

RESEARCH ARTICLE

# A plague of weasels and ticks: animal introduction, ecological disaster, and the balance of nature in Jamaica, 1870–1900

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## Abstract

Towards the end of the nineteenth century, British colonists in Jamaica became increasingly exasperated by the damage caused to their sugar plantations by rats. In 1872, a British planter attempted to solve this problem by introducing the small Indian mongoose (*Urva auropunctata*). The animals, however, turned on Jamaica's insectivorous birds and reptiles, leading to an explosion in the tick population. This paper situates the mongoose catastrophe as a closing chapter in the history of the nineteenth-century acclimatization movement. While foreign observers saw the introduction of the mongoose as a cautionary tale, caricaturing British Jamaica as overrun by a plague of weasels and ticks, British colonists, administrators and naturalists – identifying a gradual decline of both populations – argued that the 'balance of nature' would eventually reassert itself. As this paper argues, through this dubious claim they were attempting to retrospectively rationalize or justify the introductions and their disastrous aftermath. This strategy enabled them to gloss over the lasting ecological damage caused by the mongoose, and allowed its adherents to continue their uncritical support of both the Jamaican plantation economy and animal introductions in the British Empire.

In 1896, Henry Hesketh Bell, a rising star in the administrative apparatus of the British Empire, arrived in Jamaica. He was initially perplexed by the furnishings of his room, which included a small bowl of oil with a feather in it. To his dismay, his host explained that it was for removing ticks, which plagued the island. Bell was just the latest individual on the receiving end of an unmitigated ecological disaster in Jamaica. 'About ten or fifteen years before the date of my visit to the island', he later recorded, 'rats had increased so greatly in numbers and were doing such damage to the sugarcanes that the government imported a considerable number of mongoose from India to kill the rats'. From here, things only went downhill. The mongooses turned on indigenous reptiles and birds, leading to an explosion in the tick population. The biting arachnids harassed the population and swarmed in such numbers that they reportedly killed cattle. 'At the time of my visit', continued Bell, 'the breeders of stock were desperate and were faced with ruin, by this interference with the balance of Nature'.<sup>1</sup>

<sup>1</sup> Henry Hesketh Bell, Synopsis of diaries, 7 January 1890–31 December 1899, Sir Henry Hesketh Bell Collections, Cambridge University Library (hereafter CUL), GBR/0115/RCS/RCMS 36/2/1, pp. 74–5.

Historians are well versed in the disastrous, often farcical, history of the introduction of organisms into new environments. The Columbian exchange provides an early example of just how radical and damaging such introductions could be.<sup>2</sup> The eighteenth- and nineteenth-century acclimatization movements offer no shortage of examples of ill-planned introductions and their consequences.<sup>3</sup> The millions of European rabbits (*Oryctolagus cuniculus*) in modern-day Australia, for instance, spawned from a small population of two dozen rabbits introduced near Melbourne in 1859.<sup>4</sup> In the United States, the house sparrow (*Passer domesticus*) was introduced into New York in the early 1850s, possibly out of nostalgia or possibly for its insectivorous qualities.<sup>5</sup> Even though the avian arrival triggered a huge controversy in the form of the ‘sparrow wars’, it was followed in 1890 by the introduction of the common starling (*Sturnus vulgaris*). Although a popular story emerged that the starling had been introduced by a New York socialite who wished to import all the birds mentioned in Shakespeare’s plays, the actual rationale behind their introduction remains a mystery.<sup>6</sup> Across European empires, meanwhile, plantations and monocultures not only carried new plants and animals with them, but endlessly spawned demand for fresh introductions to counter the ecological damage they unleashed in the first place. One example of this trend was the importation of the small Indian mongoose (*Urva auropunctata*) to Jamaica in 1872 to combat introduced rats on sugar plantations.<sup>7</sup>

One explanation for why ecologically disastrous animal introductions occurred again and again is that they were backed by political or scientific authorities. Nineteenth-century acclimatization in Australia, for instance, was ostensibly guided by zoological science and ‘self-aware ecological imperialism’.<sup>8</sup> Yet opinion was divided both within and between scientific and administrative communities on the efficacy of such introductions. In New Zealand, members of the Mustelidae family (including weasels and ferrets, but not mongooses) were introduced in 1884 by acclimatization enthusiasts to combat rabbits against the explicit advice of Cambridge zoologist Alfred Newton.<sup>9</sup> Tensions could also emerge between scientists, colonial administrators and plantation owners. Plantation monocultures, in addition to being subject to economic volatility and dependent on exploited labour, were vulnerable to introduced pests and diseases.<sup>10</sup>

<sup>2</sup> Alfred W. Crosby, *The Columbian Exchange: Biological and Cultural Consequences of 1492*, Westport, CT: Greenwood Press, 1972.

<sup>3</sup> Warwick Anderson, ‘Climates of opinion: acclimatization in nineteenth-century France and England’, *Victorian Studies* (1992) 35, pp. 135–57; Christopher Lever, *They Dined on Eland: The Story of the Acclimatisation Societies*, London: Quiller Press, 1992; Michael A. Osborne, ‘Acclimatizing the world: a history of paradigmatic colonial science’, *Osiris* (2000) 15, pp. 135–51; Harriet Ritvo, ‘Going forth and multiplying: animal acclimatization and invasion’, *Environmental History* (2012) 17, pp. 404–14.

<sup>4</sup> Joel M. Alves *et al.*, ‘A single introduction of wild rabbits triggered the biological invasion of Australia’, *Proceedings of the National Academy of Sciences* (2022) 119, pp. 1–12.

<sup>5</sup> Ritvo, *op. cit.* (3), pp. 405–6. Sparrows were also introduced to Canada and Australia. See Matthew Holmes, ‘The sparrow question: social and scientific accord in Britain, 1850–1900’, *Journal of the History of Biology* (2017) 50, pp. 645–71.

<sup>6</sup> Lauren Fugate and John MacNeill Miller, ‘Shakespeare’s starlings: literary history and the fictions of invasiveness’, *Environmental Humanities* (2021) 13, pp. 301–22.

<sup>7</sup> The mongoose in the Caribbean is discussed by Christopher Lever, *Naturalized Animals: The Ecology of Successfully Introduced Species*, London: Poyser, 1994.

<sup>8</sup> Pete Minard, *All Things Harmless, Useful, and Ornamental: Environmental Transformation through Species Acclimatization, from Colonial Australia to the World*, Chapel Hill: University of North Carolina Press, 2021, pp. 9–10.

<sup>9</sup> Philippa K. Wells ‘“An enemy of the rabbit”: the social context of acclimatisation of an immigrant killer’, *Environment and History* (2006) 12, pp. 297–324, 301–2.

<sup>10</sup> Philip D. Curtin, *The Rise and Fall of the Plantation Complex: Essays in Atlantic History*, Cambridge: Cambridge University Press, 1990; Corey Ross, *Ecology and Power in the Age of Empire: Europe and the Transformation of the Tropical World*, Oxford: Oxford University Press, 2017; Arnab Dey, *Tea Environments and Plantation Culture: Imperial Disarray in Eastern India*, Cambridge and New York: Cambridge University Press, 2018.

In dealing with these, planters sometimes preferred to rely on their own local knowledge.<sup>11</sup> For example, in nineteenth-century Sri Lanka (then Ceylon), a literate planter community (whose elite status was underlined by its social, religious and geographical distance from both Kandyan villagers and indentured Indian labourers) stubbornly resisted advice from Britain-based scientific experts on plant disease to seek alternatives to their coffee crops.<sup>12</sup> When their decisions led to ecological crises, however, how did members of the British scientific and colonial establishment explain and justify their actions?

This paper argues that one aspect of biological control not thoroughly examined by scholars is the ‘rationalization’ of introductions gone wrong. Here, the paper uses the term ‘rationalization’ in the sense of Ernest Jones’s 1908 definition of the term. Jones theorized that nobody would readily admit that their behaviour was irrational, noting that ‘any act that might appear so is immediately justified by distorting the mental processes concerned and providing a false explanation that has a plausible ring of rationality’.<sup>13</sup> Within medical history, rationalization has been harnessed to explain both unethical practices in medicine and subsequent historiographical defences of these practices.<sup>14</sup> Rationalization and the related concept of cognitive dissonance have also been discussed in relation to contemporary attitudes to the environment.<sup>15</sup> Despite its negative connotations, rationalization is a commonplace response, and does not necessarily imply a guilty conscience. It is simply an (often subconscious) attempt to explain a past course of action in a way that provides a logical narrative.<sup>16</sup>

As this paper will show, the introduction of the mongoose in Jamaica was accounted for by actors across the British Empire through appeals to early ecological ideas, which provided them with an appropriate rationalization for events.<sup>17</sup> A faith emerged that the balance of nature would counter introductions gone wrong. Prior to this, colonial naturalists and administrators had used the balance of nature as ‘shorthand for serious attempts to understand the complexity of ecological interactions, without the disciplinary terminology and methods that emerged later.’<sup>18</sup> This balance could be easily upset by human

<sup>11</sup> On planters making their own knowledge see Marta Macedo, ‘Standard cocoa: transnational networks and technoscientific regimes in West African plantations’, *Technology and Culture* (2016) 57, pp. 557–85.

<sup>12</sup> The complex relationship of British planters in Sri Lanka with contemporary science is a matter of sustained discussion. See T.J. Barron, ‘Science and the nineteenth-century Ceylon coffee planters’, *Journal of Imperial and Commonwealth History* (1987) 16, pp. 5–23; Stuart McCook, *Coffee Is Not Forever: A Global History of the Coffee Leaf Rust*, Athens: University of Ohio Press, 2019, pp. 45–7; Matthew Holmes, ‘A parochial approach: colonial entomology on the plantations of nineteenth-century Sri Lanka’, *Itinerario* (online first, 2023), pp. 1–20.

<sup>13</sup> Brenda Maddox, *Freud’s Wizard: Ernest Jones and the Transformation of Psychoanalysis*, London: John Murray, 2006, p. 78.

<sup>14</sup> See Charlotte Paul and Barbara L. Brookes, ‘The rationalization of unethical research: revisionist accounts of the Tuskegee syphilis study and the New Zealand “unfortunate Experiment”’, *American Journal of Public Health* (2015) 105, pp. 12–19; Lawrence B. Goodheart, ‘Insane acquittees and insane convicts: the rationalization of policy in nineteenth-century Connecticut’, *History of Psychiatry* (2017) 28, pp. 410–26.

<sup>15</sup> K. Hobson, ‘Competing discourses of sustainable consumption: does the “rationalisation of lifestyles” make sense?’, *Environmental Politics* (2002) 11, pp. 95–120; Jonas H. Rees, Sabine Klug and Sebastian Bamberg, ‘Guilty conscience: motivating pro-environmental behavior by inducing negative moral emotions’, *Climatic Change* (2015) 130, pp. 439–52.

<sup>16</sup> Anneli Jefferson, ‘Confabulation, rationalisation and morality’, *Topoi* (2020) 39, pp. 219–27.

<sup>17</sup> On early forms of ecology see Donald Worster, *Nature’s Economy: A History of Ecological Ideas*, 2nd edn, Cambridge: Cambridge University Press, 1994; Frank N. Egerton, *Roots of Ecology: Antiquity to Haeckel*, Berkeley: University of California Press, 2012. While the English term ‘ecology’ did exist in the late nineteenth century, it was only used as a niche term in botany. See Libby Robin, ‘Ecology: a science of empire?’, in Tom Griffiths and Libby Robin (eds.), *Ecology and Empire: Environmental History of Settler Societies*, Edinburgh: Keele University Press, 1997, pp. 63–75, 64–5.

<sup>18</sup> Edward Deveson, ‘Plagues and players: an environmental and scientific history of Australia’s southern locusts’, PhD thesis, Australian National University, 2017, p. 186.

activity and possibly never corrected naturally. However, in the Jamaican context, the balance of nature became a way to draw a conceptual line under a complex and calamitous history of animal introductions.

This paper will approach the introduction of the mongoose to Jamaica in three parts. First, it will examine the initial introduction of the mongoose to Jamaica by William Bancroft Espeut to counter rats on sugar plantations. Second, it will turn to the ecological damage caused by the mongoose in Jamaica to indigenous birds and reptiles, the destruction of which was thought to result in a growing population of ticks. Finally, it will consider how the concept of the ‘balance of nature’ was used by administrative and scientific elites of the British Empire. While it was accepted that human activity could upset this balance, it was in the wake of the mongoose introduction to Jamaica that the balance of nature was imbued with the power to correct itself. In this instance, the outbreak of ticks among the mongoose population was taken as evidence that nature was self-correcting, thus ‘rationalizing’ a disastrous episode in the history of animal acclimatization. Incorporating the mongoose into the plantation history of Jamaica sheds new light on a complex ecology of interacting species and how these relationships were understood by British settlers and administrators in the late nineteenth century. It also further highlights the promise and difficulties of multi-species histories. While a multi-species perspective is indispensable to understand what British planters did and saw in Jamaica, this history also shows the difficulties in establishing a ‘biophysical baseline’ from which to assess biogeography and ecology in an era when it was not clear exactly which species were present or thriving.<sup>19</sup> The assertion that the ‘balance of nature’ was at work on the island also demonstrates how ecological reality could be interpreted to harmonize with the wider imperial project.<sup>20</sup>

### Rats and mongooses

William Bancroft Espeut, a landholder and fellow of the Linnaean Society, explained his decision to introduce the small Indian mongoose into Jamaica in February of 1872. His letter, published in the *Proceedings of the Zoological Society of London*, painted a picture of an island overrun by rats. The very existence of British sugar plantations was under threat, with Espeut ‘suffering unusually from rats on [his] Spring Garden Estate’. He discussed the problem with his wife, Bessie Adela Jeannette Espeut, who suggested a solution. ‘Some years before’, he explained, ‘Mrs. Espeut had been in Ceylon with her father, Colonel Armit, R.E., and had there possessed an Indian Mungoos [mongoose] as a pet’. Mrs. Espeut had seen the mongoose kill rats and told her husband it could do the same in Jamaica. Espeut wrote to the government of Jamaica with a request to import mongooses from India. They arrived in February 1872, a group of four males and five females. Espeut immediately released them into his sugar fields. He claimed that only six months later, ‘there was evidence, clear and certain, that the rats were much less destructive than had ever been known’.<sup>21</sup> From this familial discussion of a pest problem arose an ultimately disastrous animal introduction.

To understand the introduction of the mongoose to Jamaica, we must first understand what the animal would have encountered: a sugar-based plantation economy beset by

<sup>19</sup> Diogo de Carvalho Cabral, ‘Into the bowels of tropical earth: leaf-cutting ants and the colonial making of agrarian Brazil’, *Journal of Historical Geography* (2015) 50, pp. 92–105, 96.

<sup>20</sup> On the interaction between nature and politics in the British Empire see Rohan Deb Roy, ‘White ants, empire, and entomo-politics in South Asia’, *Historical Journal* (2020) 63, pp. 411–36. An intriguing parallel can also be drawn with the politics of race and insect control in the United States. See James C. Giesen, *Boll Weevil Blues: Cotton, Myth, and Power in the American South*, Chicago: The University of Chicago Press, 2011.

<sup>21</sup> William Bancroft Espeut, ‘On the acclimatization of the Indian Mungoos in Jamaica’, *Proceedings of the Zoological Society of London* (1882) 50, pp. 712–14, 713.

rats. Sugar had been introduced to the island in the sixteenth century, with Jamaica and Saint-Domingue (now Haiti) becoming the world's largest sugar producers by the eighteenth century.<sup>22</sup> Under British rule, large-scale sugar production in Jamaica was driven by African slaves forced to labour in plantation monocultures. Yet these supposedly ordered environments were not fully under the control of British colonizers. Jamaica experienced numerous rebellions and uprisings, culminating in the emancipation of slavery in 1833 and the abolition of the so-called 'apprenticeship' system in 1838.<sup>23</sup> British planters (who by now formed only a small proportion of the island's total population) relied upon a combination of black workers and indentured labourers from Asia.<sup>24</sup> In 1865, a collapse in the price of sugar was one of many factors behind the Morant Bay Rebellion, an uprising of the black peasantry which was violently repressed by the British colonial government.<sup>25</sup> Following the rebellion, Jamaica was ruled directly from the Colonial Office. Against this backdrop of economic depression and social unrest, planters also found their control of Jamaica contested by the rat, whose global spread by ship had also proved impossible to curb.<sup>26</sup>

Prior to European incursions into Jamaica, the island's evolutionary rodent niche was filled by *Oryzomys antillarum*, known as the Jamaican rice rat, plantation rat or cane rat.<sup>27</sup> In his 1756 book *The Civil and Natural History of Jamaica*, Irish physician and botanist Patrick Browne described the fauna of Jamaica as sparse. However, new species were 'daily imported there, as well from Africa as from the neighbouring coasts, and ... the methods of living, or other natural causes, are frequently observed to change the dispositions even of those that are imported there from Europe.'<sup>28</sup> European intellectuals depicted Jamaica as an island of imported plants and animals, and did not consider indigenous species to be especially noteworthy. The country was therefore thought to be ripe for acclimatization, as its environmental conditions rapidly changed new animal arrivals. One of these arrivals, Browne mistakenly claimed, was the indigenous Jamaican cane rat. He erroneously described the rat as a North American native, brought to Jamaica for 'the amusement of the curious'. The rat inhabited the 'sugar-colonies, where it proves extremely destructive to the sugar-canes'. Browne calculated that the rats routinely cut the sugar crop by a quarter or more.<sup>29</sup>

The cane rat, however, was not the only rodent residing in the plantations. At some point during the British occupation of Jamaica, the brown rat (*Rattus norvegicus*) arrived. One nineteenth-century commentator suggested that it had been introduced to combat its cousin. Regardless, the brown rat predictably joined it in attacking the sugar cane.<sup>30</sup> By the 1870s, went one estimate, about a fifth of the produce of a large sugar estate was

<sup>22</sup> Reinaldo Funes Monzote, 'The Greater Caribbean: from plantations to tourism', *RCC Perspectives* (2013) 7, New Environmental Histories of Latin America and the Caribbean, pp. 17–24, 18.

<sup>23</sup> A useful overview of the extensive literature on slavery and emancipation is given by Christer Petley, 'New perspectives on slavery and emancipation in the British Caribbean', *Historical Journal* (2011) 54, pp. 855–80.

<sup>24</sup> R.B. Sheridan, 'Simon Taylor, sugar tycoon of Jamaica, 1740–1813', *Agricultural History* (1971) 45, pp. 285–96.

<sup>25</sup> On the multifaceted factors behind the rebellion see Thomas C. Holt, *The Problem of Freedom: Race, Labor, and Politics in Jamaica and Britain, 1832–1938*, Baltimore: Johns Hopkins University Press, 1992; and Mimi Sheller, 'Complicating Jamaica's Morant Bay Rebellion: Jewish radicalism, Asian indenture, and multi-ethnic histories of 1865', *Cultural Dynamics* (2019) 31, pp. 200–23.

<sup>26</sup> Jules Skotnes-Brown, 'Scurrying seafarers: shipboard rats, plague, and the land/sea border', *Journal of Global History* (2023) 18, pp. 108–30.

<sup>27</sup> In the Lesser Antilles, rats arrived prior to European contact. See Marine Durocher *et al.*, 'Archaeobiogeography of extinct rice rats (*Oryzomyini*) in the Lesser Antilles during the Ceramic Age (500 BCE–1500 CE)', *The Holocene* (2021) 31, pp. 433–45.

<sup>28</sup> Patrick Browne, *The Civil and Natural History of Jamaica*, London: T. Osborne and J. Shipton, 1756, p. 483.

<sup>29</sup> Browne, *op. cit.* (28), p. 484.

<sup>30</sup> Anon., *Blackie's Tropical Readers*, vol. 1, London: Blackie and Son, 1897, pp. 16–17.

still lost to rats of all species.<sup>31</sup> By this point, it is possible that the cane rat may well have been on the road to extinction, outcompeted by the larger brown rat.<sup>32</sup> Taxonomic confusion over exactly which animals were eating sugar cane persisted. The naturalist Philip Henry Gosse argued that the cane rat was 'manifestly a distinct species'.<sup>33</sup> Yet Elliott Coues, the respected American ornithologist and naturalist, was confused by the diversity of rats in the Caribbean. When he was presented with some cane rat skins from Jamaica in 1877, he declared that his ignorance of the 'physio-geographical influences that work upon the West Indian rats' left him unable to 'pursue the subject' further.<sup>34</sup>

British planters did not inquire into the details of which animal attacked their crops; they only wanted something done about it. William Espeut was able to list an itinerary of failed efforts to introduce animals capable of combating the cane rat. In the eighteenth century, sugar planter Sir Charles Price had tried using ferrets to hunt rats. In 1844, a Mr Anthony Davis brought agua toads (*Bufo aqua*) from Barbados, which were known to prey on young rats. In Jamaica, they preferred chicken eggs and presented agriculturalists with yet another pest. Sir Stamford Raffles, colonial administrator and founder of the Zoological Society of London, even introduced the *Formica omnivora*, or 'Raffle ant', as it came to be known locally, from Cuba to Jamaica. This latest arrival was luckily confined to certain localities, as it destroyed the young of almost every bird and mammal it encountered.<sup>35</sup> By acknowledging these earlier efforts, Espeut situated himself in the acclimatization movement and represented himself as a gentleman of science.<sup>36</sup> When compared to the failures of his predecessors, his mongoose introduction seemed all the more ambitious. Espeut refuted any suggestion that he alone had not been responsible for the introduction of the mongoose in Jamaica. When the government botanist Daniel Morris suggested that several individuals were responsible for the introduction of the mongoose to Jamaica, Espeut declared that Morris had been 'misinformed'.<sup>37</sup>

Shortly after Espeut's 1872 introduction, the mongoose was in great demand. This need was served by commercially minded Jamaicans who trapped mongooses on Espeut's estate and sold them to other planters. Espeut considered his introduction a huge success. 'I question much', he wrote, 'if such enormous benefit has ever resulted from the introduction and acclimatization of any one animal, as that which has attended the Mungoos in Jamaica and the West Indies'. He suggested that the animal would provide similar benefits for agriculturalists plagued by rabbits in Australia and New Zealand.<sup>38</sup> The Jamaican mongoose population grew rapidly. British botanist Daniel Morris reported that, in the ten years following the first release of the mongooses, they had 'so multiplied that they are abundant all over the island, and are now found even at elevations of 5000 feet'.<sup>39</sup> Yet the decline of the rat did not benefit Espeut personally. In an 1885 letter to Joseph

<sup>31</sup> C.B. Lewis, 'Rats and the mongoose in Jamaica', *Oryx* (1953) 2, pp. 170–2, 170.

<sup>32</sup> C.E. Ray, 'The *Oryzomyine* rodents of the Antillean subregion', doctor of philosophy thesis, Harvard University, 1962, p. 31

<sup>33</sup> Philip Henry Gosse, *A Naturalist's Sojourn in Jamaica*, London: Longman, Brown, Green and Longmans, 1851, p. 444.

<sup>34</sup> Elliott Coues, *Monographs of North American Rodentia*, Washington, DC: Government Printing Office, 1877, p. 116. Some believed the cane rat and brown rat were the same species. O. Thomas, 'On indigenous *Muridae* in the West Indies; with the description of a new Mexican *Oryzomys*', *Annals and Magazine of Natural History* (1898) 7, pp. 176–80, 177.

<sup>35</sup> Espeut, op. cit. (21), pp. 712–13.

<sup>36</sup> Richard Bellon, 'Joseph Dalton Hooker's ideals for a professional man of science', *Journal of the History of Biology* (2001) 34, pp. 51–82.

<sup>37</sup> Espeut, op. cit. (21), p. 714. Several mongooses arrived in Jamaica from London around 1872. They had been bred in captivity and did not catch rats. See Lewis, op. cit. (31), p. 170.

<sup>38</sup> Espeut, op. cit. (21), pp. 713–14.

<sup>39</sup> Daniel Morris, 'The mongoose in the West Indies', *American Naturalist* (1883) 17, p. 299.

Dalton Hooker, director of Kew Gardens, Espeut explained that an agricultural depression had driven him out of the sugar industry.<sup>40</sup>

The flourishing Jamaican mongoose population was carried across the British West Indies. At some point in the 1870s, mongooses were carried from Jamaica to Grenada, with a Mr Septimus Wells recalling a crate of them arriving at St George's. 'On Granada', reported one observer, 'they are now common, not only about the houses and plantations, but even in the forests on the hill-tops of the interior'.<sup>41</sup> In Barbados, a bill to protect the mongooses, which 'have recently been imported into this Island for the purpose of destroying rats', was introduced in 1879. The bill was likely brought before the House of Assembly in Barbados by a planter, since it was not sponsored by a member of the government. Francis Fleming, the Attorney General of Barbados, did not foresee any legal objections to the bill, nor did he feel that he knew enough about the mongoose to oppose a law protecting it. Nonetheless, 'I thought it was but fair', he wrote, 'to tell the House that I had heard that the mongooses were so fond of poultry as they were of rats'.<sup>42</sup> The law protecting the mongoose went into force in 1881, with British governor William Robinson reporting that the animals would destroy the rats that attacked sugar cane. A few years later, Robinson was appointed governor of St Lucia, where he reported that the Agricultural Society there was importing mongooses to kill off poisonous snakes.<sup>43</sup>

The impact of the mongoose – at least shortly after its introduction – varied from island to island. C.C. Knollys, a British administrator who had personally introduced the mongoose to St Lucia, acknowledged that Jamaica was the most affected. In an 1895 report to the Colonial Secretary, Joseph Chamberlain, Knollys explained that the open and densely populated nature of Barbados would prevent the mongoose from becoming a serious pest. In St Lucia, where Knollys had a personal investment in the success of the mongoose, he claimed that the number of venomous snakes was falling, though 'the Mongooses have not had time to increase very largely'. Grenada, with its cocoa and nutmeg plantations, had the 'happiest results', while in Antigua the introduction of the animal had been accompanied 'with the usual destruction of poultry and ground game'.<sup>44</sup> In Jamaica, on the other hand, William Sabonadière, a coffee planter from Sri Lanka, gave an early warning that the mongoose was not behaving as expected. 'The mongoose has without doubt been a good friend to the planters', he wrote in 1888, 'but he is getting dainty, and does not consume as many rats as of yore, if he would but kill them we should be content'.<sup>45</sup>

William Espeut had a logical explanation for his introduction. As a plantation owner, he was part of the island's British colonial elite and was familiar with remedies proposed by members of the scientific establishment for the damage caused by rats in colonial sugar plantations. In 1882, the third year after his mongoose introduction, Espeut wrote, 'I enjoyed relief and immunity; and ever since the losses from rats have been a mere trifle'. Sugar, cocoa and coffee could be grown on Jamaica without fear, while the reduction of

<sup>40</sup> Letter from W. [William] Bancroft Espeut to Sir Joseph Dalton Hooker; from Spring Garden, Jamaica; 23 April 1885; folio 102. Directors' Correspondence, 210/102, Royal Botanic Gardens, Kew.

<sup>41</sup> Cited in Glover M. Allen, 'Mammals of the West Indies', *Bulletin of the Museum of Comparative Zoology* (1911) 54, pp. 173–263, 217–20.

<sup>42</sup> George Cumine Strahan, 'Submission of authenticated copy of an act to protect mongooses in this Island, together with the Attorney General's [Fleming] Report', 1879, CO 321/27/19, The National Archives, Kew (hereafter TNA).

<sup>43</sup> William Robinson, 'Papers relating to her Majesty's colonial possessions', 1884–5, 19thc House of Commons Sessional Papers, C. 4583, Parliamentary Papers (hereafter PP), p. 117.

<sup>44</sup> C.C. Knollys, 'The mongoose in the West Indies', 1895, CO 295/365/55, TNA.

<sup>45</sup> W.A. Sabonadière, 'A short treatise on coffee planting', *Bulletin of the Botanical Department* (1888) 6, pp. 2–3, 2.

the rat population opened doors to the cultivation of new crops and vegetables. Despite his carefully constructed rationale to the Zoological Society, however, Espeut had introduced an untested biological control to combat the threat from rodents whose precise species remained unknown. Previous efforts to do this, which might have inspired his actions, had failed – which could be read as a warning, especially since the idea that mongooses would consume rats was based on his partner’s observation of the actions of a family pet, not the behaviour of wild animals. Even in the early days, Espeut had to admit that, unfortunately, ‘ground-nesting birds, the Quail and others, have been diminished’.<sup>46</sup> The mongoose had begun to eat its way through the fauna of Jamaica.

### Assessing the damage

As the mongoose increased in number and the rat diminished, the dietary preferences of the former changed. Theodore Sherman Palmer, assistant chief of the Biological Survey at the United States Department of Agriculture, reported in 1893 that the Jamaican mongoose ‘destroyed young pigs, kids, lambs, kittens, puppies, the native “coney,” or capromys, poultry, game, birds which nested on or near the ground, eggs, snakes, ground lizards, frogs, turtles’ eggs and land crabs’. In short, the mongoose was an omnipresent omnivore, devouring anything in its path. After its introduction, ‘Towards the close of the second decade’, continued Palmer, ‘the mongoose, originally considered very beneficial, came to be regarded as the greatest pest ever introduced into the island’.<sup>47</sup> In 1890, a committee established by Governor Henry Blake found that the mongoose was responsible for the extinction of several Jamaican birds, recommending that ‘a law should be passed prohibiting the introduction and turning loose of any animal which might, as in the case of the mongoose, become a scourge to the country, and so disturb the equilibrium of nature’.<sup>48</sup>

What made the mongoose such a scourge for Jamaican wildlife? The small Indian mongoose is a highly adaptable animal which can live in a wide range of environments, including open landscapes, humid forests, farmland and urban areas. Its diet is opportunistic, feeding on small birds, mammals, reptiles and eggs, in addition to insects, some vegetable matter and waste. This versatility is now known to be a direct threat to insular and highly specialized island ecosystems.<sup>49</sup> Nineteenth-century complaints that the mongoose was becoming ‘dainty’ and turning away from its intended diet of rats were probably sound. Contemporary studies reveal that the diet of the mongoose largely consists of invertebrates, lizards, birds, small mammals and seeds. The unfortunate invertebrates and lizards, however, account for about 93 percent of the mongoose’s prey. Even larger species such as the Jamaican iguana (*Cyclura collei*) were not immune, as the mongoose targeted its hatchlings.<sup>50</sup> If some equilibrium of nature had ever existed on Jamaica, the mongoose had certainly upset it.

<sup>46</sup> Espeut, op. cit. (21), pp. 713–14.

<sup>47</sup> T.S. Palmer, *The Danger of Introducing Noxious Animals and Birds*, Washington, DC: US Dept. of Agriculture, 1893, p. 94.

<sup>48</sup> Catherine Levy, ‘History of ornithology in the Caribbean’ *Ornitologia Neotropical* (2008) 19, pp. 415–26, 419. See also ‘Letter from C.A. [Charles Alfred] Barber to Daniel Morris; from Department of Agriculture of the Leeward Islands, St Kitts’, 21 March 1893, folios 67–8, Directors’ Correspondence 212/67, Royal Botanic Gardens, Kew.

<sup>49</sup> Vivien Louppe, Boris Leroy, Anthony Herrel and Geraldine Veron, ‘The globally invasive small Indian mongoose *Urva auropunctata* is likely to spread with climate change’, *Scientific Reports* (2020) 10, article no. 7461.

<sup>50</sup> Delano S. Lewis, Rick van Veen and Byron S. Wilson, ‘Conservation implications of small Indian mongoose (*Herpestes auropunctatus*) predation in a hotspot within a hotspot: the Hellshire Hills, Jamaica’, *Biological Invasions* (2011) 13, pp. 25–33.

In the years after the mongoose's introduction, a series of North American zoologists and ornithologists came to Jamaica.<sup>51</sup> William Earl Dodge Scott, a Princeton ornithologist, visited the island from November 1890 to March 1891, gathering specimens and notes as a 'field naturalist'.<sup>52</sup> Unable to locate the naturalized quail (*Colinus virginianus*) in Jamaica, he turned to William Espeut for assistance. The latter was in a state of denial regarding the consequences of his introduction. 'Undoubtedly the mongoose has played havoc with the Quail and other ground-nesting birds', admitted Espeut, 'but they (the Quail) are not exterminated, for I saw five Quail at Halfway Tree three weeks ago'. When Scott began to ask more questions on how the mongoose had been introduced, discrepancies arose in Espeut's account. He now claimed that his mongooses had arrived in March of 1873, not February of 1872. He was also less keen to claim credit for establishing the mongoose in Jamaica. 'Mr. Morris in a pamphlet he wrote said he thought the entire mongoose population of Jamaica was due to my nine', explained Espeut, leaving the inferred suggestion that this was merely Daniel Morris's opinion.<sup>53</sup>

By the 1890s, British naturalists and colonial administrators were clearly aware of the toll exacted by the mongoose. When Cambridge zoologist Alfred Newton wrote to the British Museum in 1894 with an inquiry regarding specimens of the Jamaican poorwill (*Siphonorhis americana*), his hopes were not high. In his letter, Newton explained that the character of the bird 'may indicate a terrestrial habit that would render the bird one of the easier victims of the mongoose, and therefore especially liable to extirpation'.<sup>54</sup> Newton was no stranger to the 'exterminating process', having searched in vain for the great auk (*Alca impennis*) in the mid-nineteenth century. At this time, the idea that human activity could entirely destroy a widespread species was an unsettling concept.<sup>55</sup> In his 1895 report to Joseph Chamberlain, C.C. Knollys noted that Jamaica had formerly been full of wild game, with quail shooting a popular pastime among settlers. Now, he reported, 'the mongoose has entirely destroyed the ground game, has nearly destroyed the birds of every description, and has turned its attention to poultry'.<sup>56</sup>

When Outram Bangs and Frederick H. Kennard, members of the Museum of Comparative Zoology in Cambridge, Massachusetts, compiled a list of the birds of Jamaica in 1920, they found that many species they had previously seen were no longer present. Both zoologists had visited Jamaica in 1907, returning again after the First World War. Their surveys were incomplete, in part due to 'the many changes in the avifauna – most of them resultant upon the disastrous introduction of the Mongoose'. Among the avian casualties was the blue mountain duck (*Pterodroma jamaicensis*, probably *Pterodroma caribbaea*), formerly found in the mountains and now driven to extinction by the mongoose.<sup>57</sup> The common, or helmeted, guineafowl (*Numida meleagris*), a naturalized bird introduced to Jamaica, was 'now believed to have been wholly exterminated in a wild state, by the Mongoose'. By 1910, the limpkin, or cluckling hen (*Aramus vociferus*, now *Aramus guarana*), could only be found in one spot in Jamaica. 'The Mongoose', recorded Bangs and Kennard, 'is supposed to have found this species an easy prey, and

<sup>51</sup> On ornithology in the United States see Mark Barrow, *A Passion for Birds: American Ornithology after Audubon*, Princeton, NJ: Princeton University Press, 1998, pp. 57–9.

<sup>52</sup> W.E.D. Scott, *The Story of a Bird Lover*, New York: The Outlook Company, 1903, p. 250.

<sup>53</sup> W.E.D. Scott, 'Observations on the birds of Jamaica, West Indies', *The Auk* (1892) 9, pp. 120–8, 120–1.

<sup>54</sup> T.D.A.C., 'The British Museum catalogue of birds', *Journal of the Institute of Jamaica* (1892) 1, pp. 182–3, 183.

<sup>55</sup> Henry M. Cowles, 'A Victorian extinction: Alfred Newton and the evolution of animal protection', *BJHS* (2013) 46, pp. 695–714, 698–9.

<sup>56</sup> Knollys, op. cit. (44).

<sup>57</sup> Outram Bangs and Frederick H. Kennard, *A List of the Birds of Jamaica*, Kingston: Government Printing Office, 1920, pp. 1–2.

to have caused its near extinction'.<sup>58</sup> The American zoologists did find that some birds had survived the mongoose by altering their behaviour. The whistling tree-duck (*Anas arborea*, now *Dendrocygna arborea*) had initially suffered a sharp decline. 'Then', reported Bangs and Kennard, 'it changed its breeding habits in some way, probably keeping its young in places too wet for the Mongoose to hunt and appears to be regaining its former abundance'.<sup>59</sup>

It is notable that this evidence of the destructive nature of the mongoose caused a reversal in the policy of Britain's colonial administrators. When the government of Trinidad became aware that cocoa planters had introduced the mongoose, they passed an 1899 ordinance banning further importations and offering a reward for its destruction.<sup>60</sup> The minutes of a 1904 meeting of the colonial government in Barbados reveal members under pressure from planters to destroy the mongoose that they had once insisted be protected. A Mr Luas protested that the government should leave the destruction of the mongoose to planters. Mr Riley agreed, but noted that even an 'energetic planter' would 'produce little effect in the way of diminishing the pest'.<sup>61</sup> F.J. Clarke, the vice president of the Barbados General Agricultural Society, feared for the future of sugar in Barbados. Since the introduction of the mongoose, he reported, 'few insectivorous birds are seen, and snakes, toads, and lizards are rarely found in the canefields'. Insects had subsequently grown in number and caused 'heavy losses' of sugar.<sup>62</sup> In 1905, Governor F.M. Hodgson passed an Act to encourage the destruction of the mongoose, offering a payment of threepence per animal.<sup>63</sup> Elsewhere, a lack of mongooses was now seen as a blessing. Edward Drayton, a British administrator in Grenada, linked the success of poultry rearing on the island of Carriacou to the absence of the animal.<sup>64</sup>

The impact of the mongoose on Jamaica's ecology was not, however, confined to destruction. With the removal of so many birds and reptiles, reports began to circulate that the tick population in the country was increasing. At first, this inconvenience was treated as something of a joke. At the 1891 meeting of the Institute of Jamaica, a Dr J.C. Phillippo complained of the 'abominable tick' to the knowing laughter of attendees. Phillippo recalled that it was once possible to roll in the grass, but now one could hardly walk 'through a grass-piece anywhere without being covered with ticks'. He speculated that these biting insects had been imported with Central American livestock and noted that 'United States naturalists' were in the habit of importing whatever animals preyed upon insects. 'But if any creature were employed to kill them off', remarked Phillippo to more laughter, he 'sincerely hoped it would not turn out another mongoose'.<sup>65</sup> In 1895, C.C. Knollys connected the destruction of small birds by the mongoose to the tick. 'In most parts of the Island', he wrote, 'a person cannot walk on the grass, much less go among the bushes, without being covered with these pests'.<sup>66</sup> As this paper noted earlier, by the time Hesketh Bell visited Jamaica in 1896, tick bites had become an everyday hazard, as the keeping of a feather and oil by his bedside indicated.<sup>67</sup>

<sup>58</sup> Bangs and Kennard, op. cit. (57), pp. 5–6.

<sup>59</sup> Bangs and Kennard, op. cit. (57), p. 4.

<sup>60</sup> 'G. Carter to the Earl of Elgin', 1907, CO 295/441, TNA.

<sup>61</sup> 'Act 6 of 1904 mongoose (destruction)', 1904, CO 28/262, TNA.

<sup>62</sup> F.J. Clarke, 'Enclosed no. 2 in dispatch no. 58', 1904, CO 28/262, TNA.

<sup>63</sup> F.M. Hodgson, 'An Act to encourage the destroying of mongoose', 1905, 20thc House of Commons Sessional Papers, Cd. 2238–9, PP, p. 14.

<sup>64</sup> Edward Drayton, 'Colonial reports – miscellaneous. No. 24. Granada', 1904, 20thc House of Commons Sessional Papers, Cd. 1820, PP, p. 9.

<sup>65</sup> Anon., 'Members' meetings', *Journal of the Institute of Jamaica* (1892) 1, pp. 40–8, 47.

<sup>66</sup> Knollys, op. cit. (44).

<sup>67</sup> Bell, op. cit. (1), pp. 74–5.

Economic threats to planters were also linked to the mongoose. William Fawcett, director of the Department of Gardens and Plantations in Jamaica, reported the appearance of a plague of caterpillars in 1896. 'In St. Catherine', he wrote, 'and, particularly, in the districts ranging from Gregory Park on to Spanish Town, thousands of acres have been simply swept away by these insects'. Fawcett speculated that 'this new plague is due to the destruction of our birds by the mongoose as the eggs of the butterflies, and indeed, the caterpillars themselves, formed excellent food for these birds and were quickly eaten up by them'.<sup>68</sup> In Britain, the mongoose and tick made their way from scientific periodicals to children's books, such as the Tropical Readers series, 'designed to interest school children in the familiar objects of the animal and vegetable kingdoms'.<sup>69</sup> The first volume explained that the mongoose had been introduced to Jamaica to kill off the brown rat. The mongoose 'killed off so many of the lizards and birds that fed upon small insects and grubs', concluded the book, 'that we now have to suffer from swarms of ticks, grass-lice, and other insects'.<sup>70</sup>

In this way, within two decades the mongoose had moved from the saviour of sugar to an object of fear. When the Cocos-Keeling and Christmas Islands in the Indian Ocean faced their own rat problem, their British governor hesitated to use the 'services' of the mongoose, 'lest they, too, should multiply and overrun the island'.<sup>71</sup> It was now accepted – both within the British Empire and beyond – that the introduction of the mongoose to Jamaica had been an ecological disaster. The destruction of insectivores by the mongoose meant that it was blamed for the explosion in the tick population: a linkage that would lead to two key claims that circulated in wider public discourse. The first was that the 'balance of nature' had been upset by the introduction of the mongoose, hence the appearance of ticks and other unwanted arachnids and insects. The second, more intriguing, assertion was that a reported decline in the mongoose population from tick infestations was an example of the balance of nature reasserting itself. This paper argues that this latter claim represented a *post hoc* rationalization, downplaying the long-term impact of a disastrous introduction.

### The balance of nature

A Eurocentric lecture on the history of Jamaica, delivered to the Society of Arts in London in 1896, saw Frank Cundall take to the stage. Cundall was active in the arts and literature, having returned to London after a spell as secretary and librarian at the Institute of Jamaica. His lecture was heavy on Columbus and critical of slavery and the Spanish Empire.<sup>72</sup> Yet Cundall looked at the history of Jamaica's animals with nostalgia. A few years earlier, whilst in Jamaica, he had applauded a time when there were 'then no great clearings for the sake of cultivation, no mongoose to kill off the ground birds and lizards and upset the natural balance of animal life, and no ticks to annoy the agriculturalist'.<sup>73</sup> He returned to this natural balance in his lecture, albeit with an update. 'It is now, however, reported from various parts', Cundall informed his audience, 'that the ticks are killing the mongoose – a fitting retribution. At all events, the history of the mongoose in Jamaica is a standing warning to any who would lightly upset the balance of nature in any

<sup>68</sup> William Fawcett, 'Plague of caterpillars', *Bulletin of the Botanical Department* (1896) 3, p. 233.

<sup>69</sup> Anon., op. cit. (30), publisher's note.

<sup>70</sup> Anon., op. cit. (30), pp. 16–17.

<sup>71</sup> Acting Governor Smith, 'Strait settlement papers relating Cocos-Keeling and Christmas Islands', 1897, 19thc House of Commons Sessional Papers, C. 8367, PP, p. 86.

<sup>72</sup> Frank Cundall, 'Jamaica in the past and present', *Journal of the Society of Arts* (1896) 44, pp. 103–48.

<sup>73</sup> Frank Cundall, 'The story of the life of Columbus and the discovery of Jamaica', *Journal of the Institute of Jamaica* (1894) 2, pp. 1–79, 58.

country'.<sup>74</sup> This theme, of the balance of nature disturbed and restored, would become a common trope around the introduction of the mongoose in Jamaica.

The idea that nature exists in a balance is an old and persistent one. Charles Darwin toyed with the concept in a story involving house cats. Later iterations of his 'balance-of-nature story' suggested that too few cats would have led the British Empire to collapse, as a subsequent excess of mice would have exterminated bees, clover and cattle.<sup>75</sup> Shortly after the 1872 mongoose introduction, the balance of nature was given another scientific boost when Karl Möbius, a German zoologist, described the existence of a 'social community' of different species in an oyster bank in an 1877 paper, stressing the importance of 'keystone species'. That same year, Stephen A. Forbes, an American naturalist based at the Illinois Industrial University, wrote of the 'steady balance of organic nature' as different organisms in a lake interacted with each other and their environment.<sup>76</sup> Across the late nineteenth-century British Empire, the 'balance of nature' was frequently referenced by officials. Auberon Herbert, the chair of a select committee established to examine legal protection for wild birds in 1872, referred to the 'common expression about the balance of Nature'.<sup>77</sup> Several witnesses later, he remarked, 'The Committee have heard a great deal about the balance of Nature.' Herbert's understanding of this balance was Darwinian. He believed that if birds were 'left to fight it out amongst themselves, Nature will address that balance'. In Britain, however, this was not possible, as 'in a civilised cultivated country the balance of Nature has been destroyed already'.<sup>78</sup>

Two characteristics were applied to the balance of nature by Herbert. One was that nature was self-correcting, and that where possible it would gravitate back towards equilibrium. This belief could be applied to human, as well as animal, populations. In 1893, Frederick Broome, the governor of Trinidad, remarked that 'there were more deaths [on the island], but more births, the compensated balance of nature asserting itself'.<sup>79</sup> The second characteristic was that the balance of nature could be irrevocably destroyed through human action. One example was given in 1892 by the Bering Sea commission, appointed to settle fishery disputes between Britain and the United States. Noting the decline of seals in the region, the commission argued that 'the initiation of commercial killing on the breeding islands interfered with the previously established balance of nature'.<sup>80</sup> In the early years of the twentieth century, colonial administrators linked this balance to plantation agriculture and insect infestations. W.E. Davidson, governor of the Seychelles, received several suggestions in 1905 that beetles only attacked trees already injured by another cause, but noted that 'these examples have been quoted for countries where perhaps the balance of nature is not disturbed'.<sup>81</sup> In 1908, F.B. Pearce, the acting commissioner of the British Central Africa Protectorate, bluntly stated that when 'thousands of plants of the same species are grown together, the balance of nature is upset'.<sup>82</sup>

<sup>74</sup> Cundall, *op. cit.* (72), p. 108.

<sup>75</sup> Frank N. Egerton, 'Changing concepts of the balance of nature', *Quarterly Review of Biology* (1973) 48, pp. 322–50, 342.

<sup>76</sup> John C. Kricher, *The Balance of Nature: Ecology's Enduring Myth*, Princeton, NJ: Princeton University Press, 2009, p. 65.

<sup>77</sup> Auberon Edward William Molyneux Herbert, 'Report from the Select Committee on Wild Birds Protection', 1873, 19thc House of Commons Sessional Papers, House of Commons Papers 338, PP, p. 28.

<sup>78</sup> Herbert, *op. cit.* (77), p. 82.

<sup>79</sup> Herbert, *op. cit.* (77), p. 4.

<sup>80</sup> 'United States. No. 2 (1893). Bering Sea arbitration', 19thc House of Commons Sessional Papers, C.6919, PP, p. 7.

<sup>81</sup> W.E. Davidson, 'Colonial reports – annual', 1905, 20thc House of Commons Sessional Papers, Cd. 2684–2, PP, p. 58.

<sup>82</sup> F.B. Pearce, 'Colonial reports – annual. No. 537', 1908, 20thc House of Commons Sessional Papers, Cd. 3729–1, p. 10.

In the 1890s, the claim that the balance of nature was reasserting itself in Jamaica began to appear. 'It is said', wrote C.C. Knollys in his 1895 report, 'that the balance of nature is being restored, and that the ticks are now destroying the Mongooses'.<sup>83</sup> Hesketh Bell, who briefly visited Jamaica in 1896, would later tell the same story of nature setting the tick against the mongoose. Initially, he wrote, 'No remedy was discovered [against the mongoose] and it was not until some years later that Nature did what was necessary to restore the balance.' He described dead mongooses found around the island, covered with ticks. 'In a measure', concluded Hesketh Bell, 'as the mongoose decreased the birds and ground game increased and fed on the ticks and, after a few years, the plague had disappeared and all was well once more with Jamaica'.<sup>84</sup> That same year, J.E. Duerden, curator of the Jamaica Institute Museum, reported that 'the Mongoose is not nearly so plentiful as formerly. Some of those caught are found to be suffering from attacks of Ticks'. Indigenous birds and reptiles had been spotted in greater numbers, including some species which had been 'supposed to have been exterminated'.<sup>85</sup> As the mongoose declined, noted Duerden, these animals were returning to their 'original proportions'. 'New balances of life are being struck on the island', he concluded, 'and further developments will be watched with interest'.<sup>86</sup>

In the United States, the dangers of introduced species added an almost moral dimension to the balance of nature.<sup>87</sup> Writing in 1892, the forester John Gifford recalled, 'In crossing a pasture [in Jamaica] your legs become covered with these parasites [ticks], which, unless removed at once, bury in the flesh and cause much pain.' Explaining their ubiquity, Gifford argued that the mongoose had upset the balance of nature. 'Nature maintains an equilibrium', he declared, 'and when this is interfered with by man evils ensue which are even more serious than the one he attempts to obviate'.<sup>88</sup> American naturalists eventually repeated assertions that the balance of nature was attempting to right itself. 'Now, we are told', wrote the entomologist L.O. Howard in 1897, 'nature has made another effort to restore the balance': ticks had begun to destroy the mongoose, the result of the latter destroying the arachnid's natural predators.<sup>89</sup> Theodore Sherman Palmer of the Department of Agriculture reported 'a change in the situation' in Jamaica, with growing numbers of birds and reptiles to be seen. This, believed Palmer, was evidence that the worst excesses of the mongoose had passed. Jamaica's fauna had 'been modified by the presence of the intruders, both native and introduced species are gradually accommodating themselves to the changed conditions, and a new balance of nature is being established'.<sup>90</sup> Palmer saw an evolutionary mechanism at work behind the restored balance of nature, as species adapted to predation.

However, the relationship between the rise of the tick and the decline of the mongoose was not straightforward. An outbreak of Texas fever among cattle in 1897 spurred the Jamaica Institute's museum to place letters in local newspapers, requesting that readers send in any tick specimens they found (but did not specify that they should come from mongooses). The museum then sent these to Louis Georges Neumann, a French parasitologist who specialized in ticks. Neumann identified several different species, with the

<sup>83</sup> Knollys, *op. cit.* (44).

<sup>84</sup> Bell, *op. cit.* (1), pp. 74–5.

<sup>85</sup> J.E. Duerden, 'Phases in Jamaican natural history', *Journal of the Institute of Jamaica* (1896) 2, pp. 288–91, 290.

<sup>86</sup> Duerden, *op. cit.* (85), p. 291.

<sup>87</sup> Peter A. Coates, *American Perceptions of Immigrant and Invasive Species: Strangers on the Land*, Berkeley and London: University of California Press, 2007.

<sup>88</sup> John Gifford, 'The introduction of foreign species', *Science* (1892), new series 20, p. 304.

<sup>89</sup> L.O. Howard, 'The spread of land species by the agency of man', *Science* (1897) 6, pp. 382–98, 384.

<sup>90</sup> Palmer, *op. cit.* (47), pp. 94–5.

most common being the Texas fever tick (*Rhipicephalus annulatus*).<sup>91</sup> A second museum letter published in local papers noted that the decline of the mongoose in Jamaica was of interest to the wider world. 'One occasionally hears from correspondents and visitors to the country', it observed, 'of examples of mongoose being met with which are literally covered with ticks, and almost hairless and emaciated. Such facts suggest some kind of a relationship between the increase of ticks and the decrease of mongoose'. Yet as an anonymous contributor to the Jamaica Institute's journal noted, this letter provided no corroborative evidence that mongooses were actually being destroyed by ticks. Due to this absence of evidence, they claimed, 'the direct influence of one on the other [is] being doubted by many'.<sup>92</sup>

Following his appointment as lecturer in medical entomology and parasitology at the Liverpool School of Tropical Medicine in 1905, Robert Newstead visited Jamaica with the aim of assisting cattle owners on the island with their tick problem.<sup>93</sup> Newstead found ten different species during his tick-collecting expedition, with the most common being the Texas fever tick (identified by Neumann) and the silver tick (*Amblyomma cajennense*). Discussing the habits of these arachnids, Newstead noted that the Texas fever tick was essentially a cattle tick, although it could feed on other animals. The species he called the silver tick, however, was a 'more general feeder and although less abundant, is one of the greatest curses to the Island, owing to the fact that it occurs in all its stages among the grass and pastures, almost everywhere attacking man and beast with impunity'.<sup>94</sup> At first glance, this sounds more like the animal which bit John Gifford and was seen on emaciated mongooses by J.E. Duerden and others. *Amblyomma cajennense* is in fact not a single species, but a 'species complex' (a group of closely related organisms where taxonomic boundaries are not clear), a fact not recognized until the late 1930s.<sup>95</sup> These ticks are found across swathes of South and Central America, plus the entire Caribbean. Despite their ubiquity, however, there are many reasons to be sceptical of the claim that silver ticks reasserted the balance of nature in Jamaica by attacking the mongoose.

'The mongoose has also been accused of carrying ticks from one district to another', wrote Newstead in his 1909 report, 'and there may be some truth in this statement; but further proof is necessary, all the more so, seeing that this animal seems to be remarkably free from tick infestation'. He contradicted Duerden by suggesting that, instead of being sickened by parasitic ticks, Jamaican mongooses carried colonies of 'grass lice' in their coats. These 'lice' were the larval forms of ticks (namely *Rhipicephalus annulatus* and *Amblyomma cajennense*), which lay dormant on grasses after hatching before finding a suitable host.<sup>96</sup> In Newstead's view, the mongoose was more of a source of safe transit for young ticks than food. Unfortunately for the human inhabitants of Jamaica, grass lice did target people. Charles Alfred Barber, the British botanist and sugar cane breeder, complained about grass lice in 1895. He reported that travellers in Jamaica were covered by them, recalling how, 'On pushing aside the branches overhanging the riding path, I have been immediately covered with firmly attached young ticks which needed much care and patience to remove.' He also noted that ticks were rampant among

<sup>91</sup> Anon., 'Identification of the ticks in Jamaica', *Journal of the Institute of Jamaica* (1897) 2, pp. 470–1.

<sup>92</sup> Anon., 'Ticks and mongoose', *Journal of the Institute of Jamaica* (1897) 2, p. 471.

<sup>93</sup> J.W. Munro, 'Robert Newstead, 1859–1947', *Biographical Memoirs of Fellows of the Royal Society* (1953) 8, pp. 549–53.

<sup>94</sup> Robert Newstead, 'Reports of the twenty-first expedition of the Liverpool School of Tropical Medicine Jamaica, 1908–1909', *Annals of Tropical Medicine & Parasitology* (1909) 3, pp. 421–69, 423.

<sup>95</sup> Adriana Troyo et al., 'Acknowledging extraordinary women in the history of medical entomology', *Parasites & Vectors* (2022) 15, article no. 114.

<sup>96</sup> Newstead, op. cit. (94), p. 426.

confined cattle and were blamed for their deaths.<sup>97</sup> This concern was seemingly valid, as demonstrated by the 1897 outbreak of Texas fever in Jamaican cattle. Humans and cattle, not mongooses, were apparently the primary targets of ticks.

Nor did the mongoose simply disappear overnight. When American entomologist Edward Albert Chapin visited Jamaica on behalf of the Smithsonian Institution in 1937 and 1941, the mongoose was still a problem. 'It is now and has been for years', noted Chapin in his notes, 'a serious menace to the wild life on the island'.<sup>98</sup> In an attempt to make the best of a bad situation, early twentieth-century promoters of tourism in Jamaica pointed out that at least there were no poisonous snakes on the island: they had all been consumed by the mongoose.<sup>99</sup> The mongoose still remained an ecological threat. In addition, it was not readily apparent that the ticks which plagued the island had brought about its decline. Emaciated and tick-infested mongooses, as noted by the Jamaica Institute's museum, had only been spotted on the odd occasion. Further research was required to find what had caused the animals to end up in this state. Given this caveat, it is not surprising to find that the argument from the balance of nature did not remove hostility to animal introductions from colonial officials. When Gilbert Thomas Carter, the acting governor of Trinidad, was approached with suggestions that another biological control could be introduced to counter the mongoose, he would not hear of it. 'Do not suggest introducing any new animal', he told his subordinates in 1907. 'These imports always replace the old evil with something else as bad or worse.'<sup>100</sup>

## Conclusions

The *Chicago Daily Tribune* may have sacrificed accuracy for a sensationalist headline, but its 1890 article certainly caught the eye. 'A plague of weasels and ticks' had enveloped Jamaica, announced the paper, disregarding the fact that mongooses and weasels belong to different genera. The history of British introductions to the island and their impact provided some entertainment for those unaffected. Dismayed at the losses incurred by rats, explained the article, planters had imported the mongoose, an animal 'much like the common weasel' and 'not at all a pleasant animal to have prowling around'. The exotic introduction had ignored the rats and fed upon indigenous birds and reptiles, causing a plague of ticks. All efforts at eradicating the unwanted mongoose had ended in failure. 'One man suggested the introduction of a species of wild animal from South America to destroy the mongoose', the paper claimed, 'and he narrowly escaped lynching'.<sup>101</sup>

The mongoose in Jamaica was a genuine farce that proved impossible to remedy. Yet many reported that the balance of nature had intervened to resolve the disaster. This rationalization undoubtedly helped some actors in its introduction around the Caribbean avoid embarrassment. Take, for instance, the government botanist Daniel Morris. He had reported on the spread of the mongoose, whilst also sending at least one of the animals to St Kitts and Nevis to control rats.<sup>102</sup> On St Kitts, the mongoose

<sup>97</sup> C.A. Barber, 'The tick pest in the tropics', *Nature* (1895) 52, pp. 197–200, 198.

<sup>98</sup> Edward Albert Chapin, 'Field notebook, Cuba and Jamaica, 1937, 1941, [1947]', Smithsonian Institution Archives, p. 29.

<sup>99</sup> Frank F. Taylor, 'The burial of the past: the promotion of the early Jamaica tourist industry', *Boletín de Estudios Latinoamericanos y del Caribe* (1986) 40, pp. 49–61, 49.

<sup>100</sup> 'Destruction of mongoose', 1907, CO 295/441, TNA.

<sup>101</sup> Anon., 'A plague of weasels and ticks: a parallel in Jamaica to the Australian rabbit scourge', *Chicago Daily Tribune*, 6 July 1890, p. 11, ProQuest Historical Newspapers, 174382563.

<sup>102</sup> Letter from J.H.H. Berkeley to [Daniel Morris]; from St Kitts, West Indies; 22 December 1887, folios 529–30, Directors' Correspondence, 212/529, Royal Botanic Gardens, Kew.

brought new parasites and attacked the native fauna.<sup>103</sup> C.C. Knollys, who had introduced the mongoose to St Lucia, also had reason to promote the idea of a self-correcting natural balance. Others, including future administrators of the British Empire like Hesketh Bell, likely found it easier to accept the story of a self-regulating natural balance than to admit that a series of catastrophic mistakes had been made, which left Jamaica in the grip of biblical plague after biblical plague – of rats, mongooses and ticks – for decades. The latter would have dealt a severe blow to the perceived competence of Britain’s political and scientific elite. William Espeut sought to rationalize his decision by situating himself in a long line of acclimatizers. In reality, he had made a disastrous decision based solely upon the fact that his wife had once owned a pet mongoose.

If, then, the balance of nature was a wishful rationalization, what was really happening with the ecology of Jamaica in the decades after the introduction of the mongoose? Given the weight of evidence, it is undeniable that indigenous birds and reptiles were driven extinct or greatly reduced in number by the new predator. At some point in the 1890s, too, the tick population of Jamaica also became a problem. Cattle were struck down with Texas fever and British and American visitors to Jamaica routinely complained about bites from the arachnids. Here, however, our certainty must end. There is currently no compelling evidence that the mongoose caused a tick infestation or in turn suffered from them. In the 1890s, cattle had become a rising industry in Jamaica. Previously, cattle pens had been small and linked to sugar plantations. Now, they ‘had broken their link with the sugar estates, assumed an export dimension and were catering for an expanding local consumer market for beef and dairy products’.<sup>104</sup> Imported cattle would have brought some ticks with them (like the Texas fever tick) and provided a captive food source for others (such as the silver tick). Industrialized production of domestic cattle was a more likely culprit for the flourishing tick population than the mongoose. A mid-twentieth-century study by Gordon B. Thompson, assistant curator of the Institute of Jamaica’s Science Museum, confirmed that very few ticks were to be found on mongooses.<sup>105</sup>

Looking to broader histories of science, the mongoose catastrophe in Jamaica can be said to represent part of the closing chapter of the nineteenth-century acclimatization movement. In the years after Espeut’s introduction, the mongoose was introduced to islands across the Caribbean and beyond. In 1883, a group of farmers introduced the mongoose to Hawaii and in 1883 and 1884 determined – yet ultimately thwarted – efforts were made to establish the animal in Australia.<sup>106</sup> In the decades after this wave of introductions, however, emphasis on biological control of pests in European colonies shifted. Mammalian introductions were sidelined in favour of parasitic insects, guided by entomological institutions.<sup>107</sup> Hopes were even raised that microorganisms, including fungi, could

<sup>103</sup> Trista Cheng *et al.*, ‘Parasites of small Indian mongoose, *Herpestes auropunctatus*, on St. Kitts, West Indies’, *Parasitology Research* (2018) 117, pp. 989–94.

<sup>104</sup> Verene A. Shepherd, ‘Livestock and sugar: aspects of Jamaica’s agricultural development from the late seventeenth to the early nineteenth century’, *Historical Journal* (1991) 34, pp. 627–43, 643.

<sup>105</sup> Gordon B. Thompson, ‘XV. – Ticks of Jamaica, B.W.I. – records and notes (including a summary of the distribution of the West Indian species)’, *Annals and Magazine of Natural History* (1950) 3, pp. 220–9.

<sup>106</sup> David Peacock and Ian Abbott, ‘The mongoose in Australia: failed introduction of a biological control agent’, *Australian Journal of Zoology* (2010) 58, pp. 205–27.

<sup>107</sup> Richard C. Sawyer, ‘Monopolizing the insect trade: biological control in the USDA, 1888–1951’, *Agricultural History* (1990) 64, pp. 271–85; James E. McWilliams, ‘Biological control, transnational exchange, and the construction of environmental thought in the United States, 1840–1920’, in Erika Marie Bsumek, David Kinkela and Mark Atwood Lawrence (eds.), *Nation-States and the Global Environment: New Approaches to International Environmental History*, Oxford: Oxford University Press, 2013, pp. 163–80; Edward Deveson, ‘Parasites, politics and public science: the promotion of biological control in Western Australia, 1900–1910’, *BJHS* (2016) 49, pp. 231–58.

control or eliminate threats to settler agriculture.<sup>108</sup> By the interwar period, too, some British scientists and administrators had embraced an ecological framework – which highlighted the ‘inter-relations’ between ‘plants, animals, and people’ – when it came to understanding pests and diseases.<sup>109</sup> This newfound perspective remained rooted in colonial frameworks, just as the ‘benefits’ of the acclimatization movement for the colonized was relegated to such things as an ‘improved diet’ which ultimately aided ‘labor control and colonial governance’.<sup>110</sup> Similarly, the ‘balance of nature’ would be coopted in support of empire in Jamaica. Reinventing nature as resilient and Darwinian stymied criticism of plantation agriculture.

The *post hoc* celebration of the balance of nature was an attempt to rationalize British acclimatization in Jamaica. At some point in the 1890s, the occasional sighting of ticks on mongooses inspired the idea that the parasites unleashed by the mongooses’ own excesses had been their undoing. The balance of nature now had the power to reset itself. Such was the appeal of this claim that it passed between several British colonial officials and scholars, before ending up in scientific periodicals and textbooks. Yet it was never definitively proved that ticks were the cause of the mongooses’ decline. After the First World War, more ecologists became critical of the balance of nature and many even abandoned it as a concept.<sup>111</sup> Although the idea of the balance of nature persists among some ecologists today, it has been criticized as an idea which would be better ‘settled by empirical study rather than conceptual argument’.<sup>112</sup> Similarly, the restoration of the balance of nature in Jamaica was not rooted in empirical study, but was an attempt at rationalization through selective observation and storytelling. In an age of environmental crises, historians have a responsibility to unmask damaging concepts which downplay the impact of poor or immoral decision making. While situating historical actors in a wider context, recounting or reconstructing the logic behind their actions, it is important not to inadvertently embrace their rationalization of human-made ecological disasters.

In the eighteenth century, Jamaica had been depicted by European intellectuals as a land in flux, ripe for acclimatization and filled with introduced species. The actions of British planters in the nineteenth century made this claim a reality. Introduced rats were countered by imported mongooses. These mongooses were then blamed for a tick outbreak, which more likely originated from imported cattle. To fully grasp the impact of a single animal introduction – in this case, the mongoose – this paper has engaged with multiple species, their ecological inter-relations and changing land use practices. These diverse lines of inquiry reflect the complexity of colonial histories and their environmental consequences in the Anthropocene.

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<sup>108</sup> Matthew Holmes, ‘Houseflies and fungi: the promise of an early twentieth-century biotechnology’, *Notes and Records* (2022) 76, pp. 209–24.

<sup>109</sup> Jia Hui Lee, ‘Colonial rodent control in Tanganyika and the application of ecological frameworks’, *Annals of Science* (online first, 2023), pp. 1–29.

<sup>110</sup> Osborne, op. cit. (3), p. 150.

<sup>111</sup> Egerton, op. cit. (75), p. 344.

<sup>112</sup> Gregory Cooper, ‘Must there be a balance of nature?’, *Biology and Philosophy* (2001) 16, pp. 481–506, 482.

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