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

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Chapter Five: Colonial cattle breeding and its impact on cattle in South Africa, Swaziland, and Botswana, 1900s–1980s

> Pedigrees and eugenics – the application of selective breeding to people – are thoroughly out of fashion in contemporary thinking about human populations…. But this thinking is still the norm in relation to human control of animal breeding.[1] – Jacky Turner

[1] J. Turner, *Animal Breeding, Welfare and Society* (New York: Earthscan from Routledge, 2010), 293.

Introduction

Having looked at oxen's wagon labour, disease epidemics and veterinary regimes, and industrialised slaughterhouses, I now turn to an analysis of one further major impact of colonialism. Colonial impacts on cattle's subjectivities extended beyond labour, health, and ways of dying. Analysing state-supported colonial breeding projects and their later modernised forms, this chapter investigates which cattle were permitted to live and forced to reproduce, in particular from the early twentieth century until the 1980s. It focuses on South Africa, Swaziland, and Botswana to detect shifts in the region's cattle history. It aims to understand how breeding enterprises affected the lives and experiences of cattle and influenced the trajectory of their history. As explored in this chapter, forced artificial insemination (FAI) in particular, had a significant impact on cattle's experiences during the twentieth century. In South Africa, FAI started to occur from the 1930s but became more widespread from the mid-twentieth century. In Botswana this process emerged later, in 1967, and coincided with increased cattle slaughter rates. In both countries, FAI was preceded by colonial concerns with purebred bulls and pedigrees, notions which came to distinguish cattle as inferior and superior, and which were underpinned by concerns with productivity and profitability. Interestingly, colonists often claimed that local Africans in southern Africa were backward or primitive when they did not adopt modern, colonial breeding practices. Further, just as colonial states were marked by racial ideologies which regarded races in terms of superiority and inferiority, colonists invoked scientific discourses to perceive cattle breeds as inferior and superior.

Broadly, literature on cattle breeding in southern Africa can be arranged into four genres. First is a genetics literature, which examines genetic histories of cattle breeds, such as those of the broader southern African Sanga group, like Drakensbergers, Ngunis, and Africanders.[2] The second genre is starkly productionist, written often from veterinary and animal science

[2] H. Curson and R. Thornton, 'A Contribution to the Study of African Native Cattle', *Onderstepoort Journal of Veterinary Science and Animal Industry* 7, 2 (1936), 613–739; F. Stock and D. Gifford-Gonzalez, 'Genetics and African Cattle Domestication', *African Archaeological Review* 30, 1 (2013); S. Makina *et al*., 'Genetic Diversity and Population Structure among Six Cattle Breeds in South Africa Using a Whole Genome SNP Panel', *Frontiers in Genetics* 5, 333 (2014); L. Pienaar *et al*., 'Genetic Diversity of Afrikaner Cattle in Southern Africa', *Tropical Animal Health and Production* 50, 2 (2018), 399–404.

perspectives, but can include practical farmer perspectives, and is concerned ultimately with how to breed animals more efficiently and profitably.[3] Third, cattle breeding has been explored in relation to economic developments, colonial and veterinary expansions, and cattle industries.[4] Finally, cattle breeding more generally has been explored in histories of science and agriculture, exploring how ideas and contexts influenced different types of breeding practices, sometimes in relation to colonial contexts.[5]

Outside the southern African context, animal breeding has been linked to human eugenics and fascism.[6] A recent book, Tiago Saraiva's *Fascist Pigs: Technoscientific Organisms and the History of Fascism* (2016), explores the link between animal breeding, fascism in Germany, Portugal, and Italy, and colonialism in Libya, Ethiopia, Mozambique, Angola and Namibia. It is impressive in its geographical scope, and innovative in that it links histories of fascism to both histories of colonialism and histories of animal and plant breeding, by integrating the latter into the former. It does well to document how fascist colonial animal breeding regimes were implemented in Libya and Ethiopia.[7] Interestingly, that Scandinavian countries, the United Kingdom, the United States, Australia, and New Zealand had extremely extensive animal breeding projects from the mid-twentieth century, similar to those in fascist Europe, is not at all explored. With respect to their treatment of animals, it is therefore unclear what the book

[3] J. Bonsma, 'Breeding Cattle for Increased Adaptability to Tropical and Subtropical Environments Bonsma', *The Journal of Agricultural Science* 39, 2 (1949), 204–21; L. Lethola, N. Buck, and D. Light, 'Beef Cattle Breeding in Botswana', *Botswana Notes and Records* 15 (1983), 39–47; J. van Marle, 'The Breeding of Beef Cattle in South Africa: Past, Present, and Future', *South African Journal of Animal Science* 4 (1974), 197–304.

[4] L. Mafela, 'Colonial Initiatives and African Response in the Establishment of the Dairy Industry in the Bechuanaland Protectorate, 1930-1966', *Pula: Botswana Journal of African Studies* 13, 1 & 2 (1999), 77–92; C. Makgala, 'Provision of Local Services by Tribal Administrations in Bechuanaland Protectorate, 1900–1966', *South African Historical Journal* 64, 4 (2012), 787–806; W. Mwatwara and S. Swart, '"Better Breeds?" The Colonial State, Africans and the Cattle Quality Clause in Southern Rhodesia, c.1912–1930', *Journal of Southern African Studies* 42, 2 (2016), 333–50.

[5] S. Wilmot, 'From "Public Service" to Artificial Insemination: Animal Breeding Science and Reproductive Research in Early Twentieth-Century Britain', *Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences*, *Between the Farm and the Clinic: Agriculture and Reproductive Technology in the Twentieth Century* 38, 2 (2007), 411–41; K. Brown and D. Gilfoyle (eds.), *Healing the Herds: Disease, Livestock Economies, and the Globalization of Veterinary Medicine* (Ohio: Ohio University Press, 2010) see chapters 12 and 13; B. Theunissen, 'Breeding Without Mendelism: Theory and Practice of Dairy Cattle Breeding in the Netherlands 1900–1950', *Journal of the History of Biology* 41, 4 (2008), 637–76; B. Mocheregwa, 'Artificial Insemination and the Cattle Industry in Botswana, 1960-2011', *Botswana Notes and Records* 48 (2016), 109–20.

[6] C. Patterson, *Eternal Treblinka: Our Treatment of Animals and the Holocaust* (New York: Lantern Books, 2002), 81–108; Turner, *Animal Breeding, Welfare and Society*, 293–308.

[7] T. Saraiva, *Fascist Pigs: Technoscientific Organisms and the History of Fascism* (Cambridge: MIT Press, 2016), 214, 216.

infers about these 'non-fascist' countries.[8] Although the fascist and 'non-fascist' countries had very similar animal breeding regimes, the former are criticised in Tiago Saraiva's book, while the latter face no scrutiny and criticism. This emphasises the point that the book is not concerned with what fascism and breeding meant for the animals themselves. There are examples that explore how breeding has impacted the animals themselves but not in relation to colonialism and/or southern Africa.[9]

This chapter proceeds in the following way: first, it opens by describing the cattle breeding context in South Africa before the twentieth century and notes its connection to colonisation processes. It then examines the emergence of agricultural colleges in South Africa and how these related to breeding becoming more institutionalised, professional, and measurable. Thereafter, it explores early colonial cattle breeding projects in Swaziland and Botswana, from the 1920s to the 1960s. It then investigates the data-driven emergence of the Bonsmara cattle breed as a way of illustrating progeny testing. After describing the context of the global development of artificial insemination for animal breeding, it closes by describing the modernised breeding regime that developed in Botswana from the 1960s. The chapter also briefly discusses the development of artificial insemination in South Africa. Globally, the early twentieth century saw major developments in human eugenics, although after WWII human eugenics lost much of its support. However, as this chapter discusses, from the mid-twentieth century animal eugenics became entrenched and proliferated across the globe. In that the reproduction of domesticated animals became industrialised, the global proliferation of forced artificial insemination in the mid-twentieth century likely comprised the most transformative development in the history of domesticated animals. The development of artificial insemination in Botswana and South Africa is explored in the context of the global proliferation of artificial insemination.

This chapter argues that current cattle breeding regimes in southern Africa should be historicised as a direct consequence of colonialism that dramatically impacted cattle history.

[8] *Ibid*, the core passage on this is on page 12.
[9] L. Beldo, 'Metabolic Labor: Broiler Chickens and the Exploitation of Vitality', *Environmental Humanities* 9, 1 (2017), 119, 120–21, 124; S. Colling, *Animal Resistance in the Global Capitalist Era* (East Lansing: Michigan State University Press, 2021), 20, 59, 88.

In Botswana, Swaziland, and South Africa, forced artificial insemination – the industrialisation of reproduction – was for cattle an explicit impact of colonialism. The previous chapter argued that cattle slaughter in South Africa was industrialised in the early twentieth century, while Chapter Three argued that veterinary regimes came to exert control over animals' productive health from the late nineteenth century. In the mid- to late-twentieth century both slaughter and reproduction were industrialised in Botswana. In South Africa forced artificial insemination processes became more widespread from the mid-twentieth century. In Swaziland, these processes were not as common as in Botswana and South Africa but were deployed in the late twentieth century. A bovine view suggests that, specifically in terms of breeding in Botswana, human political independence or decolonisation did not imply an end to colonial breeding regimes. Instead, in Botswana colonial breeding systems were extended and consolidated after human independence. This suggests that human political independence does not necessarily imply experiential or transformative shifts for cattle histories, but actually entailed a deepening of colonial breeding processes for cattle. This is one case in which cattle history and human history chronologies became clearly distinct.

Pre-twentieth century cattle breeding context

Chapter One showed that from the ninth century Proto-Nguni speakers south of the Drakensberg Escarpment spread out across the Grasslands and started to innovate breeding taxonomy terms. This included words such as castrate, and words which distinguished the sex, age and breeding capacities of cattle. Thus, southern African cattle-keeping societies were engaged in breeding cattle from around the second millennium onwards. After Dutch colonists arrived in the mid-seventeenth century, they connected cattle, sheep and goat breeding practices to the global economy via the Cape of Good Hope. One transformation was that cattle and sheep were bred by settler colonists to be slaughtered, sold, and consumed, whereas southern African cattle keepers ate cattle, sheep, and goat flesh ceremonially and thus more rarely.[10] Butchering, selling, and eating animals became central to colonial economies in the region.

[10] See Chapter Two.

Colonial breeding ideas and practices, linked to European ideas of flesh consumption, comprised major affective and experiential impacts for cattle in southern Africa. Colonialism in the Cape was always distinctly connected to breeding cattle, as attested explicitly by VOC policy: 'It is stated that instructions have been received from the Chamber of Seventeen to increase as much as possible the number of cattle by breeding'.[11] Attempts to introduce European cattle into the Cape appear to have failed in the seventeenth and most of the eighteenth century, likely because imported cattle were worked to exhaustion via forced ploughing.[12] After the late eighteenth century, colonists increasingly imported cattle from Britain and the Netherlands. Some cattle themselves became mixes of local Sanga cattle and British and Dutch cattle.

Willem Stephanus van Ryneveld was commissioned by the British government to report on how to improve the Cape's economy, including the prospects of animal breeding and production. In his 1804 report he noted that, twenty or twenty-five years prior, the governor of Plettenburg had imported 'een Friesche Bul en Koe', one Friesian bull and cow.[13] Mentions from observers in the late eighteenth century and the nineteenth century suggest cattle from Britain were imported and bred across what became South Africa.[14] In the early nineteenth century, settler colonists could readily access imported British cattle.[15] Author and editor John Noble wrote or compiled several handbooks on the Cape colony and other parts of southern Africa. In his remarkably detailed *History, Productions and Resources of the Cape of Good Hope* (1886), he noted that Charles Somerset, governor of the Cape Colony from 1814 to 1826, gave his 'personal encouragement to the improvement of the breed of horses, cattle,

[11] G. Theal, *Abstract of the Debates and Resolutions of the Council of Policy at the Cape from 1651 to 1687* (Cape Town: Saul Solomon and Co, 1881), 16.
[12] A. Heinrich, 'A Zooarchaeological Investigation into the Meat Industry Established at the Cape of Good Hope by the Dutch East India Company in the Seventeenth and Eighteenth Centuries' (PhD Dissertation, The State University of New Jersey, New Jersey, 2010), 23.
[13] W. van Ryneveld, *Aanmerkingen over de Verbetering van Het Vee Aan de Kaap de Goede Hoop* (Kaap de Goede Hoop: A. Richert, 1804), 42.
[14] A. Barnard, *South Africa a Century Ago (1797 - 1801)* (Cape Town: Maskew Miller Limited, n. d), 23, 42; H. Lichtenstein, translated by A. Plumptre, *Travels in Southern Africa, in the Years 1803, 1804, 1805, and 1806* (London: Henry Colburn, 1812), 114, 217, 234; G. Thompson, *Travels and Adventures in Southern Africa* (London: Henry Colburn, 1827), 125, 204, 206; J. Barrow, *Travels into the Interior of Southern Africa* (London: T. Cadwell and W. Davies, 1806), 36.
[15] Thompson, *Travels and Adventures in Southern Africa*, 206.

and sheep by the importation of the best stock'. [16] The 1820 British settlers were formally designated 'Agricultural Emigrants'.[17] In the Cape, by 1870, cattle, sheep, goats, asses, mules, and horses had become subject to the Cattle Removal Act, which regulated and restricted their movement.[18] Persons wanting to move such animals more than 15 kilometres had to acquire a certificate of permission from a resident magistrate, colonial official or landowner, which included descriptions and the number of cattle. This was an early form of surveillance that would come to characterise many cattle's lives. By the 1880s John Noble noted that the 'chief Pastoral pursuits of the colonists are horse, cattle, goat, ostrich, and sheep-breeding; and fully one-third of the entire population may be said to be engaged in these and other occupations subsidiary thereto.'[19] He noted that the:

> cattle of the Colony include the descendants of the long-horned native species which the Hottentots possessed in Van Riebeek's time, crossed with the Dutch breed introduced by the early colonists. To these have been added contributions from nearly every breed known in England and Holland—Shorthorns, Herefords, Ayrshires, Devons, Alderneys and Kerries.[20]

In 1892, the Cape's Brands Registration Act of 1890 enabled local councils to make orders for branding cattle, horses, and ostriches, and created a registrar of brands for the Cape Colony. In time, thousands of animals became painfully branded with searing iron or tattoos – and were registered in the colonial records. Late into the nineteenth century cattle breeding was the province of dispersed farmers and a few commercial breeding specialists.[21]

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[16] J. Noble, *History, Productions and Resources of the Cape of Good Hope* (Cape Town: W. A Richards & Sons, 1886), 58.
[17] S. W Silver and Co, *S. W Silver & Co's Handbook to South Africa* (London: S. W Silver & Co, 1880), 242–43.
[18] L. van Sittert, 'Writing on Skin: The Entangled Embodied Histories of Black Labour and Livestock Registration in the Cape Colony, C. 1860-1909', *Kronos* 40, 1 (2014), 77–78.
[19] Noble, *History, Productions and Resources of the Cape of Good Hope*, 236.
[20] *Ibid*, 237, and compare to Silver and Co, *S. W Silver & Co's Handbook to South Africa*, 220.
[21] Pretoria National Archives (hereafter PNA), CVS1/52, G. King and Sons, breeders of shorthorns to the Colonial Veterinary Surgeon, 17 June 1898.

Breeding societies, and Agricultural colleges and schools in South Africa, 1902–1920s

In the early twentieth century, two principal types of institutions signalled the shift towards standardised pedigree breeding in South Africa. These were cattle breeders' societies and agricultural colleges.

In 1905 the Stud Book Association was constituted at a colonial stud breeders' conference in Bloemfontein.[22] A stud is a male animal held for breeding purposes. The first SA Studbook was published in 1906, and pedigree breeds of horses, goats, sheep, pigs and cattle were recorded.[23] Studbooks, as Nigel Pemberton and colleagues put it, 'signalled attempts to better standardise…animals and to have their features recognised as breeds'.[24] Notions of pedigrees underpinned stud books, and stud books, in turn, gave rise to the emergence of specific pedigree cattle breeding societies. Pedigrees are fictions. 'The pedigree of a domestic animal', writes Jacky Turner, 'is essentially a marketable brand' that protects 'those who invest in the brand by breeding.'[25] A pedigree black and white Friesian cow, for example, was in the nineteenth century simply a cow from Friesland whose body conformed to what breeders in Friesland took to be the prestigious archetypical black and white Friesian cow.[26]

In Britain, cattle breeders started registering cattle in public stud books in the mid-nineteenth century.[27] There, the first Herd Book for cattle was published for Herefords in 1846, and a society to promote Herefords was constituted in 1878. An Aberdeen Angus First Herd Book was started in 1862, and its breeding society was formed in 1879. The English Jersey Cattle Society started a Herd Book in 1878 and arranged a 'conformation competition' and butterfat testing.[28] Selective cattle breeding in Britain had by the early twentieth century become

[22] SA Stud Book, 'SA Stud Book's History', *SA Stud Book*, https://studbook.co.za/p107/about-us/sa-stud-book's-history.html., accessed 3 April 2021.
[23] *Ibid*.
[24] N. Pemberton, J-M. Strange, and M. Worboys, 'Breeding and Breed', in H. Kean and P. Howell (eds.), *The Routledge Companion to Animal-Human History* (London: Routledge, 2019), 406.
[25] Turner, *Animal Breeding, Welfare and Society*, 225.
[26] Theunissen, 'Breeding Without Mendelism', 655.
[27] Pemberton, Strange, and Worboys, 'Breeding and Breed', 406.
[28] *Ibid*.

dramatically influential. The 1908 census showed that cattle of the Shorthorn variety comprised 64% of the national herd.[29]

Cattle breeding societies in South Africa were formed in the early twentieth century; they emerged after the public Stud Book in 1906. In 1912 there were Afrikaner and Shorthorn breeders' societies, and in 1914 a society for South Devon cattle breeders.[30] Breeding societies for Aberdeen-Anguses, Herefords, and Ayrshires emerged in 1917, for Sussexes, and Jerseys in 1920, and for Red Polls in 1921.[31] Apart from private breeding societies, the agricultural colleges and also the state via its Department of Agriculture had become interested in purebred cattle.

The significance of applied agricultural research and development in the early twentieth century is evident in part by the number of agricultural schools that emerged: in the Cape, Elsenburg (1898) and Grootfontein (1911); in Natal, Cedara (1905); Potchefstroom in the Transvaal (1909) and; Glen (1919) in the Orange Free State.[32] Each of these colleges had a specific pedigree cattle breeding programme. Purebred cattle were then sold to farmers. The state's general ambition was to upgrade the national herd, in terms of higher flesh to carcass ratios of bulls, and higher milk yields for cows, so that the value of the cattle trade would increase. Because Onderstepoort's veterinary and agricultural research had met success in

[29] J. Grundy, 'The Hereford Bull: His Contribution to New World and Domestic Beef Supplies', *The Agricultural History Review* 50, 1 (2002), 80.
[30] SA Stud Book, 'SA Stud Book's History'; Farmer's Weekly, 'Shorthorn (blog)', *Farmer's Weekly*, 23 April 2012, https://www.farmersweekly.co.za/farm-basics/how-to-livestock/shorthorn/, accessed 3 April 2021; South Devon Cattle Breeders' Society, 'South Devon's Prime Beef, About the Breed', *South Devon*, https://www.southdevon.co.za/Breed-About.htm, accessed 3 April 2021.
[31] SA Hereford, 'Hereford Breed History', *SA Hereford*, https://www.hereford.co.za/Breed-History.htm accessed 3 April 2021; Angus Society of South Africa, 'History of the Angus Society', *Angus Society of South Africa*, http://www.angus.org.za/history/ accessed April 3, 2021; Ayrshire, 'History of the Ayrshire Breed', *Ayrshire*, http://www.ayrshire.co.za/p2/about-the-breed/history-of-the-ayrshire-breed.html, accessed 3 April 2021; Sussex, 'The History of the Sussex Breed', *Sussex*, http://sussex.co.za/p13/sussex-breed/the-history-of-the-sussex-breed.html, accessed 3 April 2021; Jersey SA, 'Historical Origin Of Jerseys', *Jersey SA*, https://www.jerseysa.co.za/Breed-History.htm, accessed 3 April 2021; Red Poll Cattle Breeder's Society of SA, 'History of the Red Poll Cattle Breeder's Society', *Red Poll Cattle Breeder's Society of SA*, http://www.redpollsa.co.za/p2/the-society/history-of-the-red-poll-cattle-breeder's-society.html, accessed 3 April 2021.
[32] S. Dubow, *A Commonwealth of Knowledge: Science, Sensibility, and White South Africa 1820-2000* (New York: Oxford University Press, 2006), 180; J. Fisher, 'Cedara School of Agriculture: Its History and Development', *Farming in South Africa*, (May, 1929), 67. For agricultural schools in the Transkei see J. Tischler, 'Education and the Agrarian Question in South Africa, c. 1900–40', *The Journal of African History* 57, 2 (2016), 255.

combating cattle diseases, in 1911 a centralised Department of Agriculture was formed.[33] It aimed to control animal diseases and modernise farming.[34] Under the Milner administration, the department was from its first iteration in 1902 starkly interventionist and 'laid the foundations' for much of what became the South African state.[35] As with state control over cattle explored in Chapters Three and Four, the emergence of the Department of Agriculture connects revealingly with political philosopher Kimberly Smith's argument that the development and consolidation of modern states was premised upon expansively controlling animals.[36]

In his annual report in 1919, the South African Minister of Agriculture reflected on the first two decades of cattle breeding in the twentieth century.[37] Apart from 'a few bright exceptions', he wrote, animal farming had before then 'consisted of little more than nomadic grazing'.[38] In 1898, the export of wool, mohair, hides and skins, and ostrich feathers amounted to £4 507 772, while imports of animal products, including flesh, processed pig flesh, butter, cheese, and chickens' eggs cost £1 112 961.[39] Since then, he claimed, 'almost revolutionary changes' had occurred. Cattle, pig, and chicken flesh, cows' secretions, and chickens' eggs industries had boomed to the extent that in 1919 these exports were valued at £14 354 039.[40] By 1920, 68 689 'pure bred animals' had been recorded in the Studbook.[41]

The Cedara and Potchefstroom agricultural schools had sent flesh consignments to the Liverpool and Smithfield markets that were 'warmly praised'.[42] But, to meet the London market's requirements cattle breeding needed to be 'vastly improved', and the minister

[33] Dubow, *A Commonwealth of Knowledge: Science, Sensibility, and White South Africa 1820-2000*, 180.
[34] W. Beinart, *The Rise of Conservation in South Africa: Settlers, Livestock, and the Environment 1770-1950* (Oxford: Oxford University Press, 2008), 224.
[35] S. Milton, 'The Killing Floor: The First World War and the Emergence of the South African Beef Industry 1902-24', *Collected Seminar Papers. Institute of Commonwealth Studies* 48 (1994), 82; Beinart, *The Rise of Conservation in South Africa*, 224.
[36] K. Smith, *Governing Animals: Animal Welfare and the Liberal State* (New York: Oxford University Press, 2012), 19.
[37] The National Archives of the United Kingdom in London (hereafter TNA), CO 633/148. Union of South Africa. House of Assembly, Index of the Printed Annexures, First Session, Fourth Parliament 1921, 9.
[38] TNA, *Report of the Secretary for Agriculture*, 1921, 9.
[39] *Ibid*.
[40] *Ibid*.
[41] *Ibid*.
[42] *Ibid*, 11.

implored farmers to realise that 'only well bred and well fed *young* animals' would suffice.[43] He attributed the increased financial value of domesticated animals to 'large importations of high-class stock from abroad and improvements in animal husbandry'.[44] Between 1910 and 1918, 7004 pedigree cattle, 23 861 stud sheep and 364 pigs had been imported into South Africa, and he estimated that South Africa had 10 000 'well bred bulls' among its national settler herd.[45] 28 196 cattle brands had been registered by 1919.[46]

The trade in cattle bodies for slaughter was substantially regional at the time. In 1919, 9 065 cattle were imported for slaughter from Rhodesia, 4 152 from the Bechuanaland Protectorate, 2 276 from South West Africa, and 1 693 from Swaziland, while 13 589 'breeding stock' animals were imported from Bechuanaland.[47] The value of the 6 851 924 settler-owned cattle was £100 000 000 in 1920, the minister estimated.[48] Between 1910 and 1918 South Africa exported over 40 million kilograms of cattle flesh.[49]

It was 'particularly urgent', he said, that pigs and cattle reached 'early maturity'.[50] He wanted to speed up the time to slaughter-maturity. The minister noted that recent increased attention to cows' butterfat and milk recordings was welcomed.[51] By 1920, ideas of pedigree breeding, milk and butterfat surveillance, and bulls reaching mature weights as soon as possible were entrenched in state agricultural thinking.

The agricultural schools were indicative of increasing farming specialisations; they had experts in agricultural law, dairying, and breeding; they offered courses and practical demonstrations, and conferred diplomas and other qualifications. They signalled the modernisation of agriculture in South Africa. To young learners or those who wanted to become farmers or develop their skills, the agricultural colleges inculcated into them a strongly productionist view of animals, in which the exploitation of animals for their milk or

[43] *Ibid*.
[44] *Ibid*, 9.
[45] *Ibid*, 29; TNA, CO 633/148, *Statement of Pedigree Stock Imported 1910-1918*, 1921, 164.
[46] TNA, CO 633/148, *Report of the Registrar of Brands and Controller of Fencing, 1921*, 159.
[47] TNA, CO 633/148, *Report of the Principal Veterinary Surgeon*, 1921, 40.
[48] TNA, CO 633/148, *Report of the Secretary for Agriculture, 1921*, 29.
[49] TNA, CO 633/148, *Statement of Meat Exported 1910-1918, 1921*, 164.
[50] TNA, CO 633/148, *Report of the Secretary for Agriculture*, 1921, 30.
[51] *Ibid*, 16

flesh or labour was normalised. The state's view on domesticated animals – useful as producers or as flesh – was diffused to generations of learners who were trained at the agricultural colleges.

All five of the agricultural colleges were keenly involved in pedigree cattle breeding. In explicitly productionist terms, they minutely recorded the number and type of purebred cattle, the numbers of days cows were milked per annum, and well as the latter's average milk and butterfat records.[52] Cows with higher butterfat percentages in their milk, and those who could produce larger quantities of milk, were prized. Although dairy industries are not the focus of this chapter, it is important to recognise some of the experiential shifts cows and calves experienced from modernised dairy industries from the bovine perspective. For cattle, these shifts bear on what it meant that cows' milk outputs were monitored by colonial state institutions.

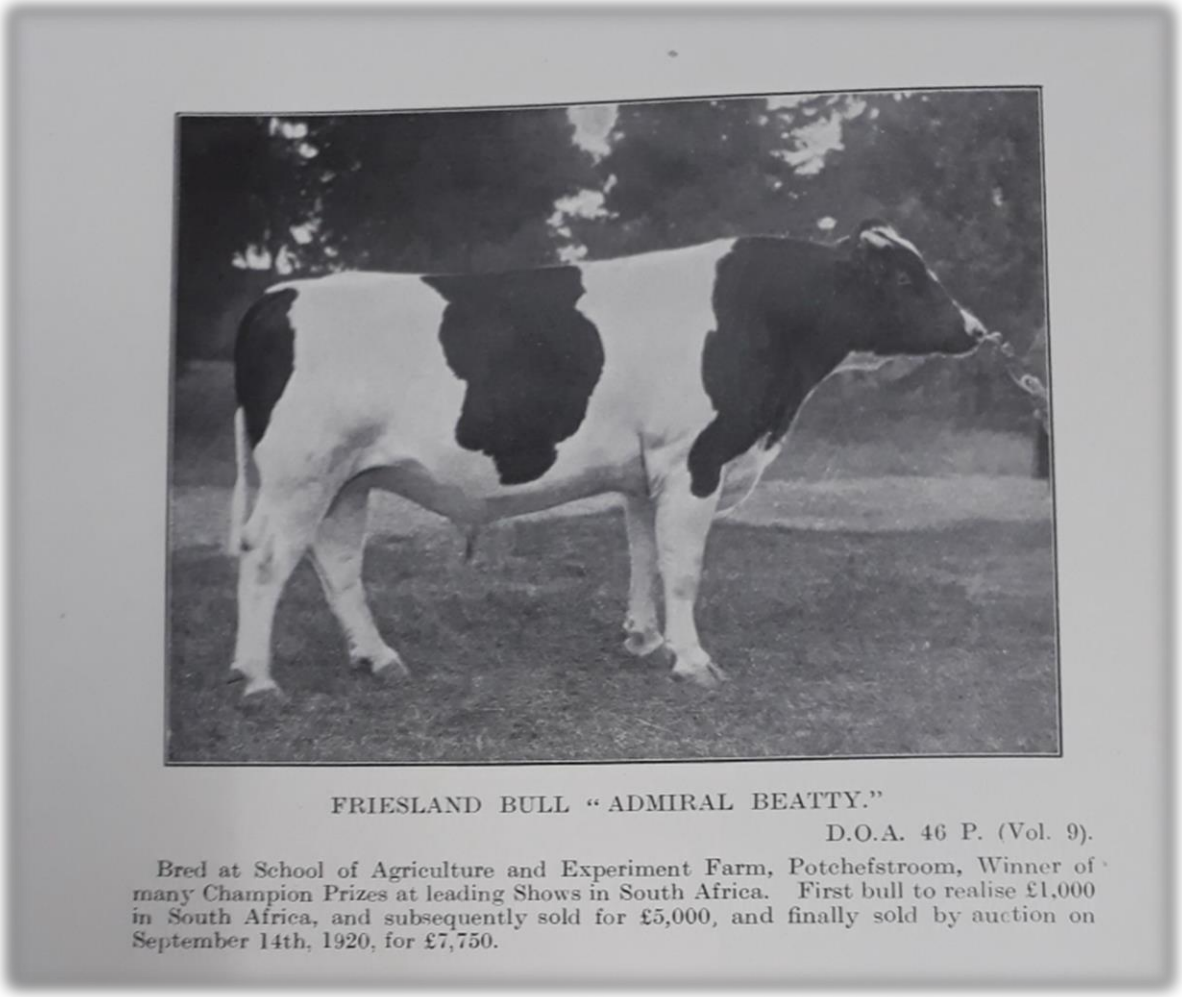
Whereas calves naturally wean themselves after 10 months, or about 300 days, one Shorthorn cow at Cedara, called S.43, was milked for 467 days. A Friesland cow, F.5 was milked for 523 consecutive days.[53] When a calf stops drinking his mother's milk, his mother stops producing milk. When cows are artificially milked by humans, they can continue to produce milk beyond the natural 10-month cycle. Intensive milking, subjecting cows' udders to extreme, extended milking periods, caused many cows to suffer mastitis, which is a painful swelling and infection of their udders.[54]

The agricultural schools each specialised in different breeds of cattle. For instance, in 1919 Grootfontein School of Agriculture sold 10 Friesland bulls, 14 cows, 4 heifers, as well as 4 Hereford bulls and 4 Shorthorn heifers. They also sold scores of purebred horses, goats, sheep, and chickens.[55] The Potchefstroom school in the same year sold 31 purebred cattle, comprising Frieslands, Ayreshires, Lincoln Reds, Herefords, Sussex's, and Africanders.[56] In

[52] TNA, CO 633/148, *Report on Agricultural Education*, 1919, 60, 84, 90.
[53] *Ibid*, 84.
[54] C. Fitzpatrick *et al*., 'The Effect of Meloxicam on Pain Sensitivity, Rumination Time, and Clinical Signs in Dairy Cows with Endotoxin-Induced Clinical Mastitis', *Journal of Dairy Science* 96, 5 (2013), 2847–56; TNA, CO 633/148, *Report on Agricultural Education*, 1919. CO 633/148., 72.
[55] TNA, CO 633/148, *Report on Agricultural Education*, 1919, 62.
[56] *Ibid*, 73.

1919 they held 407 breeding cattle, including what they called cross-bred Africanders and Trek oxen.[57] Cedara specialised in breeding Frieslands, Shorthorns, Aberdeen Anguses, and Ayreshires, of whom they had 207 in 1919.[58] The Glen school bred and sold Frieslands, Lincoln Reds, and South Devons and had 208 purebred cattle in 1919.[59] The value of purebred animals sold at Elsenburg, Grootfontein, Glen, Cedara and Potchefstroom increased from £7 303 in 1915 to £28 251 in 1918.[60] A single Friesian bull bred at Potchefstroom, for example in 1920 sold for £7 750.

Image 5.1. Friesland bull Admiral Beatty



FRIESLAND BULL "ADMIRAL BEATTY."

D.O.A. 46 P. (Vol. 9).

Bred at School of Agriculture and Experiment Farm, Potchefstroom, Winner of many Champion Prizes at leading Shows in South Africa. First bull to realise £1,000 in South Africa, and subsequently sold for £5,000, and finally sold by auction on September 14th, 1920, for £7,750.

Source: TNA, CO 633/148, *Report on Agricultural Education*, 1919, iv.

[57] *Ibid*.
[58] *Ibid*, 83.
[59] *Ibid*, 90.
[60] *Ibid*, 23.

State-supported agricultural schools were specialising in breeding bulls and cows. Knowledge of cattle breeding was becoming increasingly specialised, and cows' value was becoming determined by their milk yields. The Agricultural Department saw purebred bulls and cows as the solution to establishing a competitive cattle industry. Cattle's sexual and reproductive autonomy was inhibited and controlled. Via the Agricultural Department, the state became hyper-focused on milk and butterfat yields. Cattle breeding was becoming rationalised and modernised in South Africa.

Colonial breeding regimes in Botswana and Swaziland, 1920s–1940s

From the 1920s in Bechuanaland, and the 1930s in Swaziland, the British settler colonial states started instituting breeding centres, ostensibly to improve the type of cattle and advance their cattle industries. The outcomes differed notably in that in Swaziland colonial cattle breeding programmes were largely unsuccessful, while in Botswana such programmes became increasingly entrenched.

Notably, state involvement in cattle breeding in Britain was a very recent development; prior to WWI, the state was not involved in cattle breeding.[61] In 1914 the British state implemented a Livestock Improvement Scheme as a 'public service'.[62] This scheme centred on the perceived problem of farmers' limited access to superior pedigree sires, including boars, horses, and bulls. The scheme enabled farmers' access to breeding bulls and encouraged and incentivised farmers to record cows' milk outputs as a way to enable a better selection of bulls for breeding. 'Livestock Officers', a novel class of civil servants, thus emerged to advise farmers on bull selection. The scheme offered grants to farmers and breeding societies. Breeders would pay a service fee and then bring their cows to designated farms where the selected bulls were detained for breeding. Milk output records were intended to guide their culling of less productive cows and enable bull selections. In the mid-1920s pedigree bull breeders requisitioned the British state to adopt policies to 'eliminate' bad or 'scrub' bulls via slaughter or castration. These requisitions culminated in the Improvement of Livestock (Licensing of Bulls) Act of 1931, which made it illegal for farmers to retain a bull older than ten months

[61] Wilmot, 'From "Public Service" to Artificial Insemination', 420.
[62] *Ibid*.

unless that bull had a permit to live. The ministry of agriculture was sanctioned to slaughter bulls without such a permit.[63] In this way, by the 1930s the British state exercised extreme control over the breeding of cattle and institutionalised the slaughter and castration of undesirable bulls, as well as recording cows' milk outputs. Until the emergence of artificial insemination in Britain in the 1940s, the Livestock Improvement Scheme was the state's predominant mechanism for controlling animal breeding.[64] From the bovine view, this scheme and its state-sponsored slaughter and castration policies was a violent and tragic development in cattle history. As we shall see, it foreshadowed the industrialisation of forced artificial insemination in both Britain and Botswana.

Britain exported its ideas and practices regarding cattle breeding to its southern African protectorates in the 1920s and 1930s. In Bechuanaland in the Ngwaketse and Kwena reserves 'bull camp schemes' were established in 1924 and 1926 respectively.[65] Select bulls were supplied by the government and farmers could bring cows to be impregnated by such bulls.[66] For bulls, it was a form of sustained sexual abuse. Like the Kayne Bull Camp, in southern Bechuanaland, these schemes were regarded as unsuccessful, due to a low uptake from cattle keepers, and were soon discontinued.[67]

In the context of Bechuanaland's absent rains in 1931 and the drought which ensued, as well as South Africa embargoing cattle imports under the pretext of the Foot and Mouth outbreak in Southern Rhodesia, the protectorate faced the prospect of losing its sole cattle export market.[68] Resident Commissioner Rey turned to cattle breeding interventions. Grants were secured by the Colonial Development Fund to drill boreholes to provision cattle, since much of the country lacked adequate water to supply cattle in large numbers, and from 1937 to set

[63] *Ibid*, 421.
[64] *Ibid*.
[65] Makgala, 'Provision of Local Services by Tribal Administrations in Bechuanaland Protectorate, 1900–1966', 797.
[66] *Ibid*, 796.
[67] *Ibid*, 797; Botswana National Archives (hereafter BNA) 425/ S.4251/1, H. Price to Resident Magistrate, Kanye. 'Bulls: Bulls and Bull Camp Kanye', 17 January 1936.
[68] M. Hubbard, 'Desperate Games: Bongola Smith, the Imperial Cold Storage Company and Bechuanaland's Beef, 1931', *Botswana Notes and Records* 13 (1981), 20.

up Livestock Improvement Centres with government-supplied breeding bulls.[69] These were modelled in part on the British Livestock Improvement Scheme. Livestock Improvement Centres were instituted in the Bakwena, Bangwaketse, Bangwato, Barolong, Balete, and Bakgatla reserves to crossbreed Tswana cattle with imported cattle and then sell bulls and heifers to farmers.[70] All reserves used Africander bulls but the Balong centre also used Shorthorns, the Bangwaketse Sussexes, and the Bangwato centre used Friesian cattle. From the perspective of producing more marketable cattle flesh and dairy yields, the results were mixed. By 1944 Africander cattle, indigenous to the region, were the predominant and majority breed used by all centres.[71] The British breeds had largely been abandoned. In that these centres were modelled on the British schemes, and funded by the Colonial Development Fund, they were an explicit impact of colonialism. The breeding schemes mirrored those pursued in colonial Nigeria and Kenya.[72]

In colonial Swaziland, similar breeding regimes were set up in the 1930s and 1940s. Writing to the Swaziland resident commissioner in 1932, the Swaziland principal veterinary officer noted that 'trying to improve native cattle by distributing expensive bulls at native kraals is a failure'.[73] Loaning select bulls to herders had been the approach in Basutoland. In a likely expression of his racial prejudice, he continued that indigenous Swazis did not appreciate that imported cattle required 'more care and attention' and that in cases where loaning cattle was attempted, the cattle's lives were 'short'.[74] He recommended a state-run farm

> with one pure bred bull of different breeds, five pure bred females of the different breeds and 150 selected native bred females: the pure bred males [will be] mated with all the females to breed pure bred animals, and to keep up the supply of grade bulls for distribution amongst the native.[75]

[69] Makgala, 'Provision of Local Services by Tribal Administrations in Bechuanaland Protectorate, 1900–1966', 797; E. Hillbom, 'Cattle, Diamonds and Institutions: Main Drivers of Botswana's Economic Development, 1850 to Present', *Journal of International Development* 26, 2 (2014), 165–66.
[70] Lethola, Buck, and Light, 'Beef Cattle Breeding in Botswana', 39.
[71] *Ibid*.
[72] Makgala, 'Provision of Local Services by Tribal Administrations in Bechuanaland Protectorate, 1900–1966', 798.
[73] Swaziland National Archives (hereafter SNA) RCS 408/32 Memorandum by Principal Veterinary Officer Swaziland W. Elder to Resident Commissioner's despatch, Swaziland, 8 March 1932, 140.
[74] Ibid.
[75] Ibid.

In addition, he recommended that:

> a campaign against the native scrub bull would have to be carried out. I propose that all native bulls be castrated, only one bull to every twenty five cows or heifers being allowed to remain uncastrated. This work in the first place should be carried out by the Government, and after that, the owner should be compelled to castrate all bulls under twelve years old. With the simplified methods of castration it is not a difficult matter for this to be carried out.[76]

This breeding project was implemented in 1934, funded by the Colonial Development Fund. It came to comprise various bull camps where Swazis could bring their cows to be impregnated and also a government farm for the same purpose. By 1937 cattle inspectors were employed to castrate undesirable 'scrub' cattle.[77] In the same year, at the government breeding farm, there were 60 bulls, 152 cows, 45 heifers, and 111 calves.[78] The Swazis were not receptive to the breeding schemes. They were disinclined to sell bulls to the camps, and did not want to purchase so-called graded bulls from them.[79] By June 1940 only 98 bred bulls were sold by the government to Swazi herders and the same number had been deemed unsuitable and slaughtered.[80] Three years later a total of 1 239 cattle were imported for breeding.[81] In 1944 an additional farm at Mpisi was purchased via the Colonial Development Fund to establish another cattle breeding centre.[82] The Mpisi Cattle Breeding and Experimental Station came into operation during 1947 to improve local Nguni cattle and to breed Africander cattle.[83] Again, Swazis neither wanted to sell their cattle to the breeding station nor purchase graded bulls.[84] A commission into the Swaziland cattle industry later concluded that the breeding regimes were unsuccessful because Swazis refused to recognise the economic value of breeding more marketable cattle. For indigenous Swazis, they wrote, there

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[76] Ibid.
[77] SNA, RES 665/38, *Annual Report 1937: Veterinary and Agricultural Department*, 3.
[78] *Ibid*, 4.
[79] TNA, DO35/919/11, R. Thornton, Agricultural Advisor to the High Commissioner, to the Government Secretary, Swaziland 'Swaziland Improvement Scheme', 6 May 1940, 1.
[80] TNA, DO35/919/11, Swaziland High Commissioner, E. Harding to Viscount Cranborne, Dominions Office, 'Colonial Development Fund Cattle Improvement Scheme', 7 November 1940, 2.
[81] SNA, 793, 673/37, *Annual Report Veterinary and Agricultural Department 1942 and 1943, 1944*, 21.
[82] SNA, 793, 673/37, *Director of Livestock and Agricultural Services Report 1939-1945, 1947*, 3.
[83] F. van Biljon *et al*., *Report of the Commission of Enquiry into the Cattle Industry of Swaziland* (Manzini, 1962), 16.
[84] *Ibid*.

> is no selection on a production basis: the best fighter is considered to be the best bull in the herd… Bull calves are not castrated until they have grown out to animals of 3 years of age or more and it is not unusual to find the number of adult bull equal to the number of adult females in a small herd. In spite of continued propaganda by the Department of Land Utilization to encourage better animal husbandry practices, little so far has been achieved.[85]

They attributed the Swazis' unwillingness to sell Nguni bulls to the breeding centres because of Swazis' complex social relationships with cattle. Swazis only sold cattle in times of desperation and when money was otherwise unobtainable. Cattle too were integral to lobola systems, signified cultural value, wealth, social prestige, and were core to religious and spiritual customs.[86] 'To the Swazi people,' the report noted, 'cattle therefore have far greater significance than the mere economic value of the beasts'.[87] The Swazis' rejection of modernised breeding regimes the commission disparaged as 'primitive'.[88]

Why then was the uptake of colonial breeding schemes greater in Bechuanaland than in Swaziland? In part, this was likely because the Bechuanaland schemes were largely under elite, chiefly control, whereas the Swazi schemes were run by distrusted government officials. Further, before the 1930s Bechuanaland cattle keepers had received large cash payments from exporting cattle to South Africa, while the Swazi herd was smaller and their trade with South Africa less established.

Further, a combination of rinderpest in the 1890s and the imposition of colonial rule at the beginning of the twentieth century had undermined rural self-sufficiency.[89] Also, both Boer and British administrations blocked Swazi cattle raiding.[90] Stemming from the 1907 Land Partition policy, settler land alienation was also seriously disruptive, and unsustainably

[85] *Ibid*, 7.
[86] *Ibid*, 6.
[87] *Ibid*, 46.
[88] *Ibid*.
[89] H. Simelane, 'The Colonial State and the Political Economy of Famine in Swaziland, 1943–1945', *South African Historical Journal* 66, 1 (2014), 108; R. Packard, 'Maize, Cattle and Mosquitoes: The Political Economy of Malaria Epidemics in Colonial Swaziland', *The Journal of African History* 25, 2 (1984), 195.
[90] Packard, 'Maize, Cattle and Mosquitoes', 195.

confined Swazi people and cattle to smaller areas.[91] By 1911, 25% of adult Swazi males were subjected to migrant labour, mostly to farms and mines in South Africa.[92] Between 1911 and 1930 Swazi cattle herds expanded from 57 000 cattle to 297 828.[93] It seems reasonable to infer that Swazis held onto their cattle as attempts to secure self-sufficiency in the face of rupturing colonial rule.

From cattle's perspectives, the further one was from a colonial breeding centre the better. This is not to hark back to a merry Swazi past where cattle lived idyllic romanticised lives but rather to recognise that the bonds between Swazi cattle and Swazi humans, the extents to which cattle were entwined in Swazi cultural, spiritual and social lives, in part saw Swazi cattle spared from entering the rationalised and sometimes deadly colonial cattle breeding centres. Whereas colonial regimes in Swaziland, South Africa and Bechuanaland regarded cattle in exclusively productionist terms - carcass to flesh ratios, milk and butterfat yields, and calving rates – Swazis did not: and so, into the 1960s, this spared most Swazi cattle from incorporation into colonial breeding systems. By contrast, as explored later, in Bechuanaland, the Livestock Improvement Schemes, as in Britain, laid the groundwork for the development of industrialised breeding regimes premised on forced artificial inseminations.

The Bonsmara cattle breed and the human eugenics context

While colonial breeding regimes in Bechuanaland and Swaziland were developing slowly and unevenly in the 1940s and 1950s, in South Africa cattle breeding was becoming hyper data-driven. In 1940 the South African government's Division of Animal and Crop Productions pursued a policy of loaning bulls between breeding centres.[94] Its director wrote to the five agricultural colleges requesting the lineage and dates of births of pedigree cattle, their registrations, and cows' milk outputs and number of calves.[95] The case of Bonsmara demonstrates a core concept underpinning animal breeding, namely progeny testing.

[91] *Ibid*, 191, 195.
[92] *Ibid*, 196.
[93] van Biljon *et al*., *Report of the Commission of Enquiry into the Cattle Industry of Swaziland*, 3.
[94] PNA, A226/38. Colleges of Agricultural and Agricultural Research Stations - Cattle Breeding Policy, 17 August 1940.
[95] Ibid. See also PNA, A53/9, Potchefstroom College of Agriculture. Cattle Breeding Policies: Dairy and Beef Cattle Herds, 1941; PNA, A184/9 Stellenbosch Elsenburg College of Agriculture. Cattle Breeding Policies, 1940;

Bonsmara are a breed of cattle who were engineered into existence by one of southern Africa's foremost animal geneticists, Jan Bonsma.[96] Jan Bonsma studied agriculture and animal science at the University of Pretoria and animal breeding at Iowa State University. Upon his return to South Africa, in 1937, he was placed at the Mara Research Station.[97] Mara emerged because the Department of Agriculture had purchased farms west of Louis Trichardt in 1935 to establish a research station.[98] For over twenty years Jan Bonsma conducted breeding experiments with 20 commercial cattle herds.[99] These experiments culminated in the Bonsmara cattle breed. The term Bonsmara melded two concepts, Bonsma and the Mara Research Station. The *raison d'être* of Jan Bonsma's breeding projects was to produce cattle flesh cheaply:

> The whole object of genetic improvement should be to produce cheaper meat. In other words, the superior genotype should give a superior phenotype at the lowest cost possible.[100]

> Successful livestock production and ranching depend on calving and weaning percentages. The aim in livestock production is to produce the maximum amount of beef per unit area. The rancher must realize that selection is his best tool.[101]

> All the selection is based on the concept of increasing cutability rate.[102]

PNA, A39/10 Grootfontein College of Agriculture. Cattle Breeding Policies: Dairy and Beef Cattle Herds, 1941; PNA, A25/11, Glen College of Agriculture. Cattle Breeding Policies: Dairy and Beef Cattle Herds, 1940.
[96] I. Aitken, 'Bonsma Revisited', *The Luing Journal*, January 2021, 26–27.
[97] 'Life, Education & Work', *familysearch.org*, https://www.familysearch.org/service/records/storage/das-mem/patron/v2/TH-904-74804-2087-19/dist.txt?ctx=ArtCtxPublic, accessed 3 May 2021.
[98] A. van Zyl, 'Deplorable State of Mara Research Station Raises Eyebrows', *Zoutpansberger*, 19 September 2020, https://www.zoutpansberger.co.za/articles/news/53114/2020-09-19/deplorable-state-of-mara-research-station-raises-eyebrows#:~:text=The%20history%20of%20the%20Mara,station%20was%20Professor%20Jan%20Bonsma, accessed 3 April 2021.
[99] The American Bonsmara Breed, 'History of Bonsmara', *The American Bonsmara Breed*, http://www.bonsmara.com/bonsmara/, accessed 4 May 2021.
[100] J. Bonsma, *Jan Bonsma and the Bonsmara Cattle Breed* (Pretoria: Breeders' Society's 21st Anniversary Publication, 1987), 26.
[101] J. Bonsma, *Wortham Lectures in Animal Science* (Texas: B.R Cutrer, 2020), 23.
[102] Bonsma, *Jan Bonsma and the Bonsmara Cattle Breed*, 18.

Cutability is the ratio of flesh to carcass; the higher the cutability rate, the more flesh, the more commercial value. The core objective of his breeding research was economic, i.e., to lower the cost of cattle flesh.

Jan Bonsma framed his animal breeding projects in contradistinction to southern African cattle-keeping societies' practices. Invoking what he imagined as his superior race, religion, and culture, grandiosely, and with granite self-assurance, he claimed that:

> Throughout the world one finds that those races who are superstitious, ignorant and prejudiced are backward in their approach to livestock improvement and the betterment of agriculture in general. The Bantu tribes in Africa consider animals to be a token of wealth and a means of acquiring a wife. These people never have regarded livestock production as a means of benefiting mankind and a method of improving the nutritional standards of their people. They have never practiced systems of selection and improved breeding with the object of producing more and better food for their own people. Likewise, to the Hindu, whose outlook on the animal is holy. These people are not permitted to castrate useless bulls; hence, they carry out no system of herd improvement whatsoever. The people of the western civilization have a cultural and religious background which stimulates improvement in livestock production.[103]

At the Mara and Messina research institutes his work engaged what he called the problem of 'tropical degenerates', namely, British cattle breeds with high mortality and low cutability rates.[104] Below is an image of what he regarded as a tropical degenerate Shorthorn cow.

[103] Bonsma, *Wortham Lectures in Animal Science*, 12.
[104] Bonsma, *Jan Bonsma and the Bonsmara Cattle Breed*, 3–4.

Image 5.2. Shorthorn cow disparaged by Bonsma as a tropical degenerate

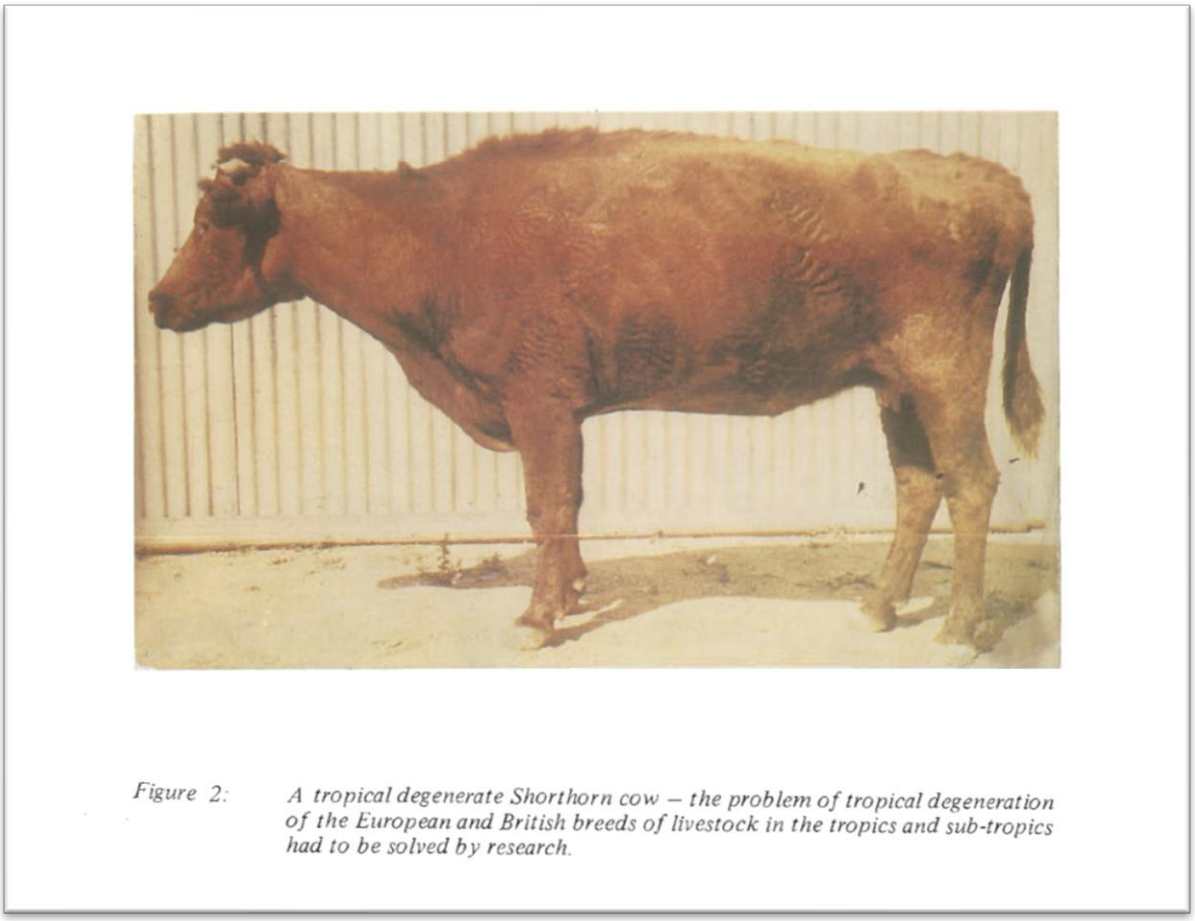


Figure 2: *A tropical degenerate Shorthorn cow – the problem of tropical degeneration of the European and British breeds of livestock in the tropics and sub-tropics had to be solved by research.*

Source: J. Bonsma, *Jan Bonsma and the Bonsmara Cattle Breed* (Pretoria: Breeders' Society's 21st Anniversary Publication, 1987), 3.

In his breeding projects, cattle were subjected to extreme bodily surveillance. His dictum was that 'man must measure'.[105] His selection for 'functional efficiency', a concept he had learned during postgraduate work on a Texan farm, included selection criteria that comprised 14 body measurements taken every three months.[106] Cattle's weight gains, body temperatures, pulses, respiration rates, tick counts, hairs per square centimetre, hide thickness, their fertility, calving rates, milk outputs, longevity, and mortality rates were exhaustively measured.[107] In the 1940s, some 2 000 cattle each had a personal data sheet recording their performance.[108]

[105] Bonsma, *Wortham Lectures in Animal Science*, 2.
[106] Bonsma, *Jan Bonsma and the Bonsmara Cattle Breed*, 15.
[107] Aitken, 'Bonsma Revisited', 26.
[108] Bonsma, *Jan Bonsma and the Bonsmara Cattle Breed*, 15.

He noted that:

> In creating the Bonsmara breed, adaptability was measured and no inheritable defects were tolerated in the selection process. In fact, only one bull out of every six bulls kept, was selected for further breeding purposes, and only after extensive testing.[109]

Selection and elimination were two sides of the same coin. The extensive surveillance had lethal consequences for cattle.

> In selecting cattle for the Bonsmara breed, every animal that had completed a performance test, was subsequently evaluated and cattle that showed signs of hereditary weakness or defects, were immediately culled. This is the only way to eliminate defects in the breed.[110]

Bulls and cows were evaluated via different 'functional efficiency' standards. From 1940 sires were selected on the basis of performance testing. From 1946 cows were selected on the basis of calving percentages.[111] He claimed an ability to determine a female's fertility value based on her briskets, dewlaps, shoulders, chests, hipbones, and hindquarters.[112] A visual depiction of the body conformation profile of fertile versus subfertile cows that he devised follows.

[109] *Ibid*, 13.
[110] *Ibid*, 23.
[111] *Ibid*, 25.
[112] *Ibid*, 17.

Image 5.3. Jan Bonsma's depiction of fertile and sub-fertile cows

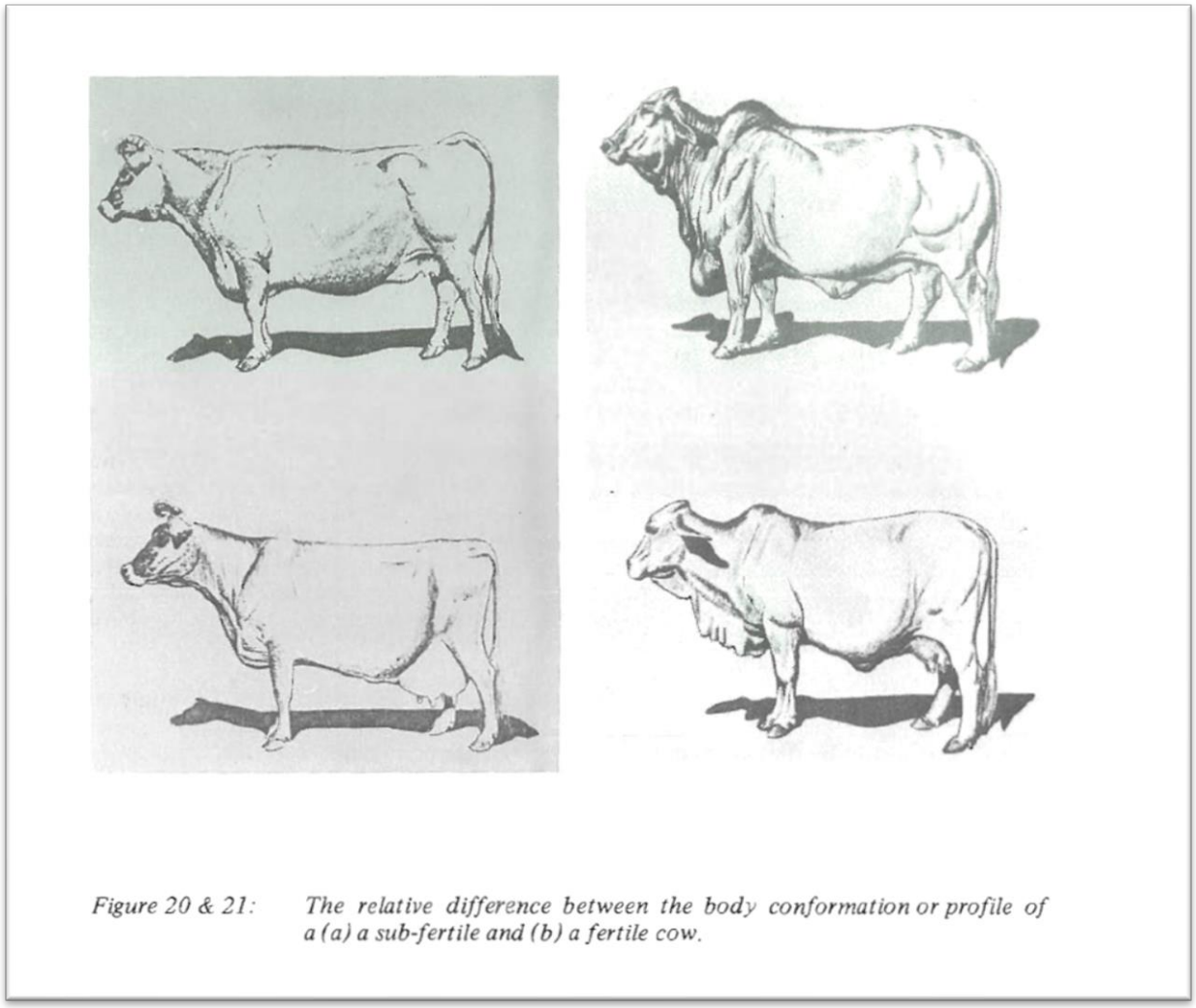


Figure 20 & 21: The relative difference between the body conformation or profile of a (a) a sub-fertile and (b) a fertile cow.

Source: Bonsma, *Jan Bonsma and the Bonsmara Cattle Breed,* 18.

The cows on the bottom left and right were regarded as possessing fertile body types.[113] Also to measure fertility, each cow had a personal birthing datasheet. Over an eight-year period, any cow who twice failed to produce a calf during a cycle was slaughtered summarily.[114] Fertility was the single most important factor determining whether a young cow would be slaughtered.[115] He also placed a high value on the 'importance of a sound, efficient udder'.[116]

[113] Bonsma, *Wortham Lectures in Animal Science*, 53.
[114] Bonsma, *Jan Bonsma and the Bonsmara Cattle Breed*, 13.
[115] Bonsma, *Wortham Lectures in Animal Science*, 60.
[116] Bonsma, *Jan Bonsma and the Bonsmara Cattle Breed*, 17.

'Conformational features', he noted, 'such as teat shape, size, placement and udder attachment are also crucial in judging cows for functional efficiency'.[117]

Males too had specific body conformation criteria. 'Heaviness or coarseness of the forequarter,' he wrote, 'which constitutes the shoulder blades, spine and related tissues are indicative of the desirable bull.'[118] Their legs and feet were required to be 'sound'.[119] He added that the 'functional efficient bull with high fertility and sex drive has a well developed forequarter and a masculine head and neck'.[120] Further, for him, the bull needed to

> be alert and immediately cock his ears when a cow passes. It is of the utmost importance that the bull must have well developed testes with a circumference of 34 to 40 cm and a good neck to the scrotum which allows proper temperature control.[121]

Bulls at the Mara Research Station had to be able to impregnate 50 or more cows during a two and a half month breeding season, suggesting that forced artificial insemination was not the primary means of breeding cattle in the 1960s in South Africa.[122] Depictions of fertile versus sub-fertile bulls follow.

[117] *Ibid*, 18.
[118] *Ibid*.
[119] *Ibid*.
[120] *Ibid*.
[121] *Ibid*.
[122] Bonsma, *Wortham Lectures in Animal Science*, 37.

Image 5.4. Jan Bonsma's depiction of fertile and sub-fertile bulls

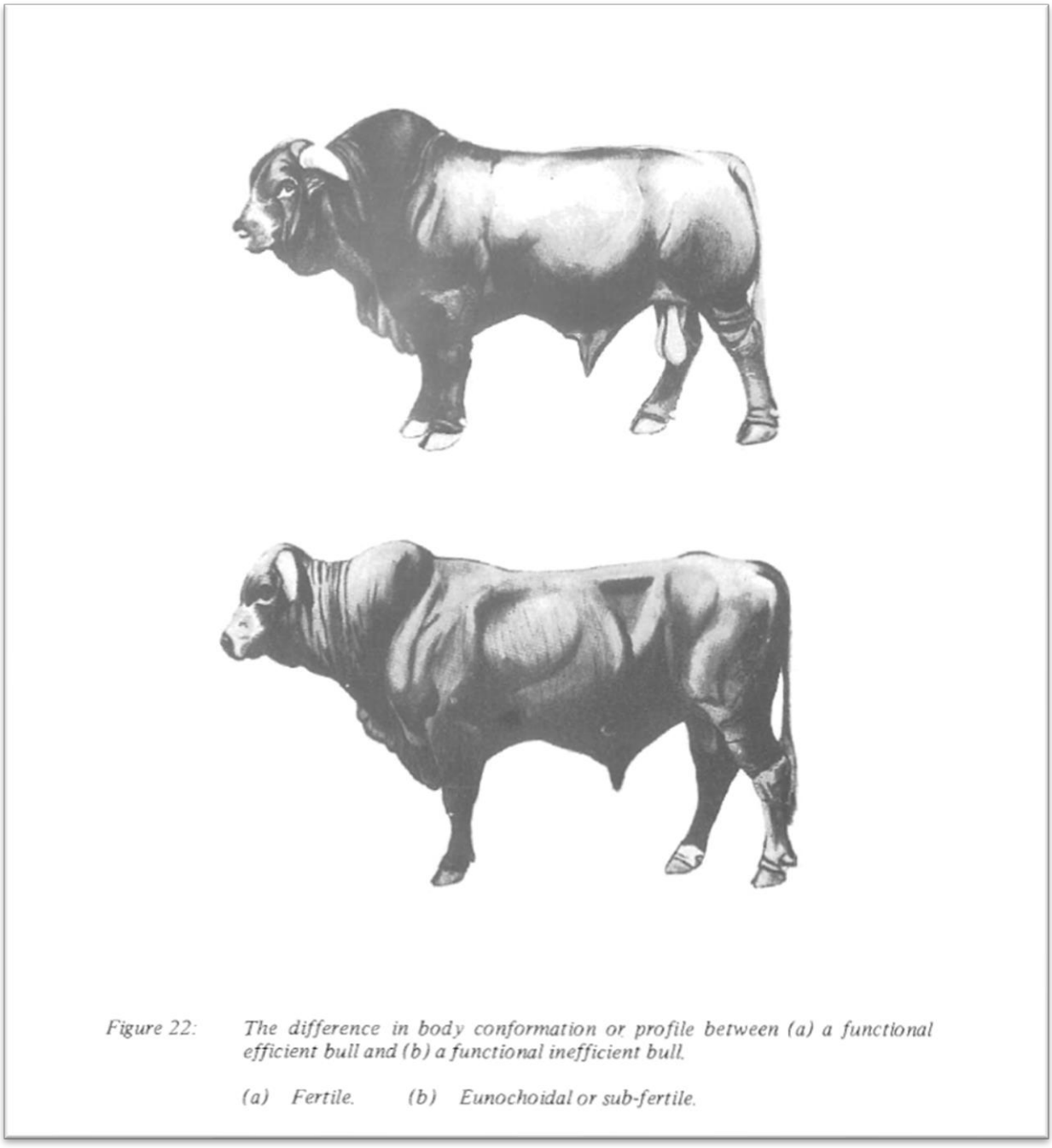


Figure 22: The difference in body conformation or profile between (a) a functional efficient bull and (b) a functional inefficient bull.

(a) Fertile. (b) Eunochoidal or sub-fertile.

Source: Bonsma, *Jan Bonsma and the Bonsmara Cattle Breed*, 19.

Image 5.5. Rear view depicting testes of fertile and sub-fertile bulls

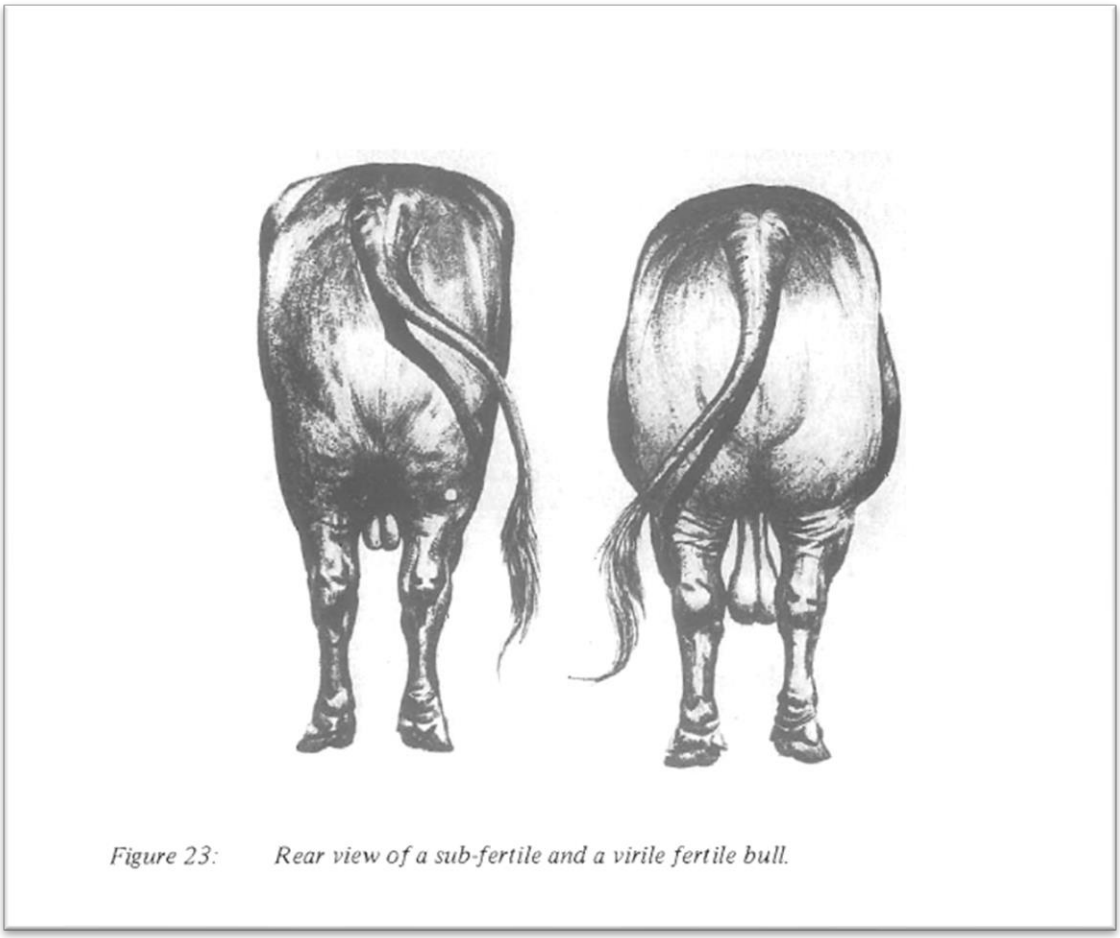


Figure 23: Rear view of a sub-fertile and a virile fertile bull.

Source: Bonsma, *Jan Bonsma and the Bonsmara Cattle Breed*, 20.

Interestingly, beyond physical assessments, Jan Bonsma was vividly alive to cattle's subjective aspects.

> Temperament is of the utmost importance in judging an animal for functional efficiency since animals with a bad disposition can make management difficult and often hazardous.[123]

Those cattle who were more docile were more likely to survive. He was attempting to eliminate cattle who were inclined to resist or whose affect coincided with protestatory actions. Via these data-driven breeding processes, the Bonsmara cattle breed came into being. Bonsmaras comprised 5/8th Africander, 3/16th Hereford and 3/16th Shorthorn.[124] In the

[123] Bonsma, *Jan Bonsma and the Bonsmara Cattle Breed*, 21.
[124] Aitken, 'Bonsma Revisited', 27.

form of a new scientifically designed and locally adapted breed, Bonsmaras symbolised the connection between southern Africa and Britain, and the latter's impact on the former. Here is an image of what Jan Bonsma considered the ideal Bonsmara bull.

Image 5.6. Jan Bonsma's ideal Bonsmara bull, Noble Gentleman

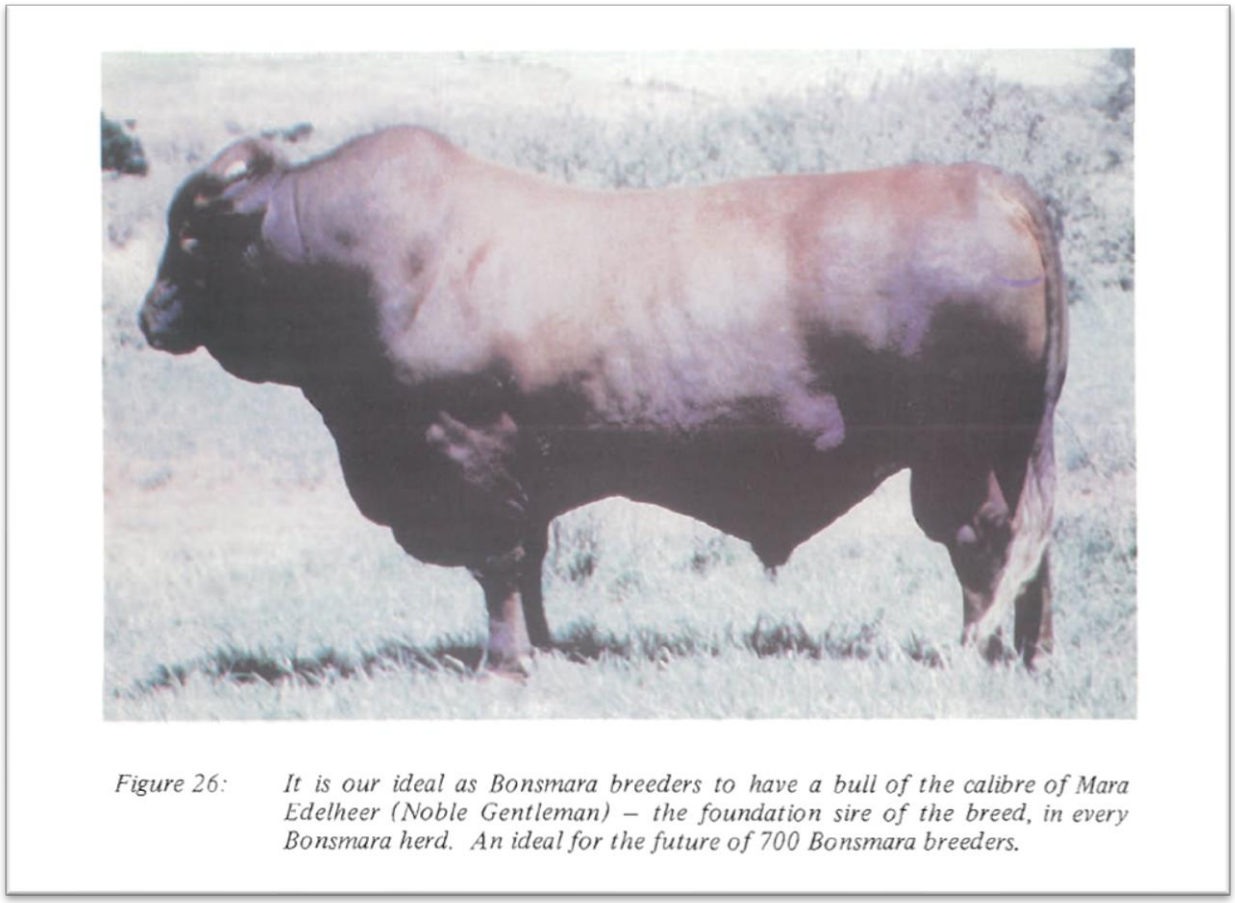


Figure 26: *It is our ideal as Bonsmara breeders to have a bull of the calibre of Mara Edelheer (Noble Gentleman) – the foundation sire of the breed, in every Bonsmara herd. An ideal for the future of 700 Bonsmara breeders.*

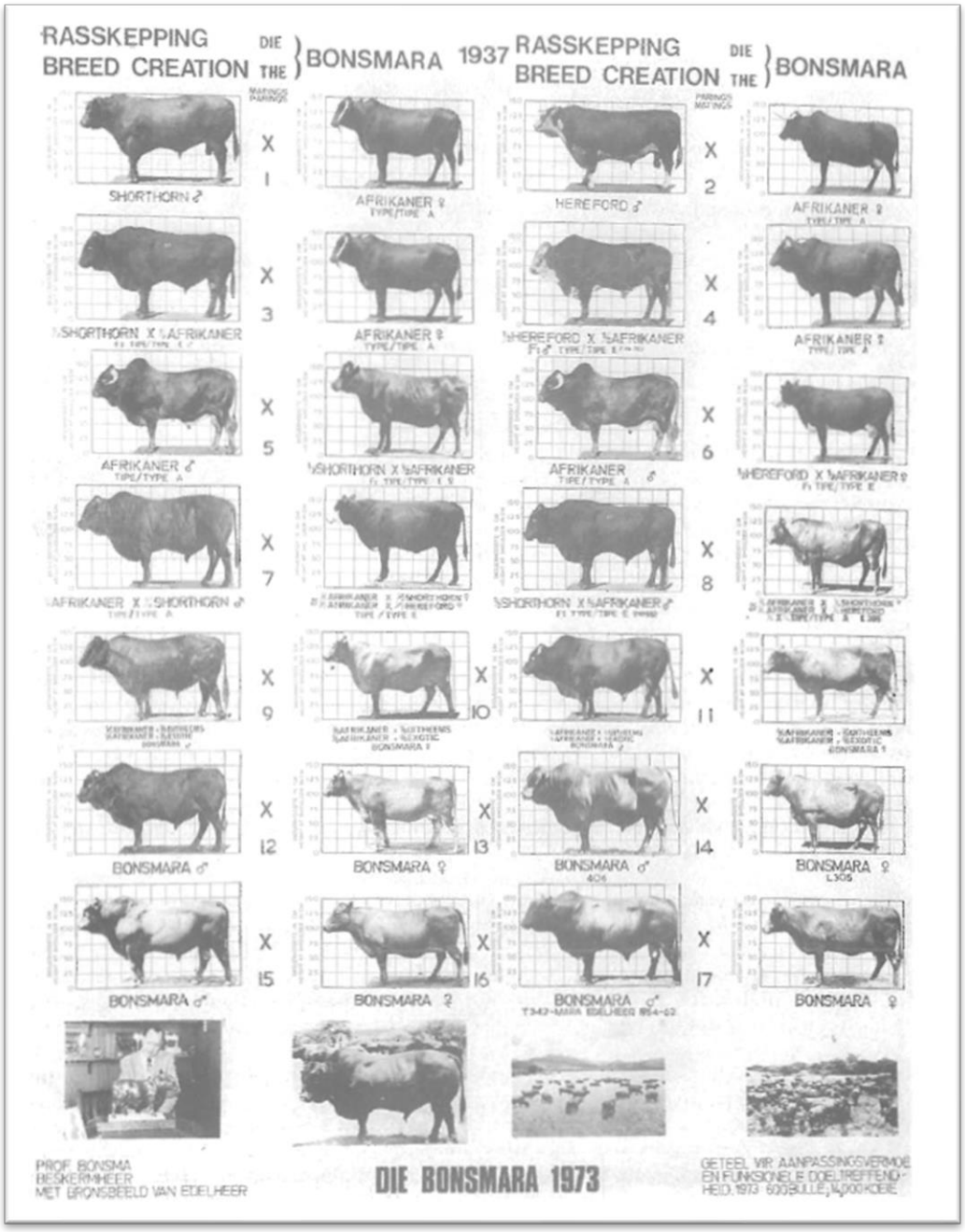
Source: Bonsma, *Jan Bonsma and the Bonsmara Cattle Breed*, 23.

In 1953, Jan Bonsma announced that a new breed of cattle, Bonsmara had been created.[125] In time Bonsmara would become South Africa's predominant breed raised under feedlot systems.[126] Bonsmara today are farmed in three continents. A Bonsmara cattle breeding society would later claim that 'Bonsmara is the only breed in the world that can boast a

[125] van Zyl, 'Deplorable State of Mara Research Station Raises Eyebrows.'
[126] M. Scholtz *et al*., 'Results of the National Cattle Survey Undertaken in South Africa, with Emphasis on Beef', *Applied Animal Husbandry & Rural Development* 1 (2008), 6.

pictorial genealogy from the very beginning of the breeding work until the new breed was established'.[127] A summarised visual depiction of this process follows.

Image 5.7. Seven generations of cattle bred to be a Bonsmara



Source: Bonsma, *Jan Bonsma and the Bonsmara Cattle Breed*, 14.

[127] The American Bonsmara Breed, 'History of Bonsmara', *The American Bonsmara Breed*, http://www.bonsmara.com/bonsmara/, accessed 4 May 2021.

The breeding system involved consequential ideas of inferior and superior genes, and desirable and undesirable hereditary traits. From a bovine perspective, it was a form of cattle eugenics.

Many of the ideas underpinning cattle eugenics programmes also underpinned human eugenics programmes. In the book that galvanised human eugenics thinking, *Hereditary Genius* (1896), Francis Galton argued that:

> It is easy… to obtain by careful selection a permanent breed of dogs or horses gifted with peculiar powers of running, or doing anything else, so it would be quite practicable to produce a highly-gifted race of men by judicious marriages during consecutive generations.[128]

He frequently compared human and animal breeding. Francis Galton later distinguished between positive and negative eugenics. Abstractly stated, positive eugenics increased the proportion of persons with desirable traits while negative eugenics decreased the proportion of those with undesirable traits.[129] In the early twentieth century, eugenics practices for humans commanded wide support and appeal in many countries, including at the state level. Governments in Sweden, Denmark, and Finland enacted eugenics sterilisation programmes in the early twentieth century.[130] Human eugenics ideas and movements were influential in Britain, New Zealand, Australia, China, Hong Kong, Kenya, South Africa France, Germany, the Netherlands, the Soviet Union, Iran, Japan, Cuba, Puerto Rico, Mexico, Brazil, the United States, and Canada, for example.[131]

In the United States by the end of the 1920s, more than half of the states in America had legalised compulsory sterilisations for those people they considered unsuitable to reproduce.[132] Such people included those who were classified as cognitively deficient, insane,

[128] Turner, *Animal Breeding, Welfare and Society*, 295.
[129] D. Paul and J. Moore, 'The Darwinian Context: Evolution and Inheritance', in A. Bashford and P. Levine (eds.), *The Oxford Handbook of the History of Eugenics* (Oxford: Oxford University Press, 2010), 28–30.
[130] Turner, *Animal Breeding, Welfare and Society*, 296.
[131] A. Bashford and P. Levine (eds.), *The Oxford Handbook of the History of Eugenics* (Oxford: Oxford University Press, 2010).
[132] Patterson, *Eternal Treblinka: Our Treatment of Animals and the Holocaust*, 88.

epileptic, sexual offenders, or repeat criminals. By 1941, over 30 000 people had been legally sterilised in the United States.[133]

The appeal and support of human eugenics lost much of its force in the mid-twentieth century. After WWII, specific human rights enshrined reproductive and marriage freedoms as inalienable. But for cattle no rights were enshrined. As human eugenics declined but did not disappear after WWII, so cattle eugenics accelerated rapidly.[134]

Modernised cattle breeding in Botswana and South Africa in the context of the global proliferation of FAI

In Bechuanaland, the Colonial Development Fund was integral to modernising the cattle industry. Against the backdrop of implementing Livestock Improvement Schemes in the 1930s, in the late 1940s the CDF set up a matrix of cattle 'fattening' operations on Crown land in Odiakwe, Nata, and Pandamatenga.[135] Also in the 1940s demand for cattle flesh on the Northern Rhodesian Copperbelt mines, in the Congo, and Southern Rhodesia, saw Bechuanaland expand its cattle flesh exports.[136] During WWII British demand for South African cattle flesh increased suddenly, and absent excess supply saw many cattle from Bechuanaland transported to slaughterhouses in Kimberley, Durban and Bulawayo in order to be exported to the United Kingdom.[137] Cattle exports increased markedly from the 1940s to the early 1960s, alongside borehole drilling schemes and veterinary fences to control disease outbreaks.[138] Cattle exports in Bechuanaland were closely tied to the Colonial Development Corporation (CDC).[139] Managed and supported by the CDC, the opening of the Lobatse slaughterhouse in 1955 signalled a shift towards globalising Bechuanaland's cattle

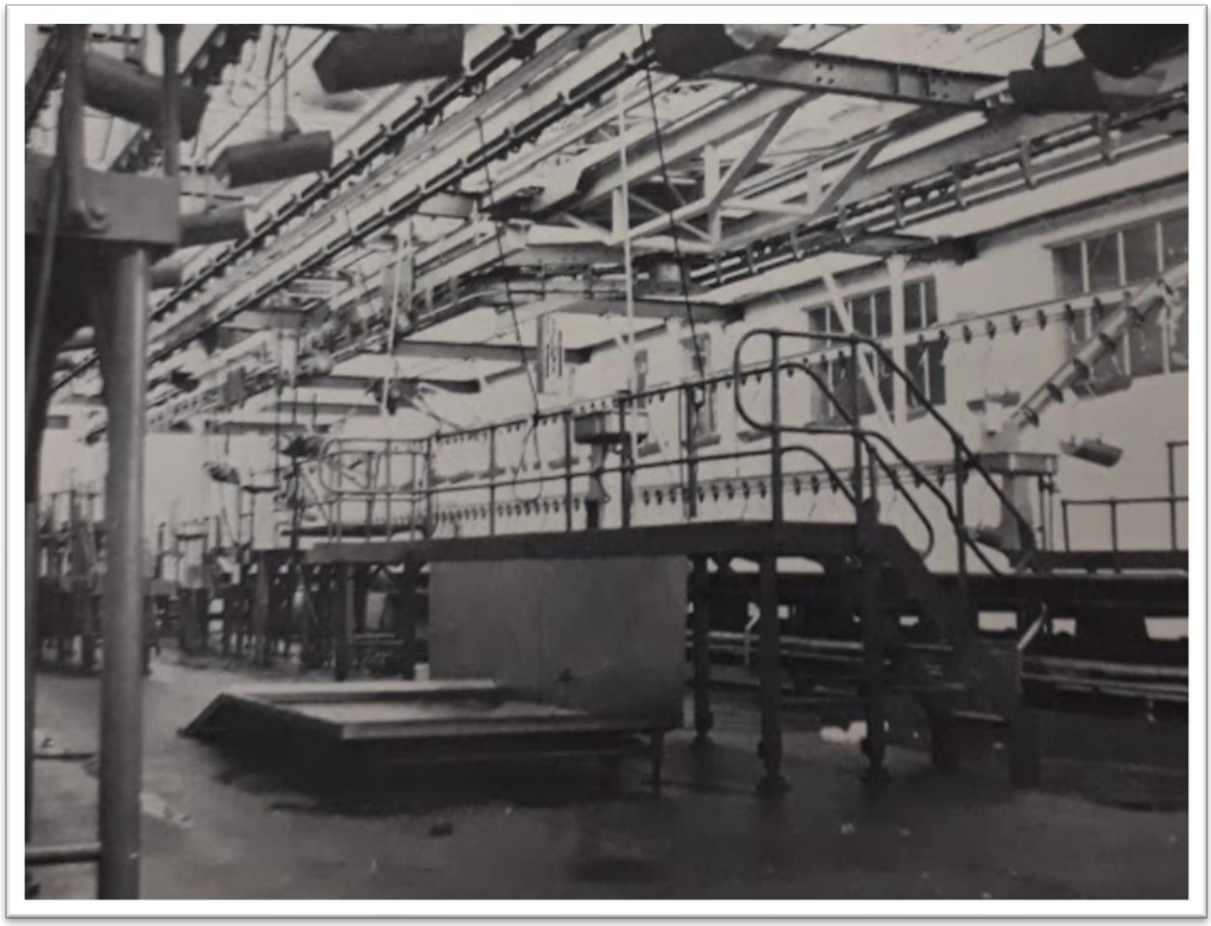
[133] Turner, *Animal Breeding, Welfare and Society*, 297.
[134] For information on human eugenics after WWII, see M. Thomson, 'Psychiatry, Disability, and Eugenics after World War II', in A. Bashford and P. Levine (eds.), *The Oxford Handbook of the History of Eugenics* (Oxford: Oxford University Press, 2010), 116–33.
[135] M. Darkoh and J. Mbaiwa, 'Globalisation and the Livestock Industry in Botswana', *Singapore Journal of Tropical Geography* 23, 2 (2002), 153.
[136] *Ibid*, 152.
[137] *Ibid*, 153.
[138] Hillbom, 'Cattle, Diamonds and Institutions', 166.
[139] The CDC was renamed the Commonwealth Development Corporation in 1963.

flesh exports and modernising its cattle industry.[140] In this respect cattle slaughter in Bechuanaland became industrialised four decades later than in South Africa, as we saw in Chapter Four. In 1959 a proclamation prohibited new competitor slaughterhouses opening without a license, and the next slaughterhouse only opened in 1983, 640 kilometres north of Lobatse in Maun.[141] The centralised Lobatse slaughterhouse enabled access to southern African markets, the UK, and later the European market.[142] The number of Batswana who sold cattle directly to Lobatse increased from 12 in 1954 to 1 500 in 1962, which indicates an increase of cattle sellers and that cattle selling was no longer the preserve of a numerically minuscule chiefly elite.[143]

The Lobatse slaughterhouse was in 1963 co-owned by the Commonwealth Development Corporation (formerly Colonial Development Corporation) which held 50% of shares, and the Bechuanaland Government and the Livestock Producers' Trust, which each held 25% of shares.[144] Lobatse comprised the sole export slaughterhouse.[145] In 1965 the Lobatse slaughterhouse was modernised. In that year it reported a record daily slaughter rate of 1 226 animals, or more than two per minute in an eight-hour day.[146]

[140] A. Samatar and S. Oldfield, 'Class and Effective State Institutions: The Botswana Meat Commission', *The Journal of Modern African Studies* 33, 4 (1995), 660.
[141] *Ibid*, 660, 662.
[142] Darkoh and Mbaiwa, 'Globalisation and the Livestock Industry in Botswana', 152.
[143] T. Tlou and A. Campbell, *History of Botswana* (Gaborone: Macmillan, 1997), 275.
[144] BNA, BNB 4750 ARC 472.29, Price Waterhouse & Co, *The Livestock Industry of the Bechuanaland Protectorate, Report*, Price Waterhouse & Co, 1963, 4.
[145] Samatar and Oldfield, 'Class and Effective State Institutions', 662.
[146] BNA, BNB 969, Botswana Meat Commission, *Reports and Accounts*, 1966, 4.

Image 5.8. Inside of Lobatse slaughterhouse in 1965



Source: BNA, BNB 969, Botswana Meat Commission, *Reports and Accounts*, 1966, 4.

In 1965 the Botswana Meat Commission (BMC) was established.[147] The Lobatse slaughterhouse complex was nationalised at Botswana's independence in 1966.[148] The BMC enacted a monopoly where all cattle for slaughter or export were purchased by the BMC. From its inception in 1966, the BMC increased the cattle throughput – the cattle it slaughtered or sold – from 150 000 to 239 293 in less than two decades.[149]

[147] E. Roper, *Report of the Commission of Inquiry into Certain Matters Related to the Botswana Meat Commission* (National Assembly of the Republic of Botswana, 1967), 2.
[148] Samatar and Oldfield, 'Class and Effective State Institutions', 661.
[149] *Ibid*, 662.

Image 5.9. Botswana Meat Commission in Lobatse, 1967

Source: BNA, BNB 969, *Reports and Accounts*, 1966, 3.

At independence in 1966, live cattle and cattle flesh exports comprised 85% of total export revenue.[150] From just over a million in 1965, in the decade after independence the cattle population in Botswana grew to 2.5 million.[151] Botswana's five-year plan (1968-1972) apportioned 60% of its agricultural budget towards 'livestock and animal health'.[152]

The Colonial Development Fund and the Bechuanaland government were involved in virtually every aspect of modernising the cattle trade, including breeding schemes, fattening projects, veterinary fences, drilling boreholes, funding and operating a centralised slaughterhouse, and connecting Bechuanaland cattle to the UK market. What became Botswana's cattle economy was a colonial project started in the 1930s via LISs and borehole drilling projects. In terms of

[150] J. Bolt and E. Hillbom, 'Long-Term Trends in Economic Inequality: Lessons from Colonial Botswana, 1921–74', *The Economic History Review* 69, 4 (2016), 1269.
[151] E. Roe, *Development of Livestock, Agriculture, and Water Supplies in Botswana before Independence* (Ithaca: Cornell University, 1980), 2; Hillbom, 'Cattle, Diamonds and Institutions', 168.
[152] Darkoh and Mbaiwa, 'Globalisation and the Livestock Industry in Botswana', 154.

breeding, for cattle the next major developments were forced artificial insemination schemes and intensive performance tests.

From 1967 forced artificial insemination was deployed against cattle in Botswana.[153] Forced artificial insemination comprised a breeding development that had its roots in the colonial livestock improvement centres from the 1920s.[154] This development – FAI centres being mapped onto LIC infrastructure – mirrored in part what had happened in the United Kingdom. For cattle in the United Kingdom, the impact of artificial insemination was dramatic. From the 1930s researchers at the University of Cambridge started developing forced artificial insemination procedures for cattle.[155] Over the next two decades, a matrix of FAI centres had been implemented across England and Wales, such that FAI was available to every cattle farmer; each FAI centre was linked to a cow population of 60 000.[156] Certain highly desirable bulls were moved between centres to ensure 'rotational crossbreeding'.[157] The matrix of FAI centres was linked to the UK's centralised milk records data, and enabled national progeny testing. In England and Wales, in 1951 20% of cows were impregnated via FAI – by 1958 58% of all cows were impregnated by FAI.[158] Under the auspices of the UK's Milk Marketing Board, it was the largest FAI system in the world under a single body.[159] This extremely vast coverage was enabled by the Livestock Improvement Scheme which had been operating for the previous three decades, and without which the FAI network in the UK would have been 'unthinkable'.[160] From one FAI centre in 1944/5 which impregnated 2599 cows, in 1957/8 there were 22 centres impregnating 1 399 349 cows.[161]

Modern cattle breeding has been discussed as a core feature of fascist states in the twentieth century. Tiago Saraiva specifically explored how FAI was used by fascist European regimes as

[153] J. Moreki, T. Pelaelo-Grand, and A. Ranko, 'Artificial Insemination in Botswana: Challenges and Opportunities – A Review', *Journal of Animal Science and Veterinary Medicine* 4, 4 (2019), 122.
[154] Mocheregwa, 'Artificial Insemination and the Cattle Industry in Botswana, 1960-2011', 109.
[155] Wilmot, 'From "Public Service" to Artificial Insemination', 423.
[156] *Ibid*, 411.
[157] *Ibid*, 428.
[158] *Ibid*.
[159] *Ibid*.
[160] *Ibid*, 422–23.
[161] *Ibid*, 429.

part of their colonial regimes in Angola, Ethiopia, Libya, and Libya.[162] He regarded artificially inseminated sheep as 'materialized fascist ideology.'[163] Analysing FAI programmes that were imposed on sheep in Libya under Italian occupation, he highlights that in 1939, 1 592 Barbaresca ewes (Italian sheep) were artificially inseminated through a process that involved:

> four basic steps of artificial insemination—collecting, diluting, conserving, and inseminating proper—[which] were to be undertaken under strictly standardized procedures.[164]

Over-foregrounding the standardisation aspect, what forced artificial insemination meant for the ewes and rams disappears. Animals' experiences of fascism and colonialism in Africa remain unarticulated. Tiago Saraiva summarises the impact of FAI on sheep in Cyrenaica, Libya, as comprising 'obligatory passage points'. He writes:

> we can say that artificial-insemination centers worked as obligatory passage points for the performance of colonial relations. Determining which animals would be allowed to reproduce and which would be eliminated from a herd meant intervening at the core of indigenous life… colonial domination meant breaking the relations between natives and their animals. In terms likely to be familiar to present-day scholars of Science Studies, control of animal reproduction constituted an obligatory passage point translating questions of colonial power and political independence.[165]

For animals, FAI was far more than an obligatory passage point. From animals' perspectives, the expansion and coverage of forced artificial insemination from the mid-twentieth century plausibly comprised the most transformative development in domesticated animals' history. In terms of its impact on animals, the artificial insemination of domesticated animals is probably the most significant development since the agricultural revolution. This is because artificial insemination enables the reproduction of animals to become industrialised. Experientially, it involved forcibly extracting semen from males and forcibly impregnating females. Forced artificial insemination rapidly and vividly increased the commercial value of farmed animals, and the technology spread with celerity across the globe.

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[162] Saraiva, *Fascist Pigs: Technoscientific Organisms and the History of Fascism*, 211–12, 214, 216, 226, 230, 234.
[163] *Ibid*, 3.
[164] *Ibid*, 214.
[165] *Ibid*, 215.

In June of 1948, the 'First International Congress of Physiology and Pathology of Animal Reproduction and of Artificial Insemination' was hosted in Milan by the Lazzaro Spallanzani Italian Experimental Institute for Artificial Insemination and the University of Milan.[166] Lazzaro Spallanzani in 1789 had published about impregnating a spaniel with a small cannula, and is regarded as one of the first people to artificially impregnate a mammal.[167] Previously, Telesforo Bonadonna, who directed the Lazzaro Spallanzani institute, had visited artificial insemination centres in fascist Germany and the Soviet Union and returned with instruments to start inseminating cows and sheep.[168] At the conference were 600 attendees, representing over 80 countries and six continents.[169] There were lectures on experiments in Kenya, Uruguay, Sweden, and Denmark. A total of 224 papers were presented.[170]

One of the most significant English texts on artificial insemination from the mid-1940s to the late 1960s is Enos Perry's edited volume, *The Artificial Insemination of Farm Animals* (1945). Its fourth edition in 1968 was the book's 11th reprint. The 1968 editor's forward gave a sense of the global and commercial impact of artificial insemination. It noted that in 1967 over a dozen countries were artificially breeding between 50 and 98% of cows.[171] In 1964 the New Zealand Dairy Production and Marketing Board reported an annual increase of 11.3 kilograms of butterfat per cow from artificial breeding.[172] In Denmark between 1939-40 and 1964-65 cows' annual milk outputs on average each rose from 3 505 to 4 765 kilograms.[173] In the United States cattle raised for their flesh, 'beef cattle', doubled in commercial value in the mid-1960s. The financial incentives for governments were therefore considerable. The scale of artificial breeding reached unprecedented levels. By 1966 one bull in the United States had

[166] B. Morgan, 'First International Congress of Physiology and Pathology of Animal Reproduction and of Artificial Insemination', *Science* 108 (1948), 465–66.
[167] B. Orland, 'The Invention of Artificial Fertilization in the Eighteenth and Nineteenth Century', *History and Philosophy of the Life Sciences* 39, 2 (2017), 10–11.
[168] Saraiva, *Fascist Pigs: Technoscientific Organisms and the History of Fascism*, 213.
[169] T. Bonadonna, 'A World Survey of Artificial Breeding I. Development and Organization', *British Veterinary Journal* 125, 10 (1969), 518.
[170] Morgan, 'First International Congress of Physiology and Pathology of Animal Reproduction and of Artificial Insemination', 465.
[171] E. Perry, 'Editor's Forward' in E. Perry (ed.), *The Artificial Insemination of Farm Animals* (New Jersey: Rutgers University Press, 1968), vii.
[172] *Ibid*.
[173] *Ibid*.

been used to forcibly impregnate 350 000 cows.[174] Telesforo Bonadonna's global survey of FAI suggested that 69 702 422 cows had been forcibly artificially inseminated in 1967.[175] In the 1960s over 50% of all cows were artificially inseminated in the Netherlands, Bulgaria, Denmark, France, Finland, East Germany, Japan, the USSR, Sweden, and Hungary.[176] The book provided information and practical examples regarding how to forcibly artificially inseminate cattle, horses, donkeys, buffaloes, sheep, goats, pigs, chickens, turkeys, dogs, and honeybees.[177] FAI use was by the 1960s most widely adopted and on large scale in Britain, the United States, Netherlands, France, West Germany, the Scandinavian countries, and Canada.[178] In South Africa, as discussed below, FAI emerged in the 1930s, was regulated by the state in the 1950s, and was established by the 1960s, whereas in Botswana FAI emerged shortly after political independence. In Botswana's case, discussed later, colonial breeding regimes were intensified after political independence.

Forced artificial insemination was different for bulls and cows. Forced ejaculations were imposed on bulls every five to seven days for older bulls, or once every seven to ten days for younger bulls.[179] The three methods were, masturbating the bull by massaging his ampullae, compelling a bull to inseminate into an artificial vagina, and electroejaculation.[180] Electroejaculation was first developed in 1936 and was more commonly deployed from the 1950s.[181] By the late 1960s many electroejaculators were commercially available.[182] Describing how to use electroejaculators on bulls, John Almquist noted that the process involved:

[174] E. Perry, 'Historical Background', in E. Perry (ed.), *The Artificial Insemination of Farm Animals* (New Jersey: Rutgers University Press, 1968), 7.
[175] Bonadonna, 'A World Survey of Artificial Breeding I. Development and Organization', 519.
[176] Perry, 'Historical Background', 7.
[177] Perry, 'Editor's Forward', xi–xii.
[178] Bonadonna, 'A World Survey of Artificial Breeding I. Development and Organization', 518.
[179] S. van Rensburg, 'Pitfalls of Artificial Insemination and Semen Examination', *Journal of the South African Veterinary Association* 21, 4 (1950), 190.
[180] J. Almquist, 'Dairy Cattle', in E. Perry (ed.), *The Artificial Insemination of Farm Animals* (New Jersey: Rutgers University Press, 1968), 94.
[181] R. Gunn, *Fertility in Sheep: Artificial Production of Seminal Ejaculation and the Characters of the Spermatozoa Contained Therein* (Melbourne: Council for Scientific and Industrial Research, 1936); P. Dziuk, E. F. Graham, and W. Petersen, 'The Technique of Electroejaculation and Its Use in Dairy Bulls', *Journal of Dairy Science* 37, 9 (1954), 1035–41.
[182] Almquist, 'Dairy Cattle', 105.

> inserting a probe or electrode into the bull's rectum and stimulating nerves to the reproductive system by gradually increasing voltage in rhythmic fashion with a rheostat over a period of three to five minutes.[183]

He cautioned that the 'electrostimulation often causes straining and muscle tetany' and that 'the bull may go to his feet'.[184] He recommended that bulls 'should be restrained in a chute or stocks and provided with good footing to avoid injury'.[185] Because bulls bucked and kicked furiously, they had to be constrained by nose rings attached to ropes that could be pulled at any moment. This indicates they were in states of agitation and distress. They likely experienced excruciating discomfort and pain. For this reason, from the mid-1950s some inseminators started to feed bulls antipsychotic tranquilisers before electroejaculating them. The psychoactive tranquiliser used on bulls after the mid-1950s was Chlorpromazine.[186] First synthesised in 1951, Chlorpromazine was the earliest antipsychotic medication.[187] It was framed as a 'neurovegetative stabilizer' and it established the field of psychopharmacology.[188] It enabled the discovery of antidepressants like imipramine, Prozac, Valium, and Ritalin.[189] Chlorpromazine was distinguished from other sedatives and barbiturates in that it left motor reflexes intact, but blocked avoidance responses.[190] Rats who were fed earlier iterations of this drug were unresponsive to electric shocks.[191]

In humans, Chlorpromazine is used to treat schizophrenia and manic depression, and is powerful enough to relieve hallucinations and delusions.[192] For bulls it functioned as a chemical straitjacket. Various studies from 1954 recommended using this antipsychotic medication on bulls during electroejaculation because it reduced 'straining and tetany',

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[183] *Ibid*.
[184] *Ibid*.
[185] *Ibid*.
[186] P. Dziuk *et al*., 'Some Observations in Collection of Semen from Bulls, Goats, Boars and Rams by Electrical Stimulation', *Veterinary Medicine* 49 (1954), 455–58; R. Lundvall and R. Campbell, 'Chlorpromazine Hydrochloride for the Examination of the Penis in Bulls', *Journal of the American Veterinary Medical Association* 131, 2 (1957), 86–87.
[187] T. Ban, 'Fifty Years Chlorpromazine: A Historical Perspective', *Neuropsychiatric Disease and Treatment* 3, 4 (2007), 495; D. Healy, *The Creation of Psychopharmacology* (Cambridge: Harvard University Press, 2002), 2.
[188] Ban, 'Fifty Years Chlorpromazine', 495–96; Healy, *The Creation of Psychopharmacology*, 2.
[189] Healy, *The Creation of Psychopharmacology*, 2.
[190] Ban, 'Fifty Years Chlorpromazine', 497.
[191] Healy, *The Creation of Psychopharmacology*, 80.
[192] Ban, 'Fifty Years Chlorpromazine', 495.

reduced their tendency to extend their rear legs, and its generally powerful sedative effects.[193] It also 'extended the period of usefulness of aged or injured bulls'.[194]

For cows, by the 1960s there were two primary forced artificial insemination methods, the speculum and the rectovaginal methods.[195] After WWII the latter method largely replaced the former because it yielded higher birth rates.[196] The speculum method involved a glass or metal speculum, an inseminating tube, and a light. A sterile lubricated speculum was inserted into the vagina and cervix. Thereafter an inseminating tube was inserted through the speculum 'and into the external uterine…or the posterior part of the cervical canal as far as possible'.[197] For the rectovaginal method, the primary instrument was an inseminating tuber or catheter 5-6 mm in diameter and 40-45 cm long. The method comprised a twelve-step process. For step nine the instructions were:

> with the hand in the rectum, press downward on the rectal wall, grasp the cervix, and guide the tube into external uterine os (mouth of cervix) with aid of thumb and little finger around posterior end of cervix.[198]

FAI comprised extreme violations of cows' and bulls' bodily integrity and dignity. FAI is a bedrock feature of modern animal agriculture. Sometimes, in order to teach humans how to perform this procedure, stains or dyes were placed in the insemination device. Cows were inseminated, then slaughtered, and then their reproductive organs were removed. These were then examined to determine where the insemination had occurred.[199]

In 1959 a South African veterinarian reported that one veterinarian at an international veterinary conference in London claimed that inseminators should perform between 800 and 1 000 forced inseminations before the inseminators could be regarded as 'experienced and

[193] M. Wells *et al*., 'Effect of Method of Semen Collection and Tranquilization on Semen Quality and Bull Behavior', *Journal of Dairy Science* 49, 5 (1966), 500.
[194] *Ibid*.
[195] Almquist, 'Dairy Cattle', 128.
[196] *Ibid*.
[197] *Ibid*, 130.
[198] *Ibid*, 128–30.
[199] G. King and J. Macpherson, 'Observations on Retraining of Artificial Insemination Technicians and its Importance in Maintaining Efficiency', *The Canadian Veterinary Journal* 6, 4 (1965), 83–85.

efficient'.[200] By its fourth edition, *Artificial Inseminations for Farm Animals* (1968) contained no mention of medicating cows with tranquilisers during forced artificial inseminations.[201] Counterfactually, if forced artificial inseminations were imposed onto humans it would unflinchingly be called industrialised rape. Were electroejaculations imposed on male humans it would unflinchingly be called industrialised torture. For humans, after WWII fascism in Europe was largely halted. For animals, this core aspect of European fascist regimes, modernised animal breeding, was expanded and intensified, and became a basis of many modern states' animal agriculture systems.

Prized breeding bulls were isolated from their kin and blocked from pursuing their species-characteristic flouring. They were condemned to a life of traumatising, often electric sexual abuse. Cows too were stripped away from their kin and calves, which involved all the psychological and physical distress which accompanies the destructions of cattle's social bonds. Cows used for breeding were physically and sexually violated – repeatedly, forcibly impregnated, and reduced to rapid, birthing machines. Cattle's life cycles became strictly and tyrannically controlled on the basis of birth rates, milk yields, flesh to carcass ratios, or more generally the economic value of their progeny.

In Africa, forced artificial insemination emerged more slowly than in Europe. It was in use in Kenya in 1935, in Libya and Ethiopia in the 1930s, Angola in 1947, Rwanda and Burundi by 1964, Tunisia by 1965, Namibia in 1972, and Lesotho in 1977.[202] Swaziland's post-WWII plans included resources for forcibly artificially inseminating cattle and there is evidence that cattle used for dairy were subjected to this later.[203] As we have seen, colonists in southern Africa

[200] van Rensburg, 'Pitfalls of Artificial Insemination and Semen Examination', 189.
[201] Perry, *The Artificial Insemination of Farm Animals*.
[202] J. Anderson, 'Artificial Insemination and Community Breeding of Cattle', *The East African Agricultural Journal* 8, 1 (1942), 4; Saraiva, *Fascist Pigs: Technoscientific Organisms and the History of Fascism*, 214,216; Bonadonna, 'A World Survey of Artificial Breeding I. Development and Organization', 521; B. Moore, 'Smuggled Sheep, Smuggled Shepherds: Farm Labour Transformations in Namibia and the Question of Southern Angola, 1933–1975', *Journal of Southern African Studies* 47, 1 (2021), 109, 111; H. Schneider, 'The History of Veterinary Medicine in Namibia', *Journal of the South African Veterinary Association* 83, 1 (2012), 8; 'Lesotho Agricultural Sector Investment Programme. Working Paper 4B Intensive and Extensive Livestock Production Agricultural Diversification' (Lesotho, 1997), 4.
[203] A. Dlamini, C. Malima, and Z. Hlandze, 'Farmers' Perceptions of Socio-Economic Biosafety Considerations Regarding Adoption and Use of Biotechnology: A Case Study of Sithobeleni and Lesibovu Communities in Swaziland', *Journal of Scientific Research & Reports* 8, 4 (2015), 8; SNA, Acc. no 881. 630.2683, Swaziland Policy

were wont to disparage indigenous southern Africans as primitive and inferior where they were disinclined to adopt these practices.

In South Africa, John Quinlan and colleagues started afflicting merino sheep with forced artificial inseminations at the Onderstepoort Veterinary Research Institute in 1932.[204] Until the late 1940s, FAI was used against animals on a small scale in South Africa, mainly at research and experimentation centres.[205] From 1948 farmers and breeders increasingly used FAI.[206] Whereas in Britain, FAI centres were controlled and run as state operations, in South Africa during the 1950s and 1960s, FAI was conducted by farmers' co-operatives.[207] John van der Byl in Irene, in south Pretoria, for example did much to promote the Transvaal Artificial Insemination Co-operative during this time, specifically to expand cows' milk production.[208] The first law to regulate FAI in South Africa was the Artificial Insemination of Animals Act of 1954.[209] It enabled the establishment of an Artificial Insemination Board, comprising two members nominated by the South African Agricultural Union, two milk producers' representatives, six representatives of animal breeding associations, while the remaining three to five members had to be officials from the Agricultural Department. The Act required FAI operations to apply to the board to secure a registration certificate, and enabled state officials to inspect such facilities. But the Act did not standardise or specify insemination procedures, nor did it place any specific restrictions on how FAI was carried out, nor were animals protected by this law in any way.[210] The board, impelled by desires to increase the productive and economic value of farmed animals, was thus given considerable power to determine which FAI procedures were permissible, in accordance with their motives.

Particularly in light of the 'intensification of cattle and swine breeding', by the 1960s South African veterinarians were well aware of the veterinary use of narcotics, barbiturates,

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and Plans for the Immediate and Post-war Development of Animal Industry, Agriculture, and Forestry, 1945, 33, appendix 1.

[204] J. Quinlan, H. Steyn, and D. De Vos, 'Observations on Artificial Insemination of Sheep with Fresh and Stored Semen', *Onderstepoort Journal of Veterinary Science and Animal Industry* 16, 1 and 2 (1941), 264.

[205] van Rensburg, 'Pitfalls of Artificial Insemination and Semen Examination', 187.

[206] *Ibid*.

[207] I. Geldenhuys, 'The Development of Agricultural Co-Operation in South Africa', *Agrekon* 1, 3 (1962), 19.

[208] D. van der Byl, 'A Short History of Irene', *Pretoriana* 42 & 43 (1963), 21.

[209] Union of South Africa, *Artificial Insemination of Animals Act, 1954*.

[210] *Ibid*.

analgesics, and antipsychotic drugs such as Chlorpromazine.[211] And by the late 1950s researchers at Onderstepoort were promoting the use of convenient electroejaculators for bulls and rams. W. de Vos even connected a bicycle wheel and a generator to an electroejaculator and obtained a 6-volt current with which to electroejaculate rams and bulls in the field.[212] In 1964 South Africa artificially inseminated at least 315 000 cows.[213]

[211] O. Dietz, 'Modern Narcosis in Horses, Cattle and Swine', *Journal of the South African Veterinary Association* 31, 2 (1960), 315.
[212] W. van Rensburg, 'A Convenient Type of Electro-Ejaculator for Bulls and Rams', *Journal of the South African Veterinary Association* 28, 1 (1957), 1–4.
[213] Bonadonna, 'A World Survey of Artificial Breeding I. Development and Organization', 521.

Image 5.10. Bicycle generator FAI device used on a ram

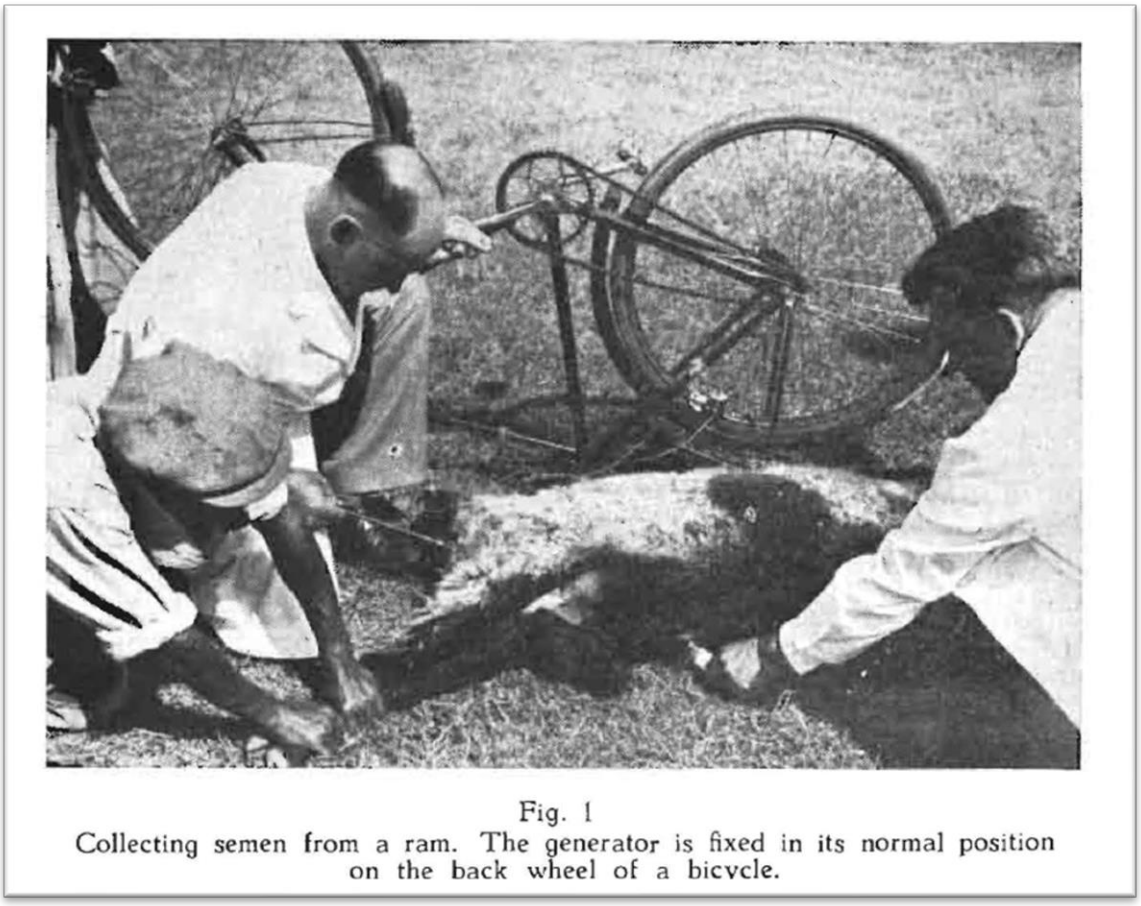

Fig. 1
Collecting semen from a ram. The generator is fixed in its normal position on the back wheel of a bicycle.

Source: W. van Rensburg, 'A Convenient Type of Electro-Ejaculator for Bulls and Rams', *Journal of the South African Veterinary Association* 28, 1 (1957), 1.

In the context of its expanding cattle exports in the 1960s, the Commonwealth Development Corporation and the Bechuanaland government reinvigorated their breeding efforts. A school to train veterinary assistants was opened in 1963.[214] Another 'bull subsidy scheme' was launched in 1964 and some 2 120 bulls were used in this scheme over the next decade.[215] In Botswana artificial insemination appeared just after human independence in 1967.[216] Initially, Botswana's government signed an agreement to import bull semen from the Transvaal Artificial Insemination Cooperative Society in Pretoria.[217] Botswana's vice president himself had sent 90 heifers to be inseminated by December 1967 but only 50 were recommended by

[214] Hillbom, 'Cattle, Diamonds and Institutions', 168; Tlou and Campbell, *History of Botswana*, 274–75.
[215] Mocheregwa, 'Artificial Insemination and the Cattle Industry in Botswana, 1960-2011', 111–12.
[216] *Ibid*, 112.
[217] *Ibid*.

the government's FAI specialist C Jensen, the others being too small.[218] In the same year at least 450 cows were scheduled for the procedure by early adopter farmers.[219] At the end of 1967 there were two functional FAI centres in Botswana. C. Jensen wrote to Irene on 19 December and ordered the semen of 600 Brahman, 200 Africander, 80 Sussex, 60 Simmentaler, and 60 Charolais bulls, and 800 units of liquid nitrogen to preserve the semen.[220] In June 1968 a third centre was opened, namely the Good Hope Artificial Insemination centre, while another two, one in Ghanzi and another in Dibete, were being built.[221]

Image 5.11. Ghanzi forced artificial insemination centre, Botswana 1969

Source: BNA, BNB 1378 (1) ARC 47.2.4, Ministry of Agriculture, *Artificial Insemination in Botswana*, Government Printer: Gaborone, 1969, 2.

[218] *Ibid*.
[219] *Ibid*.
[220] *Ibid*, 113.
[221] *Ibid*, 113–14.

In 1969 the director of veterinary services published and distributed a 12-page information document about how to access FAI in Botswana.[222] It comprised a four-page question and answer section, as well as information about and images of the bulls whose semen was imported from Irene, and some information about progeny tests and about how cows were inseminated in Botswana. It noted that '[o]ur aim with artificial insemination is the improvement of the National Herd by using semen from superior bulls.'[223]

All cattle born via FAI were tattooed on the ear, with information indicating their unique number, year of birth, and the name of their father.[224] They noted that 3 500 cows or heifers had been inseminated so far.[225] The pamphlet warned that [i]njuries can be done to the cow by the inseminator if he is not properly trained', and noted that inseminators in Botswana were trained by a 'Veterinary Surgeon'.[226] It continued, noting that the 'quality of the bull is the best as we only use performance and, preferably, progeny-tested bulls'.[227] Farmers and cattle herders were invited to participate.

> You must bring your females to one of the A. I Centres. Any Stock Inspector will advise you when you bring your cattle to the local crush. After the selection the animals must be brought straight to the A. I centre.[228]

Farmers paid a fee of R2, which included forced insemination, grazing, water, supplementary feeding, and medicine in the event of illness.[229] Cows were detained for between two and four months.[230] The camps ran from September to March. Farmers or herders wishing to forcibly inseminate cows themselves could purchase equipment and semen from the government provided they attended a six-day course first.[231]

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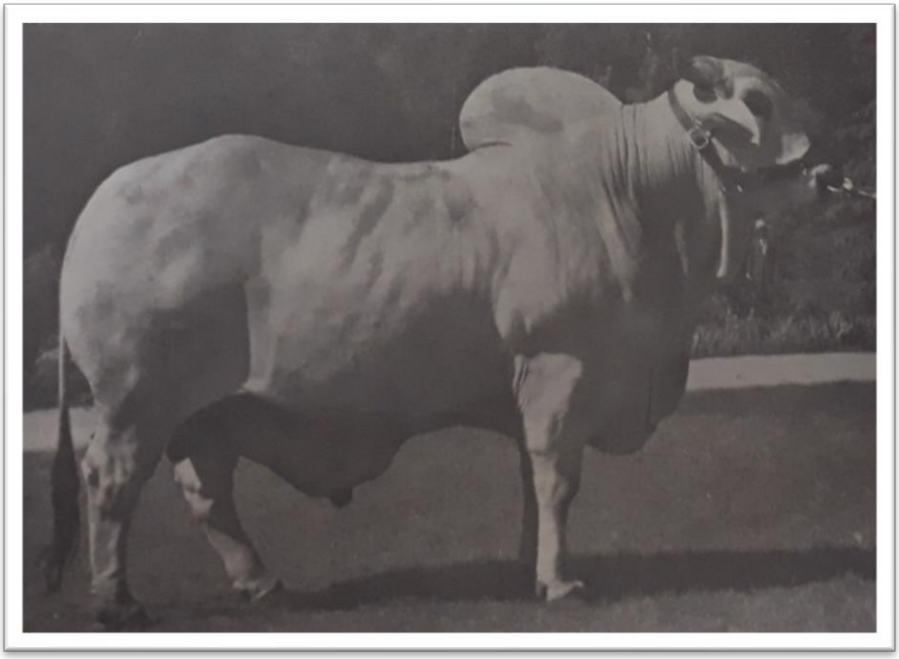
[222] BNA, BNB 1378 (1) ARC 47.2.4, Ministry of Agriculture, *Artificial Insemination in Botswana*, Government Printer: Gaborone, 1969, 1–12.
[223] *Ibid*, 1.
[224] *Ibid*.
[225] *Ibid*, 4.
[226] *Ibid*, 1.
[227] *Ibid*.
[228] *Ibid*, 3.
[229] *Ibid*.
[230] *Ibid*, 4.
[231] *Ibid*, 5–6.

Image 5.12. 'Africander/improved Tswana progeny' born at Good Hope FAI centre

Source: BNA, BNB 1378 (1) ARC 47.2.4, *Artificial Insemination in Botswana*, 7.

The pamphlet then provided images of the bulls whose semen was available at its FAI centres.

Image 5.13. Imperator Mansa at Transvaal FAI centre



Source: BNA, BNB 1378 (1) ARC 47.2.4, *Artificial Insemination in Botswana*, 8.

Image 5.14. Simmenthaler cattle 'Hanf' at Transvaal FAI centre

Source: BNA, BNB 1378 (1) ARC 47.2.4, *Artificial Insemination in Botswana*, 10.

It noted that Simmenthalers were bred for their flesh and milk. Hanf weighed 1202 kilograms when he was photographed. The government noted that only big cows should receive his semen and that all of his male progeny should be castrated.[232]

At this point, Botswana did not forcibly collect bull semen at its FAI centres. This changed in 1970. In 1968 Professor N. Rasbech of the Danish Royal Academy travelled to Botswana, met with the Botswana government and chief veterinary officer, and visited Good Hope, Ghanzi, Maun, Francistown, Tuli Block, Serowe and Dibete.[233] Denmark subsequently funded Botswana's first FAI centre capable of forcibly extracting semen from bulls. This centre was built at Ramatlabama, about 320 kilometres from Irene.[234] Here bulls were subjected to semen extraction. Thereafter, FAI services spread across Botswana with new stations constituted in Makalamabedi, Morupule, Phuduhudu, Nokaneng, and Sefhophe.[235] By 1975

[232] *Ibid,* 10.
[233] Mocheregwa, 'Artificial Insemination and the Cattle Industry in Botswana, 1960-2011', 114.
[234] *Ibid*.
[235] *Ibid*.

there were nine FAI centres in Botswana, with the capacity for impregnating 5 000 cattle.[236] From 1285 cows artificially inseminated in 1967/68, 3039 were thus afflicted in 1972.[237] In these respects, both regional and international scientific networks facilitated the development of FAI in Botswana.

In 1970 Botswana's Animal Production Research Unit (APRU) was established to conduct productionist research on animals.[238] The Botswana government also undertook progeny testing in the 1970s and 1980s. Progeny testing is the other main component of modernised, industrialised animal breeding. Its core aim is to determine the most financially valuable animals for breeding. From 1970 to 1990, 13 different progeny-related tests of cattle were undertaken, 10 relating to flesh production and three relating to dairying.[239] Tests included those evaluating cross-breeding, pure breeding, the effects of Zeranol (an anabolic oestrogen that promotes growth), oestrus synchronisation, and intensive milking systems.[240] Similar studies were undertaken on goats and sheep.[241] One report of bull performance tests in Mantswabese opened by noting that the 'only way in which young bulls can be evaluated for their suitability to enter a breeding herd is on their performance.'[242]

Over two years, fifty bulls were tested for annual and daily weight gains, and then ranked on these metrics.[243] In 1976 the APRU reported on their five-year plan for cattle flesh research. The language used was lucidly productionist, with cattle conceptualised as economic units.

[236] N. Buck, L. Serema, and H. Staugaard, 'Artificial Insemination in Botswana', *British Veterinary Journal* 131, 4 (1975), 386–7.
[237] *Ibid*, 388.
[238] J. Macala, D. Norris, and B. Kiflewahid, 'Cattle Milk and Meat Research and Development in Botswana' (ILCA Workshop on Collaborative Cattle Milk and Meat Research in East and Southern Africa, Harare, 1989), 5.
[239] B. Masilo and O. Madibela, *Report on the State of the World Animal Genetic Resources, Botswana Country Report* (Gaborone: Botswana National Focal Point for the Management of AnGR, 2003), 21.
[240] *Ibid*, 21; BNA, BNB 3143/ ARC 20. 415, Animal Production Research Unit, 'A Five Year Programme of Integrated Beef Cattle and Range Research in Botswana 1970-1975', Gabarone: Ministry of Agriculture, 1976.
[241] Masilo and Madibela, *Report on the State of the World Animal Genetic Resources, Botswana Country Report*, 21–22.
[242] BNA, BNB 1914 (1) ARC 47.2. 12, Animal Production Research Unit, *Increased Production through Breeding. A Report on: Tswana Bull Performance Test Mantswabese Ranch*. Gabarone: Ministry of Agriculture, 1973, 2.
[243] *Ibid*, 3–4.

> The beef breeding cow is maintained for one reason – the production of beef calves for finishing or herd replacement. The female cow is biologically capable of producing one calf per year…it is the objective which should be aimed at.[244]

> At present most heifers do not conceive until they are more than 2.5 years of age. This is too old...Every effort should be made to reduce this age, by finding the faster growing breeds or cross breeds which can be bred younger. Old cows must be culled on assessment of age, tooth wear and bodily condition.[245]

> Maximum growth rates are desirable to ensure that male calves reach slaughter weight at an early age, and that female calves may join the breeding herd as soon as possible.[246]

By the 1980s FAI had become established in South Africa and Botswana. So too had norms of progeny testing, where the value of cows and bulls and calves was determined by scores which related ultimately to their commercial value, as flesh, or calving mothers, or milk producers. FAI in Botswana never became as widespread as in the UK, Scandinavia, Germany, or the US. But FAI was for cattle an explicit impact of colonialism in South Africa, Botswana and Swaziland. For those whom it reached, it comprised an industrialisation of cattle reproduction. Since they were designed to kill cattle at a rate of one per minute, we can say that slaughterhouses in Cape Town and Johannesburg were industrialised by the early twentieth century.[247] Slaughter was industrialised by the mid-twentieth century in Botswana.

Conclusion

This chapter focused on the development of breeding regimes in South Africa, Swaziland and Botswana. In South Africa, the department of agriculture supported pedigree cattle breeding via its agricultural colleges in the early twentieth century. In Bechuanaland and Swaziland, the Colonial Development Fund implemented breeding regimes from the 1920s and 1930s,

[244] BNA, BNB 3143/ ARC 20. 415, Animal Production Research Unit, 'A Five Year Programme of Integrated Beef Cattle and Range Research in Botswana 1970-1975', 19.
[245] *Ibid*, 20.
[246] *Ibid*, 23.
[247] See Chapter Four.

mirroring in part the way the state had established state-supported cattle breeding in England and Wales. In Botswana forced artificial insemination infrastructure was mapped onto its existing colonial breeding centre systems. Globally speaking, the chapter argued that forced artificial insemination was for cattle likely the largest transformation since their domestication during the agricultural revolution. Forced artificial insemination meant that cattle reproduction became industrialised. The emergence of FAI in Botswana and South Africa was investigated in the context of the global proliferation of FAI. In South Africa and Botswana, the coverage of FAI was far less extensive than in Europe, the UK and the United States. In South Africa from the 1940s, and in Botswana especially from the 1970s, cattle became subject to progeny testing, which calibrated cattle in exclusively productionist terms. This chapter investigated progeny testing via a case study of Bonsmara cattle in South Africa, and the Animal Production Research Unit in Botswana from 1975. The chapter explored how processes such as progeny testing and forced artificial insemination subjectively impacted cattle.