Knowledge, Nation and Capital:
The Development of Brazilian Beef in the Twentieth Century

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May 2024

Supported by The British Academy THE NATIONAL ACADEMY FOR THE HUMANITIES AND SOCIAL SCIENCES

Commodities of Empire Working Paper No.38

ISSN: 1756-0098

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Today when we think about beef from Latin America we typically think of Argentina. However, in terms of scale, Brazil is a much larger producer and exporter of beef products, second only to the United States in terms of global production.[1] Furthermore, although the environmental impact of Brazilian beef production is well known today and often linked to deforestation and rising temperatures caused by methane produced by cattle, what is less well known is that almost 75 percent of the beef produced in Brazil is for domestic consumption, while only around 25 percent is exported to international markets.[2] This phenomenon is deeply connected to the construction of national identity, while also being emblematic of the development of vast global meat markets that were central to the growth of Brazilian capitalism.

This paper addresses the historical development of the Brazilian beef industry by assessing how it emerged and some of its consequences. In so doing it weaves together three components that were crucial to the development of the Brazilian beef industry during the twentieth century: knowledge, nation and capital. It argues that the development of the Brazilian beef industry was contingent on forms of knowledge and tied to the pursuit of profit and nation-building. This created a dynamic, especially in the years following the Second World War, whereby the Brazilian population had increasing access to beef, which in turn led to the creation of new forms of knowledge and even greater efforts towards capital accumulation that also helped to reinforce national identity.

The paper positions itself at the intersection of several areas of historical research. Firstly, it builds upon the scholarship of Brazilianists concerned with the cattle industry and nation-building in Brazil – in particular, the pioneering work of Brazilian economic historians working in the mid-twentieth century, such as Caio Prado Júnior and Maria Yedda Leite Linhares. They investigated the historical continuities in Brazilian agriculture that explain processes of nation-building, linking the colonial past to the neo-colonial present.[3] For these historians cattle and ranching were crucial elements for explaining the national formation of Brazil via the expanding land frontier and resource extraction. I extend this focus by examining the production and consumption of beef as a product of these developments during the twentieth century, which was integral to the ongoing reformation of Brazilian nationalism. In addition, more recent research by scholars such as Stephen Bell, Maria-Aparecida Lopes and Robert Wilcox, has revealed accounts of the social, environmental and economic influence of cattle and the beef industry in particular regions of Brazil.[4] This paper incorporates these regional perspectives to provide a broader national perspective on the history of

[1] Heinrich Böll Stiftung, *Fleischatlas,* Berlin: Heinrich Böll Stiftung, 2021, p.15.
[2] Danielle Rodrigues Magalhaes et al., 'An Exploratory Study of the Purchase and Consumption of Beef: Geographical and Cultural Differences between Spain and Brazil', *Foods* 11:1 (2022), p.2.
[3] Caio Prado Júnior, *Formação do Brasil Contemporâneo,* São Paulo: Companhia das Letras, 2011, pp.195-221; Maria Yedda Leite Linhares, *História do Abastecimento: uma problemática em questão 1530-1918*, Brasília: Binagri, 1979, pp.22-25.
[4] Stephen Bell, *Campanha gaúcha: A Brazilian ranching system, 1850-1920,* Stanford: Stanford University Press, 1998; Maria-Aparecida Lopes, *Rio de Janeiro in the Global Meat Market, 1850-1930,* New York: Routledge, 2022; Robert Wilcox, *Cattle in the Backlands: Mato Grosso and the Evolution of Ranching in the Brazilian Tropics,* Austin: University of Texas Press, 2017.

the Brazilian beef industry. As a result, this work follows recent scholarship concerned with regionality in Brazil, which preceded national identity.[5]

Secondly, this paper engages with scholarship about capitalism and the commodification of animals and natural environments, to bring the subject of the Brazilian beef industry into dialogue with these highly productive fields. It draws inspiration from the work of Barbara Noske, who described the creation of the animal-industrial complex to elaborate on the commodification of animals under industrial capitalism.[6] Moreover, it is influenced by the work of Tony Weis, who has examined the exponential growth in global meat consumption driven by industrial livestock production, which today has accelerated the biophysical contradictions of industrial capitalist agriculture.[7] Furthermore, recent work on the relationship between capitalism and the cattle industry by scholars such as Samuël Coghe, Tatsuya Mitsuda, Thaddeus Sunseri and Rebecca Woods has highlighted the emergence of world-spanning meat-packing companies, global meat markets, the standardisation of cattle breeds and transformation of natural environments in service of expanding the cattle frontiers.[8] This paper seeks to highlight the salience of these themes to the emergence of the Brazilian beef industry. In addition, it seeks to engage with the recent trend of studies concerning the commodification of a broader array of animals that reveal the influence of different political economies upon the process of commodification. In particular, Reinaldo Funes-Monzote and Steven Palmer, Joshua Specht, Tiago Saraiva and Thomas Fleischman have demonstrated the importance of capitalist, fascist and socialist political economies to the different patterns of commodification of cattle and pigs.[9] Drawing inspiration from these studies, this project aims to highlight how the political economy of Brazil influenced the development of the beef industry and the expansion of the cattle frontier.

Thirdly, the paper draws upon recent impetus within the field of the history of knowledge outlined by Martin Mulsow, to go beyond the narrow remit of scientific objects that are often studied, and apply the analytical category of knowledge to the Brazilian beef industry.[10] As such I examine the roles of different kinds of scientific and culinary knowledge tied to beef production and consumption, which can be associated with the distinction some scholars, such as Peter Burke, have drawn between sources of practical and theoretical knowledge.[11] These forms of knowledge aided the growth of the beef industry and helped to foster capital accumulation and Brazilian national identity.

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[5] Courtney Campbell, *Region out of Place: The Brazilian Northeast and the World, 1924-1968*, Pittsburgh: University of Pittsburgh Press, 2002.
[6] Barbara Noske, *Humans and Other Animals: Beyond the Boundaries of Anthropology*, London: Pluto Press, 1989.
[7] Tony Weis, *The Ecological Hoofprint: The Global Burden of Industrial Livestock*, London: Zed Books, 2013.
[8] Samuël Coghe, *Population Politics in the Tropics. Demography, Health and Transimperialism in Colonial Angola*, Cambridge: Cambridge University Press, 2022; Tatsuya Mitsuda, 'From Colonial Hoof to Metropolitan Table: The Imperial Biopolitics of Beef Provisioning in Colonial Korea', *Global Food History* (2022), pp.1-20; Thaddeus Sunseri, 'International Beef Packing in the Age of Empire: LEMCO in South West Africa, 1906– c .1940', *South African Historical Journal* 73 (2021), pp.1-28; Rebecca Woods, *The Herds Shot Round the World: Native Breeds and the British Empire, 1800–1900*, Chapel Hill: University of North Carolina Press, 2017.
[9] Reinaldo Funes-Monzote & Steven Palmer, 'Challenging Climate and Geopolitics: Cuba, Canada, and Intensive Livestock Exchange in a Cold War Context, from the 1960s to the 1980s', in A. Chastain & T. Lorek (eds), *Itineraries of Expertise: Science, Technology, and the Environment in Latin America,* Pittsburgh: University of Pittsburgh Press, 2020; Joshua Specht, *Red Meat Republic: A Hoof-to-Table History of how beef changed America*, Princeton: Princeton University Press, 2019; Thomas Fleischman, *Communist Pigs: An Animal History of East Germany's Rise and Fall*, Seattle: University of Washington Press, 2022; Tiago Saraiva, *Fascist Pigs Technoscientific Organisms and the History of Fascism,* Cambridge: MIT Press, 2016.
[10] Martin Mulsow, 'History of Knowledge', in Peter Burke and Marek Tamm (eds), *Debating New Approaches to History,* London: Bloomsbury, 2019, pp.159-60.
[11] Peter Burke, *What is the History of Knowledge?* Malden: Polity Press, 2016, p.8.

Moreover, this paper explores the interplay between culinary knowledge and the concept of 'gastronationalism' popularisedd by Michaela DeSoucey to highlight how the changing political economy impacted on Brazilian national identity.[12]

The structure of this working paper begins with a historical overview of the development of the Brazilian beef industry up until the 1960s. It follows the development of a commodity chain that is divided into four phases: early Brazilian agricultural commodities, the commodification of cattle, the First World War and national integration. This analysis addresses why the Brazilian beef industry rose to such prominence during the twentieth century. Moreover, it seeks to identify the historical position of beef in the Brazilian economy, the commodification of cattle in Brazil, and the barriers that were overcome to increase the supply of beef. The paper then turns towards the cases of scientific and culinary knowledge since the 1960s and argues that these forms of knowledge were deeply connected to the beef industry and contributed to the construction of national identity and economic development. Specifically, it argues beef became central to a project of nation-building and modernisation that gained pace in the middle of the twentieth century and helped to fuel the creation of new domestic tourism markets. In relationship to this, new forms of culinary knowledge emerged in connection with restaurants, recipes and cookbooks. Alongside this, new scientific knowledge was developed to assist the further growth of the beef industry into new regions of Brazil. These new types of knowledge were also tied to the existing project of nation-building and capital accumulation. Ultimately by understanding the intensification of the interplay between these factors related to knowledge, nation and capital in the case of the Brazilian beef industry, provides a means to help us reframe our understanding of the interaction between nationalism and the industrialisation of meat production beyond this setting.

Early Brazilian agricultural commodities

At the end of the nineteenth century, Brazil was already an extremely important site of agricultural production in the global economy. It accounted for around 70 percent of the world's coffee supply, of which the majority was exported to Europe and North America. Alongside coffee, Brazil also exported other agricultural commodities to the world economy, albeit less significantly, including sugar, rubber, cotton and cocoa. Besides these exports, Brazil also produced vast quantities of rice, beans and manioc (otherwise known as cassava or yuca) for internal markets.[13] These helped to feed the country′s growing population, which in 1900 surpassed Mexico as the most populous country in Latin America with some 17 million people.[14] These crops were all cultivated on huge plantations located mostly in the southeast of the country around the state of São Paulo. This mode of production was a legacy of the colonial era and similar to other parts of Latin America, such as Columbia, where a lack of agrarian reform meant that most land was under the control of a small landowning class.[15] Likewise, industrialisation was also highly concentrated and centred predominantly around the southeast of the country in the states of Rio de Janeiro, Minas Gerais and São Paulo. It was also from

[12] Michaela DeSoucey, 'Gastronationalism: Food Traditions and Authenticity Politics in the European Union', *American Sociological Review* 75 (2010), p.432.
[13] Herbert S. Klein & Francisco Vidal Luna, *Feeding the World. Brazil's Transformation into a Modern Agricultural Economy,* Cambridge: Cambridge University Press, 2019, pp.8-16.
[14] Lopes (2022), p.4.
[15] Klein & Luna (2019), p.35.

here that a large part of the country's agricultural wealth flowed outwards to international consumers, particularly from the major port of Santos.[16]

In comparison to other sectors of the economy, the beef industry was at this moment a relatively minor constituent. Brazilian meat products had virtually no overseas buyers before 1914, with the small exception of salted dried beef, known as *charque* or *carne seca,* and bouillon.[17] At this point, beef production was predominantly for domestic consumption. As such it was largely ignored by landowners, necessitating the importation of the majority of beef from neighbouring Argentina and Uruguay.[18] Indeed, according to classic historiography on the subject of Brazilian foodstuffs production for internal consumption was of "little interest to the state", and consequently farmers dedicated vast swathes of land to export crops that seemed more lucrative, therefore neglecting domestic needs.[19]

Although the production of beef was seemingly of small importance to Brazilian landowners, it was nevertheless an important constituent of Brazilian diets. Throughout the nineteenth century, the staple foods for Brazilians were beans, manioc flour and salted meat.[20] This combination was composed of a rich mixture of nutritional elements including carbohydrates, vitamins and minerals, and animal proteins. Typically, these foodstuffs would be consumed by mixing cooked beans with manioc flour, which were kneaded into small cakes and eaten with fried *charque*.[21] These three items cut across Brazilian society. In Rio de Janeiro, the then capital city, all three were consumed by every class of person – slave and free, rich and poor, immigrant and traveller, hospital patients and prisoners.[22] This is not to suggest that they were consumed equally, or not supplemented with other food items by those who could afford them. However, it is important to bear in mind given that meat consumption is, as Joshua Specht and Maria-Aparecida Lopes both separately point out, an important indicator of living standards and therefore a vital public concern.[23] In this sense even though beef production was seemingly of small importance to the Brazilian economy before the twentieth century, it was nevertheless a preeminent feature in the lives of virtually all Brazilians.

The Commodification of Cattle

The production of forms of dried and salted beef to feed the general population has existed in Brazil since the beginning of colonialisation in the 1500s. The commodification of cattle in Brazil began with the introduction of cattle primarily from the Iberian peninsula by the Portuguese during the colonial era.[24] The development of the cattle industry occurred initially in the central Brazilian state of Mato Grosso and the southern state of Rio Grande do Sul.

[16] Warren Dean, *The Industrialisation of São Paulo 1880-1945,* Austin: University of Texas Press, 1969, pp.3-15.
[17] Wilcox (2017), p.71.
[18] Lopes (2022), p.25.
[19] Linhares (1979), pp.22-5.
[20] Cláudia Moraes Trindade, 'Doeças, alimentação e resistencia na penitenciária da Bahia, 1861-1865', *História, Ciências, Saúde - Manguinhios* 18:4 (2011), p.1081; Ramiro Alberto Flores Guzmán, 'The Feeding of Slave population in the United States, the Caribbean, and Brazil: Some Remarks in the State of the Art', *América Latina en la History Económica* 20:2 (2013), pp.24-7.
[21] Lopes (2022), p.24.
[22] Lopes (2022), p.24.
[23] Specht (2019), p.241; Lopes (2022), p.10.
[24] Klein & Luna (2019), p.73.

In most Brazilian pasturelands, Crioulo cattle were predominant. These were relatively small animals that weighed on average no more than 400lbs when fully butchered and dressed.[25] Despite their low meat yield, Crioulo were well-suited to Brazil's tropical and semitropical environments – in particular the vast tropical savanna known as the Cerrado, which today covers large parts of the states of Goiás, Mato Grosso do Sul, Mato Grosso, Tocantins and Minas Gerais. This was because of their short hair and thick skin, which protected them from thorny vegetation, insects and sunlight.[26]

Although the Crioulo was well adapted for conditions in Brazil, its small size in comparison to other cattle breeds meant that it yielded relatively little meat, thereby preventing a major expansion of the beef industry until the end of the nineteenth century. In addition, environmental factors – including intense sunlight and humidity, as well as tropical diseases and pests – caused slower growth and lower rates of reproduction in many larger European cattle breeds, such as English Durham and Shorthorn cattle. These cattle breeds were further disadvantaged because they had been bred to digest lush grass grown in temperate climates, and were not used to the coarser indigenous grasses of the subtropics.[27] As such the tropical and semitropical environments of Brazil meant that cattle raised there were generally smaller, carried less flesh, and yielded tougher meat than breeds raised in the temperate climates of adjacent Argentina and Uruguay, as well as further afield in North America and Europe.[28] This made beef produced in Brazil less attractive to European markets, which favoured beef with a consistency and tenderness familiar to the average consumer, as such most of the beef consumed in Europe was also produced there.[29]

The examples of lucrative cattle markets in other parts of the Americas pushed Brazilian policymakers and ranchers, otherwise known as *gaúchos*, to find solutions to how these factors could be overcome in order to develop the cattle industry.[30] The instrumentalisation of scientific knowledge about cattle breeding played a key role in achieving this goal.[31] The best example of this was the introduction of a new subspecies of domestic cattle from India, the Zebu. Zebu cattle were more resistant to the high tropical temperatures, diseases and pests than taurine cattle (mostly from Europe), and were accustomed to a less plentiful supply of lush grass found in temperate climates. Furthermore, the Zebu was better adapted to the tropics due to its longer legs and slower metabolism, ensuring greater conservation of energy, and longer eyelashes, which protect against intense light and dust. All of these factors contributed to make the Zebu better able to survive in Brazil.[32] As such, according to Maria-Aparecida Lopes, for Brazilian *gaúchos*, the introduction of Zebu cattle was a rational decision when confronted with the hardship of the environment and the opportunity for profit.[33]

A key advocate around the turn of the century for the introduction of the Zebu was the politician and member of the National Agricultural Society, Joaquim Carlos Travassos. Travassos produced a study of the Zebu in reference to the conditions in Brazil and India, which noted how well-adapted the breed was to tropical climates.[34] This study relied heavily on work by the English scientist

[25] Lopes (2022), p.114.
[26] Lopes (2022), p.114.
[27] Wilcox (2017), p.205.
[28] Wilcox (2017), p.4.
[29] Lopes (2022), p.112.
[30] Lopes (2022), p.112.
[31] Burke (2016), p.8.
[32] Wilcox (2017), p.211.
[33] Lopes (2022), pp.113-14.
[34] Joaquim Carlos Travassos, *Monographias agrícolas,* Rio de Janeiro: Typographia Altina, 1903, pp.257–96, 321–23, 330–32.

Robert Wallace, who worked in India in the 1870s. Wallace had conducted the first scientific study of Zebu, which also recounted failed attempts to improve cattle production in India by importing European breeds. Wallace along with later scientists, therefore, concluded that European cattle were unsuited to the tropics and that breeder stations and veterinary schools should be established to improve the productive quality of the Zebu.[35] In response, Travassos argued the same should be done in Brazil.[36]

The exact date when the first Zebu was introduced to Brazil is debated by historians. However, it probably occurred at some point between the 1870s and 1880s.[37] What is better understood are the numbers of Zebu that were imported to Brazil. Between 1893 and 1914, more than 2,000 Zebu cattle were imported from India for breeding.[38]

Alongside the introduction of the Zebu, investment in slaughterhouses, meatpacking factories and the development of railway systems helped to develop the cattle industry at the end of the nineteenth century. In Rio de Janeiro new slaughterhouses built in 1853 and 1881 helped to increase the supply of fresh meat to the city alongside the expansion of the railroads, which accelerated the transportation of cattle from the hinterlands.[39] Furthermore, the invention of refrigeration technologies, which were slowly introduced in Brazil, also helped to ensure that fresh meat now became increasingly common, and also possible to ship internationally to foreign markets.[40] Indeed, as Chris Otter has noted, the creation of a 'cold chain' (a term first used in 1908), via refrigerated railway cars, barges, butchers' coolers and cold stores, through which meat circulated, ensured that the flow of meat commodities was eased due to this new architecture and transport connections.[41]

As scientific knowledge aided the expansion of the Brazilian cattle industry, culinary knowledge related to eating practices hindered its expansion into European markets. In the particular case of Britain during the late nineteenth century, Rebecca Woods has recently demonstrated "the strength of the connection between breed, quality, and the discerning British palate".[42] As a result, animal commodities derived from the feral or semi-feral descants of animals brought over with European settlers were often seen to be responsible for the poor quality of the resulting product.[43] More generally, European meat markets were difficult to access, as meatpacking companies in the United States had discovered in the late nineteenth century when they tried to export pork to Europe. This was largely prevented by protectionist policies designed to protect local producers, but also because European palates preferred leaner pork meat to the fattier American equivalent.[44] In Europe, there was a preference for meat from improved pure breeds, such as Angus, Durham, Charollais and Limousin, which was "tender interlaced with fat deposits". In comparison, Zebu meat was "drier",

[35] Robert Wallace, *India in 1887,* Edinburgh: Oliver and Boyd, 1888, pp.52–4, 99–100, 312–14.
[36] Wilcox (2017), p.210.
[37] Lopes (2022), p.115; Wilcox (2017), p.206.
[38] Wilcox (2017), p.205.
[39] Lopes (2022), p.36.
[40] Carlos Alberto Dória & Marcelo Corrêa Bastos, *A Culinária Caipira da Paulistánia,* São Paulo: Fósforo Editora, 2021, p.181.
[41] Chris Otter, *Diet for a Large Planet: Industrial Britain, Food Systems, and World Ecology*, Chicago: University of Chicago Press, 2020, pp.44-7.
[42] Woods (2017), p.163.
[43] Woods (2017), p.166.
[44] Joseph Leslie Anderson, *Capitalist Pigs: Pigs, Pork and Power in America,* Morgantown: West Virginia University Press, 2019, p.128.

"leaner" and "potentially tougher when cooked".[45] As such beef exports to Europe were low until the beginning of the First World War.

The First World War

The start of the First World War increased demand for cattle products from Brazil to European markets, which alongside the improved cattle stock helped to increase the number of cattle in Brazil. European nations not only required canned and frozen meat to feed their soldiers and civilian populations, but also leather for boots, holsters, cartridge holders, belts, slings and other necessities in a foot soldier's kit.[46] Crucially Brazil was only able to fulfil this demand due to the earlier introduction of the Zebu and the substantial growth of meat-packing companies and railways. As the politician Antonio da Silva Prado, who had interests in all three, put it in 1916, "without the Zebu, Brazil would not be exporting meat nor would it be doing so soon. Almost all cattle being slaughtered for beef exports are Zebu."[47]

Wartime demands allowed Brazilian exports to rise dramatically. The export of frozen and chilled beef jumped significantly from a negligible 1.5 tons in 1914 to more than 65,000 tons by 1917. In the same period, exports of canned meats climbed from less than 230 tons in 1913 to 6,500 tons, and jerky exports from 20 tons to 8,700 tons.[48] The development of new cattle-processing infrastructures was key to this expansion and represented the early formation of an animal industrial complex in Brazil that would continue to grow during the twentieth century.[49] This would, as Tait Keller has argued, blur the distinction between wartime and peacetime landscapes involved in the First World War, as agricultural commodities surged from around the world, not least from Brazil, to fee wartime economies.[50]

A vital component of this new infrastructure was the increasing number and size of slaughterhouses in Brazil. During the nineteenth century, Brazilian slaughterhouses were modestly sized and aimed solely to supply the growing urban demand for meat. However, larger slaughterhouses began to arise in the 1910s in the states of São Paulo, Rio de Janeiro and Minas Gerais, not only to supply internal demand, but also to export to European markets.[51]

In addition to slaughterhouses, the establish the infrastructure necessary for frozen beef production also aided Brazilian exports to Europe. These had previously been weakened by the dominance of Argentinian and Uruguayan control of the market, and the heavy reliance of Brazilian producers on salted beef for domestic consumption. This expansion was made possible by a blend of foreign and domestic interests.[52] Sustained interest in South America by British and American meat-packing companies during the late nineteenth century was initially centred on Argentina. By 1882,

[45] Shawn van Ausdal, 'Reimagining the Tropical Beef Frontier and the Nation in Early Twentieth-Century Colombia', in Gordon M. Winder & Andreas Dix (eds), *Trading Environments Frontiers, Commercial Knowledge, and Environmental Transformation, 1750–1990,* New York: Routledge, 2016, pp.171-72; Wilcox (2017), p.21.
[46] Wilcox (2017), p.73.
[47] Lopes (2022), p.119.
[48] Wilcox (2017), p.71.
[49] Noske (1989), p.20.
[50] Tait Keller, 'The Ecological Edges of Belligerency – Toward a Global Environmental History of the First World War', *Annales* 71:1 (2016), pp.61-78.
[51] Walter Belik, *The Food Industry in Brazil: Towards a Restructuring?* London: Institute of Latin American Studies, 1994, p.10
[52] Bell (1998), pp.148-52.

British interests had led to the creation of a freezing plant in Buenos Aires by the River Plate Fresh Meat Company Limited, which exported Argentine lamb and beef to consumers in Britain. Other companies quickly followed suit in Argentina, while entrepreneurs began to explore the possibility of expanding operations into Uruguay and southern Brazil. A shortage in domestic capital amongst Brazilian ranchers hampered these efforts in the southern cattle-rearing state of Rio Grande do Sul. However, elite families in São Paulo, who had benefited from the coffee economy, were quick to mobilise their wealth towards establishing packing plants assisted by the state government, which subsidised their initiatives. Before the start of the First World War, the Brazil Land, Cattle, and Packaging Company was established in southern central Brazil and attracted huge foreign investment. This company controlled vast rangelands for cattle in Mato Grosso and Goiás, and bought and leased other properties for fattening cattle close to São Paulo. These locations also linked the company to Brazil's growing railway network, which itself was heavily funded by British interests, and to the port of Santos. Although there was an abrupt slowdown of frozen beef production in Brazil after the war, the industry was nevertheless firmly established and would become increasingly significant in the decades to come.[53]

Scientific knowledge related to Zebu cattle certainly helped to increase the size of the Brazilian cattle industry, improving its ability to export beef during the war. However, forms of culinary knowledge derived from eating practices produced the opposite effect.[54] Culinary knowledge can be understood as a form of vernacular knowledge that relates to knowing which ingredients to use, how to prepare and season them before cooking, the correct way to cook the ingredients, how food should be served and consumed, in what settings these processes should take place, and who should be involved performing these actions. This definition is based on the distinction that historians working within the field of the History of Knowledge have drawn between theoretical and practical forms of knowledge.[55] Furthermore, it builds upon the recent impetus within the field to pay greater attention to forms of practical knowledge.[56]

In 1918, the London Board of Trade banned all importation of meat from Brazil to Britain on account of the quality of Zebu meat. Detractors argued that the breed had less fat than European cattle and thus was unpalatable to European consumers. Especially when compared with beef exported from Argentina, Zebu do carry their flesh differently from other varieties of beef cattle. Generally, European cattle breeds have a much thicker layer of subcutaneous fat that protects them against the cold. In contrast, Zebu generally show less marbling since their fat is found between the muscles, making Zebu meat not only leaner but also drier and potentially tougher when cooked.[57]

In response to these measures, the Brazilian government halted all imports of Zebu cattle in 1920 and did not resume importing the breed until the 1950s. These setbacks did not halt the process of expanding the cattle and beef industry via the Zebu, which was already firmly underway. As such between 1921 and the 1940s, the Zebu became the dominant type of cattle in Brazil.[58] Contributing to this was the development during the 1920s by Brazilian ranchers of their own national breed of

[53] Wilcox (2017), p.71.
[54] Burke (2016), p.8, 86.
[55] Burke (2016), p.8.
[56] Mulsow (2019), pp.159-60.
[57] Wilcox (2017), p.212-14.
[58] Wilcox (2017), p.217.

Zebu: the Induzebu, also known as the Indubrasil.[59] Characterised by especially large ears this breed proved highly robust in the Brazilian tropical climate and was used both for the dual purpose of milk and meat production.[60] Additionally, an inflow of foreign capital further stimulated the beef industry during the early postwar years as British and American meat-packing companies including Swift, Armour, and the Vestey Brothers moved quickly to establish ranches, slaughterhouses, and freezing plants across the south of Brazil.[61]

As a consequence of these developments, Brazil began to massively increase its beef production during the first half of the twentieth century and outperform its closest rivals. This is clearly represented by the increase in the number of cattle in Brazil. On the eve of the First World War, Argentina claimed to have 26 million head of cattle, while 30 million were pastured in Brazil. At the same time, Uruguay possessed 8 million cattle, almost a million more than the neighbouring Brazilian state of Rio Grande do Sul. By the late 1930s, the Argentine cattle population had grown to 32 million while Brazil had a total of 40 million. This lead was extended further by 1952 when Brazil had more than 55 million cattle, over 10 million of which were in Rio Grande do Sul alone, while Argentina had just over 45 million and Uruguay just under 8 million.[62] From 1940 until the 1950s, the Indubrasil was the dominant breed among registered Zebu purebreds in Brazil and its success helped to increase the production of cattle in Brazil steadily during the next several decades, as the graph in Figure 1 depicts.

Despite the global depression that followed the 1929 Great Crash, the 1930s saw an increase in the export of cattle products from Brazil.[63] Average annual Brazilian meat exports rose to a respectable 72,000 tons, thanks chiefly to expanded sales to Italy after 1935.[64] Furthermore, in the mid-1930s the state of Mato Grosso alone processed between 300,000 and 350,000 head of cattle annually for export and a further 50,000 for domestic consumption.[65] This trend was in line with a growing global demand for meat, which was also connected to the rising importance of nutritional science that recommended fresh red meat as the superior source of protein to dried salted meats.[66] Local and national consumption is difficult to gauge at this point owing to a lack of evidence. However, tentative estimates by historians highlight growing levels of beef consumption for many Brazilians alongside regional differences in access. For example, according to Robert Wilcox in 1936, the state of Mato Grosso had a population of just under 375,000, where per capita beef consumption was between 13 and 18 kilos annually. This amounted to a meagre 35 to 50 grams per person per day, in a state dedicated to cattle ranching. In comparison, Wilcox points out that the average consumption in Rio de Janeiro was allegedly a substantial 50 kilos a year, some 137 grams per day in 1940.[67] In addition, Maria-Aparecida Lopes has estimated that beef consumption accounted for 80 percent of the annual protein intake of the inhabitants of Rio de Janeiro between 1940 and 1945.[68] The only

[59] Lopes (2022), p.118.
[60] Alberto Alves Santiago, *O Zebu na Índia, no Brasil e No Mundo,* Campinas: Instituto Campineiro de Ensino Agrícola, 1986, p.744.
[61] Bell (1998), pp.153-4; Belik (1994,) p.10; Wilcox (2017), p.220; Lopes (2022), p.179.
[62] Wilcox (2017), p.4.
[63] Wilcox (2017), p.76.
[64] Wilcox (2017), p.76.
[65] Mato Grosso, 'Exportação de Matto-Grosso, Decennio de 1926–1935', *Relatório do Interventor Federal de Matto- Grosso, Manoel Ary Pires*, 13 de junho de 1937, Cuiabá: Imprensa Oficial, 1937.
[66] Specht (2019), p.221; Lopes (2022), pp.89-91.
[67] Wilcox (2017), pp.76-7.
[68] Lopes (2022), p.194.

place with a higher level of average consumption was the regional capital of Mato Grosso, Campo Grande, which appeared to have even greater access to beef. In 1927, enough cattle were slaughtered there for roughly 250 grams of beef per person per day, although undoubtedly not all of this went to local residents.[69]

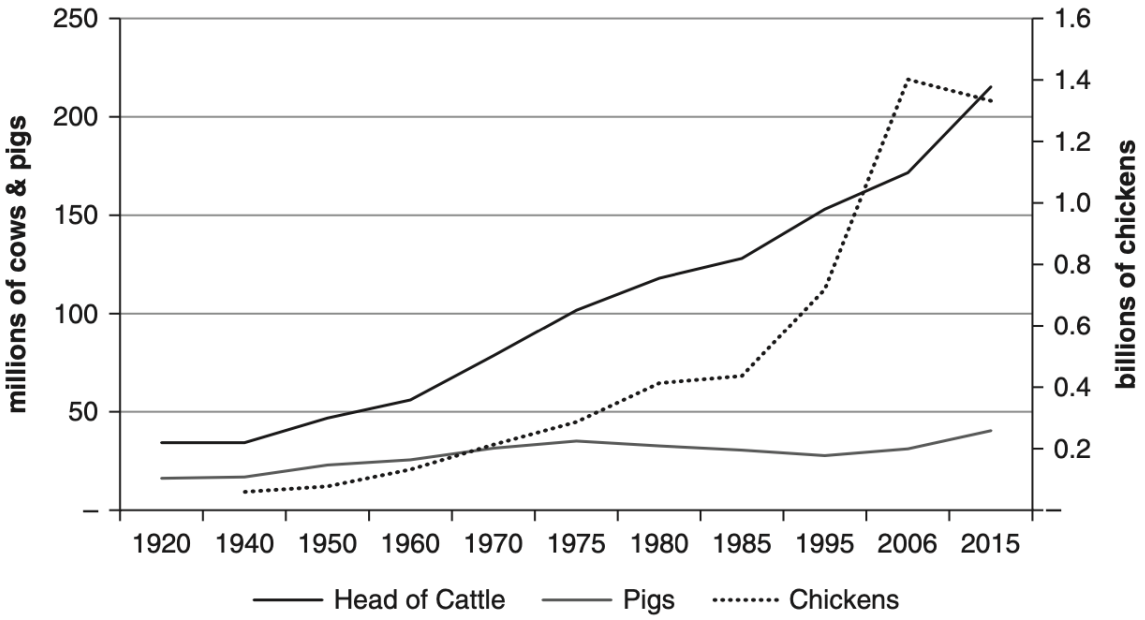

Figure 1
Growth of stock of animals in Brazil, 1920–2015
Source: Klein and Luna (2019), p.74

"In the long term" the historian Earl Downes points out, "[the] cattle and beef sector found that the internal market held the true solution for their quest for a market."[70] As beef production rose so too did domestic consumption, which increased progressively throughout the rest of the twentieth century.[71] This suggests a potentially mutually constituent process of production and consumption. Moreover, it also indicates the growing availability of beef to the Brazilian population in general at this point. This presents a parallel with a similar process identified by Joshua Specht, which he calls the "democratisation of beef" as a means to describe the increased availability of beef to all sections of society in the United States during the twentieth century. Crucially Specht notes that this term does not mean that all beef products were equally available to everyone. However, it does denote the increased prominence of beef and consumers' greater access to it.[72] As we shall see, a similar dynamic emerged in Brazil, as beef became more widely available and increasingly found its way into cooking pots and onto the tables of the rich and poor alike.

[69] Wilcox (2017), pp.76-7.
[70] Earl Richard Downes, 'The Seeds of Influence: Brazil's "essentially agricultural" old republic and the United States, 1910-1930', PhD thesis, Austin: University of Texas (1986) p.479.
[71] United States Department of Agriculture Foreign Agricultural Service, 'Brazilian Beef Consumption 1960-2017', 2017, at https://www.fas.usda.gov/.
[72] Specht (2019), pp.220, 301.

National Integration

In 1930, the First Brazilian Republic collapsed and was replaced by the Second Republic (1930-1937) and the Third Brazilian Republic (1937-1946), under the rule of the economic nationalist, Getulio Vargas. Vargas's rise was precipitated by an economic crisis caused by Brazil's continued dependence on coffee exports. From 1906 onwards, the overproduction of coffee led to a situation where rising levels of credit and government subsidies to producers were required to store coffee and thereby withhold it from international markets to maintain higher prices. Despite these efforts, international coffee prices fluctuated significantly throughout the early twentieth century, and then declined severely after the 1929 Great Crash, placing huge economic pressure on the government to maintain its subsidies.[73] This economic crisis morphed into a political crisis as the government crumbled allowing Vargas to seize power. The new government introduced restrictions on coffee production and forgave coffee planter debts to alleviate the situation.[74] To prevent another crisis from developing, successive Vargas-led governments during the 1930s and 1940s attempted to modernise the economy, thereby reducing the dependency on coffee. The financing of agriculture was supported by the creation of specific agencies, such as Carteira de Crédito Agrícola e Industrial (the Agricultural and Industrial Credit Portfolio), which became the principal source of agricultural credit.[75] This was accompanied during the Vargas era with efforts to strengthen and integrate the idea of the Brazilian nation.

The Vargas era was an important period for the construction of Brazilian national identity. According to the anthropologist Rogéria Dutra, the appropriation of specific cultural manifestations of certain social groups by the rest of the society, and their transformation into national symbols, was a defining aspect of this period.[76] Building upon this reflection, the historian Steven Byrd argues that these manifestations took various forms. Including samba music (derived from Afro-Brazilians in the northeast), *candomblé* (a fusion of West African and Catholic religious practices) and *feijoada* (a dish comprised of meat and beans).[77] Other scholars, such as Glen Goodman, have noted how in this period novel discourses of national identity were developed, which celebrated racial and cultural mixing as the very core of Brazilianess.[78] In particular, this was famously typified by sociologist Gilberto Freyre and his book *Casa-Grande e Senzala* (1933), which emphasised a form of ethnic nationalism based on a defence of the legacy of Portuguese colonialism in Brazil.[79] This stressed the significance of the cultural mixture between Portuguese, African and Indigenous peoples in shaping Brazil, which later fed into Freyre's idea of 'Luso-tropicalismo'.[80] In contrast, during the same period culturally distinct

[73] Gavin Fridell, *Fair Trade Coffee: The Prospects and Pitfalls of Market-Driven Social Justice,* Toronto: University of Toronto Press, 2016, p.120.
[74] Klein & Luna (2019), pp.11-12.
[75] Klein & Luna (2019), p.19.
[76] Rogéria Campos de Almeida Dutra, 'Nação, região, cidadania: A construção das cozinhas regionais no projeto nacional brasileiro', *Campos: Revista de Antropologia Social* 5:1 (2004), pp.93–110.
[77] Steven Byrd, 'Comida Mineira: A "Cultural Patrimony" of Brazil', *Global Food History* 4:1 (2018), p.4.
[78] Glen S. Goodman, 'Consuming the café colonial: German Ethnicity and Tourist Migrant Marketplaces in Southern Brazil', *Global Food History* 4:1 (2017), pp.1-13.
[79] Gilberto Freyre. *Casa-grande & Senzala: formação da família brasileira sob o regime de economia patriarchal,* Rio de Janeiro: Maia & Schmidt, 1933; Jerry Dávila, 'Gilberto Freyre: Racial Populism and Ethnic Nationalism', in Warwick Anderson, Ricardo Roque & Ricardo Ventura Santos (eds), *Luso-tropicalism and Its Discontents The Making and Unmaking of Racial Exceptionalism*, New York: Berghahn Books, 2019, pp.45-67.
[80] Warwick Anderson, Ricardo Roque & Ricardo Ventura Santos, 'Introduction', in Anderson et al. (eds), *Luso-tropicalism and its Discontents: The Making and Unmaking of Racial Exceptionalism,* New York: Berghahn Books, 2019, pp.1-22.

groups, such as German, Italian, Japanese and Jewish communities, were increasingly seen as dangerous in the eyes of the state.[81]

During the 1950s and 1960s, the project of nation-building intensified, accompanied by the growth of domestic tourism, which became closely linked to the importance of beef. According to Glen Goodman, forms of sociability based along ethnic lines, such as German and Italian immigrants in the southern state of Rio Grande do Sul, were eclipsed by notions of *gaúcho* identity that reduced the southern region's immigrant past.[82] This process was also common to other regions in South America, particularly in Argentina, where the *gaúcho* as a folk symbol was similarly used in reaction to mass immigration during the twentieth century.[83]

In 1959, a state tourism plan was developed in Rio Grande do Sol to display rural *gaúcho* culture. The plan did not call for the development of cultural tourism, instead it aimed to create a "progressive vision of Rio Grande do Sul's cattle industry" for visitors. Similarly, a guide to Rio Grande do Sul published in 1961 refers only to "churrasco" and "gaúcho" folklore as possible points of cultural interest for tourists in the Serra Gaúcha.[84]

These projects were further developed after the 1964 military coup, which enshrined a military-led government in Brazil until 1985. This regime continued the process of economic development and national integration that characterised the Vargas era. During this time, the government promoted agricultural expansion, often at the expense of natural environments. For example, the construction of the Trans-Amazonian Highway in 1972 facilitated the movement of cattle ranchers into previously untouched densely forested regions, leading to deforestation and growing environmental concerns. Moreover, the creation of the Brazilian Tourism Enterprise (Embratur) in 1966 consolidated the push towards national integration.[85]

Embratur immediately began to transform the tourism industry in Brazil using its hefty budget of Ɠ$50 billion for its first five years. Beyond infrastructure projects like constructing airports and hotels, Embratur was charged with realising the national potential of tourism.[86] As such, Embratur articulated a vision of tourism as vital to the "spiritual progress" and "integral realisation" of the Brazilian nation.[87] This national integration would come from familiarising increasingly greater numbers of Brazilians with the country′s different regions.

In order to promote a novel cultural experience, Embratur representatives held extensive seminars across the country to teach local stakeholders how to identify local and regional cultural characteristics which might be of interest to tourists. As such, concepts like "folklore" and "cultural patrimony/heritage" occupied prominent positions in Embratur′s policy prescriptions.[88] This focus on

[81] Jeffery Lesser, *Negotiating National Identity: Immigrants, Minorities and the Struggle for Ethnicity in Brazil,* Durham: Duke University Press, 1999; Geraldo Endrica, 'O "Perigo Alienígen": Política Imigratória e Pensamento Racial No Governo Vargas (1930–1945)', PhD thesis, Universidade Estadual de Campinas, 2007; Glen Goodman, 'From "German Danger" to German-Brazilian President: Immigration, Ethnicity, and the Making of Brazilian Identities, 1924–1974', PhD thesis, Emory University, 2015.
[82] Goodman (2017), p.4.
[83] Jeane Delaney, 'Making Sense of Modernity: Changing Attitudes toward the Immigrant and the Gaucho in Turn-Of-The-Century Argentina', *Comparative Studies in Society and History* 38:3 (1996), pp.434–59.
[84] Goodman (2017), p.8.
[85] Goodman (2017), p.7.
[86] Goodman (2017), p.7.
[87] Goodman (2017), p.7.
[88] Instituto Brasileiro do Turismo (EMBRATUR), *Ano Nacional do Turismo - 1973 - Plano Geral*, Rio de Janeiro: Embratur, 1973, p.2.

domestic tourism was markedly different from campaigns aimed at international audiences, which instead tended to rely on tropes of beaches, tropical landscapes, carnival, samba, sexualised bodies and football.[89]

According to Goodman, the "touristification" of certain cultural traits, especially culinary practices, informed the ways locals thought about and performed their own cultures. The notions of "place" became central to new kinds of marketplace, helping create both supply and demand for ethnically-coded food memories. This included the German *Cafe und Küchen* (coffee and cake), otherwise known in Brazil as *café colonial*, which became synonymous with German populations in the South.[90] Similarly, the consumption of beef increasingly became associated with a romanticised vision of *gaúcho* culture.[91] Indeed at Embratur's first annual congress, *gaúcho* traditions and folklore were nearly exclusively the focus of Rio Grande do Sol's primarily touristic potential.[92] Other regions in Brazil followed a similar path toward promoting culinary traditions. For example, in Minas Gerias *comida mineira* has been actively promoted in guides and restaurant reviews since the 1970s. This expanded during the 1980s when *hotéis-fazendas* began to be promoted, which advocated a type of agritourism on rural estates where tourists could leave behind sophisticated food from the cities and instead eat traditional *"comida caseira* (homemade food) cooked on the *fogão de lenha*' (wood-fired stove).[93] This period of national integration thereby highlights the continued intensification of relations between Brazilian national and regional identities, and the production and consumption of beef in Brazil.

Scientific Knowledge

The rapid growth of the Brazilian beef industry led to the creation of new scientific knowledge designed to increase profits and productivity. Spearheading this initiative was the Brazilian Agricultural Research Corporation (Embrapa) formed in 1973, which was designed explicitly to develop and distribute knowledge to farmers in order to increase their productivity and thereby improve the competitive strength of the overall economy. The importance of this issue is easily measured in the amount of resources Embrapa was given by the military government. Initially, the organisation received a total of 92 physical bases of which 70 were research stations. These allowed Embrapa to begin managing agricultural research from a national level.[94] The corporation also received R$2 billion within its first decade of existence via its annual budget.[95] Moreover functioning as a public corporation allowed Embrapa to work in cooperation with a mixture of public and private institutions, including universities, research institutes, private companies and overseas partners.

Although Embrapa was a new endeavour, it built upon an earlier tradition of institutions established to develop scientific knowledge to aid agricultural and livestock production in Brazil. For

[89] Kelly Akemi Kajihara, 'A Imagem Do Brasil No Exterior: Análise Do Material de Divulgação Oficial Da EMBRATUR, Desde 1966 Até 2008', *Observatóro de Inovação Do Turismo – Revista Acadêmica* 5:3 (2010), pp.1–30.
[90] Goodman (2017), p.7.
[91] Dória (2021), p.8.
[92] Instituto Brasileiro do Turismo (EMBRATUR), *Anais Do 1o Encontro Oficial Do Turismo Nacional,* Rio de Janeiro: Embratur, 1967, pp.151–65.
[93] Byrd (2018), p.5.
[94] Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA), 'História da Embrapa', 2022, at https://www.embrapa.br/memoria-embrapa/a-embrapa.
[95] A. Fishlow & J.E.V. Filho, *Agriculture and Industry in Brazil: Innovation and Competitiveness,* New York: Columbia University Press, 2020, p.100.

example, in 1887 the Imperial Estação Agronômica de Campinas was established in Sao Paulo state to develop scientific knowledge designed to counter pests and diseases affecting coffee plantations.[96] Furthermore, concerning cattle specifically in 1951, the Pan-American Foot and Mouth Disease Centre was formed and headquartered in Rio de Janeiro. This initiative grew out of the need to counter the serious threat posed to livestock by the spread of foot and mouth disease, particularly between Brazil, Mexico and the United States, during the 1940s.[97]

The genesis of Embrapa grew from Brazilian policymakers who at the end of the 1960s were keen to increase agricultural production. Despite the massive improvement in agricultural production during the twentieth century, particularly in terms of the beef industry, in the 1960s Brazil was still a net importer of food. As such soybeans, corn and beef production were largely for domestic consumption.[98] To achieve this goal, increasing the amount of land used for agriculture and improving productivity were seen as paramount. Embrapa was therefore conceived to develop technologies, knowledge and technical-scientific information that could be passed on to farmers to address these issues.[99]

In the case of beef producers, Embrapa was instrumental in producing information about soil and grass quality to increase the size and yield of cattle, thereby actively working to support government policies toward expanding the beef industry. Historically these have taken the form of published pamphlets and reports – including *Evaluation of the Economic Policy for Beef Cattle in Brazil* (1972), *The National Market for Meat and Meat Products* (1973) and *Analysis of the Time Series of Average Prices for Beef Cattle at the Producer Level* (1978).[100] However, today this information often takes the form of online videos. Furthermore, according to internal reports produced by Embrapa during the 1980s, Embrapa also employed economists specialising in rural economics to work closely with cattle farmers and researchers. These economists guided researchers by providing them with knowledge and raw information about specific problems experienced by producers and wider societal demands, thereby shaping researchers' decisions toward certain subjects. Likewise, the economists also guided the implementation of this research with farmers, in order to offer these producers the best economic results for their efforts in conjunction with their own practical knowledge of agricultural production.[101] In this sense, the relationship between economists, researchers and farmers, reflects the interplay between forms of theoretical and practical knowledge in service of expanding the Brazilian beef industry.

The expansion of land used for cattle production was also incentivised by the government, which provided cheap and easily accessible credit. In particular, during the 1970s funding was available to anyone willing to establish cattle ranches in parts of the Amazon basin and Cerrado – a vast tropical savanna that today covers large parts of the states of Goiás, Mato Grosso do Sul, Mato

[96] Pedro Ramos and Fabrício Piacente, 'O Instituto Agronômico de Campinas: sua criação, importância e um pouco de sua história', *Revista Brasileira de Inovação* 15:2 (2016), pp.365-7.
[97] Lopes (2022), p.210.
[98] Fishlow & Filho (2020), p.92.
[99] Geraldo B. Martha Jr., Elisio Contini & Eliseu Alves, 'Embrapa: Its origins and Changes', in Werner Baer (ed.), *The Regional Impact of National Policies: The Case of Brazil,* Cheltenham: Edward Elgar, 2012, p.213.
[100] Embrapa, *Avaliação da política Econômica para a Pecuária de Corte no Brasil* (Dias 1972); Embrapa, *Mercado Nacional de Carne e Produtos Derivados* (Conselho Nacional de Desenvolvimento da Pecuária, 1973); Embrapa, *Análise da Série Temporal de Preços Médios deBois Gordos para Corte ao Nível do Produtor* (Programa Nacional de Pecuária, 1978).
[101] Eberth Marcos Alvarenga Costa Júnior, *A pesquisa e seus reflexos no desenvolvimento da precuária bovina de corte*, EMBRAPA-CNPGC, Documentos 17, Embrapa, 1984, p.23.

Grosso, Tocantins and Minas Gerais.[102] To increase the supply of land available for cattle production, Embrapa turned its attention to both of these areas, which were seen as underexploited and simply in need of scientific solutions to make them economically productive.[103] It is therefore not by chance that Embrapa established its cattle research headquarters in Campo Grande in Mato Grosso do Sul in 1977 at the heart of the Cerrado. This unit worked with other specialist cattle units in the South and Southeast of the country to find technical solutions to issues related to foraging, breeding, nutrition and disease control. As such they helped to fund and publish a tremendous volume of studies on these issues and other aspects of cattle care and improvement.

During the initial phase of Embrapa's efforts to develop the Cerrado in the 1970s, improving the quality of arable land for crop production was prioritised. Embrapa encouraged the technique of adding large quantities of lime to change the soil acidity of the Cerrado to expand grain production. Soybean production was also enhanced by inoculating bacteria in soybean seeds to increase production with less fertiliser usage.[104] The use and development of scientific knowledge in these ways was crucial to providing suitable feed for subsequent cattle production. Alongside these efforts, Embrapa oversaw the introduction of new grasses to the Cerrado, which helped to fatten cattle faster thereby increasing productivity by reducing the time before slaughter.[105] This increased the international competitiveness of Brazilian beef exports.[106] Furthermore, this was particularly crucial since the growth of livestock production in Brazil depended heavily on the expansion of the pasture area until 1985.[107] As such Tony Weis notes that cattle ranching and soy production in Brazil have been a leading force of destruction of natural environments globally since the mid-twentieth century.[108]

The influence of scientific knowledge developed by Embrapa has reaped tangible rewards. Between 1978 and 2011 beef production increased from 2,114,000 tons to 9,184,000 tons (4.3 times).[109] Additionally, productivity improved on the individual level with beef carcass weight improving from an average of 10.1 kilograms per hectare in 1950, to an average of 43.4 kilograms per hectare in 2006.[110]

Expanding the cattle frontier produced new problems necessitating Embrapa to develop new knowledge to maintain economic output. For example, new diseases like *cara inchada* (CI) began to affect cattle, causing the lateral enlargement of the upper jaw bones of affected calves caused by microorganisms in the soil.[111] This disease caused the greatest loss of cattle by a single disease during the 1970s for cattle farmers in central-western and northern Brazil, after the occupation of new land for cattle raising in the 1960s and 1970s. Cattle raised on pastures after the recent removal of virgin forests, which were cut down, burnt and then seeded with grasses, were often affected by the disease. In Matto Grosso, as many as 50 percent of calves reared on these pastures were affected by the

[102] Wilcox (2017), p.231.
[103] Wilcox (2017), p.231.
[104] Fishlow & Filho (2020), p.93.
[105] Fishlow & Filho (2020), p.94.
[106] Fishlow & Filho (2020), p.94.
[107] Geraldo B. Martha Jr., Elisio Contini & Eliseu Alves, 'Land-saving Approaches and Beef Production Growth in Brazil,' *Agricultural Systems* 110 (2012), pp.173–77.
[108] Weis (2013), p.35.
[109] Martha et al. (2012), p.208.
[110] Martha et al. (2012), p.218.
[111] Costa Júnior (1984), p.19.

disease.[112] CI therefore represented a major economic hurdle to the expansion of the cattle frontier. During the 1980s Embrapa scientists were able to successfully isolate the specific types of bacteria responsible, *Bacteroides melaninogenicus* and *Corynebacterium*, by studying local soil and plants, which led to the development of a mineral solution that reduced the effects of CI in cattle.[113] Since then the disease declined sharply and has almost disappeared entirely in Brazil, which is confirmed by no mention of CI in a book on the principal diseases affecting beef cattle in Mato Grosso do Sul published in 1998.[114] Likewise, according to internal documents produced by Embrapa during the 1980s, the Embrapa cattle units also developed other scientific means to increase cattle productivity. Immunisation programs for cattle using blood transfusions were initiated and tick-killing formulas that protected cattle were created, thereby further increasing herd sizes by preventing losses.[115]

New diseases that affected cattle also resulted directly from the changes to natural environments instigated by Embrapa and the effort to improve economic productivity. For example, the need to replace native savannah grasslands in the Cerrado with cultivated pastures to increase livestock productivity led to the creation of monocultures of Brachiaria grasses. These grasses were first introduced from Africa and initially represented an important scientific achievement by Embrapa because they allowed for more intensified cattle grazing and the increased availability of land for farmland as pastures became smaller.[116] By the end of the twentieth century, Brachiaria grasses occupied around 40 million hectares in Brazil.[117] However, accompanying the importation of these grasses was a microorganism that caused hepatogenous photosensitisation. This caused the skin of cattle to become more sensitive to ultraviolet light and lesions to appear all over the body, eventually leading to swellings of the legs and blindness. This disease continues to affect livestock in Brazil to this day and is a major problem for cattle farmers.

International collaboration between Embrapa and other bodies has been crucial to the development and circulation of scientific knowledge. Ryan Nehring has written about the close involvement of the United States in developing Brazilian agricultural production, particularly in the Cerrado through social relations of scientific knowledge production between Brazilian and US scientists. As such he argues the transfer of scientific knowledge and technology was not a direct diffusion from the US to Brazil but an ongoing process of North-South collaboration through scientific research, academic training and intergovernmental political negotiations.[118] Moreover, Nehring also notes the vast capital transfers from the US to Brazil that further enabled this process. In particular, between 1961 to 1969 USAID provided US$106,123,000 to finance various activities, from conducting land surveys to training Brazilian scientists, all with the goal of modernising Brazil's agriculture and supporting long-term development planning.[119] Besides the United States, Japan has

[112] Júrgen Döbereiner, Iveraldo. S. Dutra, Ivan V. Rosa and Hans Blobel, 'Cara inchada of cattle, an infectious, apparently soil antibiotics-dependant periodontitis in Brazil', *Pesquisa Veterinária Brasileira* 20:2 (2000), p.49.
[113] Döbereiner et al. (2000), p.57.
[114] Ricardo Antonio Amaral de Lemos, *Principais Enfermidades de Bovinos de Corte do Mato Grosso do Sul. Reconhecimento e Diagnóstico,* Cuiabá: Federal University of Mato Grosso, 1998.
[115] Costa Júnior (1984), p.17.
[116] Maurílio José Alvim, Milton de Andrade Botrel & Deise Ferreira Xavier, 'As Principais Espécies de Brachiaria Utilizadas No País', *Comunicado Técnico* 22 (2002), pp.1-4.
[117] Esteban A. Pizarro et al., 'Regional Experience with Brachiaria: Tropical America—Savannas', in W. Miles, B. L. Maass & C. B. do Valle (eds), *Brachiaria: biology, agronomy, and improvement,* Centro Internacional de Agricultura Tropical; Empresa Brasileira de Pesquisa Agropecuária, 1996, p.230.
[118] Ryan Nehring, 'Yield of dreams: Marching west and the politics of scientific knowledge in the Brazilian Agricultural Research Corporation (Embrapa)', *Geoforum* (2016), pp.206–17.
[119] Nehring (2016), p.207.

also been closely involved with the development of scientific knowledge. In 1979 the Program of Japanese–Brazilian Cooperation for the agricultural development of the Cerrado (PRODECER) was signed. Between 1979 and 1990 US$150 million was jointly invested into expanding the agricultural frontier through land surveys and experiments with land colonisation, which combined livestock and perennial crops. A further US$137.9 million was invested between 1995 and 2001 in order to develop irrigation systems.[120] Ultimately, the development of these relations highlights once again the significance of knowledge for the cattle industry. Moreover, it reiterates the significance of the increasing intensification of bonds between forms of knowledge and capital, for the expansion of the Brazilian cattle industry.

Culinary Knowledge

Accompanying the development of scientific knowledge, new culinary knowledge emerged in the 1960s that strengthened Brazilian national identity, producing a form of gastronationalism that reflected the political economy of Brazil. The term 'gastronationalism' has been used by a variety of scholars to denote the relationship between food and nation states. This term has been popularised by the sociologist Michaela DeSoucey, who argues that "food production, distribution, and consumption can demarcate and sustain the emotive power of national attachment".[121] As such gastronationalism serves as a claims-making device that allows states to make interventions into markets.[122] In addition, Ayşe Şahin has further defined the term as meaning the adoption, preservation and promotion of foods specific to the nation from the past to the present, based on the geographical conditions and ethnic backgrounds of a nation.[123]

Culinary knowledge can also be brought into consideration with the relationship between food and national identity that has recently been taken up by several scholars. For example, Gregory Ramshaw has argued that the kitchen is an important symbol of nationalism, a source of pride, and an effective tool for economic and social development.[124] Similarly, Barry Higman claims that modern states gain a unique structure and sense of themselves through their national cuisines.[125] Building on Eric Hobsbawm's concept of invented traditions, Alberto Grandi has argued that "when a community finds itself deprived of its sense of identity, because of whatever historical shock or fracture with its past, it invents traditions to act as founding myths." Grandi applies this perspective to the case of Italian recipes, such as carbonara and tiramisu, which he argues have the veneer of ancient traditions but were invented after the Second World War.[126] In relation to beef specifically, Natalia Milanesio has made a compelling case for the role beef played as a tool of nation-building in

[120] Brazilian Ministry of Agriculture, Livestock and Supply and Japanese International Cooperation Agency, Japan-Brazil Agricultural development cooperation programs in the Cerrado region of Brazil, *Joint Evaluation Study General Report Summary*, JICA, 2002, pp.6-7.
[121] DeSoucey (2010), p.432.
[122] DeSoucey (2010), p.433.
[123] Ayşe Şahin, 'Examination of the notion of gastronationalism: Geographical indication and branding factors', *The Journal of International Social Research* (2017), pp.459-64.
[124] Gregory Ramshaw, 'Food, heritage and nationalism', in Dallen Timothy (eds), *Heritage Cuisines-Traditions, identities and tourism,* London: Routledge, 2010, pp.53-64.
[125] Barry Higman, *How Food Made History*, New York: John Wiley & Sons, 2012.
[126] Marianna Giusti, 'Everything I, an Italian, thought I knew about Italian food is wrong', *Financial Times,* 23.03.2023, at https://www.ft.com/content/6ac009d5-dbfd-4a86-839e-28bb44b2b64c.

Argentina.[127] As Milanesio points out, "by favoring internal consumers over external markets, Peronist beef politics created an empowering ideology of economic sovereignty."[128]

Recipes found in cookbooks provide another telling source of the emergence of new culinary knowledge in response to the newfound abundance of beef available in the mid-twentieth century. Of course, as Lopes points out, these sources are not entirely representative of what people actually ate.[129] However, they do provide insight into what ingredients were available and what certain groups aspired to eat. One particularly striking example from Brazil is *Dona Benta* (1946), which has remained in print since its initial publication and has so far gone through seventy-seven editions. Here the increasing frequency of recipes calling for the inclusion of forms of beef highlights its growing availability.[130] Comparatively, this cookbook from the mid-twentieth century highlights significantly more dishes using beef than cookbooks in the previous century, such as *Cozinheiro Imperial* (1839) and *Cozinheiro Nacional* (1860).[131] As such *Dona Benta* provides another valuable source of information about how the democratisation of beef was influencing culinary knowledge.

Feijoada

In the case of Brazil, food provides a particularly interesting example of culinary knowledge in service of the construction of gastronationalism. In particular, because mixing different elements together to form the nation, similarly to mixing different ingredients in a recipe, was a crucial component of the formation of Brazilian identity, which has been often portrayed as a combination of European, African and Indigenous groups.[132] *Feijoada* is a particularly evocative example of this, which both today and historically is considered a Brazilian national dish.[133] The dish itself consists of a mixture of beans, dried beef and smoked pork, served typically with various side dishes including rice, farofa and plantain. Historical references to *feijoada* are found in the earliest examples of Brazilian cookbooks from the early nineteenth century, where its status as a national dish was already being touted, such as *Cozinheiro Imperial* (1839) and *Cozinheiro Nacional* (1860).[134] This status has been more recently cemented by the Brazilian poet and songwriter, Chico Buarque, in his famous ballad *Feijoada Completa,* which in misogynistic terms details the correct ingredients and way to prepare the dish.

The popular origins of *feijoada* are that it emerged from the ingenuity of slaves brought to Brazil from West Africa who concocted the dish from whatever ingredients were available. Both today and historically this has meant a lot of variations on a universal theme, and the preparation of feijoada varies greatly often in relation to region. For example, black beans are favoured in Rio de

[127] Natalia Milanesio, 'Food Politics and Consumption in Peronist Argentina', *The Hispanic American Historical Review* 90 (2010), pp.75-108
[128] Milanesio (2010), p.76.
[129] Lopes (2022), p.87.
[130] Renata da Silva Simões, 'Dona Benta – Comer Bem Uma fonte para a História da Alimentação (1940-2003)', MA thesis, São Paulo: University of São Paulo, 2008 pp.35-55.
[131] [Author Unknown], *Cozinheiro imperial, ou nova arte do cozinheiro e do copeiro,* 10th ed., Rio de Janeiro: Laemmert & Cia., 1887; [Author Unknown], *Cozinheiro nacional, ou coleção das melhores receitas das cozinhas brasileira e européias*. São Paulo: Ateliê Editorial/Editora Senac São Paulo, 2008.
[132] Carmen Nava, 'Forging Future Citizens in Brazilian Public Schools, 1937-1945', in C. Nava & L. Lauerhass (eds), *Brazil in the Making: Facets of National Identity* Lanham: Rowman & Littlefield, 2010, pp.107-11.
[133] Lopes (2022), p.86.
[134] Author Unknown (1887); Author Unknown (2008).

Janeiro and Minas Gerais, while in Sâo Paulo brown beans are preferred and in Bahia red and brown beans are typical.[135]

Several scholars have disputed the popular account that *feoijada* was the invention of slaves, which they label the "Feijoada Myth". For example, in his account of the nineteenth-century Brazilian cookbooks, Tim Wätzold highlights the elevation of *feijoada* to the status of a national dish during the 1920s and 1930s, and notes its similarity to Portuguese imperial cuisine. Indeed Wätzold goes so far as to argue that the idea that certain cuts of meat were considered inferior in the Empire is wrong and a twentieth-century invention. As evidence, he cites the last imperial ball in Brazil where members of the imperial family and aristocracy were served an array of dishes featuring many meats served alongside a stuffed pork head for decoration.[136] Similarly, the nutritionist Irene Countinho de Macedo has made several arguments that contradict the popular narrative. Firstly, she argues that African and Indigenous peoples did not usually combine ingredients into a single dish. Secondly, that accounts from Europeans in Brazil during the sixteenth and seventeenth centuries mention a similar dish prepared with black beans, beef jerky and manioc flour, before the arrival of large numbers of slaves. Thirdly, Europeans prepared similar stews consisting of mixed meats, vegetables and beans dating back at least as far as the Roman Empire. And finally, that the first *feijoadas* were prepared with fresh meat, beef jerky, bacon, bay leaves, onions and garlic, so where would slaves get the fresh and dried meat? Even the rich, Macedo points out, would not waste meat as the supply was too small for slave masters to share.[137]

Historical evidence highlights that prior to the twentieth-century *feijoada* was only consumed at special events, often on Saturdays. Maria-Aparecida Lopes has highlighted how during the 1830s *feijoada* was prepared at samba festivals in poor working-class districts of Rio de Janeiro and by the 1880s it was served at middle-class banquets and dinner parties.[138] During the twentieth century, the composition of the dish and the regularity people had access to consume it changed owing to the increasing availability of beef in people's lives, therefore making it a compelling example of gastronationalism. As such beef, often in the form of *carne seca*, has been increasingly integrated into *feijoada* recipes in modern cookbooks.[139] Furthermore, the dish has been transformed from being eaten irregularly on special occasions to being available twice a week as a standard meal (*Prato Feito*).[140] Despite these changes, class distinctions nevertheless still govern the consumption of *feijoada* with middle-class consumers having access to greater qualities and varieties of *feijoada* with more desirable cuts of meat highlighting an example of conspicuous consumption, while poorer working-class consumers are less able to afford such variety or to eat *feijoada* so regularly.[141] This case thus further demonstrates the changing interplay between forms of knowledge, national identity and capital, in relation to the transformation of the beef industry in Brazil.

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[135] Jane Fajans, *Brazilian Food: Race, Class, and Identity in Regional Cuisines,* London: Berg, 2012, pp.87-97.
[136] Tim Wätzold, 'Die Kochbücher des brasilianischen Kaiserreichs. Quellen zur nationalen Identität, materiellen Kultur und der Proklamierung der brasilianischen Küche 1840-1889', *Vierteljahrschrift für Sozial- und Wirtschaftsgeschichte* (2011), p.452.
[137] Elisa Macedo Dekaney & Joshua A. Dekaney, *Music at the Intersection of Brazilian Culture: An Introduction to Music, Race, and Food*, London: Routledge, 2021, p.98-100.
[138] Lopes (2022), p.86.
[139] Eda Romio, *500 Anos de Sabor, Brasil 1500-2000,* São Paulo: ER Comunicações, 2000, p.220.
[140] Fajans (2012), pp.87-97.
[141] Kathryn S. Oths, Adriana Carolo & Jose Ernesto Dos Santos, 'Social status and food preference in Southern Brazil', *Ecology of Food and Nutrition* (2003), pp.303-24.

Churrasco

Similarly to *feijoada*, *churrasco* is another symbol of Brazilian cuisine embedded with culinary knowledge and strong resonance with national identity. *Churrasco* is a style of cooking and serving meat, most often beef, over a fire on either a grill or metal skewers. Today it is ubiquitously associated with modern Brazilian Rodizio-style restaurants, which feature all-you-can-eat barbecued meat cooked and served on metal skewers. These cooking and serving methods are heavily associated with *gaúcho* culture and reflect how beef was prepared and consumed by the early cattle ranchers in Brazil.[142]

For the anthropologist Maria Eunice Maciel, *churrasco* is a strong maker of Brazilian identity that is often described to foreigners as a regional specialty associated with the South of Brazil and *gaúcho* culture. However, according to Maciel, to conclude that *churrasco* only highlights a sense of regional belonging is an extremely limited conclusion.[143] While there is no doubt about its origins, today *churrasco* has become more than simply a marker of regional identity and has grown into a national signifier, thereby paralleling the trajectory of other regional foods that have become symbols of national cuisine, such as Anatolian food in Turkey.[144] Within Brazil, this is reflected in the spread throughout the country of dedicated restaurants known as *churrascarias*, which began to open nationwide during the mid-twentieth century. These were often opened by migrants from beef-producing regions, particularly Rio Grande do Sul, who travelled throughout Brazil motivated by the potential of profiting from the country's expanding road network.[145] The aesthetics of these restaurants were highly associated with *gaúcho* culture, typically featuring pictures and objects representing rural life.[146]

Culinary knowledge plays an important role in the preparation and consumption of *churrasco*. The person who cooks the meat is sometimes known as the *assador*, and is often concerned with every aspect of work that concerns the meat from choosing the cuts to cleaning the skewers. Culinary knowledge is reflected in the preparation of the meat. Only coarse salt should be used. Preparing the fire correctly is another important area of culinary knowledge, alongside cooking the meat the correct way and flipping it so that the meat cooks slowly and crucially is kept away from the flames.[147] The meat must be well cooked, crispy on the surface and juicy on the inside. Achieving this point is difficult, which is why the *assador*'s knowledge of the process and technique is important. An oven-cooked piece of meat loses its juices, which are typically used to accompany the meat. Despite the simplicity of the recipe, the technique is not easy and a good *assador* is someone of prestige recognised as having a special talent.[148] This manner of preparation highlights differences with other similar cooking methods: most notably Brazilian *churrascos* tend not to let the meat rest after it has been cooked, thereby indicating a difference from other culinary knowledge systems, such as in neighbouring Argentina where meat typically is allowed to rest for several minutes after being grilled.

[142] Fajans (2012), pp.87-97.
[143] Maria Eunice Maciel, 'Churrasco à Gaúcho' *Horizontes Antropológicos* 4 (1996), p.47.
[144] Yeliz Pekersen, 'The Hotel Chefs Perception on Traditional Kitchen Culture and Gastronationalism', A*nais Brasileiros De Estudos Turísticos* (2020), pp.12-20.
[145] Rafael Tonon, '"Eater's Mecca": How the Brazilian Steakhouse Swept America', *Eater* (2016), at https://web.archive.org/web/20180502050019/https://www.eater.com/2016/10/6/13168942/fogo-de-chao-brazilian-steakhouse.
[146] Dória (2021), pp.82-3.
[147] Maciel (1996), p.45.
[148] Maciel (1996), p.46.

Gender plays an important role in this work, as the duties of the *assador* are normally undertaken by men, although women sometimes will take on this role. The conventional answer given to explain this is that when the *churrascos* were first invented there were no women around on the long cattle drives across the Pampas.[149] This answer seems somewhat doubtful and serves as a continuation of the heroic myth of the *gaúcho*. Moreover, since food preparation is often seen as a female activity, thereby showing that a focus on food and nationalism can shed light on the question of gender in social relationships.[150] This situation highlights a link between masculinity and beef, which is also present in other locations.[151] Therefore the figure of the male *assador* may be related to the cultural codes in which red meat is a symbol of virility as opposed to sweets or salads, associated with women and children.[152]

Increasing access to beef and competition between *churrascarias* in the mid-twentieth century led to the creation of new recipes and the importation of recipes from abroad, constituting the development of new forms of culinary knowledge in Brazil. In particular, new cuts of beef, such as Picanha, became increasingly popular in Brazil during the 1950s and 1960s as restaurants competed to attract customers.[153] The name of this cut of beef is deeply associated with *gaúcho* culture, since it comes from the name of the rod traditionally used to brand cattle in the South of Brazil. Additionally, new recipes, such as beef stroganoff, were imported around the same time and became staples of Brazilian cuisine.[154] Stroganoff, or *Estrogonofe* as it is locally referred to, is not always prepared using beef – chicken and prawns serve as possible alternatives. There is currently a lack of empirical evidence to prove exactly when stroganoff first appeared in Brazil. However, the appearance of this dish on Brazilian menus during the mid-twentieth century does correlate strongly with the growing availability of beef in Brazil. Furthermore, the centrality of these dishes today within Brazilian national cuisine indicates the wider political economy of Brazil where beef production and consumption are hegemonic. As a result, *churrasco*, similarly to *feijoada*, has become a national symbol tied to culinary knowledge that reflects the wider economic state of contemporary Brazil.

Conclusion

This working paper has demonstrated how the development of the Brazilian beef industry was contingent on several factors. The commodification of cattle, which had begun in the early phase of colonialism, could only develop further after overcoming the substantial environmental factors with scientific knowledge and increasing transportation infrastructure. The First World War provided a powerful opportunity for the industry to expand internationally and solidify its position in order to begin to outgrow regional competitors, such as Argentina and Uruguay. As production increased so too did domestic consumption, resulting in the democratisation of beef in Brazil. This became associated with an intense program of nation-building in Brazil, particularly since the 1930s, which

[149] Maciel (1996).
[150] Michael Symons, 'The Confection of a Nation: The Social Invention and Social Construction of the Pavlova', *Social Semantics* (2010), pp.197–217.
[151] Food studies scholar Amy Bentley shows the identification between meat and masculinity in the United States. Amy Bentley, *Eating for Victory: Food Rationing and the Politics of Domesticity*, Champaigne: University of Illinois Press, 1998, pp.87–9.
[152] Erika Cudworth, '"The Recipe for Love"? Continuities and Changes in the Sexual Politics of Meat', *Journal for Critical Animal Studies* 13 (2010), p.87.
[153] Evandro Caregnato, *Churrasco: Grilling the Brazilian Way,* Layton: Gibbs M. Smith Inc, 2016, pp.56-9.
[154] Romio (2000), p.192; Rafael Battaglia, 'Uma breve história do estrogonofe', *Super*, July 2020, at https://super.abril.com.br/sociedade/conexao-brasil-russia-a-origem-do-estrogonofe/.

involved the creation of new culinary knowledge tied to the development of new recipes and restaurants. These developments paved the way for the current status of Brazilian beef, and help us to understand the intense relationship between knowledge, nation and capital that characterised them.

Thinking in these terms provides a useful potential vista for future research into commodity histories – in particular animal commodities. Indeed, it would be highly productive to explore the interplay between these factors in relation to other commodities in different settings. For example, cases such as the colossal rise of pork production and consumption in China during the twentieth and twenty-first centuries, which has led to the creation of a strategic pork reserve, highlight the pivotal position of this commodity in the Chinese political economy.[155] Similarly, the increasing move towards synthetic meat, poultry and seafood production being pursued by numerous governments and corporations around the world, provides an additional area to potentially consider the interaction between forms of knowledge, national identity and capital, which builds upon existing commodity chains.[156]

This paper has also sought to go beyond the remit of agricultural and economic aspects of the history of the Brazilian cattle and beef industry, to look at role of culinary and scientific knowledge – in particular, the pivotal role of scientific knowledge in the remarkable expansion and transformation of the Brazilian beef industry; and has delved into the realm of culinary knowledge as a potent force in shaping national identity in Brazil. As such it has shed light on the interplay between science, agriculture, food and economic development in Brazil, highlighting the profound impact of forms of knowledge on national identity. As a result, this provides new ways for scholars concerned with the histories of commodities to consider forms of knowledge involved in the production, consumption and circulation of different commodities. Specifically, in terms of culinary knowledge, this new concept furnishes researchers interested in food histories with a means to interpret wider analytical dimensions, such as class and gender, as they relate to eating and cooking practices, and the availability of ingredients in relation to consumption of food. Moreover, its conjunction with other concepts like gastronationalism can shed light onto how food commodities can become not only a vital source of sustenance for populations, but also a symbol of national identity. This vista is especially promising as studies of nationalism have long ignored the importance of food and culinary knowledge in nation-making. Indeed, by considering the intensification of the interplay between forms of knowledge, nation and capital in the case of the Brazilian beef industry, has provided a means to reframe the interaction between nationalism and the industrialisation of meat production.

Likewise, the consideration of scientific knowledge in the development of commodity histories could also have a valuable effect. In particular, by bringing to light the role of institutions, such as Embrapa, involved in the production and circulation of knowledge in service of economic development. In the case of Brazil, this knowledge aided the expansion of the cattle frontier into new regions, like the Cerrado and the Amazon, therefore indicating the ecological and economic consequences of scientific knowledge. Similarly, it would also be possible to consider the role of

[155] Helen Davidson, 'Chinese pork prices surge to new high prompting authorities to act', *Guardian*, 13 September 2022.
[156] Damian Carrington, 'Reinventing the eel: first lab-grown ell meat revealed', *Guardian* 22 January 2024; Emily Chow & Dominique Patton, 'Chinese firm serves up lab-grown pork in world's top meat market', *Reuters*, 4 September 2021; Anna Starostinetskaya, 'Japanese Government Part Of $2.7 Million Investment in New Clean Meat Brand', www.vegnews.com, 4 June 2018.

scientific knowledge and its carriers in relation to other commodities in different settings, such as the turn towards Green Imperial History, which has demonstrated the importance of dendrology to the imperial exploitation of timber, or the significance of geology and mining to imperial expansion.[157]

By drawing attention to the productive possibilities offered by the History of Knowledge to the History of Commodities, this paper has highlighted the strong potential for interdisciplinary research to continue to develop. Locations like the Food Studies Centre at SOAS (University of London) – which combine historians, anthropologists and sociologists – are powerfully productive towards this end. Moreover, they remind us of the limits of our disciplinary knowledge and the potential to expand beyond them.

[157] Richard Grove, *Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600-1860*, Cambridge: Cambridge University Press, 1996; Peder Anker, *Imperial Ecology: Environmental Order in the British Empire, 1895-1945*, Cambridge: Harvard University Press, 2001.

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The mutually reinforcing relationship between 'commodities' and 'empires' has long been recognised. Over the last six centuries the quest for profits has driven imperial expansion, with the global trade in commodities fuelling the ongoing industrial revolution. These 'commodities of empire', which became transnationally mobilised in ever larger quantities, included foodstuffs (wheat, rice, bananas); industrial crops (cotton, rubber, linseed and palm oils); stimulants (sugar, tea, coffee, cocoa, tobacco and opium); and ores (tin, copper, gold, diamonds). Their expanded production and global movements brought vast spatial, social, economic and cultural changes to both metropoles and colonies.

In the Commodities of Empire project we explore the networks through which such commodities circulated within, and in the spaces between, empires. We are particularly attentive to local processes – originating in Africa, Asia, the Caribbean and Latin America – which significantly influenced the outcome of the encounter between the world economy and regional societies, doing so through a comparative approach that explores the experiences of peoples subjected to different imperial hegemonies.

The following key research questions inform the work of project:

1) The networks through which commodities were produced and circulated within, between and beyond empires;
2) The interlinking 'systems' (political-military, agricultural labour, commercial, maritime, industrial production, social communication, technological knowledge) that were themselves evolving during the colonial period, and through which these commodity networks functioned;
3) The impact of agents in the periphery on the establishment and development of commodity networks: as instigators and promoters; through their social, cultural and technological resistance; or through the production of anti-commodities;
4) The impact of commodity circulation both on the periphery, and on the economic, social and cultural life of the metropoles;
5) The interrogation of the concept of 'globalisation' through the study of the historical movement and impact of commodities.

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