Board Manual. This reason was partially due to the fact that these bulls were not property, and thus could not be reclaimed, but also fears of people challenging the fact that these animals were not stray.⁷⁸ Many officials sought to tailor less intrusive methods of monitoring and improving the custom, seeking to integrate the bull within a model of order and control. For example, Molony called for an identification tag to be used to link the bull to its owner. These bulls would then be bound to civilisation, and subjected to cattle trespass laws. However, an unnumbered animal might be treated on the same footing as if it were a wild beast and remain without protection. Molony sought to bring a sense of order through ownership, though making the ungovernable behaviours of these dedicated animals the responsibility of a specific master. Regardless of the protest and ‘ill-feeling’, in actuality Molony estimated that most of the bulls were either too old, too young and weak, or maimed to work. It was estimated that possibly only ten per cent might be found fit for work. As long as the custom persisted, he felt that ‘any hope’ of improving the local stock of animals was out of the question, as the quality of the cattle in the region varied in ‘inverse ratio to the number of these bulls’.⁷⁹

One approach that colonial officials took was to appeal to cattle sanctuaries (*gaushālā*) to help improve the quality of Brahmani bulls dedicated. Many officials felt that the cow protection movement, including members of the Hindu revivalist society the Arya Samaj, should round up and house these animals homes.⁸⁰ Hailey justified the need for action to protect the breed, calling upon Brahman priests to take responsibility for the impact of the customs they promoted. Many officials stressed that these cattle homes should take in bulls that were causing issues, if they were exempt from government pounds. Hailey justified this approach by citing the Punjab, where ‘the worst’ bulls were sent ‘at once to a *gaushālā*’. They believed this practice would not only control their mischief, but discourage people from dedicating

⁷⁸ UPSA, RD (516/1913), ‘Confidential Notes and Orders: Correspondence regarding Brahmani bulls’.

⁷⁹ UPSA, RD (516/1913), 516/1913, ‘Copy of a confidential demi-official letter dated 21/07/1913, from Commissioner E. A. Molony, Benares’.

⁸⁰ UPSA, RD (516/1913), ‘Extract from a fortnightly demi-official letter, from the Commissioner, Gorakhpur division, 05/08/1913’.

animals.⁸¹ To the east of Gorakhpur in Deoria, Moss King sought to tackle the ‘considerable’ numbers of bulls in Gorakhpur by proposing that cattle sanctuaries should work with the government to regulate dedications.⁸² Emphasising the need for reasonability for the actions of bulls, he proposed that a ‘public ceremony’ should be held so that all in the village knew who dedicated the animal. Moreover, he proposed a set of regulations should govern the process of releasing a bull, including that it should be inspected, fed at cattle homes and of a quality that could support breeding. If these rules were breached, the dedicator should be fined.⁸³ The extent to which cattle homes would provide an outlet to control and uplift Brahmani bulls was met with a host of issues. Despite the growth of interest from the nineteenth century, cattle homes were ‘not springing up all over the country’. They were often situated in remote locations, run on small budgets or business principles, doing an extensive trade in dairy products.⁸⁴ Some Pandits, landowners and tenants that ran these homes also felt that these bulls were an ‘evil’. Many welcomed some government intervention through veterinarians, especially in Gorakhpur district. Others drew upon the text the *Nirnaya Sindhu* and the *Vide Gadur Purana*, religious scriptures that stressed that an animal that was ‘not able-bodied, which is sickly, or young, should be discarded’. The *Preta Manjari* stated that the animal should be three years old to be released. In the *Purana*, it is suggested that if ‘at the time of releasing a bull, a suitable bull cannot be had, then a bull made of flour or kushagrass, may be substituted’. Moreover, Ganga Prasad stressed that despite the material merits of confining these animals, ultimately the Hindu public would not agree with these bulls being ‘captured and confined’, as it clashed with ‘the religious idea of their being “set free”’. Prasad linked this quotation to a line from the *Vide Parashar Smriti*, that ‘no one should confine a sacred bull, nor should any one use it in carts &c.’. The only purpose that they can perform if captured is to serve cows. By religious decree these bulls were not meant to be tied up or caged even at night.⁸⁵ Such examples demonstrate that many colonial officials began to question whether they could work with Hindu nationalists and cow protectionists to revive the custom and uplift the quality of animals.

⁸¹ UPSA, RD (516/1913), ‘Demi-official letter from the Director of Land Records and Agriculture, HRC Hailey, 06/05/1914’.

⁸² UPSA, RD (516/1913), ‘Demi-official letter from the Commissioner, Gorakhpur Division, R. Burn, 07/03/1914’.

⁸³ UPSA, RD (516/1913), ‘Copy of confidential demi-official letter dated 05/08/1913, from H. R. Nevill, esq., collector of Etawah, to the commissioner, Allahabad division’.

⁸⁴ UPSA, RD (516/1913), ‘Demi-official letter from the Director of Land Records and Agriculture, HRC Hailey, 06/05/1914’.

⁸⁵ UPSA, RD (516/1913), ‘Copy of a confidential demi-official letter dated 14/09/1913, from Ganga Prasad, Sub-divisional officer, Deoria, to the Collector of Gorakhpur’.

5.4 Conclusion

As this chapter demonstrated, for the majority of colonial officials and Hindu leaders the Brahmani bull was not necessarily a problem. Due to the lack of pasture and the decision of the High Court in 1884, many Hindu leaders felt that they were fading from use. Colonial officials held Gorakhpur and other regional centres as examples of how the custom was being revived by orthodox Hindus, regardless of the damages that the animals caused in the vicinity of religious sites. In the final analysis, the Brahmani bull debate has shown two competing ideas about domestication and perceptions of animal behaviours. While the British began with the assumption that these bulls were the root of degeneration, Indian culture had been built around the idea that the practice was virtuous and beneficial to the individual and society. The idea of a bull wandering the landscape was not imbued with negative connotations, quite the opposite, in fact. Hindu leaders saw the bull and its ability to reproduce as a positive force, a utilitarian function that spread improvement across the landscape, to villagers that could not afford a bull any other way. That being said, many also felt that in recent times the decline in quality of animals dedicated meant that the custom was not working as the scriptures proclaimed. For most, this was not due to the influence of uncontrolled animal mating. It was instead because of the expansion of cultivation and the lack of protection provided by colonial law, which discouraged people from dedicating bulls that would struggle to find food, be stolen or even killed. Thus, following on from the previous chapter, it is clear that many colonial officials assumed that animal breeding was only productive if the reproductive dynamics of the animal population were controlled, demonstrating the presence of the discourses of mastery. Yet the evidence has demonstrated that this perception of animal mating was not universally replicated in North India. Wandering bulls could play a functional role in the animal economy, for many Hindu leaders and even some colonial officials and missionaries.

This chapter has shown that the Brahmani bull and its mobility revealed a number of significant aspects of how colonial discourses perceived animal behaviours. Moreover, it has demonstrated how these perceptions were associated with the collective impact of the population upon developmentalist discourses in imperial and nationalists thought. Firstly, Malaviya's analysis of the legal discourses revealed that a debate existed within colonial law about animals as property, and that unless an animal was owned it was considered to be wild. Because their *ferae naturae* was not controlled, the custom created the conditions for the bulls

to become wild and ungoverned, according to colonial law. The process of dedication was thus an example of a custom that was perceived to be contributing to disorder and decline, as it unleashed the untamed instincts of the bull and its desire to mate upon the landscape. Secondly, within the context of imposing complete control over a regional populations of cattle, the Brahmani bull threatened the possibility of using stud bulls to create pure-breeds in each region. Ultimately, Hindu leaders contested the notion that this lack of control over the animal was a root issue. The act of letting the animal loose to wander and pursue its mate was a key feature of the custom, implying that animal behaviours could serve a material and spiritual function. Instead, the socio-cultural, legal and environmental factors had led the act of dedicating to become plagued with issues. The process of breeding cattle was shaped by the influence of animal behaviour upon domestication norms in India. While initially hesitant, some western observers such as the aforementioned Wisers embraced the custom as a socio-culturally valid outlet for the stud bulls, and promoted the idea that government animals should be dedicated. Witnessing a dearth of bulls beyond the sacred sites of North India where Hindu revivalists promoted the custom, colonial officials also questioned whether they could work with cattle sanctuaries to improve the quality the bulls and use them to improve the deteriorated herds. Yet such an approach clashed with the fundamental significance of control and order over animal breeding, which was a core assumption of colonial developmental discourses. Though the Wisers explored the notion of its function, other missionaries at the Allahabad Agricultural Institute were less supportive. In the next chapter, the focus will shift to discuss one such missionary, Sam Higginbottom. During his formative years in India, Higginbottom lamented the prevalence of customs such as the dedication of bulls, arguing that they were leading to the decline of cattle populations in North India. Due to the widespread prevalence of many low quality animals, Higginbottom promoted the idea that humans should abandon the animal worker and like their counterparts in Western Europe and North America, embrace the age of the machine.

Chapter 6

Working bullocks, missionaries and machines

The goal of this closing chapter is to understand how the debate about the merits of working animals was shaped by the arrival of agricultural machines in North India. During the early twentieth century, perceptions of the capacity of working bullocks to support agriculture were increasingly redefined within a new discourse, namely, in comparison to the machine. This contrast between the living, breathing animal and the inanimate machine forms the crux of this chapter, which aims to understand how perceptions of animal behaviours were reconstituted in light of the mechanical revolution. To achieve this objective, I will concentrate on the establishment and activities of the Allahabad Agricultural Institute (AAI), founded by Presbyterian missionary Sam Higginbottom (1874-1958). Reaching India in November 1903, Higginbottom initially began working as an economics teacher in the Allahabad Christian college. Raised in Liverpool and on a dairy farm in Llandudno, North Wales, he gained a scholarship to study at Amherst College, Massachusetts. He found his feet at Princeton University, where he signed up to work for the North Indian Mission of Presbyterian Church in 1903. At the same time, he met future wife Jane Ethelind Cody, who joined him in India where they worked together to raise a family of four children, manage the Naini Leper Asylum and found the AAI in 1911. The main focus of this chapter is on Sam Higginbottom's ideas, work and writings.

For over thirty years, the Higginbottoms managed the AAI, quickly converting a series of abandoned buildings and waste lands into a thriving and respected centre for higher education, practical knowledge and the latest agricultural research. It was situated on the outskirts of Allahabad, a holy city home to 1.5 million in 1896-97 at the centre of North India's grand trunk road, railways networks, and confluence of great rivers. Renowned for 'delightful cold weather' from November to March, and 'a long and almost intolerably hot summer' leading to a heavily humid rainy season, Allahabad was home to a diversity of soils and crops due to the district's partition into three sections by the Ganges, Yamuna and ancient Saraswati, known as the confluence of three rivers (*Triveni Sangam*), where millions of Hindus gathered to bathe

for the spiritual and political reasons every twelve years at the Kumbh Mela.¹ The institute was made possible due to \$30,000 of donations that Higginbottom collected from funds raised in the United States, where he gave lectures to Presbyterians about the plight of India and the steps that needed to be taken to improve the lot of the farmer. In these lectures, Higginbottom critiqued aspects of Indian agricultural society that he felt were stagnating its progress. One of the major aspects he felt to be holding back North India was its reliance on animal labour, presenting its locomotive power as a fading inefficiency of the old world. But would this mechanical revolution be possible, or desirable, to the people of North India? Or, would cattle remain the heart of village life?

The purpose of this chapter is to analyse Higginbottom's vision of development, in order to understand how domesticated animals were perceived in missionary and North American discourses of modernity. To date, scholars have mostly focused on Higginbottom's beliefs as a missionary, as well as his overall policy of practical agricultural development.² Aside from the biographical work of Gary Hess (1966), most historians have based their analysis on Higginbottom's most widely distributed publication *The Gospel on the Plow* (1923), a book he published to garner support for his cause.³ As the opening section demonstrates, Higginbottom affiliated progress with technologies that he felt could revolutionise all aspects of life, including agriculture. Working bullocks became symbols of the slow and cumbersome traditions of the past. The limitations of animal labour became a point of contrast, which Higginbottom used to emphasise superior productivity and efficiency of tractors, reapers and other machines. As the second section demonstrates, Higginbottom experimented with a host of machines and tools that could both replace and support the animal economy. To access and improve conditions across North Indian villages, Higginbottom and western businesses recognised that while tractors and other machines were useful on large scale farms, the villages of North India could be a marketplace for improvements to local *desi* ploughs and bullock carts. To close the chapter, I will explore the continued significance of both cattle and agricultural machines in North India. Higginbottom gained the attention and respect of influential businessmen and inventors, as well as colonial officials and leading figures in the Indian nationalist movement,

¹ Kama Maclean, *Pilgrimage and Power: The Kumbh Mela in Allahabad, 1765-1954* (Oxford, 2008), p. 8.

² Nandini Chatterjee, *The Making of Indian Secularism: Empire, Law and Christianity, 1830-1960* (Basingstoke, 2011), pp. 147-148.

³ Gary R. Hess, *Sam Higginbottom of Allahabad: Pioneer of Point Four to India* (Charlottesville, 1967); Gary R. Hess, 'American Agricultural Missionaries and Efforts at Economic Improvement in India', *Agricultural History*, 42:1 (1968), p. 25.

such as Mahatma Gandhi. These figures proposed many rival ideas about the role of cattle in progress, placing cattle in visions of an independent India. By analysing the Uttar Pradesh government's journal *Krishi aur Pashu Pālan* (Agriculture and Animal Husbandry), this closing section will assess the continued role of bullocks and machines, demonstrating the dual pathways of development that emerged in post-colonial North India.

6.1 *Higginbottom, modernity and agricultural technology*

Machines were a constant presence in the lives of the Higginbottoms. On their voyages back and forth to India, they enjoyed the luxury of cruise liners such as the Lloyd Triestino.⁴ To navigate the subcontinent they relied on the growing network of railways laid down by the British Raj, as well as the web of telegraph lines and metalled roads that delivered the mail. These expanding roads helped them to journey across India, Europe and Persia in the latest motor cars, pushing the boundaries of this new form of transport. For staff, students and the people of Allahabad, Higginbottom's movements were synonymous with the clattering and guzzling sounds of the car engine as he sped around the city and its surrounding villages. At the institute and leprosy asylum, new machines and gadgets were essential for a comfortable life, especially in the summer heat and monsoon season. By connecting the institute to the newly installed electricity grid in Allahabad city and building a power generator, the Higginbottoms were able to enjoy the benefits of refrigeration and electric fans. These technologies promised an easier time in the tropics, replacing many of the mundane and tiresome aspects of life and work. Sweating uncomfortably one day in the shade at 100 degrees, Higginbottom felt that the days of his fan (*punkha*) coolie falling asleep in the heat while fanning were numbered.⁵ Machines promised not only to improve the life of the wealthy in India, but also to change many aspects of work performed by humans and also animals.

Across Western Europe and North America, one of the main ways that machines would reshape society was by replacing working animals. While equine numbers initially rose across these regions during the nineteenth century to meet the demands of operating heavier agricultural machines, by the mid-twentieth century the physical strength of both humans and animals had

⁴ Albert and Shirley Small Special Collections (henceforth ASSSC), 5996: 4 (1927), 'Tickets and blueprint of the Lloyd Triestino'.

⁵ ASSSC, 5996: 2 (1922), 'Letter from Sam Higginbottom to Mrs Wentworth, 24th April, 1922'.

gradually been replaced by the power of machines in factories, farms and domestic spaces. In this industrialised heartland, working horses and oxen faded from rural and urban life, as motor-cars, tractors and an endless array of steam, gasoline and electric powered contraptions became affordable and essential features of life. While agriculturalists continued to debate the merits of animals in light farming work until the 1930s, the introduction of smaller and rubber tyred tractors cleared the way for the mechanisation of rural and urban life by the outbreak of the Second World War across Western Europe.⁶ During its near two hundred years of rule over the Indian subcontinent (1757-1947), the British Raj introduced railways, motor cars, tractors and other agricultural machines to its Indian Empire, as well as cheaper items such as the bicycle and the sewing machine.⁷ For many colonial officials and missionaries such as Higginbottom, the introduction of machines was a symbol of progress and the liberation of India from poor quality traditional tools, customs and animal stock. The presence of these new possibilities reshaped perceptions of domesticated animals, and their place in a modern India. Witnessing the power and speed of machines, many saw cattle as a slow and unproductive option that would soon be replaced. As Malcolm Lyall Darling noted on his tour of the Punjab in 1934, 'stick or no stick, the Hissar bullock goes slow'. Despite its potential to be the 'best for cart and draught', if it 'does not get food, it gets thin at once'.⁸ With high demands for feed, maintenance and capacity to perish from disease, animals were deemed to pale in comparison to the productivity and efficiency of machines.

Unlike the industrialised global north, across South Asia the rise of machines did not lead to the immediate decline of working animals. Even by the 1930s only ten per cent of India's workforce was engaged in the manufacturing industry, mostly localised to industrial cities such as Bombay, Calcutta and Cawnpore.⁹ The benefits of agricultural machines were only accessed by affluent farmers from thriving regions such as the canal colonies of the Punjab and the western districts of the United Provinces, near Delhi.¹⁰ For many city dwellers downtrodden by the reality of an industrial landscape, cattle were a symbol of nostalgia for a simple and

⁶ For studies of animals, machines and western history, please see, Jonathan Brown, *The Horse in Husbandry* (Ipswich, 1991); William Cronon, *Nature's Metropolis: Chicago and the Great West* (London, 1991); Douglas Harper, *Changing Works: Visions of a Lost Agriculture* (Chicago, 2011).

⁷ David Arnold, *Everyday Technology: Machines and the Making of India's Modernity* (Chicago, 2013), p. 52.

⁸ Malcolm Lyall Darling, *Wisdom and Waste in the Punjab Village* (London, 1934), p. 156.

⁹ Rajnarayan Chandavarkar, *The Origins of Industrial Capitalism in India: Business Strategies and the Working Classes in Bombay, 1900-1940* (Cambridge, 1994), p. 2.

¹⁰ Stanley A. Freed and Ruth S. Freed, 'Sacred Cows and Water Buffalo in India: The Uses of Ethnography', *Current Anthropology*, 22:5 (1981), p. 486.

unpolluted pre-industrial past. The competing role of animals and machines in visions of South Asian modernity was depicted plainly on the cover of Margaret Read's study *From Field to Factory*, a work commissioned for people in England to better understand working conditions in India. The cover illustrated the contrast between agricultural society, symbolised by the farmer and the bullock ploughing the field, the rise of industrialisation in the distance, and the capacity for both to work together towards a brighter future on the horizon.

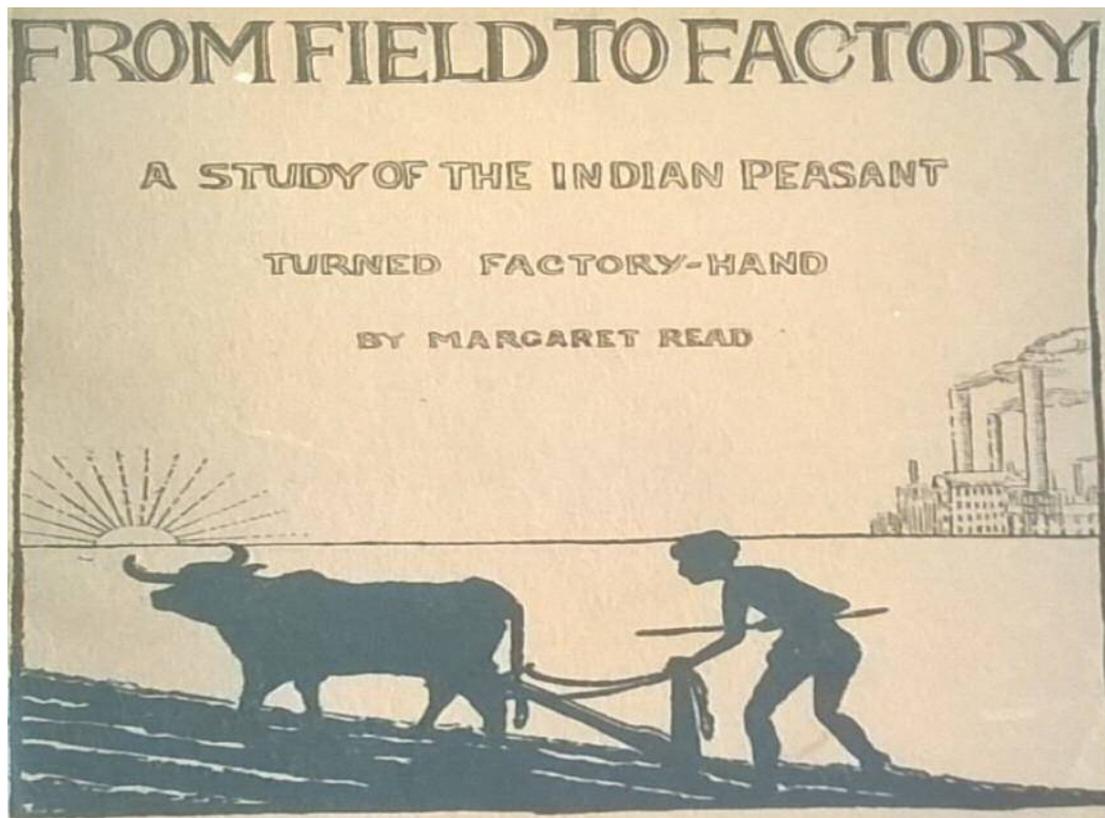


Figure 15: Margaret Read, *From Field to Factory: A Study of the Indian Peasant Turned Factory-Hand* (London, 1927).

Higginbottom's faith in mechanisation as a pathway for agricultural progress developed from his experiences in India and also during his frequent trips to North America, where every few years he would return to tour the Presbyterian institutions, raising awareness and donations to support his work at the AAI. As part of the stipulations put down by the Missionary board and government of the United Provinces, Higginbottom returned to North America to complete a Bachelors of Science in Agriculture at Ohio State University, gaining an education in the latest

techniques and methods of agriculture.¹¹ Whilst completing tours to raise money for the institute, he also submitted an MA thesis to Princeton University in 1911, titled 'A Report on the Economic Conditions in the United Provinces of Agra and Oudh, India'. In his thesis, he summarised his experiences of India and offered his stance on the factors influencing agriculture and its development across the region of North India. He began by dismissing the popular Indian nationalist argument that poverty was caused by the drain of resources by British colonialism.¹² Instead, drawing on colonial discourse, he painted a picture of a subcontinent trapped and subservient to the oppressive tropical climate, where disease and caste laws ravaged unchecked or unchallenged. People lived in 'horror and suffering' during any famine or plague, often inaccessible to 'willing hands and hearts' because of the lack of roads, infrastructure or education. Higginbottom drew upon a Biblical reference to paint a stark contrast between the modernising city and the ancient countryside, stating that 'in the villages we go back to conditions as they were when David was tending his sheep on the hills of Palestine'. These villages were 'independent and self contained' unlike 'any villages on earth today'. But this autonomy was not celebrated. Instead, the village was viewed as a cage, padlocked by climactic forces and traditional customs. The crux of the issue for Higginbottom was the fact that cattle were the 'chief object of worship' for approximately 220 million people. He felt that the cow protectionist 'golden age' of a 'land flowing with milk' was an imagined past, and that the environmental and socio-cultural dynamics of domestication that religious nationalists promoted would only lead to degeneration. The first major issue was the lack of any systematic means of storing fodder in most villages, meaning that during the rains oxen and cows were 'the first to suffer'. This problem in turn perpetuated to the second core hindrance to progress, being the Brahmani bull. As he noted, due to the lack of forage,

the ryot must keep some of them alive or he cannot plow when the favourable season returns. Here it seems to me is the place where the sacred Brahmini Bull arose to power. There are few large herds of cattle in India, one cow and one pair of oxen being all the cultivator usually owns. It would not pay him to keep a bull solely for the one cow. Neither would his neighbors pay for the use of the bull. He may not kill a calf. He does not need, could not find work and food for more than his one pair of oxen, so he sacrifices to the gods the bull calf that he cannot afford to keep (sacrificing means turning loose to forage for himself). This calf wanders around the country-side taking toll of every farmer and serving the cows without any one cultivator feeling the burden, but the practical result is that there are altogether too many bulls loose, and if any bull calf is defective and not fit to make into an ox this is sure to be sacrificed, with the

¹¹ ASSC, 5996: 3 (1924), 'Letter from Sam Higginbottom, to Sir Grimrod Mears, 02/01/1925'.

¹² Ajit Dasgupta, *A History of Economic Thought in India* (London, 1993), p. 79.

result that the cattle of India have deteriorated very much and there is a great field for the scientific breeder of cattle.

Higginbottom felt that one of the main pathways towards progress was the replacement of animals with the new possibilities of technology. Whilst many Indian nationalists saw rail tracks as needles draining the subcontinent's resources, Higginbottom presented them as infrastructural and technological advancements that liberated people from the environmental, social and cultural causes of poverty. With more access to markets, transport and trade, people could communicate and thrive.¹³ That said, in spite of his faith in technology and the possibilities that it could bring, Higginbottom recognised that machines and infrastructure needed to be adapted to Indian village life. It was not enough to import machines. He wanted to reach the 'much larger India' that remained 'untouched and unmoved' by nationalist politics, colonial economics and the 'banks, factories, mills, markets, municipal undertakings' that were shaping life in the 'modern cities' of Calcutta, Bombay, Madras and Cawnpore. Many people had tried before, leaving scars of failed attempts across the rural landscape. As he starkly noted,

Scattered up and down the Provinces are unused sugar factories, cotton mills, glass factories that ventured out of the big cities, to where labor was plentiful and cheap and the demand great for the commodities, but so deep in the groove of custom and tradition were the village folk that these empty factories are about the only evident witness there is to the fact that some one tried to hustle the East.

He also sought to challenge the perception held by government, businessmen and missionary bodies that the mass of Indian farmers were 'too huge and inert to move, too ignorant and illiterate to tackle'. Higginbottom was disgruntled by the theoretical and laboratory bound research of the Raj and the reluctance of missionaries to improve the material condition of the people. He felt that institutes did nothing to help Indian farmers overcome the 'extreme industry' that they undertook for very small returns.¹⁴ Farmers could only afford cheap and flimsy tools, costing less than three American dollars at any village bazaar.¹⁵ These implements only worked in the perfect conditions, which were often unobtainable due to varying climatic factors such as extensive dry periods and the monsoonal rains. Due to their reliance on the inconsistent rhythms of the rainy season, people prayed and donated to priests for prophecies,

¹³ Sam Higginbottom, 'A Report of Economic Conditions in the United Provinces of Agra and Oudh, India', (unpublished MA Thesis, Princeton University, Princeton 1911), p. 10.

¹⁴ ASSC, 5996: 3 (1924), 'Letter from Sam Higginbottom, to Sir Grimrood Mears, 02/01/1925'.

¹⁵ Higginbottom, 'Economic conditions', pp. 5-6.

following lunar calendars and their rhymes and couplets in the hope that the gods would bless them with water.

During his frequent trips to North America, Higginbottom propagated his vision of India to his audiences of Presbyterians and the general public, calling for sympathy and support from his congregation. His talks gave him widespread press and praise in many circles. In 1918 the American reporter Tyler Dennett wrote in his book *The Democratic Movement in Asia*, that Higginbottom was bringing progress to India through his strength of will and unique agricultural teaching, and that Americans should support his efforts.¹⁶ In an advertisement in *The Presbyterian Banner* in 1921, Higginbottom recast India for the North American audience. By offering simple conversions of estimated costs into dollars and comparable ideas about daily life and farming tools, Sam painted the picture of a great chasm separating North America's thriving countryside and India's suffocating poverty.¹⁷ For many supporters, machines were the answer. One of the main goals of the Ohio based Anglo-American Mission Engineering Company was to support the 'great Industrial Awakening in India' by supplying machines for vegetable oil production, workshop plants and other implements. As a member of the company's advisory board, Sam supported the idea that these machines should be used in India. While it was clear that on larger farms these machines could increase productivity, Sam also believed that these machines could help to spread Christianity and agricultural progress into the villages. By training Indian Christians in the latest agricultural machines and techniques, missionaries felt that Christian converts would become 'skilled workmen' that were indispensable across rural India, giving them a powerful position in village societies that had previously outcaste them for their religion.¹⁸

In 1927 the AAI was visited by the Royal Commission on Agriculture, the aforementioned commission that reshaped British policy on agriculture. In an article in the Allahabad-based newspaper *The Pioneer* (February 10th 1927), the Commission and its Chairman Lord Linlithgow were said to have praised all aspects of the farm, from the machinery to the animals and the 'spirit of common co-operation', which was felt to be lacking amongst the village tenant farmers (*ryots*). The Commission hoped to use demonstrations, trials and access to the

¹⁶ Tyler Dennett, *The democratic movement in Asia* (New York, 1918).

¹⁷ ASSSC, 5996: 2 (1921), *The Presbyterian Banner*, July-Sept 1921'.

¹⁸ ASSSC, 5996: 2 (1921), 'The Anglo-American Mission Engineering Company, promoting Christian enterprise in India'.

ideas and methods used on the farm, to help improve the conditions of ‘many villages and small landowners who are trying to wrest a living out of unpromising land, handicapped by old fashioned and uneconomical methods’. But both Higginbottom and the Commission recognised that common farmers were sceptical of the promises of prosperity shown at farms such as the AAI, which stood in stark contrast to the struggle farmers faced in the surrounding farmlands. Many farmers would ‘dismiss the possibility as applied to his own prospects with the thought that “big money” is behind the scheme, able to recuperate after mistakes, to keep going in lean years’. The author recognised that ‘this, of course, is true’. The Institute was supported by an international network of funding, much like government farms. But despite their scepticism, writing to the *Pioneer* in 1928, Higginbottom felt that the findings of the Royal Commission brought ‘the Indian farmer and his problems, his limitations, to the front’.¹⁹ In his response to the Royal Commission’s questionnaire, Higginbottom argued that it needed to centralise its production of food, dairy, textiles and other essential items, and divert its agrarian masses from the countryside into the cities where they could work in industry, commerce and transportation. If the Indian masses could not be reformed, then they could be moved. Higginbottom felt that poverty was a result of the ‘enforced idleness of both man and beast’ due to environmental, economic and religious factors, a stagnant mass of starving people and weak animals that watched the skies in the blazing summer heat, waiting with the ‘crudest farm implements’ at hand for the monsoonal rains to break. Higginbottom summarised that farmers in Britain and North America would fare no better with the ‘lack of machinery, superstition, ignorance, dishonesty, oppression, comparatively poor transportation facilities, poor farming methods, bad seed’ that faced the Indian farmer. He deployed such racial and Euro-centric concepts to argue that if the production of food and resources was centralised, then India could thrive like the United States, where less than 30% of the population were committed to the land, with the remaining 70% working elsewhere. The answer to this problem was a ‘large increase in agricultural machinery’, the key to prosperity and freeing ‘the farmer’s life from its severest toil and its most debasing drudgery’. By multiplying the production capacity, wages and profits of a select few farmers, more food and resources could be produced each year that could be consumed by India’s rising populations that were working in industry and other non-farming trades, helping India to become an industrial nation.²⁰

¹⁹ ASSSC, 5996: 4 (1927), *The Pioneer*, ‘Profitable agriculture’ (10th February 1927).

²⁰ ASSSC, 5996: 2 (1921-1929), ‘Sam Higginbottom, Royal Commission on Agriculture: Answers to questionnaire’.

In the next section, it will be shown that Higginbottom's efforts to improve the farm were shaped by the transnational forces of modernity pulling him towards colonial ideas, elite Indians and American-style mechanisation. But the direction of the Institute was also governed by the realities of Allahabad and its surrounding districts, the environment of North India and the socio-economic realities of the farmers they hoped to help. At the heart of this debate was the machine and the animal, two modes of powering agriculture that clashed in the minds of many, one a symbol of the future, the other a relic of the past. To what extent would Higginbottom abandon the animal for the machine? Would modern technologies support the revolutionary changes that he envisioned? Or, would the animal continue to play a part in the rural economy?

6.2 *Tractors, ploughs and development in North India*

During the 1920s, the AAI introduced many new agricultural machines that promised to supplement and gradually replace animal workers. In order to adapt these European and American machines to India, in 1921 Higginbottom appointed Mason Vaugh as an Agricultural Engineer, the only one employed by a British college at the time.²¹ Initially, Vaugh was 'simply overwhelmed' by the task of fixing the mixture of machines that had been 'very badly used and are in a very bad shape'.²² But gradually, he adapted a number of machines to the institute, allowing them to work alongside and replace the 72 oxen and young stock, as well as 80 milch cows and buffalos that inhabited the Institute's expanding infrastructure. Sam hoped that his efforts to introduce and adapt machines to Indian agriculture would bring mechanisation to people untouched by the British Government's Industrial Commission, set up in response to World War 1. Sam felt that the Commission 'left untouched' the most 'fundamental and elemental part of India's life', namely, the 'rural life of India'. Sam also recognised that he had to navigate this urban-rural disconnect if he was to adapt the machines of American investors that were 'looking for new markets for manufactured products, such as agricultural machinery, milling machinery, motor cars, railway equipment, structural steel' and so on. These would work well if 'India were wealthier' and 'produced more, she could pay for

²¹ ASSSC, 5996: 5 (1929), 'Letter from Sam Higginbottom to Cyrus McCormick, 25/03/1929'.

²² ASSSC, 5996: 2 (1922), 'Letter from Sam Higginbottom to Edwin Lawrence, 03/01/1922'.

more with her raw produce of the manufactured articles of the United States'. But at the time it was not the case.²³

Many European and North American companies introduced and demonstrated their agricultural machines at the AAI. In 1927 Mr Gilbert and Mr Ghosh came to demonstrate the potential of the Fordson tractor. Manufactured by Ford Motor Company from 1917 to 1964, the Fordson tractor dominated the American market in the 1920s by mass producing tractors affordable to the common farmer. While they were prone to overheating and costly to repair, the Fordson gradually replaced the horse on many farms across America, as farmers began to feel that tractors were cheaper to maintain, worked harder and required less fuel than an animal did feed. Commenting on the demonstration, Higginbottom praised the Fordson's ability to plough 'very heavy growth of weeds and Juar stubble...infested with Khans and Khus grass'. While late rains had made the ground softer and easier to plough than usual, Higginbottom admitted that even two pairs of large bullocks with a large plough would likely only 'slide over' the ground and fail to turn most of the weeds, making for 'hard slow work'. The Fordson made light work of tasks that were arduous for animal workers, gaining praise from Indian students at the Institute who were known to hold a 'prejudice against power machinery on an Indian farm'. It also converted the previously sceptical Director of Agriculture for the United Provinces, who felt witnessing the Fordson that there was 'a place in the U.P. for the tractor'.²⁴

Higginbottom also endorsed tractors manufactured by the McCormick Harvesting Machine Company, founded by the disputed inventor of the mechanical reaper Cyrus Hall McCormick (1809-1884).²⁵ In 1929 Higginbottom corresponded with his son Cyrus H. McCormick Jr. (1859-1936), who, at the time, was on holiday in Agra, likely visiting the Taj Mahal. Higginbottom requested a donation of \$150,000 from his fellow Princeton alumni McCormick Jr, who had inherited and merged his father's company into the International Harvester Company in 1902. To support his plea, Higginbottom wrote about the contribution that McCormick's own Deering Tractors were making to the rapid 'mechanical development' taking place in India at the time, from the spread of motor cars and buses to lorries and agricultural machines. Within six weeks of its arrival at the AAI in October 1928,

²³ ASSSC, 5996: 2 (1920), 'Memorandum Regarding the need for a Rural Life Commission for India'.

²⁴ ASSSC, 5996: 4 (1927), 'Letter from Sam Higginbottom to Mr Gilbert and Ghosh, Fordson Company, Allahabad, 29/11/1927'.

²⁵ Cyrus McCormick, *The Century of the Reaper* (New York, 1931), p. 5.

McCormick's tractor had already become a profitable investment. It had enabled the preparation of seed beds in less time and 'for much less money than bullocks', with whom it 'would have been impossible to prepare so much land and have crops on it'. These benefits were also felt by villagers in the surrounding area, who rented and purchased their own Deering Tractors from McCormick.²⁶ As we can see, the benefits of machines were understood in terms of their superiority to animal workers. The tractor was praised for the scope and scale of work it could perform in a shorter space of time than plough bullocks. In the context of the farm, the machine would greatly improve the speed and stability of agriculture. It was a clear and obvious replacement for animals in many aspects of agricultural work.

In other cases, machines performed a supporting role by minimising the time needed to perform some of the more mundane and labour intensive aspects of farming, freeing up human and animal labour to complete more important tasks during India's short harvesting season. One such aspect of farming was the process of threshing, the act of separating the edible portions of the crop from the straw and other attached leafage. For centuries, farmers threshed their crops by beating the grain off the stalks with a flail, or by letting animals walk on the stalks, a highly time consuming process that slowed down agricultural production. This would change in 1786, when a threshing machine was invented by Scotsman Andrew Meikle. These first threshers were powered by humans working a crank, and later by oxen and horse, who walked in circles to power the machine. Due to their high cost, they were initially beyond the reach of most farmers in Britain. But by the late nineteenth century both horse and steam powered threshers had been replaced by gasoline engines.²⁷ In 1923 a thresher manufactured by the Avery Company arrived at the Allahabad Agricultural Institute. Founded by Robert Hanneman Avery in 1891, the company found success until it buckled in the financial crisis of 1929, famed for designing a thresher that used an un-mounted engine, similar to those found in trains. Higginbottom sang the praises of his 'new Avery thresher' for taking grain out cheaply, cleanly and quickly. Due to its speed, it prevented crops being stolen by 'rats, ants and other thieves'. It also freed up the 'oxen to plough'. Before the thresher, the Institute relied on all of its oxen to thresh the crops for six weeks, leading the wheat to become mixed with animal dung and urine, as well as increasingly the risk of spreading foot and mouth disease from the hooves of the animals. For Higginbottom, the mechanical reaper was 'necessary if India is to reap the full

²⁶ ASSSC, 5996:5 (1929), 'Letter from Sam Higginbottom to Cyrus McCormick, 25/03/1929'.

²⁷ Harper, *Changing Works*, p. 34.

benefits of her wonderful soil and climate'. If put into general use across India, the thresher machine 'would leave the oxen free for plowing at a time when good plowing gives a full return'. From an educational perspective, Higginbottom felt that training in new machinery would improve the mental abilities of the people. As he states, 'it takes more intelligence to run a thresher than to drive oxen round and round in a circle, and so the man is developed, his capacity for efficient work is increased, his self-request is enlarged'.²⁸

Machines and animals were both a part of the curriculum taught at the AAI by qualified staff from North American universities and across India, who educated the growing numbers of students from Christian, Hindu and Muslim backgrounds from 'the farthest' reaches of west, east and north India. Sam and his staff would struggle to teach many uninterested and disruptive students from privileged elite backgrounds, as their overall objective was to teach practical skills that students could replicate in their villages. As acting Principal in 1921, the American ecologist and botanist Dr. Leslie Alva Kenoyer (1883-1964)²⁹ recalled feelings of elation and pride on a holiday at the source of the Ganges river in the Himalayas. On the journey he found a former student in a 'remote mountain village...doing his best to introduce improved agriculture into this crudely tilled and poorly fed region', as well as reading from the Bible to his companions.³⁰ A number of students also expressed their commitment to this goal, such as John Ketha, who wrote to the institute in order to request whether he could gain an education that would help him to uplift his village.³¹ The Institute also attempted to reach out and educate farmers in areas surrounding Allahabad, by offering short courses to promote education amongst 'village pastors'. This vision gained an international perspective with the arrival of Indian Fijian students, the ancestors of coolies sent to the South Pacific many years before. Their arrival signified a transnational connection between Indian and Australian missions, who saw that it was important to train men and women 'for the betterment of agriculture among their own people'. Speaking with a visiting commission on education in India, Kenoyer summarised that there needed to be a system of education that was largely agricultural and industrial, for 'preparing boys for life in the village rather than leading them, as the present system tends to do, away from the villages'.³² In addition to the guidance given relating to

²⁸ ASSSC, 5996:2 (1923), 'Letter from Sam Higginbottom to Dr Trull'.

²⁹ Ralph R. Stewart, 'Missionaries and Clergymen as Botanists in India and Pakistan', *Taxon*, 31, 1 (1982), p. 61.

³⁰ ASSSC, 5996cd: 6 (1921), 'Letter from Dr. Kenoyer to Mr. Cody, 24/02/1921'.

³¹ ASSSC 5996: 2 (1921), 'Letter from John Ketha to The Principal of the Allahabad Agricultural Institute, 15/04/April 1921'.

³² ASSSC, 5996cd: 6 (1921), 'Letter from Dr. Kenoyer to Mr. Cody, 24/02/1921'.

strictly agriculture, from 1936 the AAI opened a Home Making Department, designed to respond to the 'deep-felt need' for education to create 'more capable wives, mothers, social workers and teachers of Domestic Science or Home Economics'. This included the role that women should play in village life to help society, including a curriculum of handicrafts, English, economics, sociology and social service. But it also meant that these women who enrolled would also sit aspects of the Intermediate course in Agriculture which provided knowledge of chemistry, botany, zoology, gardening and soils as well as Animal husbandry, dairying, food and nutrition.³³ But how did machines sit alongside the goals of Higginbottom, his staff and also the education desired by students? Were they perceived to support agricultural development for the few, or the many?

Higginbottom's work at the AAI had long addressed the question of cattle and how to support their populations. One of the main avenues his work explored was cattle feeding. As an accessible and cost effective solution to issues facing fodder, Higginbottom sought to support the RCA's efforts to develop a self-sufficient and long lasting system of 'making of silage' from local grass and plant life.³⁴ A similar goal was pursued by Colonial Ernest Hudson at the Naini Central Jail in Allahabad. Visiting the jail in 1904, Higginbottom spoke enthusiastically about the 'machine shops, carpentering and woodcarving...pottery...weaving sheds...the most up-to-date hand-loom' for prisoners to make 'their own blankets and clothing'. Furthermore, the jail's 'modern dairy...provided milk for the sick prisoners and jail staff', feeding its cattle using experimental 'underground silos'. Higginbottom would proclaim that he had 'never seen cattle in better condition than those at the Naini jail fed on this silage', and took inspiration from Hudson's effort to teach every prisoner a practical skill.³⁵ Higginbottom was disgruntled by the theoretical and laboratory bound research of the Raj and the reluctance of missionaries to tackle the practical issues facing the people. Furthermore, he felt that because Indian customs of animal husbandry imposed 'no control' over 'the breeding of cattle', many 'good ...cows of a fair dairy breed were brought into a district', only to be 'sired by a local sacred bull' and produce offspring that 'give from one-half to one-fourth of the milk that the mother gave'. Mirroring the notion of the vicious circle, he believed that unless this tradition was prevented,

³³ ASSSC, 5996:13 (1939), 'Agricultural Institute, Allahabad: Home Making Department Prospectus, 1938-39'.

³⁴ *Royal Commission on Agriculture*, p. 206.

³⁵ Higginbottom, *Gospel and the Plow*, p. 11.

India would continue to produce a stock of ‘inferior dairy-breeding animals’ that would gradually become ‘progressively worse’.³⁶

Higginbottom drew parallels between the logistics and structure of supplying food to a centralised jail population and Indian small holding farms, which were ‘often distributed within a radius of a mile or so round the village’, where families lived and worked as a collective to protect ‘against wild animals and wandering bands of criminals’.³⁷ He concluded that ‘the silo was the best single means’ to improve and sustain the quality of draught labour and dairy yields through pre-monsoonal dry seasons. During the normal rains in India, villagers would ideally collect and store the ‘enormous quantities of fodder grasses’ which grow in earthen silo pits, that ‘filled with these grasses...would keep for years’. Each village would then have ‘a fodder bank’ that in times of ‘scarcity...could be drawn upon’, ultimately meaning that ‘millions of cattle that are now lost could be saved’.³⁸ Situated alongside the main railway and pilgrimage pathway into the city of Allahabad,³⁹ the institution gained prestige and funding to research silo improvements by selling milk of renowned ‘cleanliness and sanitation’ to locals.⁴⁰

When it came to questions about the role of the machine in agriculture, Higginbottom became torn between two competing forces. On the one hand, the machine indicated progress and revolution. But, in reality the socio-economic and ecological dynamics of agriculture in North India were not suited to their use. The limitations of utilising machines and the need to adapt the local context became the central focus of many colonial and Indian leaders during the 1920s. These issues and limitations came to the attention of Higginbottom and the staff at the AAI. During this period, a number of texts were published that offered descriptions and guidance about agricultural machines in English and the local vernacular, Hindi. One such book was published in 1926 by Shitalprasānd Tiwāri Vishārd, an Assistant Farm supervisor at the Allahabad Agricultural Institute. Tiwāri had been admitted for studies at the Agricultural College in Cawnpore with a stipendiary scheme that was commissioned by the Director of Agriculture for the United Provinces, G. Clarke. Tiwāri’s book was introduced with a foreword by H. N. Batham, the Agricultural Chemist to the Government of the United Provinces who

³⁶ Higginbottom, *Gospel and the Plow*, p. 72.

³⁷ Higginbottom, *Gospel and the Plow*, p. 13.

³⁸ Higginbottom, *Gospel and the Plow*, p. 74.

³⁹ Higginbottom, *Gospel and the Plow*, p. 59.

⁴⁰ Gary R. Hess, ‘American Agricultural Missionaries and Efforts at Economic Improvement in India’, *Agricultural History*, 42:1 (1968), p. 25.

had worked with Clarke from his base in the industrial city of Cawnpore, publishing widely on experiments he conducted with soils. Batham lamented that Indian agriculture was in a deplorable condition (*shochaneeya avasthā*). To improve, Indian people needed an agriculture-reference book that was written in a straight-forward Hindi, offering tips and guidance that would benefit a farmer in reality, not just in a laboratory or on a government farm. Throughout the text, Tiwāri debates whether progress should be driven by agricultural machines or animal labourers. His work offers knowledge about the methods and implements used by farmers across India, praising these items for their suitability to the landscape and the seasonal variables that people had adapted to over centuries on the subcontinent.⁴¹ For example, he is complimentary of the Raja Bullock Hoe, an implement that when pulled by bullocks can cut through the land.

In his introduction, Tiwāri recognises that, since World War 1, farming in Europe has gravitated towards machines for ploughing the soils, leading to spikes in productivity. Tiwāri felt that tractors could play a big role in developing nations (*unnti-shila deshion*). This viewpoint was shared by many colonial officials, who also saw agricultural machines as an important step towards agrarian uplift in India (*desh ke krishi vibhāg*). Tiwāri offers information about new machines and their possibilities. For example, one of the most popular brands of tractor was the Caterpillar because of its unique crawlers, designed by the company's founder Benjamin Holt (1849-1920). During the late nineteenth century, tractors were heavy and often sank into the ground. As such, the crawlers made it possible for tractors to navigate soft terrain. In the caption below, Tiwāri boasts about the power and speed of new machines that could plough from six to nine acres in only ten hours. However, at the time, tractors were not widely used. Many Indian people were reluctant to embrace machines, as they could not afford to upgrade from animal power. Others were afraid to move on from the customs of old, resisting the efforts of the government Agricultural Departments to introduce machines. For many colonial officials in the agricultural department even animals of a perfect breed were poor for cultivation, but for many people simply abandoning animals was an impossible ask (*unkā kahanā hai ki pashuaun ki nirbal dashā hi uttam shreni ki jutāi ke mārḡ mein vādhak hai*). As such, Tiwāri notes that two circumstances had to be in play for tractors to easily, and with maximum impact, be normalised and used by communities. The first instance was in famine stricken areas, when animal populations were lost and the idea of buying a new tractor

⁴¹ Vishārd Shitalprasānd Tiwāri, *Krishi Vigyān* (Agricultural Knowledge) (Allahabad, 1926), p. 280.

could be encouraged through government demonstrations. They could also be introduced to people settling into newly irrigated lands, where they could help to manage the new land and build a relationship between the machine and the people.⁴²

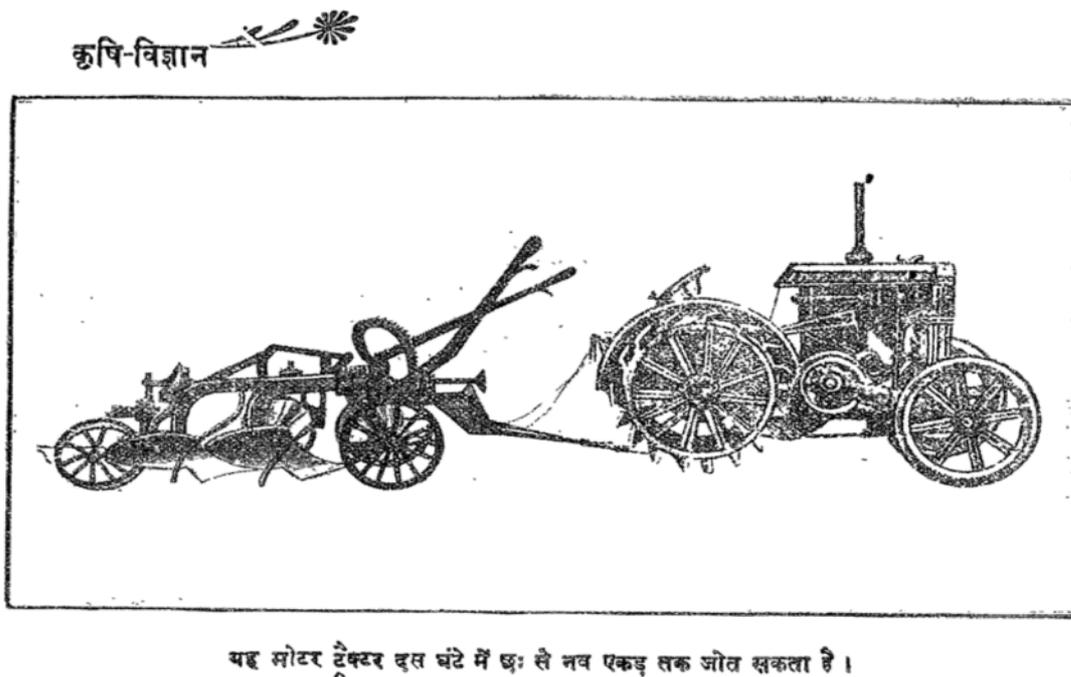


Figure 16: 'A motor tractor', from Vishārd Shitalprasānd Tiwāri, *Krishi Vigyān* (Agricultural Knowledge) (Allahabad, 1926).

Higginbottom, like many businesses and officials working in agriculture at the time, became torn between two forces, the rising presence of the machine and the presence of animals in rural India. Breaking down the sense of distance between man and machine was also a key topic in many advertisements for new machines and implements. In addition to the variables of climate and the logistics of getting tractors to the masses, one of the major issues with introducing tractors to India was the expense. In America, it had been possible for tractors to be widely distributed by companies such as Ford during the 1920s, as they kept the costs relatively cheap, selling at around \$700 initially, before reducing to approximately \$400. In India, this was a colossal expense. The image of tractors and agricultural machinery in general as something only the wealthy could afford was common. As such, many companies sought to

⁴² Tiwāri, *Krishi Vigyān*, pp. 317-319.

shake off this image in their marketing strategies. For example, in an advert published in the agricultural journal the *Allahabad Farmer*, the American manufacturing company Fairbanks Morse stress that their engines, pumps and other machines are not just for Rajas (kings) and rich men only but for common farmers also, at prices that they could afford.⁴³

Another hurdle for those selling agricultural machinery was the attachment that people felt to their animals. How could they show that machines were far superior to oxen, and worth the investment? For some, the answer lay in maintenance. Animals were less expensive to procure, but they required lots of feeding, grooming and veterinary treatments that if unresolved could quickly lead to the loss of the farmer's workforce and livelihood. Machines were not organic nor were they sentient, they did not protest or grow tired. But machines did require gasoline to run, oil to stay in good condition, and maintenance and mechanics to stay operational. In an advert in the *Allahabad Farmer*, a journal of the Allahabad Agricultural Institute, the Standard-Vacuum Oil Company stressed that although tractors were very reliable and required 'very little attention', its Gargoyle Mobiloil was necessary to prevent any breakdowns. The advert is not localised to India, suggesting that the American company were seeking to break into markets around the world.⁴⁴ In other cases, companies tried to tailor items to support and adapt animal labourers and country carts to modern infrastructures, such as roads. For example, Dunlop advertised its tyres as an improvement upon the wooden wheels that were commonly used. Dunlop was the first company to invent the pneumatic tyres, based on the research conducted by John Boyd Dunlop and Harvey du Cros.⁴⁵ Dunlop began marketing cycle tyres in India in 1896, forming Dunlop India Ltd in 1928. In 1936 it opened the first tyre manufacturing plant in Asia on a 239-acre plot in Sahaganj, near Calcutta, where they manufactured tyres for cars, cycles and animal drawn vehicles.⁴⁶ As we can see below, Dunlop began advertising its products in the *Allahabad Farmer*. As a manufacturer of tyres, Dunlop did not promote the use of new technologies, as it would not be necessarily beneficial. Instead, seeking to reach the mass market of villagers, they sought to market their tyres as vital additions to existing technologies and animal workers.

⁴³ *The Allahabad Farmer*, 9:3 (1935).

⁴⁴ *The Allahabad Farmer*, 9:3 (1935).

⁴⁵ Eric Tompkins, *The History of the Pneumatic Tyre* (Lavenham, 1981).

⁴⁶ <http://www.dunlop.co.in/aboutus/aboutus.php>

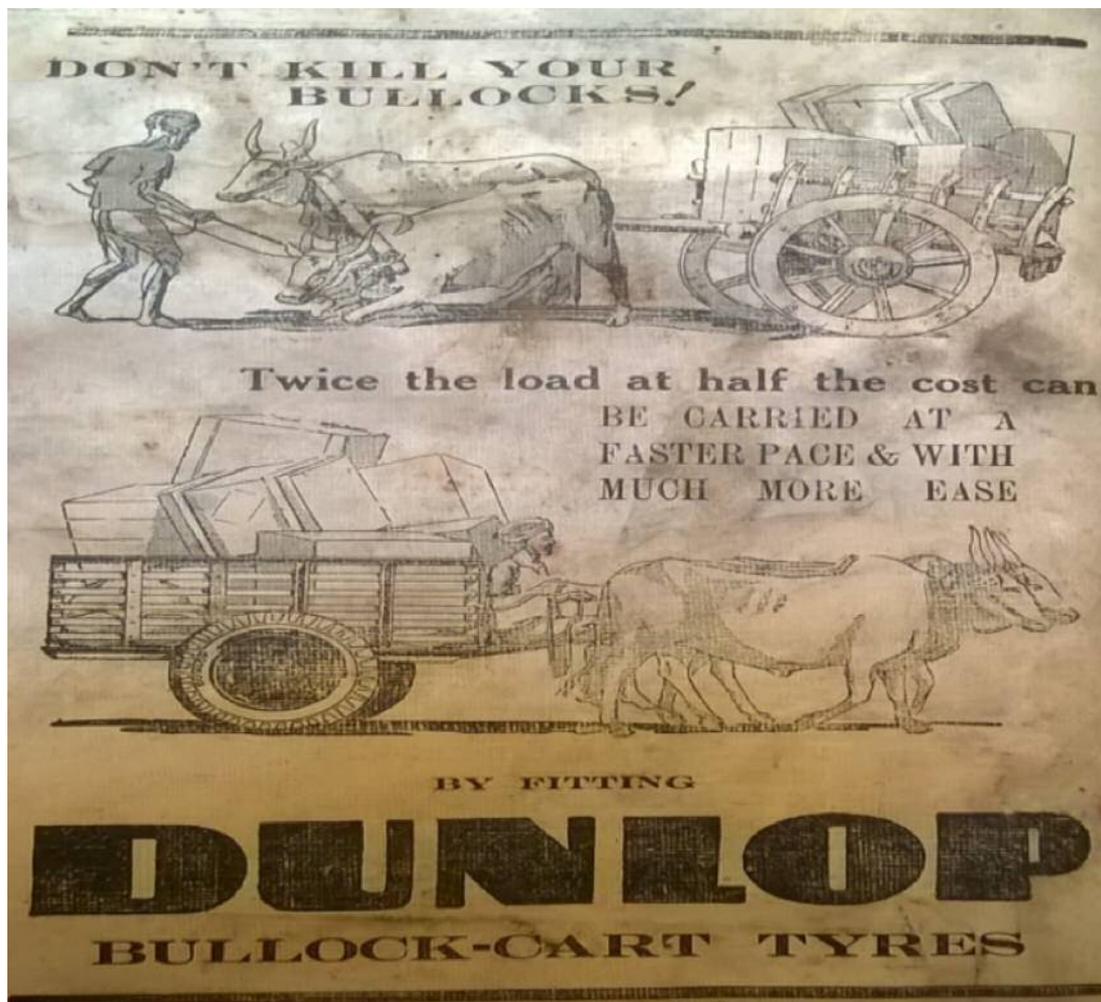


Figure 17: 'Dunlop Bullock-cart tyres', *The Allahabad Farmer*, 9:3 (1935).

The decision to design and produce technologies that catered to the animal population was a major transition of approach at the AAI. Higginbottom and his staff were initially driven by the belief that agricultural machinery was the key to prosperity in India. This belief stemmed from their close relationship with North American friends, funders and media, which perpetuated the idea that mechanisation was a cheaper and more productive way to conduct agriculture. However, the experience of Higginbottom and the institute staff led them to endorse and design implements that would support the common farmer. For example, in 1927 some of the students were learning to use an Oliver plough. These ploughs were invented and manufactured by Scottish born but American based James Oliver (1823-1908), who designed his plough to avoid the problems of soil becoming stuck in soggy ground, and breakages from

stones when the plough moved at high speeds. To do so he designed a plough with curved edges, cooling it slowly in a mould that allowed the metal to properly harden. According to ‘village neighbours’ of the institute, ‘farming with these improved ploughs has doubled their yield’. The institute rented out these ploughs to locals, when they could spare them.⁴⁷ But the most significant example of this was the *wah-wah* plough, designed by the Institute’s Agricultural Engineer Mason Vaugh, as shown in Figure 11 below. The plough was designed as an improved version of the country (*desi*) plough, which was commonly used by North Indians. As such, the technique and method were known to the people, requiring no training. It was instead an improved version of what they already had, available for only Rs. 6 – 8. It was also designed to be suited to bullocks of all shapes and sizes as it came with a range of attachments that were cheap, no more than Rs. 12 a piece. To promote the use of the *wah-wah* plough, demonstrations were performed across the district, such as in the small town of Serai Aqil to the east of Allahabad.

In operations at the Allahabad Agricultural Institute, animals and machines played a key role in ideas of agricultural progress during the early twentieth century. For western investors, donators and engineers, machinery was a path to progression in Western Europe and North America. Its introduction to India was another stepping stone towards the uplift of the subcontinent. As scholar Ian Stone has shown, concepts of the number of cattle necessary for each role were redefined by large structural and environmental changes induced by projects such as irrigation. It was also influenced by the arrival of new tools, such as a plough with a steel instead of wood, which reduced the amount of bullocks necessary.⁴⁸ Indeed, a vernacular work published in Rae Bareilly at the heart of the canal colonies in the Punjab stressed the significance of supporting bullock work with new types of equipment.⁴⁹ However, as seen from the analysis of the work of Higginbottom, while machines offered to reduce the time and cost of agriculture, they were expensive to procure and required lots of training to operate and maintain. Without an agricultural engineer, the machines at the institute were poorly used and out of service. As such, to meet the missionary goal of helping the common villagers to step out of poverty, Higginbottom and his staff needed to tailor their ideas about agricultural improvement to the environmental, economic and social realities of domestication. Part of this

⁴⁷ ASSSC, 5996:4 (1927), ‘Captions of Photographs given to Mr. Saigal’.

⁴⁸ Ian Stone, *Canal Irrigation in British India: Perspectives on Technological Change in a Peasant Economy* (Cambridge, 2002).

⁴⁹ Bejnāthprasād Yādav, *Krishi Sudhār kā Mārg* (Plan of Agricultural Progress), (Rae Bareilly, 1936), p. 3.

adjustment was accepting that the bullock would remain an essential backbone of agriculture across North India for some time to come. The AAI thus took steps to improve implements that could be used by even the smallest bullocks, inventing the *wah-wah* plough as a cheap but effective improvement to the common country ploughs in the hope of making progress available to all.

ALLAHABAD AGRICULTURAL INSTITUTE
CAN NOW SUPPLY
THE "WAH-WAH" PLOUGH WITH ATTACHMENTS

The "Wah-Wah" plough is suitable for all purposes. It works on the same principle as the desi plough, but is more efficient. The smallest country bullocks are sufficient to work it. Price complete, **Rs. 6-8**. Iron parts only, without wooden beam, **Rs. 5-8**.

SPARE PARTS AND ATTACHMENTS

No. 1. Stabilizer used with flat sweep and furrow makers.
No. 2. Flat sweep for replacement, with cultivator attachment. Has replaceable patch point, **Rs. 1**.
No. 3. Meston Bottom modified for attachment to "Wah-Wah" Plough, **Rs. 5**.
No. 4. Furrow maker. Can be supplied in 10", 12", and 15" sizes, for making all sorts of furrows and ridges. With cultivator attachment can be used for cultivating, weeding, and mulching. **Rs. 3-12, Rs. 4-12 and 6-8**, respectively.
No. 5. Special furrow maker for making furrows for sugar-cane planting. Can also be used for earthing up crops, **Rs. 10-12**.
No. 6. Cultivator attachment. This is useful for interculture, **Rs. 6**.

(NOTE.—Furrow makers are imported at present, and prices are subject to change.)
Prices and particulars from—

AGRICULTURAL ENGINEER

Figure 18: 'The Wah-Wah Plough', *The Allahabad Farmer*, 9:3 (1935).

6.3 *Agricultural progress in twentieth century India: A retrospective*

For their work at the AAI and the leprosy asylum, the Higginbottoms became local celebrities in Allahabad. They were welcomed back to Allahabad in 1922 with ‘a band and a regular parade of all kinds of people’, from professors to coolies, and a group of fifty students forming a guard of honour with hoes.⁵⁰ Sam Higginbottom’s work and vision for agricultural progress gained him many friendships outside of British, Indian and American circles. It also led to a number of correspondences and critiques of his insistence upon machines, and reflections on alternative means of progress in rural India. During his time at the Allahabad Agricultural Institute, Higginbottom was visited by and corresponded with many leading figures in Indian politics and nationalist movements, such as the aforementioned esteemed social reformer Pandit Madan Mohan Malaviya, the future Prime Minister Jawaharlal Nehru and Mahatma Gandhi himself. While Higginbottom presented his dream of a mechanical revolution to the Royal Commission, he and Gandhi often debated the best way to use technology and economics to revive India’s autonomous villages. Pluralisation was at the heart of Gandhian economics, which called for development to focus on the local level, without large scale mechanisation.⁵¹ In his works such as *Hind-Swaraj* (1909), Gandhi outlined a vision of Indian progress that conflicted with the industrial visions of centralised growth envisioned by other nationalists such as Dababhai Naorohi and Govinda Ranade.⁵² While machines saved time and increased productivity, Gandhi argued that ultimately they redistributed wealth into the hands of the few, creating widespread unemployment, inequality and further poverty. To promote universal mental happiness not material accumulation, Gandhi called for Indian people to pick up the traditional spinning wheel, the plough and Indian cultural values, to restore *swadeshi* (self-rule) by burning British goods and marching to protest the taxation of salt with the Salt Satyagraha of 1930.⁵³

The animal worker was one of the main symbols of Gandhi’s pluralised progress for Joseph Chelladurai Kumarappa (1892-1960),⁵⁴ an Indian economist educated in North America who

⁵⁰ ASSSC, 5996cd: 6 (1921), ‘Letter from Sam Higginbottom, 27th August 1921’.

⁵¹ Ajit K. Dasgupta, *Gandhi’s economic thought* (London, 1996), p. 3.

⁵² Vivek Pinto, *Gandhi’s vision and values: The moral quest for change in Indian agriculture* (New Delhi, 1998), p.

⁵³ M. K. Gandhi, *Hindi swaraj or Indian home rule* (Madras, 1909), p. 54.

⁵⁴ Mark Lindley, ‘Kumarappa: A Giant or a Midget?’, *Economic and Political Weekly*, 42:21 (2007), pp. 1975-1981.

pioneered Gandhian rural theories of development. For Kumarappa, the body of the cow was the root and centre of development, a malleable biological entity that could be altered to bring prosperity to every village.⁵⁵ Kumarappa first contributed to this discussion in his work *An Economic Survey of Matar Taluka (Kheda district)*, a survey of villages in Gujarat published for Gandhi in 1931. Kumarappa showed concern about the lack of good stud bulls, the limited amount of grazing lands, and the popularity of buffalos amongst the villages. He called for people to treat their cows better, as cows could provide both milk and produced a new generation of working bullocks. The buffalo represented an unproductive economic investment from the point of the view of Gandhian economics, as it only served one task. The cow, on the other hand, was able to perform a range of tasks and thus support growth at the local level.⁵⁶ Kummarappa took these ideas onto the world stage in his articles for the Village Industries Association (*Gram Udyog Patrika*), the journal of the All-India Village Industries Association (*Akhil Bharat Sarva Seva Sangh Parkashan*) that ran from 1939 to 1956. In essays such as ‘Cow in our Economy’ and speeches such as ‘The Cow and Peace’, Kumarappa presented the cow as not only a means to bring prosperity to the poor but a pathway to obtain global peace. Animal based economies were a peaceful alternative to the destructive potential of mechanical progress. Witnessing the violence of World War 1 and 2, Kumarappa argued that the shift in western society from ‘the horse to coal and thence to petroleum’ led to ‘greater and greater violence’. This economic structure led the nations of the world to fight for control over coal and ‘petrol pockets’, using technologies that exhausted the non-renewable mineral sources extracted from the ‘bowels of the earth’. Returning to ‘perennial’ resources offered by nature, such as animals, represented a peaceful resource base for civilisation.⁵⁷

The significance of cattle would transcend purely nationalist movements and Hindu organisations. Numerous voices stressed the significance of maintaining cattle as both workers and dairy animals. Moreover, they associated different approaches and methods of domestication with competing ideas of progress. For example, the Bombay Humanitarian League was a branch of an international organisation that sought to promote socio-economics, health, ethics and cultural norms, agricultural and animal husbandry practices, that were believed to uplift the Indian villages. It frequently hosted essay competitions, publishing the

⁵⁵ Venu Madhav Govindu and Deepak Malghan, ‘Building a Creative Freedom: J. C. Kumarappa and his Economic Philosophy’, *Economic and Political Weekly* (Sept, 2005), pp. 5477-5485.

⁵⁶ J. C. Kumarappa, *An Economic Survey of Matar Taluka* (Ahmedabad, 1952), p. 104.

⁵⁷ J. C. Kumarappa, *The Cow in our Economy* (Varanasi, 1963), pp. 9-10. For further work on Kumarappa, please see, Ramachandra Guha, *An Anthropologist Among the Marxists and Other Essays* (Delhi 2001), pp. 81-83.

winner such as Muljibhai B. Barad's work *Cattle Problem in India* in 1932. Released as a book in 1934, Maganlal M. Shah wrote in its introduction that,

In spite of such supreme importance of cattle, it is regrettable that the attention paid to it by the State and the Public is scanty. The National Leaders in the country have so far neglected the question. They seem to have forgotten that cattle is a national asset and is the main factor for the economic independence of our country. Their apathy, therefore, for this important question is in a way detrimental to our political efforts. It should be remembered that there can be no real prosperity in a country especially in an agricultural country which fails to protect the real back bones of agriculture.⁵⁸

Many colonial officials recognised the role of British Imperial rule in causing a disparity of development in India, discussing the application of governmental approaches to the socio-cultural, environmental and behavioural norms of dairy farming in India. Even the RCA stressed in 1927 that because India's population was and remains mainly rural, focusing solely on the industrialisation of dairy produce 'would be absurd from the economic point of view'.⁵⁹ In 1937 Norman C. Wright argued that techniques such as cross-breeding created cows that were only fit for industrial contexts. Even the government's approach to indigenous cattle created 'difficulty...when the policy adopted at the Military Dairy Farms is used as a model for the development of the dairy industry in the country as a whole'. Wright argued that because India was 'essentially a country of small holdings', a 'national industry...should meet the needs of the great mass of the population'.⁶⁰ This included producing indigenous dairy produce and 'mixed-farming' systems that could supply fodder to cattle. He also suggested that water buffalo should be more widely utilised. Buffalo provided more milk with less fodder, and the labour of twenty bullocks could be supplemented by that of three buffalos. Local awareness of their material value was affirmed for Wright by the very different treatment of buffalo in most localities from that of the cow. She-buffalo were carefully tended by the women of the household, and not infrequently selection was exercised in buffalo breeding, demonstrating that poorer agricultural classes valued the murrhah breed highly and recognised the value of understanding and appeasing the behaviour of their stock.⁶¹

⁵⁸ Maganlal M. Shah, 'Introduction', Muljibhai B. Barad, *Cattle Problem in India* (Bombay, 1934).

⁵⁹ *Royal Commission on Agriculture*, p. 202.

⁶⁰ Norman C. Wright, *Report on the Development of the Cattle and Dairy Industries of India* (Delhi, 1937), pp. 8-13.

⁶¹ Wright, *Development of the Cattle*, p. 59.

Other officials were sceptical of focusing on rural aspects, and instead saw development as a means to be achieved by utilising government institutions. For example, in 1949 the capacity to improve India's common stock of cattle through feed was actively rejected by the Imperial Council of Agricultural Research's series of comprehensive reports on agriculture and animal husbandry. This opinion would be outlined in 1943 by P.E. Lander's report on animal feeding, that, due to the complexities of war and Indian independence, would be published in 1949.⁶² Lander's proposed method for development drew upon an extensive range of global case studies and twenty years of trials at Lyallpur in the Punjab. In his study, Lander argued that the majority of India's cattle were fed on 'roughage only with little or no concentrates', and as such 'stand so to speak outside the pale of scientific nutrition'.⁶³ According to his estimations, even if the mass of 'non-descript' cattle with 'notoriously low' milk yields were provided with the same feed as a 'scientifically conducted dairy herd', there would not be a dramatic improvement.⁶⁴ Despite such arguments, Lander recognised that highly controlled and selective conditions used at government dairy farms were unsuited to India's climate and demography. Due to the perishability of milk and resources necessary for mass production, in economic terms industrial scale dairy production was a negative loss leader, bound to a constant chain of supply and demand that was only viable for concentrated urban populations. Nevertheless, he deduced that the best means to utilise cattle to support an Indian nation was to combine the best breeds with the highly controlled feed, artificial conditions and regular schedule of milking. The main breed to be used at Lyallpur was the Sahiwal, which was able to produce an average of 20 lbs (9 litres) of milk a day containing up to 5% fat, on rations that were slightly below the standard deemed by global breeding manuals to be necessary.⁶⁵

As the pamphlet below indicated, on the cusp of India's agricultural revolution in the 1950s workers at the Allahabad Agricultural Institute understood that technology did not have the same impact upon agriculture around the world. A plough bought in North America did not have the same effect or significance as a plough bought in India. While financial limitations prevented smaller farmers from accessing expensive machinery, wealthier farmers were also hindered by the lack of knowledge or training in mechanics. By this time the Higginbottoms had left India and returned to live in North America, working at a Christian service training

⁶² P. E. Lander, *The Feeding of Farm Animals in India* (Calcutta, 1949), p. v.

⁶³ Lander, *Farm Animals*, p. 289.

⁶⁴ Lander, *Farm Animals*, p. 294.

⁶⁵ Lander, *Farm Animals*, p. 293.

centre in Frostproof, Florida. As the colonial era came to a close and India entered its developmental era, its history would increasingly become torn between programmes that pushed for industrial progress, and those that sought to support those left behind by machines. Despite the successful integration of machines at the Allahabad Agricultural Institute, Higginbottom's initial goal of spreading agricultural machinery into the farms of India was fraught with many challenges. As studies of post-independence India have shown, discussions of agricultural modernity in India were shaped by the 'conflict between industrial and agricultural interests over definitions of development... and who should benefit'.⁶⁶ Such tensions were apparent in the Indian Republic's efforts to create a self-sustaining food supply. Its First Five Year Plan (1951-56) sought to achieve this goal through promoting the 'intensive cultivation of land by hand' by 'more than 60 million peasant cultivators', promoting employment and integration within national programmes as a means to uplift 'conditions of living in rural areas'.⁶⁷ These operations were supported by American money, machines and research, from notable corporations such as the Rockefeller Foundation. The apex of the influence of the United States upon agriculture in India and across the globe came with the Green Revolution (1967-78), which provided farmers with high yield crops designed by American agronomist Norman Borlaug.⁶⁸ Yet due to the extensive fertilizers, irrigation, chemical pesticides and mechanised traction required to successfully cultivate the modified crops, the programme ultimately benefited farmers with large holdings and access to extensive resources.⁶⁹ Across India, agrarian society became marred by disparities and inequality due to the centralising and hierarchical tendencies of industrialised crops and techniques. This created populations that were untouched by national modernity for socio-economic, cultural and climactic reasons, and thus branded as "undeveloped".⁷⁰

⁶⁶ Akhil Gupta, *Postcolonial Developments: Agriculture in the Making of Modern India* (Durham 1998), p. 15.

⁶⁷ Francine R. Frankel, *India's green revolution: Economic gains and political costs* (Princeton, 1971), p. 3.

⁶⁸ J. R. McNeill, 'The green revolution', in Mahesh Rangarajan (ed.), *Environmental issues in India: A reader* (Delhi, 2007), p. 187.

⁶⁹ Surendra Mohan Mishra, *Agriculture and environment: Debates in the central legislature of India 1937-1957* (Delhi, 2015), p. 188.

⁷⁰ Gupta, *Postcolonial developments*, p. 34.

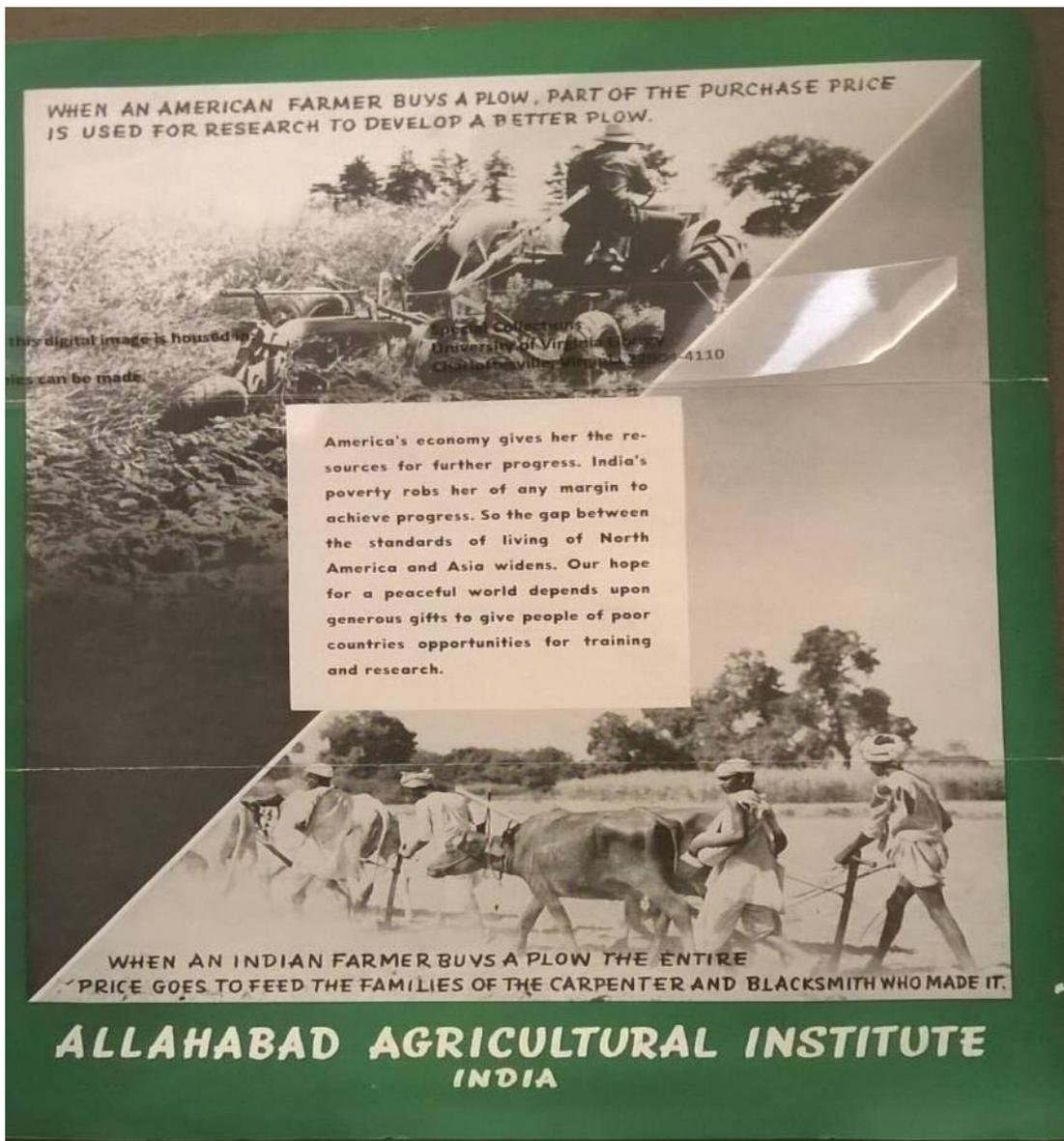


Figure 19: ASSSC, 5996cd:8 (1950), 'Pamphlet of the Christian Centre Training, Frostproof, Florida'.

The Hindi journal *Agriculture and Animal Husbandry (Krishi aur Pashu Pālan)* came to epitomise this contrasting pull of change. Even after colonial rule came to a close, the government of India believed that domesticated cattle were the cornerstone of a standard village household in North India. Published in Lucknow from 1951, the journal was one of two monthly publications released by the government of Uttar Pradesh in an effort to support the extension of technical and practical knowledge amongst the farmers of the region's Gangetic

plains, a vast expanse of agricultural land that surrounded the Ganges river.⁷¹ As the illustration from the August 1951 edition of the journal demonstrated, machines were considered to be the final chapter in a long ‘Story of Agricultural Development’ (*Krishi Vikās ki Kahāni*). To evolve as a species, the image below shows that humans developed new tools, learnt to domesticate animals and invent machines that powered the rise of civilisation to the summit of productivity and progress. That said, the author Sukhveer Singh was also weary of abandoning traditional Indian practices, as he noted that American machines and models of farming had only been in use for 200 years. Singh proposed that India should seek to revive its forgotten customs (*bhuli hui prathāun*) as well as used modern machines such as tractors, in order to attain a balanced and stable path of progress like its neighbours (*parosi*) in China, Korea and Japan. The animal worker should not be abandoned, but instead work alongside new tools and techniques.⁷²



Figure 20: Sukhveer Singh, ‘Krishi Vikās ki Kahāni’ (Story of Agricultural Development), *Krishi aur Pashu Pālan* (Agriculture and Animal Husbandry), August (1951).

⁷¹ *Annual Report of the State of Uttar Pradesh 1961-62* (Lucknow, 1963), p. 19.

⁷² Sukhveer Singh, ‘Krishi Vikās ki Kahāni’ (Story of Agricultural Development), *Krishi aur Pashu Pālan* (Agriculture and Animal Husbandry), August (1951), p. 13.

Publishing on a wide range of topics relating to agricultural and animal domestication, the journal produced a comprehensive knowledge of ideas and methods, and their applicability to rural North India. At the heart of the journal remained the understanding that cattle were a vital cornerstone of village life. Only by encouraging and supporting the capacity for cattle to influence the livelihoods of the people could any change be instilled. Perceptions of how bovine populations could improve the health and prosperity of the people were situated and understood in relation to the physiology, behaviour and environmental adaption of cattle in India. Although industrial methods were pursued to produce large quantities of dairy for urban populations, their viability was contingent upon a constant chain of demand to sustain the necessary resources. Not only was this approach unattainable due to the material conditions of the average cultivator, but it promoted a system that was detached from the environmental variables most cattle had to face and overcome. By contrast, agrarian populist methods harnessed the environment to strengthen bovine and sought to understand and support the core aspects of how human-cattle relations took place in the village. The continued significance and integral role of cattle in the rural economy was clearly expressed in an image from an article by Pitāambar Datta Ghuliyā on ‘How to celebrate Lord Krishna’s birth week’ (*Gaupāshtmi saptah kaise manāya jāya?*). As the bottom left of the image indicates, bullocks (castrated males) were important workers, whose primary task was to plough the fields when guided by male farmers (*kheti*). To the right a cow is being milked (*dōdh*) by a woman, which would then be churned into clarified butter (*ghī*) and yogurt (*dahī*), as the top right indicated. Both male and female animals were also valued for the dung (*gōbar*) that they provided. As the top left showed, this was either moulded into flat round plates and dried in the sun as fuel for cooking, or it could be distributed across the fields as manure (*khād*) for fertiliser.⁷³ This image of a harmonious balance between the human and the animal was only a vision of how agriculturalists and nationalists sought to uplift India. They sought to restore this symbiotic balance of human and animal in the Indian village, which was widely believed to have been tarnished and on the brink of collapse since the colonial era.⁷⁴

⁷³ Pitāambar Datta Ghuliyā, ‘Gaupāshtmi saptah kaise manāya jāya?’ (How to celebrate Lord Krishna’s birth week), *Krishi aur Pashupālan* (Agriculture and Animal Domestication), 6:5 (1955), p. 23.

⁷⁴ For studies of cattle in the 20th century see A. K. Chakravarti, ‘Cattle development problems and programs in India: A regional analysis’, *GeoJournal*, 10:1 (1985), pp.21-45; Venkatasubramanian, Singh, Rao, *Dairy development in India* (New Delhi, 2003); Singh et al, *Crop-livestock interactions and livelihoods in the Gangetic plains of Uttar Pradesh, India* (Nairobi, 2007).

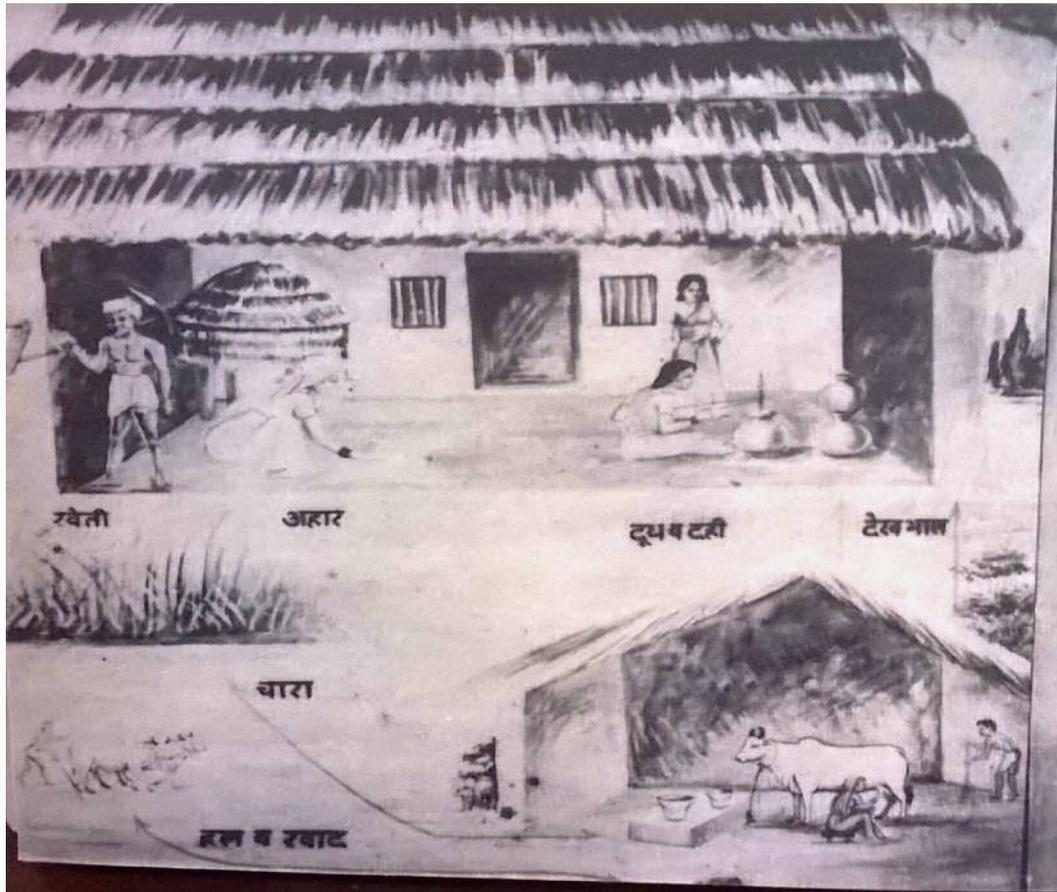


Figure 21: Pitāambar Datta Ghuliyā, ‘Gaupāshtmi sāptah kaise manāya jāya?’ (How to celebrate Lord Krishna’s birth week), *Krishi aur Pashupālan* (Agriculture and Animal Domestication), 6:5 (1955).

6.4 Conclusion

A truly post-domestic society has not emerged in South Asia.⁷⁵ Agricultural machines did replace many working animals on large farms, while mass-produced dairy, meat and eggs gradually popularised and removed animals from daily urban life over the course of the twentieth century. Yet to this day a large percentage of rural Indian people continue to rely upon and co-habitat with their cattle. As such, while a number of institutional histories of animal domestication have provided important studies of developments in imperial and national dairy farming, the practices at these institutions do not reflect the wider socio-cultural, environmental and material context of domestication in India. As this chapter has demonstrated, the work of Sam Higginbottom sat at an impasse between the modernising forces

⁷⁵ Richard W. Bulliet, *Hunters, Herders, and Hamburgers: The Past and Future of Human-Animal Relationships* (New York, 2005), p. 11.

of imperialism and North American modernity, that would ultimately influence national programmes of development in India during the post-colonial era. Higginbottom began as a wholesale advocate of industrialisation and agricultural machinery, as a revolutionary force that he believed would lead to vast socio-economic, demographic and cultural change in India. One of the symbols of the traditional past was the working animal, viewed as a remnant of a society that was subservient to the forces of nature. In many respects, Higginbottom's ideas demonstrate the prevalence of colonial discourses of mastery, and the overarching frameworks of orientalism. That said, Higginbottom was aware of the disparities that mechanical progress could bring. These issues were highlighted by numerous influential visitors from across India, including prominent nationalists that proposed alternative visions of modernity. Intertwined with Hindu nationalist and cow protectionist conceptions, these prophecies often saw the cow as the antithesis of western development. After consulting with nationalist figures such as Gandhi, Higginbottom and his staff came to this understanding about technology, leading to a policy that promoted the production of multiple levels of technology. While many advanced tractors, ploughs, reapers and other technologies worked well on the farm, beyond its lands these machines could not be afforded or worked by villagers. As such, the institute worked to design new tools and implements that could be accessed and used by farmers and their draft bullocks, regardless of their socio-economic status. This was also recognised by a number of agricultural companies in India, who sought to tailor their equipment to the common person and his oxen, and shake off the perception that advancements in agriculture were simply for the rich. The apex of this social approach to agriculture was the *wah-wah* plough, designed by the Institute's Agricultural Engineer, Mr. Vaugh, as an improvement upon the traditional countryside (*desi*) plough found in most farms across the country. Ultimately, Higginbottom and his staff at the AAI combined both technology and animal labour to their repertoire of classes, machines and approaches for agricultural progress. During the early twentieth century, these two forces sat alongside each other, as colonial officials and businessmen recognised the possibilities of selling tools that could support the existing farmers and populations of animal labour.

Conclusion

This thesis has provided an analysis of perceptions of animal behaviours in colonial and nationalist discourses. Previous histories have concentrated on veterinary sciences and agriculture in the nineteenth century, opening a gap in the field for an analysis of animal domestication at the turn of the twentieth century. Studies of animal husbandry had largely focused on the period after the formation of the Imperial Council and Agricultural Research in 1929, overlooking the significance of the opening decades of the century. This thesis has addressed this unexplored aspect of South Asian history, offering the first study of animal domestication in North India. As the centre of emerging cow protectionist movements and the formative years of colonial research in animal husbandry, the context offered a unique moment in which comparative ideas and attitudes towards cattle were formulating. Many studies have addressed the socio-cultural, political, material and environmental dynamics of human-cattle relations in India. This thesis proposed that an entirely new approach could be taken to the topic, by analysing representations of animal behaviours. In colonial and nationalist discourses, perceptions of how the behaviours of cattle influenced the composition of cattle populations, agriculture, health, economics and identity in North India were highly polarised. Through their primary behaviours of consuming, rearing, mating and herding, cattle formed the backbone of a co-evolutionary relationship with the people of North India and their imperial rulers.

The crux of this thesis has been an analysis of perceptions of cattle in two influential discourses of the era, namely colonialism and Hindu nationalism. It has been shown that in both cases, a variety of examples of animal behaviours emerged. Colonial documents often affiliated uncontrolled animals with chaos and degeneration. By contrast, Hindu nationalists valued the instincts of animals in many cases, due to their significance in ritual and material aspects of Indian life. On the surface, these contrasting cultural discourses offered entirely polarised representations of animals, and the capacity for their behaviours to influence Indian society. Under closer scrutiny, these seemingly rival perceptions held that cattle were a crucial foundation of civilisation across the subcontinent. Their representations and ideas were rooted in the understanding that India's predominantly agricultural nation was founded on its co-

evolutionary relationship with cattle. As this thesis has shown, the turn of the twentieth century was a period in which formative ideas about animal husbandry formed in colonial and Hindi vernacular studies. The work of veterinarians, agriculturalists, dairy farmers and cattle breeders analysed in this thesis revealed that efforts were taken to impose new models of animal feeding, rearing, breeding and herding upon North India's herds of cattle. From this analysis, it has been demonstrated that despite the prevalence of competing discourses, the history of animal domestication was ultimately grounded in the socio-cultural, material, environmental and behavioural dynamics of domestication. Humans and cattle shared a historically situated relationship, which these emerging discourses had to recognise and adapt their visions of progress towards. Colonial conceptions of agricultural modernity and the cow protectionist utopia of vibrant and plentiful cattle had to reconcile with the place of cattle in North Indian society, and also each other. For colonial officials or nationalists to make changes to animal domestication, it was necessary to grapple with the living and breathing animal population in question at the time. Each chapter of this thesis has demonstrated that colonial and nationalist discourses entered moments of consolidation and interaction. Western discourses of mastery and eastern religious traditions were not isolated bodies of knowledge and understanding. Questions of how to better utilise the products of cattle were grounded in the material realities of North India, such as the consumption of fodder and production of dung and urine. The act of dairying had to adapt to the cow's role in rearing its calves. The process of fixing a breed was grounded in environmental and cultural context of the bull. The merits of wandering bulls were determined by its instinct to mate and its impact upon the landscape. The very notion of how cattle contributed to civilisation was questioned by the possibilities of new technologies. While colonial and Hindu nationalist discourses seem to present static archetypes of animal behaviours rooted in cultural paradigms, this thesis has demonstrated for the first time that the history of methods and practices of animal husbandry were rooted in interactions with, and responses to, the perceived impact of animal behaviours.

As the first chapter demonstrated, perceptions of animals in the archive were presented through two competing yet intertwined discourses, namely colonialism and Hindu nationalism. Colonial discourses presented animal behaviours as a force that needed to be controlled in order to generate productive change. This paradigm was situated at the heart of imperialism and its "othering" of the people, landscapes and animals of the colonies. Management and mastery were also rooted in western traditions of animal husbandry, especially since the age of

enlightenment and the emergence of selective breeding in Georgian Britain. Within colonial discourse, domestication became one of many arenas in which the imperial power sought to demonstrate its right to rule, signified by its ability to impose progressive changes to the aesthetics, physiology and behaviour of indigenous breeds. Seeking to challenge colonial discourse, Hindu nationalism emerged at the turn of the twentieth century. North India became a central hub of cow protectionist movements, which promoted the living animal as a symbol of indigenous culture and the material foundation of society. The cow became a totem that could be used to revive the “golden age” of ancient Vedic culture within Hindu nationalist discourse, a concept rooted in colonial perceptions of India as a fallen civilisation. To revive this hallowed past and modernise the nation to challenge colonialism, nationalists promoted the development of vernacular knowledge and dairy farming that incorporated both indigenous knowledge, colonial science and western technologies. Both colonial and nationalist histories of cattle breeding have thus far situated studies of animal domestication in North India within these teleological narratives of development. As history from below, environmental and animal histories have shown, these overarching elite forces subsume the agency of historical actors within a Euro-centric narrative of change, overlooking the confluence of forces that shaped change. Utilising these approaches, this opening chapter set the stage for this thesis to challenge the assumption that the twentieth century was a period of stagnation or failure, due to the lack of progress along colonial or nationalist paradigms. Instead, these decades offer an important period in which to reflect on the contrasting perceptions of the impact of wider aspects, such as the socio-cultural and environmental dynamics of domestication, as scholars have shown. Moreover, this thesis offered the first investigation of how animal behaviours were affiliated with development and decline in the discourses of colonialism and Hindu nationalism.

In the second chapter of the thesis, the main aim was to understand how the socio-cultural norms of animal domestication were associated with ideas about agricultural progress. The aspect of this relationship analysed was that of the animal as a consumer of food, taking resources from the environment. Cattle were also understood to use this food to produce dung, a substance used as cooking fuel and fertiliser. In both colonial discourse and vernacular studies, the value of the animal was understood in terms of its contribution to agrarian life as a consumer and a producer. For many colonial officials, the socio-cultural norms of animal domestication in North India were not only unsettling the boundaries of civilisation, but were “pests” that drained the landscape of its scarce resources. Due to the taboo on slaughter and the

prevalence of wandering animals, agricultural officials believed that North India was overpopulated with a hungry herd of weak animals that trespassed and destroyed crops, leading also to the desertification of grazing lands. Curbing and controlling the consumption habits of these herds and managing their relationship to the environment was viewed by many colonial officials as a key to agrarian progress. With the introduction of agricultural chemistry from the 1890s, key journals such as the *Agricultural Ledger* promoted methods of fodder production and cattle feeding that supported the expansion of cultivation, using waste lands and river banks to grow fodder crops. Moreover, many officials felt that cattle should convert the resources they consumed into useful resources, such as using their dung to fertilise the land due to its nitrogen content. However, due to the lack of wood, cattle dung was commonly used as a cooking fuel by the people of North India. Recognising this socio-economic dilemma, many vernacular studies on agriculture and animal husbandry built upon indigenous knowledge and colonial science, in order to argue that urine was a viable alternative fertiliser for the land. Key terms such as “ammonia” were used in the Devanagari script of Hindi, to educate the readers in the latest terminology and encourage a new means of utilising the animal within the socio-cultural and environmental norms of North India.

In the third chapter the interchange of colonial and nationalist ideas about animal domestication converged around the question of the impact and contribution of an animal behaviour. Colonial dairy farmers built upon the research of agricultural chemists and horticulturalists to use controlled methods of feeding and fodder selection to improve the dairy yield of their cows. However, European methods of dairying were contested by the reluctance of *Bos indicus* cows to give up their milk unless their calf was present. Across North India during the late nineteenth century, it was commonly felt that separating the cow from its calf was not only morally repugnant, but it would lead the cow to have an adverse emotional and physiological response that lowered its yield of milk, and even caused the premature conclusion of lactation cycles. Building on previous studies, this chapter demonstrated that Indian milkmen were branded by urban elites for corruption, unhygienic practices, animal cruelty and for neglecting their calves. To distinguish the ethical and nutritional superiority of their dairy supplies, many colonial officials used the Indian milkmen as a benchmark to be condemned, within racial and ethnocentric discourses. But as dairying formalised and developed in military and government institutions, many Hindu nationalist and cow protectionists began to critique British methods. In the vernacular texts that emerged in the early twentieth century, the maternal instincts of the

cow were presented as a key to increasing her milk yield and producing strong, healthy calves that would become the backbone of the Hindu nation. To make this argument, vernacular texts utilised indigenous conceptions of the mother, but also concepts of evolution to argue that the maternal instinct was necessary to improve dairy production.

In addition to distinct behavioural characteristics, chapter four demonstrated that the cattle of North India were renowned for the aesthetic, physiological and behavioural characteristics of distinct regional breeds. As H. T. Pease reported, the south-eastern districts of the Punjab were home to a host of strong and healthy breeds of cattle, the most renowned being the Hissar type. These animals were crafted by the climate of the region, a dry landscape dotted with nutritious grasses, which forced cattle to endure hardship in order to survive. Moreover, the culture of cattle breeding and trading in the region had led to the formation of distinct regional breeds, each a product of intermixing with herds from in the Punjab, Rajputana and the United Provinces. For colonial officials, this environmental and physiological heritage could be the roots of an imperial centre of cattle breeding. Many colonial officials felt that indigenous methods of animal husbandry and trading were not conducive to the improvement of regional cattle populations, as the herds of village cattle were considered to be miscellaneous. This lack of distinct breed characteristics was perceived to be a sign of the degeneration of cattle populations. The government sought to bridge the gap between the pure breeds of cattle and the cultivators by creating its own supply and marketplace for the distribution of stud bulls. Using the environmental conditions in south-eastern Punjab, the CVD used controlled methods of feeding, rearing and selectively mating to breed stud bulls that they hoped would mate with local village cows, in order to improve regional herds. Bypassing local breeders and traders, the government felt that through distributing stud bulls across the districts, its agency as a reproducer would allow its distinct characteristics to uplift the populations by forming a regional breed. Many colonial veterinarians and cattle breeders challenged this assumption, highlighting the environmental, socio-cultural and behavioural limitations of introducing stud bulls to villages. The main opposition in North India came from CVD officials in the United Provinces, who argued that cattle populations had not collapsed due to the norms of animal husbandry, but instead the lack of grazing lands available for breeders to produce and distribute their local breed types. As such, the CVD opened a cattle rearing farm in the Kheri district of the sub-montane tracks, a rich landscape of forests and grasslands stretching along the Nepal border. This approach did not consider the capacity of any specific breed to be able to impose

an imperial conception of progress across environmental, socio-cultural and behaviour barriers. Instead, it supported local cattle breeders and attempted to revive indigenous knowledge and customs.

Regardless of whether the government bred or reared stud bulls, chapter five has shown that at the turn of the twentieth century many colonial officials were convinced that a custom practiced by the orthodox Hindu community was undermining the possibility of improving regional herds. Branded and let loose to wander the land after a funeral ritual, Brahmani bulls were viewed as wandering totems of carnal desires, danger and the degeneration. The custom was viewed as a socio-religious norm that allowed the wild instincts of the bull to wreak havoc on village herds. Ungoverned by a human master, the lustful instincts of the bull dictated the reproduction of cattle populations, leading to miscellaneous animals without the distinct attributes needed to uplift the herd. Competing perceptions of the nature of the bull and its mating abilities pervaded in colonial and nationalist discourses. Responding to a government circular, many Hindu leaders of North India contested the government's assertion that the dedication of bulls was detrimental to cattle populations. The act of letting the animal loose was deemed by Hindu scripture to be both a spiritual and material benefit to society. The Brahmani bull was one of the only means by which a villager could access the services of a bull, vital to producing a new generation of cattle. That said, many respondents concurred that the quality of bulls had declined. However, this was due to loss of grazing lands and the Allahabad High Court's judgment in 1884 that these bulls were wild animals as they lacked a direct owner, and thus were unprotected by colonial law. As the analysis of colonial officials from across the districts of the United Provinces demonstrated, the Brahmani bulls were a symbol of Hindu revivalism and the nationalist effort to restore the customs of India's Vedic past. While pre-colonial statistics are unavailable, an analysis of the geographic and cultural dynamics of dedication revealed that the majority of bulls were dedicated from cities, towns, temples and shrines that were connected to the rich spiritual lore of North India. Along the Ganges river and in the district of Gorakhpur, large numbers of bulls roamed causing damages to the land, the people and other animals. Beyond these centres, Brahmani bulls were few and far between. With cattle populations deteriorating and stud bulls failing to enact change, many officials, missionaries and landowners questioned whether the custom could be used to revive cattle populations, working with Hindu nationalists and their cattle sanctuaries.

Closing the analysis in chapter six, it was shown that perceptions of the capacity for cattle to contribute towards agricultural progress were reshaped by the emergence of machines in the early twentieth century. Imported from Western Europe and North America, tractors, reapers and other contraptions offered new possibilities for agricultural production, rendering the animal worker obsolete in the western world. For the missionary Sam Higginbottom, new technologies could revolutionise the east, breaking the reliance of the villagers upon the monsoonal rains and their “superstitions”. Animal labour became viewed as a symbol of the traditional past, an unruly and ungoverned population that needed to be abandoned in order to modernise the subcontinent. Introducing a range of machines at the Allahabad Agricultural Institute, Higginbottom worked closely with his agricultural engineer to ensure that the latest equipment could be tailored to the Indian context. Training at the institute offered a mixture of vocational and theoretical skills to potential students, including technical training using machines that Higginbottom hoped would uplift the socio-economic status of Christian converts in India. That said, throughout his tenure at the institute Higginbottom was visited by and corresponded with a range of influential Indian nationalists, who often challenged his faith in the virtues of industrial progress. In Gandhian economics, cattle were a backbone to an alternative modernity, one that uplifted each village by building sustainable foundations around the physiological abilities of the cow. From his experience of North Indian village life, Higginbottom also recognised that most farmers could not afford machines, nor needed them for their small holdings. As such, the AAI and many corporations worked to design improved types of technologies that would assist animal labour. As studies from the post-colonial era demonstrate, machines would work in conjunction with cattle in rural North India, providing the foundations of different levels of development.

The biggest challenge to completing a study of animal behaviours in South Asia has been the lack of previous studies on the topic. Animal histories have grown exponentially over the past ten years, allowing for a range of ideas and approaches to be consulted. Recent outputs across the sub-field have produced a range of comprehensive analysis of the interconnected and co-evolutionary nature of humans and cattle in a range of contexts.¹ This thesis has added to this wider literature by offering a perspective on the interconnection between animal behaviour and national and imperial discourses of progress. In South Asian history, studies have tended to

¹ Erica Fudge, *Quick Cattle and Dying Wishes: People and Their Animals in Early Modern England* (London, 2018); Joshua Specht, *Red Meat Republic: A Hoof-to-Table History of How Beef Changed America* (Princeton, 2019).

discuss the religious or material significance of cattle. Despite the presence of wandering cattle in the cities of North India to this day, scholars had yet to investigate how and why animal behaviours contributed towards history. This thesis was able to use colonial and vernacular resources to demonstrate that representations of animals were connected to cultural dynamics, grounded in the socio-cultural, environmental and behavioural foundations of the history of human-cattle relationships in North India. However, a host of pathways could be explored to further develop upon my analysis, utilising a range of types of evidence that I came across and considered during the course of completing this thesis.

It is clear that this thesis could be developed by moving beyond qualitative resources. While examples of perceptions of animal behaviours provide an important outline of the core factors, some material sense of the role and impact of animal behaviours could be garnered from statistical reports. This thesis has offered a comparison of representations of animals in colonial and nationalist discourses. It has attempted to ground these perceptions in the behaviours of the animals. An analysis of quantitative sources could develop this line of analysis, by exploring the impact of the animal upon the environment, upon the region and the people. This could be measured in many ways. For example, a study could investigate the nature of dairy yields and maternal behaviours, using government statistics. An analysis of the work of the Civil Veterinary Department over a longer time frame and its statistical impact could also provide an avenue to understand the impact of stud bulls in a regional sense. When I started this project it was unclear what data would be available in the archive, as no historians had addressed this specific topic or time period before. As such, I began to amass a wide range of statistics, some of which are utilised in this thesis. In a future study, a greater understanding of human-animal relations could be derived from further analysis of these resources.

A similar case can be made for the use and deployment of the vernacular archive in this thesis. A core focus of my journey to completing this thesis has been to learn Hindi and gain a standard that allowed me to translate historical documents. As such, for each document located I spent many fruitless hours navigating through libraries and archives, trying to decipher which documents might be relevant. Many scholars have begun to move beyond the colonial archive and investigate the vernacular in multiple languages of South Asia. Hindi texts have been studied in literature and politics, with some recent work on meteorology and agriculture. But a complete picture of texts on animal husbandry has yet to be conceived. This was in part a

limitation of my thesis, as I could not gain information on all texts, relying mostly on chronology and locality for information. Further historiographical investigations are needed to fully document and understand this wider archive, building upon the excellent groundwork already completed. Another aspect of this discussion is the question of preservation and access. For the most part, I was able to gain full access to significant textbooks and journals. Many archivists and librarians warmed to my presence after I greeted and conversed with them in Hindi. However, at some institutions a plethora of books are slowly decaying in the humid climate, that are difficult to access due to institutional issues. Some form of digitisation project or effort to preserve these documents is necessary if the history of colonial India is to also include a comprehensive knowledge from the vernacular perspective. While some books remain in good condition, many lack pages and show signs of damage.

As such, this thesis has established an important foundation for the study of animal history in South Asia, by both uncovering the extent of resources and topics from the colonial archive, and offering a formative investigation into the possibilities of the vernacular archive. In doing so, this thesis has uncovered a plethora of topics and themes, some of which need to be further investigated with future research projects. One of the most understudied aspects relating to the topic is the Cattle Trespass Act of 1871. While this thesis has touched upon this colonial law, I was unable to locate any further archival sources to support a full investigation of its impact in North India. A localised study of the nature of impact of the Cattle Trespass Act in any region of the subcontinent would greatly expand the topic of animal behaviours further. The act provides a means of studying how animal behaviours were perceived by colonial law, and also to access ideas and attitudes towards cattle as property in South Asia. It would allow for further understanding of the relationship between ideas of ownership and the animal's ability to wander and consume in the colonial era. With more time and resources, I would also develop upon the discussion of the Allahabad High Court and the nature of how representations of animals emerged in colonial law. Recent studies have discussed cow protectionism and transport animals,² but more analysis of animals in agricultural and urban society could further expand our knowledge and understanding of animal behaviours.

² For studies of colonial law and animals, please see, Rohit De, 'Cows and Constitutionalism', *Modern Asian Studies*, 53:1 (2019), pp. 240-277; Heeral Chhabra, 'Animal Labourers and the Law in Colonial India', *South Asia Research*, 39:2 (2019), pp. 166-183.

Another way to develop this thesis would be to further utilise the resources available at the Higginbottom collections in the University of Virginia. Due to time constraints, I was unable to fully explore the depth of resources. A research project dedicated to this archive could expand the history of animal domestication in North India, looking at missionary ideas of mechanisation, dairying and fodder production. Moreover, the archive also provided a wealth of ideas and resources on the work of Ethel Higginbottom. Her work at the Naini Leprosy Asylum could be studied to further understand missionary history and the social history of medicine. Her works of fiction also use animals as an analogy for the socio-cultural issues facing North India. I plan to utilise these resources to complete an article in the coming months. Gary Hess provided an extensive and unrivalled study of Higginbottom during the 1960s.³ But since, the collections available in the United States have largely lay dormant. A full scholarly investigation into the life and works of Higginbottom could provide some significant insight into agriculture in North India, but also missionary activity, the socio-cultural dynamics of the region and more on the nature of education and colonialism. Along these lines, as I became familiar with the archives of the United States I came across a host of records for missionary papers of notable figures that worked at the AAI, include Mason Vaugh the Agricultural Engineer. However, I only became aware of these figures after many hours of research, and as such was unable to visit their archives. A future study could develop greatly upon my discussion of machines, the *wah wah* plough and North India, by analysing these documents.

A complete picture of cattle breeding in North India could also be developed by analysing the range of documents available that discuss professional and village cattle breeders. In hindsight, the breeders of the sub-montane districts could have formed the basis of a unique chapter. While recent studies have addressed human-animal relations in the Himalayas,⁴ the history of the breeders along the Nepal border offers an entirely new avenue to explore in animal history. The significance of this region is initially hidden in the archive and historiography, due to the overwhelming focus of the Punjab. But after travelling to Lucknow and uncovering a range of documents at the Uttar Pradesh State Archive, it is clear that there is potential for further analysis. In terms of developing works on animal behaviour, North India still offers a wealth of untapped potential for historians seeking examples of how animals have adapted to human habitations. While many animals inhabit the streets of India's most populated cities, no study

³ Gary R. Hess, *Sam Higginbottom of Allahabad: Pioneer of Point Four to India* (Charlottesville, 1967).

⁴ Radhika Govindrajan, *Animal Intimacies: Interspecies Relatedness in India's Central Himalayas* (Chicago, 2018).

of how and why these animals are able to co-habit so successfully with humans has been created. Examples of animals in urban spaces of the past would not immediately stick out of the archive, as the presence of animals was a common sight across the globe at the time. North India's culture of cow protectionism and worship of animals such as monkeys provides an alternative dimension to the discussion. These animals are not purely commensal. They have been welcomed in some respects into the socio-cultural norms of the city. A study of urban monkeys, dogs, birds, goats, hogs and other creatures encountered on a daily basis in North Indian cities would provide an interesting means to develop upon this thesis, by offering an alternative and comparative history of animal behaviours.

Appendices

Appendix 1: Cattle populations in the United Provinces

	1904	1909	1915	1920
Bulls and bullocks	10873676	10098167	10256855	9901497
Cows	6895390	6230263	6345836	6210968
Male Buffaloes	856557	668040	826848	834109
Cow Buffaloes	3392814	3446311	3665721	3596226
Young stock (calves and buffaloe calves)	9334066	8925758	9280783	9220964
Total	31352503	29368539	30376043	29763764

Source: National Archives of India, Department of Revenue and Agriculture, 'The Cattle Census of the United Provinces 1915-1920'.

Appendix 2: Statistics on Humans and Cattle killed by wild animals 1885-1894

Humans	By Elephants	By Tigers	By Leopards	By Bears	By Wolves	By Hyenas	By other wild beasts	By Snakes	Total
1885	51	838	244	99	248	26	1,259	20,142	22,907
1886	57	928	194	113	222	24	1,169	22,134	24,841
1887	56	1,063	210	126	177	17	969	19,740	22,348
1888	57	975	184	110	139	22	912	20,571	22,970
1889	99	985	259	102	207	29	1,043	22,480	25,204
1890	57	798	179	91	242	26	1,046	21,412	23,872
1891	46	979	314	91	218	34	1,229	21,389	24,300
1892	72	947	260	145	182	42	1,315	19,025	21,988
1893	68	969	291	121	175	30	1,149	21,213	24,017
1894	68	864	371	111	227	26	1,226	21,583	24,431
Cattle	By Elephants	By Tigers	By Leopards	By Bears	By Wolves	By Hyenas	By other wild beasts	By Snakes	Total
1885	54	24,964	21,504	380	6,635	2,130	1,779	1,483	59,029
1886	14	23,769	22,275	758	4,275	1,312	2,644	2,514	57,541
1887	28	27,517	24,161	315	4,087	2,748	2,165	2,716	68,840
1888	32	30,151	28,596	347	4,469	3,142	2,076	2,813	76,271
1889	18	28,421	27,406	668	3,816	3,098	2,327	3,793	69,550
1890	14	29,275	25,552	573	3,263	3,509	2,346	3,948	68,480
1891	140	28,003	25,612	1,109	3,707	5,043	3,550	3,658	70,822
1892	108	29,969	30,013	440	6,758	3,738	6,144	4,498	81,668
1893	65	33,526	34,404	584	6,342	5,219	4,991	5,122	90,253
1894	82	34,194	33,696	286	6,313	4,899	13,025	4,876	97,371

Source: *Statistical abstract relating to British India from 1885-86 to 1894-95* (London, 1896).

Appendix 3: Selected statistics on cattle sold at fairs in the Punjab 1905-07

Cattle at fairs in the Punjab 1905	Hissar	Rohtak	Gurgaon	Kangra	Jullundur	Ferozepore	Amritsar	Jhelum	Lyallpur	Sialkot	Ludhiana
Amount of shows	6	2	2	1	1		2	1	1		
Bulls	24	18	0	29	0	19	16313	205	0		
Bullocks	17834	76915	25160	91	1050	553	18094	628	3836		
Cows	722	8467	223	40	2097	396	28393	57	2698		
Young stock	55	9	4303	46	1432	0	20400	21	0		
Buffalo	3607	17084	122	0	5441	1293	61700	0	2652		
Average price (Rs.)											
Bulls	0	0	0	18	0	0	28	0	0		
Bullocks	43	86	51	12	13	21	41	60	17		
Cows	10	39	20	25	12	17	27	29	12		
Buffalo	15	59	19	0	34	26	92	0	29		
Cattle at fairs in the Punjab 1906	Hissar	Rohtak	Gurgaon	Kangra	Jullundur	Ferozepore	Amritsar	Jhelum	Lyallpur	Sialkot	Ludhiana
Amount of shows	5	2	2	1	1	2	2	1	1	2	1
Bulls	32491	0	5231	97	4	0	13468	123	817	10393	0
Bullocks	2140	86287	27114	384	1128	3321	15023	362	3137	N/A	3191
Cows	6444	11256	677	38	0	702	19062	0	2417	9122	1454
Young stock	4995	0	7507	85	4682	488	19062	0	673	0	0
Buffalo	2239	19281	885	1	1267	1270	81665	0	3207	36387	1226
Average price (Rs.)											
Bulls	0	0	53	17	0	0	27	155	14	0	0
Bullocks	0	0	41	13	12	95	37	61	8	0	17
Cows	0	0	13	21	27	38	28	38	16	0	15
Buffalo	0	0	23	0	10	75	94	0	35	0	27
Cattle fairs in the Punjab 1907	Hissar	Rohtak	Gurgaon	Kangra	Jullundur	Ferozepore	Amritsar	Jhelum	Lyallpur	Sialkot	Ludhiana
Amount of shows	5	2	1	1	1	2	2	1	1	2	1
Bulls	0	0	0	136	5	14	12562	123	401	37	0
Bullocks	21126	80051	6747	55	1025	3838	14833	362	1251	7038	3923
Cows	368	6610	168	181	1971	622	28164	82	2168	7232	1458
Young stock	6275	0	7068	74	3999	525	20386	0	1126	0	0
Buffalo											
Average price (Rs.)											
Bulls	0	0	0	0	0	0	85	155	40	0	0
Bullocks	0	0	48	0	23	67	50	61	0	0	19
Cows	0	0	22	0	10	44	32	38	23	0	16
Buffalo	0	0	29	0	20	108	112	0	34	0	27

Source: National Library of Scotland: India Papers, Medical: Veterinary, 'Provincial Reports of the Civil Veterinary Department Punjab'.

Appendix 4: Indents and stock of stud bulls distributed by the Hissar Cattle Farm

	1905	1906	1907	1908	1909	1910	1911	1912
Stud Bulls supplied by annually by the Hissar farm	36	31	98	69	81	53	43	72
Indents received by Hisar	45		115	95	81	53	43	
Dhanni breed purchased from Chakwal and Talagang						20	19	
Total purchased by local bodies from farms	53	67	140	87	117	87	76	85
Casualties	34	27	39	64	59	52	63	53
Total Regional Stock in the Punjab	205	255	356	379	437	472	485	517

Source: National Library of Scotland: India Papers, Medical: Veterinary, 'Provincial Reports of the Civil Veterinary Department Punjab'.

Appendix 5: Distribution of stud bulls from the Hissar cattle farm to the districts of the Punjab

a) Stud bull returns for 1911-2

District	Number obtained 1911-12	Average price (Rs.)	Casualties	Total 31/03/1912
Ferozopor	11	154	8	55
Hissār	8	200	3	51
Lyalpur	6	32	2	49
Lahore	16	200	3	38
Hoshiarpur	4	200	...	34
Gurdāspur	6	200	3	33
Gujrānwāla	3	200	2	33
Karnāl	5	...	3	24
Jullundur	4	200	1	24
Ambala	10	200	1	22
Ludhiāna	3	221	...	19
Montgomery	8	200	...	18
Delhi	...	...	...	17
Gurgāon	...	...	5	15
Gujrāt	.....	...	1	15
Miānwali	...	...	3	14
Kāngra	1	...	...	12
Amritsar	...	...	2	9
Rohtak	...	...	...	8
Muzaffargarh	...	...	...	8
Siālkot	...	...	5	5
Shahpur	...	...	1	5
Rāwalpindi	...	...	2	4
Attock	..	...	3	2
Jhang	...	...	1	2
Jhelum	...	...	2	1
Multan	...	...	..	0
Dera Ghāzi Khan	...	...	2	0
Total	85	...	53	517

Source: National Library of Scotland: India Papers, Medical: Veterinary, 'Provincial Reports of the Civil Veterinary Department Punjab'.

b) Stud bull returns of 1914-5

District	Number obtained	Average price (Rs.)	Casualties	Total 31/03/1915
Hissār	14	200	2	73
Ferozepore	16 (including 4 dhanni bulls)	208	6	70
Gurdāspur	6	200	...	57
Amritsar	22	200	1	55
Jullundur	24	200	5	44
Hoshiarpur	8	200	6	43
Lahore	15	200	15 (sold at a rate of 105 each)	42
Gujrānwāla	8	200	1	39
Lyllpur	12	200	22	36
Karnāl	9	200	5	35
Gurgāon	5	200	2	33
Ambala	9	200	2	33
Montgomery	4	200	...	31
Ludhiāna	6	200	1	29
Siālkot	7	200	5	22
Miānwali	9	192	2	21
Gujrāt	10	196	2	19
Muzaffargarh	8 (includes four Dajal)	176	...	18
Kāngra	6	87	4	13
Shahpur	4	200	4	13
Rohtak	2	200	...	12
Attock	6	176	2	8
Multan	5	200	...	8
Jhelum	1	180	2	4
Rāwalpindi	3	131	2	4
Jhang	...	..	...	3
Total	219	...	91	765

Source: National Library of Scotland: India Papers, Medical: Veterinary, 'Provincial Reports of the Civil Veterinary Department Punjab'.

Appendix 6: Professional cattle breeders in the United Provinces

District	Tahsil	Village	Professional-breeders
Bijnor	Nagina	Rasulpur Muljhain	Abdullah, son of Sheikh Natthu; Ahmad Baksh, son of Ellahi Baksh
		Dhampur	Rani Phul Kunwar of Dhampur
		Tajpur	Raja F. X. Sham Rikh of Tajpur, sons of Bhupal Singh
		Benipur	Kana Padhan; Misri, Jat, son of Umra
		Sarkara	Tulshi, son of Bhagu
		Jamalpur	Anup, son of Bahol
		Bhagwaha	Amra, son of Moti; Jhanga, son of Khyali; Bhup, son of Kesri
Moradabad	Thakurdwara	Faridnagar	Thakur Ishri Singh
		Pasiapura	Jhandu, Ahir
		Bankawala	Abdul Baqi, son of Abdul Wahid
		Sahispuri	Rai Singh, son of Kehar Singh
		Hasanpur	Mahamudabad	Shahzad, son of Sattar
		Kudeni	Lalla, son of Jola Khagi
		Tigri	Ram Lal, son of Harnam Singh
Shahjahanpur	Powayan	Khutar	Raja Fateh Sah
		Bela	Kunwar Khanan Sah
		Kishanpur	Mola Murao
		Nawadia Niwazpur	Ibad Ullah; Khushal Gadi; Ori, Ahir; Gumani, Gadi; Gulab, Gadi
		Kharidpur	Nokhe, Gadi
		Seramau Shamali	Kunwar Balwant Singh
		Mandanpur	Sheo Singh
		Gulariya	Tilok Singh; Lachman Singh
Pilibhit	Puranpur	Madho Tanda	Rai Darshan Singh; K. Munna Singh; K. Dhun Singh
		Amraya	Amar Singh, Banjara
		Takiya	Durga, son of Ghareo
		Kalinagar	Ghamu, son of Haibat
		Shibnagar	Jodha, son of Chab Nath
		Gungehai	Pokhar Singh, son of Parbat Singh; Jang Bahadur, son of Puran Singh
		Dhakachat	Abdus Subhan, son of Pahari; Suba, son of Munna;
	Jatpura	Sarabjit Singh; Sardar Singh; Debi Singh; Lakhan Singh	
Sitapur	Misrik	Dakhyakalan	Rikha, son of Basawan, Gadi;
		Jalalnagar	Ali Sher Khan, son of Farkhand Khan; Baiju, son of Talib, Banjara
		Bakhraha	Kalka and Daulat Rai, sons of Kesri Lal
	Biswan	Chinsua Bilsua	Ram Sewak, Brahman
		Moharsa	Lallu Khan
		Mahwa Tal	Bhawani, Ahir
		Parsiya	Tackan, Ahir
Hardoi	Shahabad	Hindu Nagar	Chotah, Ahir
		Abdullanagar	Dhani, Ahir
Kheri	Nighasan	Dharmapur	Didara, Banjara
		Lodhpurwa	Sambar, Ram Nath and Mahabali
		Bhawanpur	Sheo Prasad
		Bhainsori	Surji Mahanand and Mohan
		Tirkaulia	Ajodhia, Jokho and Naij Nath
		Pallia	Badal Khan, Gulam Hussain and Chunu
		Baragaon	Jana, son of Hussini
	Muhamdi	Rajwapur	Kalka, Ahir
		Ahliyapur	Rohan
		Marja	Manohar, Ahir
Bahraich	Nanpara	Cherba	Sauli and Parshad, Ahirs
		Sujauli	Ms. Muna, and Hira Lal, Ahirs
	Kaisarganj	Kaundar	Tilak Das and Fakire Ahirs

Source: UPSA, RD (478/1912), 'The cattle-supply of the United Provinces'.

Appendix 7: Cattle populations in the districts of the United Provinces

District	Number of Ploughs	Number of cows	Number of cows per 100 ploughs
Gorakhpur	308579	422693	137
Kheri	125450	323848	258
Gonda	180413	313498	174
Mirzapur	123186	300385	244
Bahraich	135237	287878	213
Basti	230015	285998	124
Sitapur	148399	201533	136
Banda	71398	201256	282
Azamgarh	187608	199362	106
Allahabad	159942	192271	120
Jhansi	82504	190506	231
Rae Bareli	134221	138589	103
Jaunpur	135465	137847	102
Cawnpore	99051	136051	137
Fyzabad	143359	132981	93
Saharanpur	87370	130108	149
Moradbad	137251	129939	95
Hardoi	142383	119055	84
Partabgarh	126555	118687	94
Sultanpur	142019	116985	82
Bara Banki	113216	116619	103
Meerut	102906	115796	113
Ghazipur	83847	112980	135
Hamirpur	48800	109328	224
Ballia	58556	101676	174
Unao	106408	101359	95
Shahjahanpur	103794	93184	90
Fatehpur	78476	93167	119
Pilibhit	61089	86516	142
Budaun	104666	84390	81
Muzaffarnagar	64339	83648	130
Etawah	69559	82011	118
Benares	71105	81699	115
Bijnor	109787	80312	73
Farrukhabad	88738	77024	87
Bulandshahr	84937	75475	89
Agra	71708	68649	96
Etah	80819	68343	85
Muttra	42988	56101	131
Mainpuri	72032	56087	78
Aligarh	78395	54237	69
Lucknow	61271	52676	86
Jalaun	29508	39632	134

Source: NAI, DRA (312:5421), 'The United Provinces Cattle Census of 1915-1920'.

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