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### A Finger on the Pulse of the Fly: Hidden Voices of Colonial Anti- Tsetse Science on the Rhodesian and Mozambican Borderlands, 1945-1956

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**A Finger on the Pulse of the Fly:  
Hidden Voices of Colonial Anti-Tsetse Science on the  
Rhodesian and Mozambican Borderlands, 1945–1956\***

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**Introduction**

This article emanates from a joint research project aimed at documenting the history of transboundary wildlife policies in southern Africa. One of the issues that emerged from this project was the interplay between such policies and veterinary disease agents. Elsewhere we have shown how fear of trypanosomiasis or *nagana* – a fatal disease in cattle caused by a pathogen called the trypanosome, which is transmitted by the bite of tsetse flies – led to the abandonment of plans to establish what could be termed a transfrontier conservation area along the borders of Mozambique, Rhodesia and the Union of South Africa, in exactly the same area where the Great Limpopo Transfrontier Park is located today.<sup>1</sup> South Africa initiated the transfrontier plans in the late 1920s, hoping to expand the Kruger National Park into Mozambique and Rhodesia to prevent migrating elephants from being hunted down when they crossed the borders. Cattle ranchers in Rhodesia, however, torpedoed the idea, arguing it was tantamount to creating a breeding reservoir for pathogens, not to mention the huge costs they expected to pay to keep predators like lions away from livestock. The Portuguese – the colonial rulers of Mozambique – disowned the initiative because the area South Africa asked them to contribute to conservation was considered too vast, and included some of the

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1. C. Mavhunga and M. Spierenburg, 'The Great Limpopo Transfrontier Conservation Area: The History of a Forgotten Idea' (Paper, Annual Conference of the American Society of Environmental History, Victoria, British Columbia, 1–4 Apr. 2004).

most productive areas in terms of cattle breeding. They too cited threats of tsetse infestation as their main argument against transboundary conservation.<sup>2</sup> In order to understand better the early rejection of the transfrontier park by the Rhodesian and Portuguese authorities, we decided to commence a study of research about and interventions against *nagana* in Rhodesia and Mozambique. Hence, the geographical focus of this article is mainly the junction of the Save and Lundi Rivers across which the Mozambique-Rhodesia border passed (see map). This area is included in past and present transboundary conservation plans; research on this area will contribute to our wider aim of understanding the history of the Great Limpopo Transfrontier Park.

In both countries, the focus of research and interventions was on the vector of the trypanosome, tsetse flies, rather than on attempts to control the disease by eliminating the parasite using chemical therapies, which was the preferred intervention of French and Belgian researchers.<sup>3</sup> In this article, we focus on perceptions of and reactions to tsetse infestation in the Rhodesia-Mozambique border area in the 1940s and 1950s, after the demise of the first transfrontier conservation plans. The Save-Lundi junction is important, because it was thought to be a point of entry for tsetse fly from Mozambique into Rhodesia – it was an area where different paths ran from the Indian Ocean towards mainland Rhodesia and southwards to the Rand gold mines via the Kruger National Park. This movement of people – vectors for tsetse flies in their own right – enables us to connect human migration, entomology, and wildlife management in one discussion. The research into this epicentre of tsetse proliferation was mainly concerned with three tsetse species – the *Glossina morsitans*, *pallidipes*, and *brevipalpalis* – which all fed on animal blood.

We are interested in the differential reactions that tsetse flies triggered in the region. In that sense one could say we are exploring the role of tsetse flies as non-human agents or drivers of human programmes, though their influence is mediated by human perceptions and interpretations of the relative risks they pose to local economies. In South Africa, entomologists and veterinarians had opposed the creation of the Kruger National Park and other game reserves, warning that these would enable the return of the fly from Rhodesia and Mozambique. Political support for conservation, however, was strong, as was the belief that fauna should be protected as economic and cultural assets.<sup>4</sup> Indeed, Kruger was maintained and

2. Arquivos Históricos de Mozambique (AHM), Governo Geral, Cota 178, C3 Caça – Reservas e Parques de Caça, 8 Sep. 1927; 6 Oct. 1927; 29 Oct. 1927; 16 Nov. 1927.
3. J. Ford, *The Role of Trypanosomiasis in African Ecology: A Study of the Tsetse Fly Problem* (Oxford: Clarendon Press, 1971); see also L. White, 'Tsetse Visions: Narratives of Blood and Bugs in Colonial Northern Rhodesia, 1931–9', *Journal of African History*, 36 (1995), 219–45.
4. K. Brown, 'Tropical Medicine and Animal Diseases: Onderstepoort and the Development of Veterinary Science in South Africa 1908–1950', *Journal of Southern African Studies*, 31, 3 (Sep. 2005), 520.

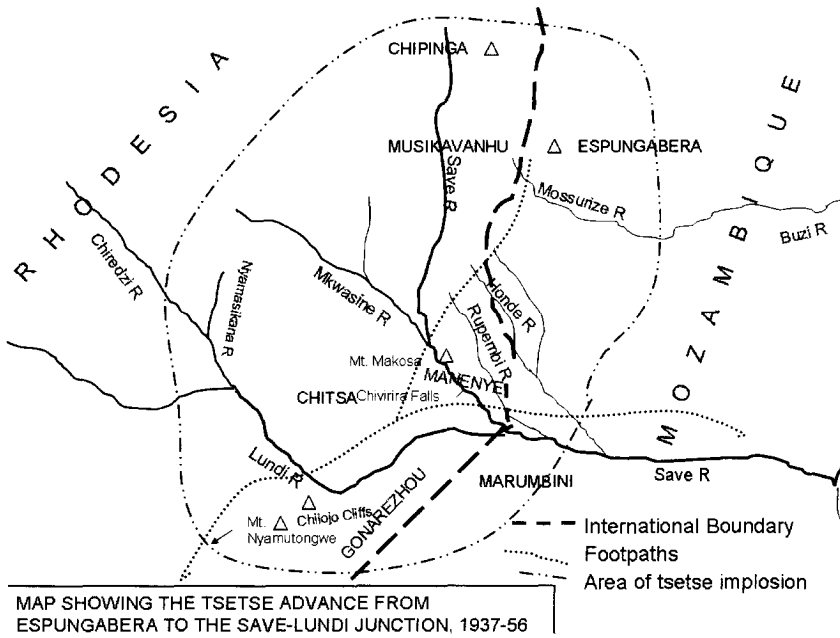
even expanded.<sup>5</sup> In Rhodesia, the battle over the establishment of Gonarezhou game reserve between those advocating the interests of the livestock industry and those favouring conservation led to proclamations that alternately expanded and contracted the reserve's boundaries.<sup>6</sup> In Mozambique, the interests of the cattle sector received priority over demands from international conservationists.<sup>7</sup> The decision in the latter two countries to favour the protection of domestic animals rather than wild fauna led to a fierce fight against the tsetse fly. The fly turned out to be tough opponent, constantly finding new ways of spreading itself, even using newly introduced technologies such as the motorcar to move around.

As we will demonstrate below, research as well as strategies to combat tsetse flies differed in Rhodesia and Mozambique. Research in Rhodesia focussed on the routes and means of spreading the infestation, as well as on the habitat of the fly. Tsetse infestation in the borderland was interpreted as an 'advance' of the fly from Mozambique into Rhodesia. Movement, especially across borders, by people and game received prominent attention in research as well as interventions. A related strategy was to compartmentalise the landscape, by separating the wilderness from the domesticated. Concerns about movement were partly shared by the Portuguese authorities in relation to labour migration,<sup>8</sup> but apparently far less so in the case of tsetse infestation. In Mozambique, the tendency was 'to blame the game'; the main focus was on game as a vector of the fly. As a result, to the Portuguese authorities control of the movement of game seemed far more important than controlling the movement of people.

The second focus of our article is on the role of Africans in the production of research and science, and in programmes to combat tsetse infestation.<sup>9</sup> The Rhodesian entomologists we cite in this article showed a mixed appreciation of their role. While agreeing that their work depended heavily upon African fly-catchers and hunters, the entomologists complained about their lack of dependability and their failure to understand the scientific underpinnings of what they were asked to do. In Mozambique, the director of the anti-tsetse service recommended involving Africans in control(led) experiments. The control experiment on the Maputo River that also features in this article will take us temporarily away from the border area, further south, close to Lourenço Marques, which is now called Maputo.

5. J. Carruthers, *The Kruger National Park: A Social and Political History* (Pietermaritzburg, 1995); J. Carruthers, 'Creating a National Park, 1910 to 1926', *Journal of Southern African Studies*, 15, 2 (1989), 190.
6. Mavhunga and Spierenburg, 'The Great Limpopo Transfrontier Conservation Area'.
7. *Ibid.*
8. See, for example, E. Allina-Pisano, Y. Adamo, R. Davies and J. Head, 'Mozambican Labour to Rhodesia', *Mozambican Studies*, 2 (1981), 58–70; M.J. Martin, "'Blackbirding at Crooks' Cornier": Illicit Labour Recruiting in the Northeastern Transvaal, 1910–1940', *Journal of Southern African Studies*, 21, 3 (1995), 373–97.
9. See White, 'Tsetse Visions'.

Equally mixed reactions can be detected towards the effects of African land use on tsetse habitat. On the Rhodesian side, Native Reserves acted as a buffer or corridor, depending on the interpretation of tsetse movement, to some of the most important commercial cattle ranches further to the west. Yet, earlier changes in the landscape resulting from attempts by African populations to protect livestock against disease went unnoticed. On the Mozambican side, the area we are interested in had been part of a concession given out to the Mozambique Chartered Company. To the south was Gaza, which was directly controlled by the colonial authorities and one of the few areas in the country where cattle could be kept. The area itself was not densely settled, but bordered on areas that were important for cattle production – mainly by African cattle owners who in that area were the main beneficiaries of government protection against tsetse.



So in many ways, ours is a story about two colonial states trying to tame nature without a ready-made toolkit. As a result, scientific interventions were improvised as the fly ‘advanced’. Science was both influencing and influenced by practical attempts to combat the fly; demonstrating success in the struggle against tsetse sometimes meant that the rules of science concerning experimental controllability were violated, making it almost impossible to isolate the influence of various factors. Further, the cases described show that what were considered ‘scientific facts’ in the end also depended on the effects combat strategies would have on state finances. Rhodesia was more prepared to go the extra mile to establish the bionomics and ecology of the tsetse fly, while the Portuguese banked on more affordable, even profitable, game slaughters. All in all, it becomes clear that entomology and veterinary science were works-in-progress that could only work through the involvement of “heterogeneous assemblies”.<sup>10</sup> Analysis, hence, should take into account a multitude of actors apart from the scientists themselves – including politicians and economic operators – as well as the non-human objects in the production of science – for instance the fly, game, livestock, vegetation, water, terrain, borders, and fences.<sup>11</sup>

### The ‘Advance’ of the Fly

In both Rhodesia and Mozambique great concern existed about the threat *nagana* posed to cattle herds. This concern was not limited to the herds of commercial, white-owned ranches, but also to cattle owned by Africans. As already mentioned, in both countries scientific research as well as interventions aimed at preventing the incidence of *nagana* focused on the vector of the disease – the tsetse fly.

In the south-east of Rhodesia, the border with Mozambique was an important factor in the interpretation of the occurrence of the fly; tsetse was thought ‘to advance’ from Mozambique into Rhodesia. This was especially the case in the area of the Save-Lundi junction, an area selected as the site of a game reserve, which is now Gonarezhou National Park. The creation of the game reserve was fiercely opposed by the Rhodesian Department of Native Affairs. In 1934, about 7 000 people were living in the Native Reserves in the area, and the Department’s representatives considered the reserve a threat to them and the approximately 3 000 head of cattle they possessed. Declaring the border area a game reserve would increase the risk of an ‘advance of the fly’ from Mozambique into Rhodesia, which would then easily move on to the commercial cattle ranches further east.<sup>12</sup>

10. See B. Latour, *Science In Action: How to Follow Scientists and Engineers through Society* (Harvard, 1987)
11. See B. Latour, *Politics of Nature: How to Bring the Sciences into Democracy* (Cambridge, MA, 2004); B. Latour, *Reassembling the Social: An Introduction to Actor-Network-Theory* (London, forthcoming).
12. Mavhunga and Spierenburg, ‘The Great Limpopo Transfrontier Conservation Area’.

The fly was allegedly re-establishing itself in Rhodesian territory following the rinderpest epizootic of 1896. In 1918, the respected tsetse fly researcher M.F.C. Swynnerton had found the southernmost limit of the fly belt to be 20° 20' (33° 25' W), on the Busi river area of Mozambique to the west of the Sitatonga Hills. In 1921, he warned of the 'disquieting fact that the tsetse *glossina morsitans* is slowly spreading west through the lowveld towards our border'. There was now a distinct threat that the fly 'may at some future date invade the Sabi valley'.<sup>13</sup> The Rhodesian authorities had a fragmentary record of this advance, but by 1936 they viewed it as a 'serious threat' to Save valley. As Swynnerton also found, *glossina pallidipes* occurred along the border north of Espungabera (Chipungumbira), while *g. morsitans* pushed southwest along the Busi. By 1942, the latter species could be caught on the Rhodesian border and had 'invaded' the Honde River valley. In the next three years, it 'advanced' rapidly: in 1943, two flies were caught at Mahenye on the Lower Rupembe, and by 1945, Chief Mahenye's herd had been decimated from 600 to just 94. In 1944, a single fly was caught west of the Save; Chief Chitsa reported four cases of *nagana* among his cattle the same year. From 1944 until 1951–2, the situation 'remained fairly static'; then a severe outbreak of *nagana* occurred among Chief Chitsa's cattle which confirmed the authorities' worst fears – the fly was now well established west of Save River, its pre-rinderpest precincts.<sup>14</sup>

The fly's presence and the threat it posed triggered government actions. Numbers of flies caught became the measure of risk. In 1949, the Entomologist H.E. Hornby undertook a survey of adjoining Portuguese territory east of the Save-Lundi junction while two Tsetse Field Officers made 'cursory examinations' of the Rhodesian side.<sup>15</sup> In July 1950, Game Ranger Hooper caught 15 *g. morsitans* 'somewhere west of the border'; exactly a year later *g. morsitans* were reported at the Shabani Mine recruiting station at Marumbini. In April 1954, the Director of Tsetse Fly Operations<sup>16</sup> gave instructions to Entomologist K.E.W. Boyd to carry out a tsetse and ecological survey of the Save's west bank between the Mkwasine and Lundi river junctions.<sup>17</sup> In 1955, another survey was carried out, again on the

13. 'Annual Report of the Chief Entomologist, 1921', *Bulletin of Entomological Research*, II (1921), 315.

14. National Archives of Zimbabwe (NAZ), File S3106/11/1/8 Sabi Valley, 1953–5, K.E.W. Boyd (Entomologist), Tsetse Fly Survey of the Lower Sabi/Lundi Area, 1954.

15. NAZ, S3106/11/1/8 Sabi Valley, 1953–5, Director Tsetse Fly Operations to K.E.W. Boyd, Entomologist, 20 Apr. 1954.

16. Anti-tsetse fly operations had been conducted in the northern districts of Rhodesia since 1905, precisely because it was feared that the path of the rinderpest would act as an incubator for re-infestation. The Office of the Director of Tsetse Fly Operations had hence been established in Causeway, Salisbury (Harare) to spearhead the campaign against tsetse fly, which took the form of shooting operations, fly-catching, and surveys.

17. NAZ, S3106/11/1/8 Sabi Valley, 1953–5, Director Tsetse Fly Operations to K.E.W. Boyd, Entomologist, 20 Apr. 1954.

Rhodesian side. The 'advance' of the tsetse fly towards Chitsa necessitated further studies in 1956 to determine the *nagana* limit south of the Lundi River.

The tsetse became an ominous presence especially because of the losses of African livestock on the Rhodesian side of the border. These sustained and extensive outbreaks of *nagana* prompted an increase in anti-tsetse fly operations to save the herds on the east bank of the Lundi River where considerable losses had occurred already. Losses on the west bank were initially low, but were rising steadily. Interestingly enough, infections on each bank were treated as separate problems despite emanating from the same fly belt.<sup>18</sup> Only three positive cases were confirmed to have occurred on the east bank at Muembe Cattle Dip in January and February 1956. This was considered 'a great improvement' given the much higher incidences of previous months.<sup>19</sup> On the west bank cases were recorded at all cattle dips during April-August 1956. *Nagana* was 'present but rare' in Sangwe Native Reserve, while at the commercial cattle ranch Hunani in Bikita District, only one case of *nagana* was recorded in May. The entomologist Mowbray ruled that there was 'little possibility' of east-to-west bank infection, contrary to earlier fears.<sup>20</sup>

The chronology for the Mozambican side is not easy to ascertain. Although we are still searching for more detailed reports and surveys, it is clear that tsetse infestation was a constant concern for the authorities. In the early 1900s, the Portuguese Government had allocated Manica, the central district bordering on Rhodesia, to the Mozambique Chartered Company. Part of that land was tsetse-infested.<sup>21</sup> In 1927, the Portuguese had rejected South Africa's request for the establishment of a game reserve in the Gaza/Sul do Save district contiguous to the Kruger National Park by arguing that the area was one of the few in the colony where cattle could be kept. The Director of Veterinary Services had advised the Portuguese High Commissioner to the Union to oppose the request on the grounds that protecting livestock in the area required leaving open the option to eliminate game should tsetse fly encroach into the area.<sup>22</sup> This suggests that at that time the area was still fly-free. In a report prepared for the Victoria Falls conference on the protection of the flora and fauna in Africa in 1950, the Acting Chief of the *Missão de Combate as Tripanosomiasas*, Francisco A. Pires, referred to the *Missão's* two-year research on the *g. austeni*, which had reached the Lebombo Mountains on the

18. NAZ, S3106/11/1/9 Sabi Valley, 1955-6, Robert M. Mowbray, Lower Sabi Valley Report for the Year Ending 30 September 1956, Department of Tsetse & Trypanosomiasis Control and Reclamation, Umtali, 14 Oct. 1956.

19. *Ibid.*

20. *Ibid.*

21. E. Allina-Pisano, 'Borderlands, Boundaries, and the Contours of Colonial Rule: African Labor in Manica District, Mozambique, c. 1904-1908', *International Journal of African Historical Studies*, 36 (2003), 59-82.

22. AHM, Governo Geral, Cota 178, C3 Ca Reservas e Parques, letter from the Directorate of the Veterinary Service, de Ca, 6 Oct. 1927.



border with South Africa.<sup>23</sup> In 1956, in another report prepared for the Conference of the Scientific Association of the Indian Ocean at Antananarivo, Madagascar, the *Missão's* representative, Andrade Silva, reported that the infestation with *g. morsitans* covered two-thirds of the territory of Mozambique, where 'it ranges over very wide savannah areas and it readily attacks man'.<sup>24</sup>

### Studying Human Impacts on Tsetse Fly Habitat in the Rhodesia-Mozambique Border Area

Fear of a 'tsetse invasion' from Mozambique resulted in two surveys which the Rhodesian Government's Department of Tsetse and Trypanosomiasis Control and Reclamation conducted on either side of the border with Mozambique. In the first, entomologist K.E.W. Boyd concentrated on areas west of Save between the Mkwazine and Lundi Rivers, before moving to the Save's eastern bank. Then in April and July 1955, the Department deployed another entomologist, Robert M. Mowbray, to examine the Lower Sabi Valley and determine the extent and density of the tsetse populations. After the survey, fieldwork was extended to other localities. In order to solve a continual lack of reliable quantitative data, Boyd proposed that 'a fly round on the Rupembe River, done monthly, ... would be a useful finger on the pulse of the fly population as well as going some way towards filling this gap in future years'.<sup>25</sup> Through the surveys, the entomologists tried to identify possible tsetse habitats, focusing on types of vegetation that were attractive to the fly. This included paying attention to human influences on vegetation and hence tsetse habitats.

The Boyd survey used aerial photographs as a baseline for constructing a vegetation map. Boyd classified eight major plant communities: 'big tree' alluvium, *mupani* on alluvium, *mupani* on stony ground, *Brachystegia tamarindoides* woodland, dense thicket, open vlei, *Terminalia combretum* woodland, and cultivation. Boyd deemed tsetse unlikely to reside in the 'big tree' and *mupani* alluvia. He also noticed the effects of cultivation on tsetse distribution: the pest was completely absent along the vleis where Africans cultivated in this generally poor rainfall area.<sup>26</sup>

Mowbray located the *g. morsitans*-infested area where the Sabi and Lundi Rivers and their tributaries drained, mostly among the *mupani* and *guibourtia*.<sup>27</sup> The most important element of his botanic survey was information on thicket formation and its suitability to tsetse habitation. Tsetse flies were discovered to

23. See reports submitted to the Conference on the protection of the flora and fauna in Africa, held in Victoria Falls in 1950, AHM, Governo Geral, Cota 383, Pasta A/13.
24. AHM, Governo Geral, Cota 384, A/13, III Congresso da associação científica do Oceano Indico a realizar em Tananarive, 1956, 1.
25. NAZ, S3106/11/1/8 Sabi Valley, 1953–5 Boyd, Tsetse Fly Survey, 7, italics added.
26. NAZ, S3106/11/1/8 Sabi Valley, 1953–5 Boyd, Tsetse Fly Survey, 3.
27. NAZ, S3106/11/1/9 Sabi Valley, 1955–6, Mowbray, 30 Sep. 1956, 14 Oct. 1956, 3.

favour shady patches in the undergrowth. To the more arid south of the Lundi, thicket was limited, with only occasional patches of good shade from isolated clumps of evergreen shrubs and scramblers. The *Androstachys johnsonii* with its 'leathery' leaves effectively excluded sunlight, thereby developing a canopy and enabling trees to grow 'with almost plantation-like regularity only occasionally disturbed by elephant damage'. The resultant absence of undergrowth suggested to Mowbray that '*Androstachys* would seem to be poor fly habitat, the very uniformity being a drawback'. He argued that this aspect should be investigated further, since it might offer possibilities for intervention.<sup>28</sup>

Mowbray discovered that some types of *mupani* forests hosted tsetse flies, whereas others not only were unattractive to them but could also form a barrier. The 'inhabitable' characteristic of some forests resulted partly from past human avoidance, but was also influenced by the presence or absence of water. Near permanent pools 'the shade and game numbers are adequate for tsetse'.<sup>29</sup> Mowbray concluded that the five-mile stretch to the west of Marumbini was, however, 'suitable tsetse habitat on account of human-induced damage to the *mupani* [that] had stunted tree growth, turning the area to scrubland'. Fire burning by Africans in both Mozambique and Rhodesia had made it 'impossible' to make out a concrete picture of the area's tsetse possibilities.<sup>30</sup>

Further human distortions were noticeable to the west, where scrubby *mupani* filled nearly all the central plateau, growing on coarse sand amid sparse, spiky grass. Some relatively well-developed trees and numerous large stumps cut or burnt flush with the ground punctuated the vegetation.<sup>31</sup> These human distortions, according to Mowbray, complicated any theory of the tsetse habit. Was the tsetse advance a climatic or a human-induced phenomenon? Bush fires were raging from Mozambique into Rhodesia as Mowbray conducted his survey, disturbing the 'normal behaviour' of game and tsetse populations and driving them westward into Rhodesia. As Mowbray noted, the colonial authorities had been negotiating to solve the transboundary fire problem since 1950. At a conference in the border town of Umtali (now Mutare), the Rhodesians proposed the establishment of direct lines of radio or telephone communication with border posts on the Mozambican side as an early warning and prevention system. The Portuguese rejected this costly measure on the grounds that 'the population was sparse, being inhabited by natives only and for this reason it would be extremely difficult for our Government to introduce any elaborate protection measure'.<sup>32</sup> Mowbray, however, argued that the fires and stunting, if controlled, could produce an effective fly barrier.<sup>33</sup> He

28. NAZ, S3106/11/1/9 Sabi Valley, 1955–6, Mowbray, Lower Sabi Valley Report, 5.

29. *Ibid.*, 5–6.

30. *Ibid.*, 5–6.

31. AHM, Governo Geral, cota 383, pasta A/13, Conferencia sobre 'Queimadas' [veldt burnings], a realizar em Umtali, 1950–1953.

32. *Ibid.*

33. NAZ, S3106/11/1/9 Sabi Valley, 1955–6, Mowbray, Lower Sabi Valley Report, 6.

proposed that government should make the stunting of *mupani* 'a controllable factor'. The resultant barrier would further reinforce the dry 'storm drain' watercourses flowing in a northerly direction, which supported thickets of *Androstachys* 'uninhabitable to tsetse'. This area could be 'kept from developing into *mupani* woodland capable of supporting tsetse'.<sup>34</sup>

One of the things Mowbray failed to explain was the occurrence of peculiarly isolated pockets of *Brachystegia* woodlands in circular groves on the entire plateau.<sup>35</sup> Yet from the accounts of Swynnerton (1921) and John Ford (1971), we know the Gaza Nguni had brought captured livestock into the Espungabera Mountains and made several efforts to introduce them to the low-lying areas. As part of a strategy to protect livestock from disease, including *nagana*, their ruler Mzila – who ruled the Nguni between 1861 and 1884 – had 'sent an order to *sondela enkosini* (draw near to the king). Thereupon an immense compulsory movement of the population took place.' On account of the concentration, 'the bush simply disappeared and the country became bare, except for the numberless native villages and a continuity of native gardens'.<sup>36</sup> Ford further describes how certain areas in the Gaza kingdom were left unsettled as game reserves, specifically an oblong area between the Sitatonga hills and the Busi River. Hunting took place anywhere outside this area. Such control was no longer guaranteed in the periods when the Gaza – under the new ruler Ngungunyana – retreated to Bilene in Southern Mozambique in 1889.<sup>37</sup> 'The wooding was let loose and soon re-established itself throughout the previously settled country.'<sup>38</sup> The isolated *Brachystegia* woodlands that Mowbray called 'natural habitats' of tsetse were in fact remnants of a cultural landscape which Africans had created partly to combat *nagana*.

Water was, according to Mowbray, also important for determining tsetse habitat. He related it to the local African agricultural practices of seasonally planting crops along river valleys, retreating to the uplands during flooding and clearing strips of bush to plant crops that depended on rainfall. He found water scarcity to account for the sparse African settlement – 'a line of kraals ... along the Lundi from its junction with the Sabi as far west as the Nyamasikana and an isolated group of kraals under the headman, Captain', in the southern tip of his 'operational area'. This human-made barrier reinforced a vegetational one caused by low rainfall. Mowbray found that the drainage line vegetation was scarce because the rainfall was too low for any 'seepage bogs' to form at the source of streams, leaving no shady patches for tsetse to breed. Larger river channels were

34. *Ibid.*, 6.

35. *Ibid.*, 7.

36. Ford, *Role of Trypanosomiasis*, 334, citing C.F.M. Swynnerton, 'An Examination of the Tsetse Problem in North Mossurise, Portuguese East Africa', *Bulletin of Entomological Research*, 11 (1921), 315.

37. Ford, *Role of Trypanosomiasis*, 315.

38. *Ibid.*, 335.

irregular and dry ten months a year; the low water-retention capacity of the sandy soil caused rivers and streams to rise rapidly. This accounted for the absence of riverine fringing vegetation in those areas.<sup>39</sup>

### Movements of People and Game

Water was also important because its availability and scarcity seasonally affected the movement of game. Boyd had found a very heavy concentration of impala; numerous zebra, eland, buffalo and kudu; lion, leopard, and elephant; and a fair number of warthog and sable on the upper Mkwazine. On the Chionja plateau up to the alluvium of the Save and Lundi, he spotted only kudu and elephant. The animals remained 'common', despite the shooting operations that were in progress. South of the Lundi game was abundant; here scattered herds of nyala shared common space with bushbuck and duiker among the river thickets and cultivated areas. Finally, he found that 'every large pool in the Sabi and Lundi ha[d] its quota of hippo and crocodiles'.<sup>40</sup> These species Boyd considered critical for the blood diet of the tsetse fly. Mowbray then drew connections between the water supplies and the patterns of game dispersals and concentrations, suggesting that practically the entire area was 'highly suitable' for game in wet season when food and water was abundant. When the waterholes dried up, two major movements of game occurred in the arid central area. One was eastward towards the pans in Mozambique and the Rio Save; the other was westwards from the hinterland to the Lundi and the semi-thickets of the Nyamasikana. Mowbray, however, concluded that the presence of vegetational barriers would render such movements 'highly unlikely to cause fly encroachments'.<sup>41</sup>

Mowbray's report connects fire and water to the tsetse fly in interesting ways. Because of the fires raging in the border area between Mozambique and Rhodesia, most elephants east of the Lundi escarpment had retreated 'well into Portuguese territory'. Their destructive feeding habits had broken *mupani* trees, leaving 'extensive low scrub belts' on their trails to and from waterholes, which were suitable to tsetse. Overall, the western area was 'a well-used dry season concentration area ... most favoured by game' owing to its permanent water and food supplies (many vegetations converged there); more importantly, game was 'largely undisturbed by humans as there [were] no settlements west of Chilojo (Fitchane's)'.<sup>42</sup> As a spur to game movement, fire and water presented two possibilities: tsetse could spread on the trail to the watering holes or when animals were driven by fire from Mozambique into Rhodesia. This meant that the vegetational barriers and burning/stumping would be inadequate because tsetse could still be carried by moving game. Nevertheless, in closing his report,

39. NAZ, S3106/11/1/9 Sabi Valley, 1955-6, Mowbray, Lower Sabi Valley Report, 9.

40. NAZ, S3106/11/1/8 Sabi Valley, 1953-5, Boyd, Tsetse Fly Survey, 4.

41. NAZ, S3106/11/1/9 Sabi Valley, 1955-6, Mowbray, Lower Sabi Valley Report, 11.

42. *Ibid.*, 12.

Mowbray was still hopeful that the 'vegetational barriers' would put paid to any 'natural encroachments' westward. He did, however, suggest additional 'modes of transport' for the fly, arguing that tsetse could only move southward if it was carried there from Marumbini 'on the Portuguese timber companies' lorries' running to Malvernia or extensive human traffic across the Lundi.<sup>43</sup>

The Boyd survey had revealed a pattern of infection resembling the progressive journey of the trypanosome from Mozambique into Chiefs Chitsa and Mahenye's areas. Boyd noticed at Chitsa the considerable movement of trans-boundary labour migrants from Mozambique across and along the Save up the Lundi through Nuanetsi (Mwenezi) to South Africa. On their way back home to Mozambique, these African labour migrants reported having encountered 'heavy fly' soon after crossing the Rhodesian border. Boyd was convinced that tsetse rode on these men's bodies and was deposited further and further along the route, inside Rhodesia. After all, this was also happening in Rhodesia's northern districts with labour migrants coming from or returning home to Nyasaland and Northern Rhodesia. At the Commandant's border camp, Boyd had caught two *g. morsitans* 'on the person of some westbound migrants'; six miles further down the road, in Portuguese territory, he took 24 more flies on another group. On his own car, he caught 42 over an eleven-mile stretch to the border. Finally, on the Honde River, he bagged 39 more in the first eleven miles of the road along the Rupembe to the Hippo Mine.<sup>44</sup>

The connections between human mobility, transport systems and tsetse movement were also clear with respect to *g. pallidipes*. Boyd had caught four on his car along the Portuguese road as he drove north to the Honde River. His fears of a heavy concentration of the species inside a five-mile proximity of the Rhodesia border deepened when he caught two more on the Save's bank inside Rhodesia. This was the furthest southern point the insect had been recorded inside the country. With respect to *g. morsitans*, the barrier of thickets to the west of the Rupembe had prevented any significant transmission across the Save. Curiously *g. pallidipes* was now well established in this thicket.<sup>45</sup> A few months prior to Boyd's survey, 'the advancing *morsitans* belt' had reached the mountain road just south of Mount Makosa.<sup>46</sup> Mowbray's hypothesis was that tsetse fly 'must be able to move large distances on vehicles as many of the (*nagana*) cases mentioned occurred up to 60 miles away from the nearest known "fly"'.<sup>47</sup>

As a result of this pattern of encroachment, the Rhodesian government had in November 1955 started to control all northbound foot, scotch cart, and motor traffic from the tsetse belt on either bank of the Save. The pattern of *nagana* infected villages on the west bank and the paths leading from them to 'native stores

43. *Ibid.*, 13.

44. NAZ, S3106/11/1/8 Sabi Valley, 1953–5, Boyd, Tsetse Fly Survey.

45. *Ibid.*

46. *Ibid.*

47. NAZ, S3106/11/1/9 Sabi Valley, 1955–6, Mowbray, Lower Sabi Valley Report, 2.

and other places of gathering' presented clear evidence of 'human vectors' of the tsetse 'advance'. Mowbray observed African mobility in a rural landscape and the networks between dwellings and other places of interest. These were often 'markers of modernity' – stores, veterinary dip tanks against tick-borne diseases, boreholes, schools, and churches.<sup>48</sup> Between each of these, a tapestry of paths emerged that became the highways on which the tsetse caught a ride on travellers within Rhodesia or across into/from Mozambique. Since the delimitation of the Anglo-Portuguese border in 1891, authorities had experienced great difficulties in controlling the movement of Africans across the border,<sup>49</sup> a problem that bothers authorities till this day. In the mid 1950s, at the time the surveys were conducted, Rhodesia still welcomed labour migrants from Mozambique, even if they were illegal, much to the chagrin of the Portuguese authorities who regretted losing labour critical to the concessionaire companies.<sup>50</sup> To address the problem of *carried fly*, Boyd proposed that migrant labourers would have to be compulsorily 'de-flied' before reaching the Rupembe.<sup>51</sup>

### Blaming the Game: Tsetse Research and Control in Mozambique

In Mozambique, the evidence we have so far suggests that a significant amount of work on tsetse flies was done, proceeding as a national project but in dialogue with neighbouring and northern countries, and wildlife organisations. Actual reports on tsetse research, however, have proven difficult to locate. An exception is a report prepared for the conference on the protection of the flora and fauna in Africa in 1950, which identified the *Missão de Combate as Tripanosomiasas* as the main institution charged with dealing with the tsetse problem. Its acting chief, Francisco A. Pires, enunciated the *Missão's* brief as 'a body which in Mozambique is in charge of the defence of man and livestock against the Tse-Tse Fly and trypanosomiasis'. Since 1948 the *Missão* had been investigating 'the geographic distribution and biology of the *G. austeni*, the least known of the East African tse-tse fly'. The *Missão* observed that the fly adapted itself well even to the most varied ecological conditions – from seaside sand dunes to areas situated 200 kilometres inland.<sup>52</sup> Pires stressed the importance of studying game-parasite relationship:

It is still of great importance for the protection of the fauna [to gather] the [most] detailed knowledge of the animal species from which each species of *glossina* depends, and the scale in which each species of mammal in particular contributes for its maintenance. Once this

48. NAZ Th10/10/1/1/132-219, Blake-Thompson Papers, Thompson to Roger Summers, 19 Mar. 1955.
49. NAZ, S2929 Delimitation Reports.
50. See, for example, Allina-Pisano *et al.*, *Mozambican Labour to Rhodesia*.
51. NAZ, S3106/11/1/8 Sabi Valley, 1953–5, Boyd, Tsetse Fly Survey, 7.
52. AHM, Governo Geral, Cota 383, pasta A/13, Conferencia da fauna – a realizar em Victoria Falls nos dias 18 e 19 do mes de setembro de 1950, report by the director of the *Missão*, 2.

is known, the fight against *glossina* by the depletion of the wild fauna could be much more discriminative [*sic*] and therefore more conservatory [*sic*].<sup>53</sup>

He cited 'the scarcity of specialized technicians' as a reason for the limited research in that direction.<sup>54</sup>

Organisations like the Society for the Preservation of the Wild Fauna of the Empire (SPWFE) and neighbouring countries had been criticising the Portuguese authorities for a long time for not taking nature conservation seriously.<sup>55</sup> To this Pires responded: 'One of the greatest obstacles to the economic and social development of Mozambique is the existence of the tsetse flies.'<sup>56</sup> He reported that many parts of Mozambique were 'gone to waste' because of tsetse even in areas where wildlife was scarce (such as the Lebombo Hills), but still maintained that wildlife was to blame:

Looking at the problem through a more vast prism – the veterinary pathology – we can say that the greater part of the cattle diseases are maintained and spread by game. It will be sufficient to mention the rinderpest, foot and mouth disease, rabies, rickettsiosis, swine fever, whose virus can be maintained latent amongst certain wild animals, to spread periodically to the cattle breeding areas causing heavy mortality in the livestock.<sup>57</sup>

The Portuguese adopted the precautionary principle of game slaughter because of their experience with other cattle diseases; they were certainly not taking chances. But what about the aesthetic and educational value that the SPWFE was asking to be respected? Pires sounded conciliatory in that direction, but was unwilling to budge. While feeling duty-bound to preserve such richness 'in the most appropriate way so as to avoid the disappearance of species',<sup>58</sup> he remained adamant that separating game from domestic animals was a priority. His position – and that of government – was that there could be room for 'two different opinions if we consider seriously the reservation of appropriate areas of the Territory, where the wild fauna will be carefully and efficiently preserved, those areas being chosen in such a way so that they do not constitute a menace to areas

53. Report by F.A. Pires, 'Controlling measures for the wild fauna required by the economic-social development submitted to the Conference on the protection of the flora and fauna in Africa, held in Victoria Falls in 1950', Governo Geral, Cota 383, Pasta A/13, 1.

54. AHM, Governo Geral, Cota 383, pasta A/13, Conferencia da fauna – a realizar em Victoria Falls nos dias 18 e 19 do mes de setembro de 1950, report by the director of the Missão, 2.

55. See Mavhunga and Spierenburg, 'The Great Limpopo Transfrontier Conservation Area'; see also J. Schafer, 'Think Locally, Act Globally? Exploring the Influence of the Global Conservation Movement on National Policy, Ideology and Activity in Portuguese Colonial Africa' (Paper, Canadian Council of Area Studies Learned Societies Conference, 'Furthering the Globalization Debate: Cross-Regional Comparisons', Montreal 27 April - 1 May 2005), 11.

56. Pires, 'Controlling Measures', 1.

57. *Ibid.*, 2. Rickettsiosis is an infectious disease caused by ticks or mites or body lice infected with rickettsial bacteria.

58. Pires, 'Controlling measures', 2.

of actual or potential economic value'.<sup>59</sup> However, even in these areas, he argued, the control of wild animals should still be possible if outbreaks of cattle disease threatened: 'When the vital interests of man are threatened, sentimentalism must be put aside and it must be considered that human beings themselves need to be preserved and defended in the first place.'<sup>60</sup>

Until the late 1950s, the *Missão* considered slaughtering (culling) game the main method of tsetse control. Travassos Dias, a medico-veterinarian in Mozambique, listed five culling operations carried out between 1949 and 1969, in which a total of 126 721 animals were killed.<sup>61</sup> Elephants were destroyed in large numbers, and the process of culling was also an economically attractive option. One fragment of evidence shows an instance where professional hunters requested a permit to sell 110 900 kilograms of ivory from a tsetse-related culling operation in 1958.<sup>62</sup> In some cases, as the report on the 'control experiment' (see below) showed, game was even removed from certain parts of game reserves. It must be noted, however, that in most reserves in Mozambique hunting was not banned but controlled through a system of permits.

The hunters were supposed to be only Europeans, with the help of African guides and trackers, who were not supposed to hunt by themselves, except for smaller animals and only with bows and arrows. Legislation in 1960 reaffirmed the regulation that 'natives' were only allowed to use firearms under the supervision of the European professional hunters who performed the tsetse-culling operations.<sup>63</sup> The opportunity for hunters to make money out of elephant tusks, however, threatened to derail the 'scientific' objectives of the *Missão*. The *Missão* had previously expressed concern the hunters might target only elephant for ivory and disperse the smaller hosts of tsetse.<sup>64</sup> White settlers had always been hunting on a considerable scale long before the anti-tsetse culling began. In the mid 1950s, their numbers increased dramatically. Many city-dwellers from Mozambique, South Africa and Rhodesia would spend their weekends on a hunting spree in the nearest area where hunting without a permit was allowed – and that was just about everywhere outside of the few game reserves and official hunting parks, including areas targeted for anti-tsetse shooting.<sup>65</sup> Science was caught up in a lucrative

59. *Ibid.*

60. *Ibid.*

61. Schafer, 'Think Locally, Act Globally?', 11.

62. AHM, Governo do distrito de Gaza, V20: cota 344: pecuaria, 1901–1972. For elephant hunting in relation to tsetse control in northern Rhodesia, see White, 'Tsetse Visions', 232–3.

63. AHM, Governo Geral, Cota 982, Secção dos Serviços de Veterinaria, Repartição Tecnica de Protecção da Fauna, Carta a A Missão Geografica de Moçambique, 27 June 1960.

64. AHM, Governo Geral, Cota 178, C3, report by the Comissão de Caça da Colónia de Moçambique, no. 57/1947.

65. Schafer, 'Think Locally, Act Globally?', 11. In the 1930s, detailed reports were written about large-scale hunting by 'weekenders' from the capital: see AHM, Administração Civil, Cota 12, Algumas notas sobre caça no distrito de Lourenço Marques, 17 Apr. 1934. Similar remarks are found in AHM, Governo Geral, Cota 178, C3, Caça – Reservas e Parques de Caça, report by the Comissão Central de Caça, 16 June 1948.



business. Companies and plantation owners would also employ hunters to provide meat for staff and workers.<sup>66</sup> Furthermore, many hunting permits were sold to foreign sports hunters, and in 1947 the proceeds from these permits in the southern part of the colony alone amounted to almost half a million dollars.<sup>67</sup>

The love-hate relationship between the *Missão* and the hunters was that between veterinary on the one hand, and sports and tourism interests on the other. Hunters dominated the National Game Board. The Board initially supported the *Missão* in combating *nagana* and blocking South Africa's proposal for a game reserve bordering Kruger, but according to the *Missão* it failed completely to understand the importance of carefully studying game-tsetse relations. In 1950, the *Missão* blamed the absence of a scientific basis for wildlife conservation in Mozambique on the lack of research funding and facilities, but also on the composition of the Game Board:

As a rule its members are sportsmen who although joining it with the best of purposes, do not possess the necessary knowledge of general biology to enable them to grasp the great importance of this question. On the other hand, our legislation does not require the Game Board to be constituted of individuals with sufficient knowledge to carry on, or at least to initiate the necessary studies for the purpose in view.<sup>68</sup>

Pires envisaged a hunting regime that specifically targeted the tsetse hosts, not trophy animals, and opposed many proposals for game reserves where the Game Board wished to protect trophy animals. In 1947, for instance, he opposed the creation of the Maputo Elephant Reserve on the grounds that it would hinder the creation of a tsetse-free zone.<sup>69</sup> Two years later the *Missão* conducted a 'control experiment' involving the removal of hippopotami from a part of the reserve. In 1955, the Portuguese proclaimed a new hunting law and enlarged the Gorongosa reserve (located not far from the border with Rhodesia).<sup>70</sup> The *Missão* congratulated the Portuguese Governor of Mozambique for the decision, but protested that the issue of *nagana* was not mentioned once in the proclamation or the accompanying report.<sup>71</sup>

For the conference on the protection of the flora and fauna in Africa in 1950, Pires had compiled a separate report for a more 'animal-friendly' strategy, the above-mentioned 'control experiment' involving the *g. brevipalpalis* conducted in

66. Schafer, 'Think Locally, Act Globally?', 11.

67. AHM, Governo Geral, Cota 178, C3, Caça – Reservas e Parques de Caça, report by the Comissão Central de Caça, 16 June 1948.

68. AHM, Governo Geral, Cota 383, pasta A/13, Conferencia da fauna – a realizar em Victoria Falls nos dias 18 e 19 do mes de setembro de 1950, report by the director of the Missão, 1.

69. See, for example, AHM, Governo Geral, Cota 178, C3, Caça – Reservas e Parques de Caça, report by the Comissão Central de Caça, 16 June 1948.

70. AHM, GG Cota 430, letter by Governador Jose Diogo Ferreira Martins to the Presidente da Comissao Central de Caca, 21 May 1955.

71. AHM, GG Cota 430, letter from the Missão de Combate ás Tripanosoiases, June 1955.

the valley of the Maputo River in 1949.<sup>72</sup> The primary objective of the experiment had been to study the relationship between hippopotami and that specific type of tsetse fly.

The control experiment was conducted in a part of the Maputo Game Reserve, relatively close to the capital Lourenço Marques (Maputo). The only wildlife left in that part of the reserve, according to Pires, were hippopotami and crocodiles. Elephants, abundant in other parts of the reserve, were avoiding the area due to the nearby presence of the village of Salamanga.<sup>73</sup> The density of hippopotami, however, 'was truly very high but this should not cause surprise due to the regime of the reserve to which the Maputo has been subjected'.<sup>74</sup> Given the presence of *g. brevipalpalis* in an area where mainly hippopotami lived, suspicions arose that this animal was indeed a suitable host to the fly. The idea was to chase the animal out of the area and then check for tsetse presence. The campaign to evict the hippopotami started in January 1949: most were chased away with the help of villagers living in nearby African settlements. Some animals were killed. Once the area was 'hippopotamus-free' livestock belonging to the African villagers were pastured in the area. The numbers were carefully counted: '2314 animals, being 1729 bovines, 100 sheep, 468 goats and 17 donkeys, belonging to the native chiefs Majajane, Magazitete, Wampchane, Chia and Lucal'.<sup>75</sup> The researchers also replaced the usual anti-tick arsenic used in dip-tanks with DDT and gammahexena so as to repulse tsetse fly from catching a ride on the body of the animals.<sup>76</sup> The cattle 'continued to be bathed [dipped] as previously at one weekly intervals, in order to not perturb the habits of the natives',<sup>77</sup> thereby adding another intervention to the experiment. Pires declared the experiment a success, though admitting he was unable to put a finger on exactly which one of the measures had been effective.<sup>78</sup> Still, he proclaimed that the experiment had proven hippopotami to be the principal hosts of *g. brevipalpalis* and strongly advised that the 'Salamanga experience' be adopted in other places like the Save valley where conditions were similar and tsetse virulent, 'because it is cheap and easy to put into practice'.<sup>79</sup>

72. AHM, Governo Geral, Cota 383, pasta A/13. Report by: Missão de Combate 'as Tripanosomíases. Secção Veterinária, by F.A. Pires, Chefe da Secção Veterinaria da M.C.T. Lourenço Marques, July 1950. Aspects of the Anti-Glossinic Fight in Mozambique. A control experiment of the *G. brevipalpalis* Newst. on the valley of the Maputo River.

73. Pires, Aspects of the Anti-Glossinic Fight in Mozambique, 4.

74. *Ibid.*, 9.

75. *Ibid.*, 8.

76. *Ibid.*, 11.

77. *Ibid.*, 11.

78. *Ibid.*, 12.

79. *Ibid.*, 12.

### African Contributions to Tsetse Science and Control

The Salamanga experiment also showed different manpower constraints the Portuguese faced compared to the Rhodesians. While Pires bemoaned the lack of ‘competent investigators ... for proper study’, he had had no problems enlisting the help Africans to remove the hippopotami. In fact he considered getting Africans to work a ‘cheap and easy’ thing. This remark seems to contradict the vast literature on the problems the Portuguese colonial authorities experienced in recruiting African labourers.<sup>80</sup> Force aside,<sup>81</sup> obtaining more pasture may have rendered the experiment attractive, and game destruction provided meat and other products of game carcasses – which may very well have rendered the anti-tsetse measures attractive to local populations.

The Rhodesian manpower problem was at two levels. It was not a problem to recruit Africans for hunting with government-issued Martini Henry rifles<sup>82</sup> at a time when only whites were allowed to own or use guns, let alone enter wildlife areas. Nor were European entomologists in short supply. The problem Boyd and Mowbray faced was in recruiting sufficient and sufficiently trained African personnel to catch flies:<sup>83</sup> There was no extra incentive to catch flies compared to hunting game to destroy the tsetse’s diet.

Fly catching was an arduous job whites could not – or would not – do when there were colonial subjects who could be mobilised to do it. An interesting question here is: what kind of expertise did Africans bring to the production of tsetse science? How do we talk about their contribution to entomology when their voices are not included verbatim in the written reports? Does it mean that when the voice is muted the actions cannot be unearthed? The reports we use are written in English, while the people who caught flies spoke, according to Boyd ‘a very attractive dialect of Zulu’.<sup>84</sup> We can read the entomological report as an English compilation of knowledge produced out of different bodies of knowledge. The hunters and flycatchers brought to this knowledge production their own knowledge of the local terrain, of tracking and guiding. As Mavhunga has shown, Africans in the southern lowveld had deployed and adapted their knowledge of game spoor, forest’s signs, and their skills in catching, killing, or nurturing wildlife to participate in and benefit from the Swahili Arab and Portuguese ivory trade. In the nineteenth century, men offered their services as porters, wagon-drivers, and trackers while women offered agricultural and accommodation services to

80. See, for example, Allina-Pisano *et al*, *Mozambican Labour to Rhodesia*; Martin, ‘Blackbirding at Crooks Cornier’; M. Newitt, *A History of Mozambique* (London: 1995).

81. Only in 1962 did the Portuguese abolish forced labour: see A. Isaacman and B. Isaacman, *Mozambique: From Colonialism to Revolution, 1900–1982* (Boulder, CO, 1983); Newitt, *A History of Mozambique*.

82. NAZ, S3099/15, Martini-Henry Rifles for Tsetse Fly Operations, 1933–40.

83. NAZ, S3106/11/1/8 Sabi Valley, 1953–5, Boyd, Tsetse Fly Survey, 5.

84. *Ibid*.

European big-game hunters as a deliberate strategy to tap into western technologies like guns, as well as clothing and foodstuffs. These repertoires that Jean-François Bayart aptly termed ‘strategies of extraversion’ continued to be applied after colonisation, and served Africans in making sense of their colonial situation, to see beyond their subalternity.<sup>85</sup> By putting these strategies to use for the tsetse surveys, one could therefore argue that Africans indeed ‘wrote’ an important part of colonial science. Yet, they were largely written out of it by those who could compile the records.<sup>86</sup>

Where the flycatchers and hunters do appear in the reports their contribution received mixed appreciation. Boyd described them as an ‘unbearable mixture’ of Ndaou and Shangaan, and found the Ndaou and Shangaan to be ‘in general uncommunicative and unreliable’ barring a few exceptions. However, he also agreed that ‘without the aid of one of these, Mkwadze by name, a retired housebreaker with a criminal record a yard long, it would have been almost impossible to visit the upper Lundi area’.<sup>87</sup> Mowbray recounted how preliminary work for the survey was delayed because ‘labour was in extremely short supply, good fly boys could not be obtained and surveys had to be done with local natives, who no sooner learnt to catch than they left’.<sup>88</sup> For a region exposed to labour migration to the South African mines, and considering that Shabanie Mine operated a recruiting depot at Marumbini run by a man called Blake Thompson, fly work was in competition with much more lucrative forms of wage labour.<sup>89</sup> Mowbray stressed the ‘great difficulty ... experienced in recruiting *the right type of native*’.<sup>90</sup> Only through the incentive of paying a wage and the bounty of game meat could African men be enticed to join fly work. Mowbray conceded that paid hunters were ‘the more useful’, especially if ‘given fly nets and encourage(d) ... to search for “fly” and retain any caught for further inspection’.

While Boyd and Mowbray approached tsetse operations as (based on) science, Africans used the game slaughters as a moment to reclaim their access to wildlife. Those who could use guns availed their skills and knowledge to the anti-tsetse operation as hunters. Five hunters were operating in the triangular area between six and seven miles from the Save-Lundi confluence, while a sixth one operated a few miles further up the Lundi. These African men were unpaid ‘as are

85. C. Mavhunga, ‘The Mobile Workshop: Science, Technology, and Wildlife Use in the Trans-Limpopo Basin, Southern Africa, 1870 – Present’ (doctoral thesis, University of Michigan, forthcoming). For a discussion of strategies of extraversion, see J.-F. Bayart, ‘Africa in the World: A History of Extraversion’, *African Affairs*, 99 (2000), 217–67.

86. See G.C. Spivak, ‘Can the Subaltern Speak?’, in C. Nelson and L. Grossberg, eds, *Marxism and the Interpretation of Culture* (Urbana and Chicago, 1988), 277.

87. NAZ, S3106/11/1/8 Sabi Valley, 1953–5, Boyd, Tsetse Fly Survey, 5.

88. NAZ, S3106/11/1/9 Sabi Valley, 1955–6, Mowbray, Lower Sabi Valley Report, 1.

89. NAZ, Th10/10/1/1/132-219, Blake-Thompson Papers, Thompson to Roger Summers, 19 Mar. 1955.

90. NAZ, S3106/11/1/9 Sabi Valley, 1955–6, Mowbray, Lower Sabi Valley Report, 1, emphasis added.

the rest of the hunters in this area'. Primarily because of the difficulties of crossing the Sabi River, very little control was exercised on them to the extent that, Boyd said, 'it is extremely doubtful if their activities are of any value'.<sup>91</sup> Boyd evaluated such independence as a weakness, fearing these African men would not do a thorough job and would leave residual game capable of supporting a large fly population, 'as [the hunting operations] are at present carried out, [they] will have little effect on the encroachment of the fly'.<sup>92</sup> Mowbray, however, understood how critical the role of African hunters was in controlling the fly. He agreed that because of the few hunters involved on the west bank, 'the situation was not found to promise good results'. Once the white rangers-in-charge paid the one salaried African hunter his wage in January, the latter would go to the villages and the hunting operations would have to be temporarily suspended. The unpaid hunters on the east bank were continuing their work, but while they had 'considerably reduced the game density', they were not capable of tackling the remaining populations without reorganisation and additional expenses:

The mode of change was to give the redundant unpaid hunters the opportunity of remaining but on a paid, monthly basis. The Makossa block was then divided into limited areas and the new paid hunters were then camped at a density of one to every 10 sq. miles. Reorganization will be completed when the west bank operations begin next year [1957].<sup>93</sup>

When we talk about how the subaltern speaks, therefore, we are referring to these moments when the scientific experiment could not go on if African hunters were unavailable. What brought the entire exercise within the orbit of western science was the white ranger or entomologist on whose orders game elimination proceeded.

### **Reinforcing Colonial Boundaries to Stem Tsetse Mobility**

Following the completion of the surveys, Mowbray decided that 'the non-isolated mixed populations of tsetse' in the Sabi Valley could be combated through a combination of 'bush clearing, game elimination and, after that process, through the resettling of Africans squeezed out of other areas of the Rhodesian hinterland. The idea was to establish a barrier against reinvasion. The strategy also involved rigorous traffic control mechanisms to prevent further encroachment of fly, an undertaking that called for a reorganization and boost in staff, transport and equipment.<sup>94</sup> We argue that especially the latter method of keeping the fly under surveillance at the same time contributed to attempts to mark the territorial jurisdiction of the state and control over the African population.

91. NAZ, S3106/11/1/8 Sabi Valley, 1953–5, Boyd, Tsetse Fly Survey, 6.

92. *Ibid.*

93. NAZ, S3106/11/1/9 Sabi Valley, 1955–6, Mowbray, Lower Sabi Valley Report, 8.

94. *Ibid.*, 6.

The tsetse fly spoke through the mobility of Africans, the Africans spoke through the mobility of the tsetse fly, and both were considered a problem. Writing in 1956, Mowbray noted that the most important aspect of tsetse control work in that year had been 'the instigation of traffic control on both banks of the Sabi River'. He was referring to the establishment of tsetse control gates (in November) on both banks involving 'a more flexible system of traffic control', where traffic was checked on fly carriage. The initial gates had been intended to supplement survey work, but now that more was known about the fly, there was merit in relocating the gates 'at strategic positions where further removal was unnecessary'.<sup>95</sup> Already five gates and fences on the east bank had proved particularly successful, significantly reducing cases of *nagana*; they would act as a fortress against invasion. That Mowbray and his African team had caught no fly around and beyond the east bank gates meant that no fly had been carried inland, 'at least on road traffic' (meaning foot, carts and occasional cars). At the same time the Makoho gate had allowed in 'alarming numbers' of *g. morsitans* and *g. pallidipes*, presumably from the Ndanga River heading south. The fly had negotiated this human technology (the gate) by 'outflanking [it] only to be returned on southbound traffic'. To address this problem, Mowbray moved the Mareya gate a few miles north of Makoho gate on the same road.<sup>96</sup>

A crucial question became how to control human movement and enforce human-designated borders, as well as to curtail tsetse and game movement. Mowbray sought to make traffic control more successful by calling on the state to erect a border fence between Southern Rhodesia and Mozambique to close the area between trigonometrical beacons 103 and 106. The reasoning was that as soon as the fence was complete, a system of daily maintenance patrols by local Africans would be put in place to prevent 'indiscriminate international movements' and the resulting problem of 'carried fly'. Mowbray argued that the 'Makaru gate' had 'prevented the ingress of over 400 "fly" in one month' and that 'far larger numbers must be carried over the border on pedestrians coming to the Rhodesian [grocery] stores'. He was advocating strict control of human movement as one of the strategies for controlling tsetse proliferation, warning:

All movement in and out of the tsetse area must be strictly controlled. Besides the border movement other haphazard wanderings of pedestrians and livestock take place. In enforcing traffic control it will be possible, without defeating the object of the scheme, to exclude those areas to and from which large movements of cattle take place. It is strongly recommended that this absolute traffic control be enforced during the coming year.<sup>97</sup>

Hence, the movement of human beings needed to be controlled in order to stem the movement of tsetse fly. The issue at stake, however, was also that Africans, like

95. *Ibid.*, 7.

96. *Ibid.*, 7.

97. *Ibid.*, 7.

tsetse fly, were violating an international border designated by treaty. Since the late 1930s, the state and Mahenye's people had been fighting a low intensity 'war' over restrictions preventing the chief's herd from grazing in Mozambique, and the gates and fences were solutions likely to be resented.

Fences and gates functioned differently in different locations. On the west bank they acted as an 'adjunct to survey' whereas on the east bank they were a primary method to quarantine already known tsetse habitats. Depending on where such gates were situated, they presented problems in some areas and solutions in others. One example is the hostile attitude of Chief Chitsa and his people to the control of 'carried fly', which had started when the first attempt to erect a border fence against FMD and East Coast Fever began in the late 1930s. The veterinary department had quarantined the entire village herd pending the completion of a border fence and other veterinary facilities such as the dip tanks.<sup>98</sup> The 'science' Mowbray said was 'working' led to restrictions that Chief Chitsa and his people bitterly resented. Mwawa gate (opened June 1956) was meant to 'prove the extensions of *G. morsitans*' and to record *pallidipes* populations on the river, yet the fact that tsetse movement had stalled was simultaneously a sign of the restriction placed on the movement of its vectors, the people. While 'numbers' of *morsitans* had been taken off westbound traffic, 'one, taken off an eastbound cyclist, may have been carried to a point west of the gate'; those numbers also reported the movement of 'the natives' to the state. The Machindu gate was set up in August 'on the suspicion' of fly in southern Ndanga East Reserve, and although none had been caught since, the gate would be maintained. Mowbray's thinking was simple: the more fences, the more rigid the traffic control in future. Everything, however, depended on suitable African staff being recruited.<sup>99</sup>

Indirectly, the presence of tsetse fly held government to ransom: now it had to commit attention, equipment, and manpower to make its presence felt in a border area long neglected, or risk a tsetse fly invasion of cattle ranches close by to the west, principally Nuanetsi Ranch. The tsetse fly was calling attention to the periphery, making it the centre in the scientific sense – that of a laboratory *in situ*. As control measures, gates and – more particularly – fences compartmentalised the landscape. They helped to classify space into 'wild' and 'domesticated' as a prerequisite for isolating tsetse flies. In order to combat the fly and further domesticate the landscape, a strategy of game elimination was deployed.

The gun and fence combined in the *cordons sanitaires*. As African hunters cleared game, the fencers erected a barrier to make such clearings permanent. Sometimes the fence came first and the shooting later, so as to canalise game into easier killing grounds and then having hunters patrol the cleared areas. This was especially so on the east bank of the Lundi River. Hunting was scheduled to resume on the west bank in early 1957, with 'a planned and ruthless campaign'

98. *Ibid.*, 7.

99. *Ibid.*, 7–8.

whose baseline would be the new fence already under construction from Chilolo escarpment to Save just south of Masapos Ranch. Mowbray alerts us to two 'points of interest' regarding the fence:

Firstly its construction with high tensile, plain steel wire and secondly the numerous difficulties encountered in trying to obtain a sound erection job from the contractor. It is fortunate that a new field officer has arrived in the area, as his presence will perhaps prevent re-erection of the fence through bad workmanship, and shorten what promises to be a long and tedious task.<sup>100</sup>

Erecting fences was by no means an easy task, requiring its own skills and the development of 'appropriate' technology. In other words, the fence also mobilised different fields of expertise beyond just the entomologist and his African staff so that, as Latour has urged, when we look at science, the networks of heterogeneous actors that produce it go well beyond the laboratory.<sup>101</sup>

Such non-laboratory labour or knowledge mobilisation also calls our attention to the role of African bush-clearers in creating *cordons sanitaires*. Even though Mowbray completed vegetational mapping and submitted bush-clearing schemes for the Rupembe watershed in March 1956, Africans were the critical mass. The scheme aimed at:

... destroying concentration sites of both *morsitans* and *pallidipes* in a locality in which the woodland surrounding the drainage lines cannot support either tsetse. Success or failure of this initial scheme will be largely judged on the 'fly' figures of the local traffic gate, as tsetse carried in an easterly direction arise in the clearing area. Random catches have also been made in the locality.<sup>102</sup>

Here it is also crucial to stress the technological adjustments envisaged at the time to cut menial labour: 'a new feature... recently ... introduced into bush clearing operations', the two-man Dolmar power saw, was expected to undergo 'extensive field trials ... in the near future'. Preliminary small-scale trials were showing the saw to be 'roughly eight times quicker than an axe team of five natives'. It had posted encouraging figures in terms of output, but presented the new problem of 'selecting and training African operators'. This saw would, however, do little to solve the immediate problem of 'the rawness of labour gangs' (i.e. inexperience) under charge of the field officer, a Mr. Janke, who was also new on the job.<sup>103</sup> Africans remained indispensable.

Another dimension to the bush-clearance strategy was the option of not employing African labour directly, but to offer Africans the infected land for resettlement and insist that they clear it. This option had not been considered in the

100. *Ibid.*, 8.

101. Latour, *Science in Action*, 158.

102. NAZ, S3106/11/1/9 Sabi Valley, 1955–6, Mowbray, Lower Sabi Valley Report, 8.

103. *Ibid.*, 8.



Save valley where the *nagana* had first struck, but rumour was rife that large numbers of people who had been removed from Matibi II and Sengwe Native Reserves when parts of what is now Gonarezhou were declared Crown Land would be resettled in tsetse-infected areas. They were to be joined by Africans from elsewhere who could afford to buy land in the newly declared 'native purchase areas' in Gonakudzingwa. The Department of Agriculture had discussed the matter with the Native Commissioner for Chipinga, who favoured the idea of creating a human shield against tsetse. Mowbray urged that the settlement should follow 'as rapidly as planning allows'. If 'judiciously carried out the measure could preclude extension of the Chipinga border clearing and the high costs this work would entail'. The funds so-saved could be reassigned for tsetse operations further south.<sup>104</sup>

### Conclusion

In both Rhodesia and Mozambique tsetse flies were perceived as an important threat to livestock economies. The Portuguese authorities especially complained about areas left to waste because of the fly. Rhodesian authorities feared that tsetse would advance further and further from the border area into the rest of the territory.

Tsetse flies proved tough adversaries to which both countries responded differently, however. Rhodesian entomologists tried to study the fly's favoured habitat, but also the ways in which it advanced further into the country. Their focus was not only on 'the vector of the vector' of *nagana*, (that is wildlife), whose movement they sought to control through culling, but also on other fly carriers, humans and their means of transport. In the case of Rhodesia it is interesting to see how the fly, through its movement and ability to find new forms of transport, was driving an extensive programme of science and controlling measures. This required considerable investment in manpower and infrastructure; the entomologists required the assistance of flycatchers, fences to be built not only as a control measure but also to facilitate research, and hunters to deal with wildlife supporting the fly. These requirements illustrate the importance of looking at what Latour referred to as the heterogeneous assemblies in the production of science.<sup>105</sup> As part of the assemblies, Africans were from the outset indispensable actors in the production of tsetse science and control, even in Mozambique, where science and control appears to have been less extensive, focusing mainly on one factor, wildlife. Here, the director of the *Missão* considered African assistance in a control experiment easy and cheap. However, while in Rhodesia wildlife culling was conducted to a large extent by African hunters, in Mozambique Africans were deployed mainly as trackers and guides to white hunters, leading to bitter complaints about the destructive effects of the latter's selective trophy-hunting

104. *Ibid.*, 9.

105. Latour, *Science in Action*.

practices thwarting the scientific criteria set for game elimination. Nevertheless, the data we have available allow us to discuss African influences on tsetse science and control in terms of labour contributed – which does imply the importance of skills and knowledge pertaining to the tasks at hand. At least for Mozambique, very little information is available about the *direct* influence of African knowledge on tsetse science during the period under study, as, for instance, found by Luise White for Zambia.<sup>106</sup> The Rhodesian entomologists occasionally referred to the impact of African land-use methods on tsetse habitat, but suggested these be controlled to aid tsetse interventions. They do acknowledge African agency, however, through their inability to conduct science without the hunters and fly-catchers, much more as labour elements than as contributors of knowledge. Yet these men were picked from the villages straight into their ‘new’ vocations, because they were known hunters among their fellow villagers, a basis upon which Native Commissioners then recommended them for service in the Department of Entomology.

In conclusion, we would like to emphasise the role of illegal border crossing in the spread of tsetse infestation. The ‘advance’ of tsetse fly called Rhodesia’s attention to the periphery of the territory, to a border area it had persistently neglected to govern since the partition of the border in 1891. Tsetse fly movement caused government to impose restrictions on human movement that it might otherwise not have contemplated. The Rhodesian entomologists demanded control measures to stop illegal border crossing, mainly by wage-labour seekers, but at the same time bemoaned the lack of African labour available to them. In an interesting contrast, the Portuguese authorities, which had always been very concerned about these illicit crossings, complaining that they lost a lot of manpower to neighbouring countries, appeared less concerned about border control in relation to disease control and agricultural production. This was shown, for instance, by their reaction to calls to cooperate with the Rhodesian authorities in order to control the veld fires that were influencing tsetse movement.

106. White, ‘Tsetse Visions’; see also Brown ‘Tropical Medicine’, and D. Gifoye, ‘Veterinary Research and the African Rinderpest Epizootic: The Cape Colony, 1896–1898’, *Journal of Southern African Studies*, 29, 1 (2003).