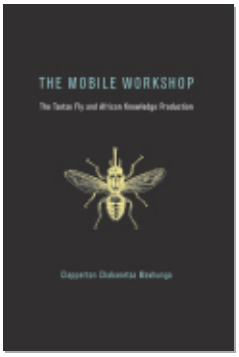
The Mobile Workshop

Clapperton Chakanetsa Mavhunga



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12 The Work of Ground Spraying: Incoming Machines in *Vatema*'s Hands

Ground spraying is different from aerial spraying in that it is not a one-person job; it is teamwork. Unlike a *ndege* (fixed-wing aircraft) or *chikopokopo* (helicopter) in flight, as a spraying machine—a mobile workshop for spraying a mobile *chipukanana*/insect—the sprayman and knapsack sprayer are subject to the control and supervision of *vanhu*, whereas the pilot, once airborne, is alone in the cockpit. Moreover, whereas the pilot is a *murungu*, the ground-spraying team is composed entirely of *vatema*, with the exception of the supervisor.

Ground spraying is thus better analyzable as a transient workspace, the meeting point between *mushonga* (spraying machine), translated and known among *mafrayi* as simply *mushini wekupureya* (hereafter *mushini*), and the sprayman (*mufrayi*; literally, "flyman"). The discussion is no longer simply one about inbound means in local hands, but about the transient work of spraying and the workspace populated by *vatema* who see themselves as *vanhu vari kubasa* or *pabasa* (people at work). By contrast, the *murungu* sees the same *vatema* as instruments for the dispensing of OCPs into the environment, just like the *ndege* above. Barring a few cases in which *murungu* was good to them, these *vatema* were subjected to the vilest *rusaruraganda* (racism), *hutsiny'e* (cruelty), and *hudzvanyiriri* (oppression—but better translated by the late reggae great Peter Tosh as *downpression*).

The chapter thus first takes the reader inside the workspace of *kupureya* (spraying) to appreciate *kupureya* as a *mufrayi*'s intellectual engagement, at once hazardous and experimental, with *mushonga* and *mushini* on the move. Understanding what *mushini* wanted, what it could and could not do, was an act of reading. When this engagement has been adequately explained, including from the perspectives of *vatema* who were once *mafrayi*, the discussion then narrows to one giant campaign in three neighboring countries: Southern Rhodesia, Portuguese East Africa, and the Union of South Africa. The purpose of the campaign was to stop the advance of *ndedzi* from

the Rio Savé region of Mozambique into the Savé-Runde junction area of Rhodesia, potentially threatening northeastern South Africa. Four aspects are considered: the racial politics and relations of power, the location of the workspace in *sango*, the transience of this workspace, and the materials involved in dispensing toxic chemicals to kill *ndedzi en masse*. Having outlined that campaign, the chapter then ends with spraying as experienced by *mafrayi* themselves. The glossary can help the reader navigate *chidzimbahwe* and other local keywords.

Inbound Things and Their Strategic (Local) Deployment

Whatever else they may have been designed for, the government imported the sprayers that arrived in Southern Rhodesia for spraying a specific *chipukanana*: *mhesvi*. This was a local and new role for which the equipment had not been originally designed. Indeed, the sprayers arrived as *potential* or *possible* rather than *actual* and *proven* means and ways of dispensing *mushonga* effectively against *mhesvi*. *Potential*, because no inbound thing arrives as means and ways a priori; only through deployment and performance—moreover, those that accomplish the purposes set for them to locals' satisfaction—does potential become actual means and ways. Pieces of *mushini* discussed here are the Motoblo, two versions of the Colibri, and the Schefenacker.

The earliest *mushini* deployed in Southern Rhodesia's *mhesvi* operations were the Four Oaks, the product of a British firm called the Four Oaks Spraying Machine Co (FOSMC; see their brochure in figure 12.1a and the Four Oaks in use in figure 12.1b). After filling the Four Oaks with *mushonga* to two-thirds capacity, its tank was pressurized using a hand pump, *mufrayi* adding more pressure as *mushonga* reduced in volume. The effect was to create uneven spray: more at the start, less as the tank receded toward empty. In April 1959, a small-scale spraying operation of 5 percent DDT wettable powder was undertaken in the Chiredzi riverine woodland using four Four Oaks pressure knapsacks spraying *mishini*. However, because of the receding pressure problem, the machines "had no great effect and one *mhesvirutondo* and one *mhesvirupani* were taken on the Chiredzi shortly afterwards."[1] Weight was also a concern for *mafrayi* maneuvering through thick and rugged forest.

A switch was made quickly to the Motoblo, a motorized, shoulder-mounted mist blower, the use of which was especially pronounced during the spraying operations in Chiredzi, Humani Ranch, and Devuli Ranch from 1959 to 1960. The mist blower was a product of Kent Engineering

"FOUR OAKS"
PNEUMATIC SPRAYER

REGISTERED TRADE MARK
THE FOUR OAKS

The "Streetley" Pattern

For spraying plants, roses, greenhouse work, and disinfecting in rooms, etc.

Capacity 2 quarts.
Working Capacity, 3 pints.

Nozzle gives a very fine spray.

Brass alloy Container.

These machines are self-contained.

No separate Pump.

"Streetley" Pattern.

PRICE

£3 10 0

Spare parts outfit, Box N, 4/- extra.

The "Streetley de Luxe" Pattern

Capacity 2 quarts. Working Capacity 3 pints.

Similar to "Streetley," but works with a press-down Tap.

Very economical with liquid.

Brass Alloy Container.

PRICE

£3 15 6

Spare parts outfit, Box O, 4/- extra.

For Ladies' use we now make a "Streetley-de-Luxe" of 1½ pints working capacity. PRICE £2 10 0
Order as "Streetley-de-Luxe No. 2"

Has been supplied to many sanitary authorities for disinfecting, and to cinemas and theatres in various parts of the country.

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A FEW USEFUL EXTRA ACCESSORIES FOR THE
"FOUR OAKS"
SPRAYING AND LIMEWASHING MACHINES.

REGISTERED TRADE MARK
THE FOUR OAKS

"Four Oaks" Unchokable Nozzle
(Patent No. 11,000)

No. 71

An Unchokable Nozzle. This nozzle automatically clears if at any time it clogs.
We recommend this nozzle for use with thick and gritty lime.
If your lime is ever inclined to choke, this is the nozzle to use.
Price, 8/3 extra, or 2/9 if in lieu of ordinary limewashing nozzle.

"Four Oaks" (Patent) Agitator.

No. 44

For use with bucket types of machines on pages 4 to 14.
A most useful little contrivance for stirring up liquid instantly.
We recommend every user of machines on pages 4 to 14 to purchase one of these.
When ordering, state for which machine it is required.

Price - 7/9

"Four Oaks" Agitator.
No. 44

Extra lengths of Rubber Tubing.

6ft. length, complete with unions 15/-
10ft. length, do. ... 21/-
15ft. length, do. ... 29/-
If armoured, 3½d. per foot extra.

If without unions, 5/- per length less.

The "Four Oaks" Marvellous Nozzle.
No. 68

Price 5/-

Gives a wide cloud of vapour-like spray 3 feet across.

Cattle Nozzle, No. 45

A very useful appliance for farmers and veterinary surgeons. Wood, lined with aluminium. Can be used with any of our machines.

Price, 16/-

"Four Oaks" Strainer Rod.

This is an invaluable addition to any machine, as every grower will realize. The Strainer absolutely prevents any choking or clogging of the nozzle. It can be immediately removed for cleaning purposes; also the thicker part of the rod, which contains the Strainer, forms an excellent handle for holding rod whilst spraying.
Price, 8/9 extra to the ordinary Spraying Rod.

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a)

Figure 12.1a, b (continued)

b)

Figure 12.1a, b
The Four Oaks Spraying Machine Co. brochure for the Four Oaks pneumatic sprayer (page 249); ground spraying with a pressurized knapsack sprayer (page 250).
Sources: www.sutton-coldfield.net (12.1a); Allsopp 1990 (12.1b).

and Foundry Limited (Kent, United Kingdom), equipped with a 70 cc two-stroke engine and ten-liter tanks of *mushonga*. It came in two models of different sizes, the Motoblo 60 and the Motoblo 90, the former preferred for its lighter weight and ease of carriage (Chadwick et al. 1964; Tarry 1967). Chiredzi, Humani, and Devuli were dense riverine vegetation areas, and the Motoblo 60 was considered more portable, allowing for flexibility of spraying. The 70 cc engine took a 25:1 petrol and oil mixture, carried in four-gallon jerry cans. The nozzle sprayed very fine *mushonga* droplets, which the two-stroke motor-powered fan blew into the dense vegetation and up steep banks to a height of twenty feet (FAO 1977).

The Motoblo's performance was "generally satisfactory." However, there were four main operational faults that *mafrayi* noticed during *kupureya*. First, the Motoblo's pressure pipe, located inside the spray tank, constantly came loose from its connections. The team of *mafrayi* improvised by securing it with wire, but if the wire was too long, it damaged the agitator; if it was too short, the tank cap could not be raised sufficiently to spray normally. Second, there was a problem with the clamping bolts that secured the blower elbow to the fan casing: if the elbow became loose on its seating, it could not be tightened up again, and the entire blower tube waggled

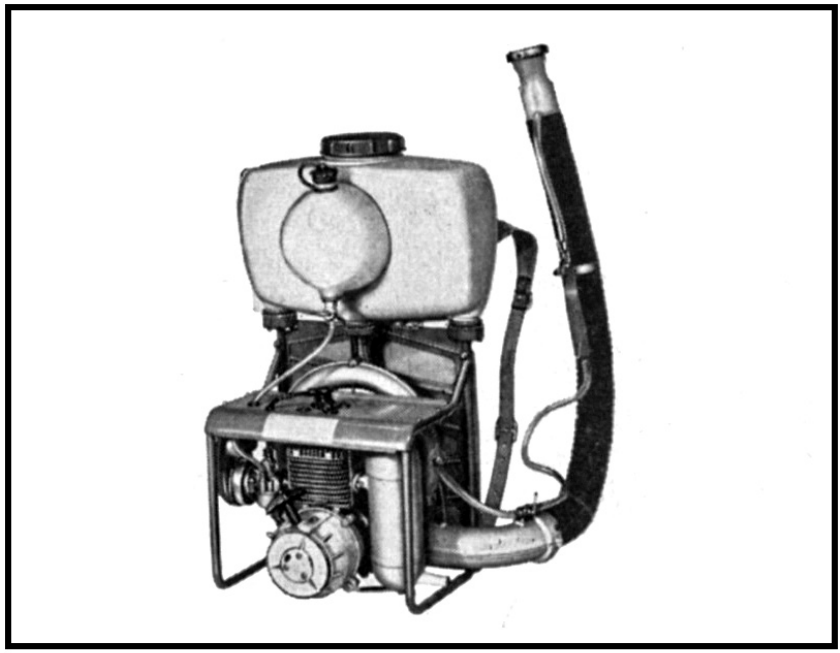
loosely or even came off. Third, after just forty hours of work, the agitator gland housing underneath the spray tank began to leak. To solve this problem, the large hexagonal nut was tightened—but if the gland itself was the problem, then there was nothing *mafrayi* could do. Finally, the clips securing the plastic nozzle to the metal blower tube were too weak and often broke when used.[2]

In addition, the Motoblo displayed problems very specific to the intense, humid, dusty, and ragged conditions of the southern African lowveld. The spark plugs required cleaning and resetting every two days. Fan belts needed adjusting every three to four days. The adjusting lever on one *mushini* became unserviceable. Petrol filters had to be cleaned every three to four days, and "considerable attention [had to] be given to cleanliness of fuel" in the future to avoid the "considerable, though minor trouble … caused by dirty fuel, in spite of the use of filter funnels in mixing." Finally, the 25:1 petrol and oil mixture caused "the oiling up of the plugs," and a 32:1 mixture was quickly adopted in situ with positive results.[3]

Another model, the Schefenacker, was a power mist sprayer manufactured by H. D. Hudson Manufacturing Company of Chicago, Illinois. The Schefenacker was advertised as shown in figure 12.2. In 1960, a trial was conducted in the Zambezi Valley using ten motor-powered, low-volume Schefenacker mist sprayers that proved "extremely satisfactory" barring "a few minor difficulties."[4] Interestingly, the dusting valve and control and the dust air delivery hoses were removed from all *mishini* "because there was a tendency for [black] operators to fiddle with and to open the dusting valve."[5] In their place, rubber bungs were used to close the holes in the delivery bends.

It was not long before the *mushini* succumbed to the demands of a highly humid, dusty climate. First, the polythene pesticide tank tended to swell in "the extreme Zambesi valley temperatures," such that by the time the spraying operation was complete, it was "extremely difficult to remove the tank from the dust hopper."[6] Instead of polythene, "a metal tank might [have been] a better proposition" to meet the hot conditions the Schefenacker was being imported to work in.[7]

The tank was not the only problem, however; pesticide tank lid gaskets "perished very rapidly," their broken pieces causing blockages in pesticide delivery systems. The problem was partly blamed on the *mushonga* used—in this case, Dieldrex 15, which was deemed incompatible with the Schefenacker. The air filter elements were found to be too expensive; as *mafrayi* maneuvered the *mushini* through the dusty terrain, the poor thing clogged up after only thirty-five minutes and needed replacement. The manual



Schefenacker power mist sprayer goes wherever you can walk or crawl; lets you penetrate areas inaccessible to any other type of power sprayer. Weighs only 32 lbs. (empty). Adjustable straps and padded, ventilated back make Schefenacker comfortable and easy to carry. Operating controls are in front at your fingertips. Two models: one for mist spraying only; the other for mist spraying, dusting, and wet dusting.

Figure 12.2
The Schefenacker power mist sprayer as advertised by Hudson Manufacturing Co. of Chicago, Illinois, in 1963.
Source: Weeds and Turf 1963.

that came with the machine said that the filter element could be cleaned with a simple tapping on a flat surface; in practice, that method did not work. But when a *mushini* was started and it did not run properly, *mafrayi* would immediately know that it had developed a blockage; modifications were necessary if the filter was to work in local conditions. *Mafrayi* were, in one sense, "demonstrating the interpretive flexibility of an artifact by deconstruct[ing]" it (Bijker 1997, 76).

However, let's not lose sight of their intellection, their reading of the *mushini*'s materialities in motion, their thinking-doing of *kupureya*, and their fixing-experimenting with the *mushini*'s problems. There was a problem with the ignition mechanism itself: "The hole in the cover plate … for the spark plug [was] too small," the *murungu* wrote in his report. As a result, when pull starting, "the spark plug bakelite cap … hit against the cover with resulting damage to the former." A remedy could have been found, but for the difficulty of getting a wrench through the hole to remove the plug, which was generally housed off-center.[8]

The Schefenacker did have something that no other *mushini* offered at the time, however: the capacity to spray far and wide, covering large areas at once and penetrating into thick vegetation.[9] *Mafrayi* loved that. They could finish faster, get their money, and go back home to their families. This capability was particularly welcomed for drainage-line spraying. The *mushini* was thus extended in 1961 to spray the 1,000 sq. mi. Nagupande-Manyande-Mzola drainage systems of Sebungwe. Forty Schefenackers were deployed in the operation.[10]

The Achilles' heel of the Schenefacker motorized sprayer was its fuel consumption and, consequently, its sheer expense to the government. Hence, it later was replaced with the Colibri, the product of a family-run French company called Vermorel, which was in the agricultural and automotive manufacturing business between 1850 and 1965 (Georgino 1975, 2001). In the post-1945 era, as white governments lurched onto DDT's power as a weapon of mass pest destruction, proven in the United States, Vermorel found a ready market for its *mishini*, the Leo-Colibri and Favori-Colibri. The machines had numerous selling points: ability to maintain pressure after discharging spray, less effort to operate, rapid recharge with a pump, and a floating-ball valve to prevent loss of pressure.

Two types of Colibris were used in Southern Rhodesia. One was the Leo-Colibri, with a detachable hand pump. The other was the Favori-Colibri, which was charged using a manual or motorized pump. The motorized pump could charge several *mishini* simultaneously, saving time, particularly when *mafrayi* were working near tracks or close to each other. The detachable pump reduced the weight of *mishini* and thus operator fatigue—a critical factor, given the rugged, steep, thorny and inhospitable terrain of the Zambezi and the Savé-Runde valleys (FAO 1977; Davies and Blasdale 1960; Kirkby and Blasdale 1960).

The Colibri sprayers were therefore deemed cheap and effective for the 1963 operation covering the Mzola-Dongamusi drainages and the vegetation surrounding Cewali Pan. These pneumatic knapsack sprayers consumed approximately eleven gallons of 3.7 percent dieldrin per machine

mile, much less than the Schefenackers had expended.[11] In 1964, they were also used to spray the Nyamusanzara, Ruenya, and Kaerezi drainages, as well as road verges and *mombe* paths in Nyanga North.[12] From 1965 to 1969, the machine was also used in the Chipinge, Savé-Runde, and cross-border operations into Mozambique between Rio Savé and the Malvernia-Lourenço Marques railway line (Thomson 2001, 49).[13]

The Southeastern Spraying Operations into Mozambique

To understand how this massive, multiyear operation unfolded, we need to first explore the political and institutional context within which it was undertaken. Put another way, this is an example of environmental engineering in context; the focus is trans-border spraying of OCPs.

The first steps were taken in 1929, just after the conclusion of the pan-African Agricultural and Veterinary Conference held in Pretoria, when Chief Entomologist Rupert Jack visited KwaZulu to learn about the Harris fly trap.[14] In June 1943, Rene du Toit and E. B. Kluge of the South African Division of Veterinary Services visited Southern Rhodesia and "inspected [the] clearing operation on the eastern border." They reported back to the director of the Division of Veterinary Services at Onderstepoort, who sent their reports as feedback to Chorley.[15]

The following year, Jack's successor, Chorley, consolidated these relations when accepting an invitation from South Africa's director of Veterinary Services, P. J. du Toit, and visiting KwaZulu in May to "inspect the work in progress" in the Umfolosi and Mkhuze forests and the Hluhluwe Game Reserve. Sub-Director Rene du Toit and Kluge accompanied him to the research site to observe and learn.[16] In 1947, Chorley again returned to observe the large-scale experimental DDT-spraying operations at the invitation of the Union Government.[17] In 1953, Rene du Toit in turn visited Southern Rhodesia "to advise on the application of *mushonga* from *ndege* and to fly over parts of Hurungwe."[18] The success of the KwaZulu spraying campaigns opened up possibilities for an interterritorial spraying campaign involving Southern Rhodesia, Portuguese East Africa, and the Union of South Africa in the 1960s.

Meanwhile, Southern Rhodesian exchanges with the Portuguese had begun well before the outbreak of World War II. As early as 1925, the Rhodesians had asked the Portuguese to ascertain the position of *ndedzi* in the Rio Savé border area and urged them to act. However, the Portuguese were busy with the even more serious *ndedzi* and *n'gana* situation in the Tete and Cabo Delgado provinces. In any case, *ndedzi* was to all three neighbors

of less importance than foot-and-mouth disease (FMD) and African Coast fever (ACF), with the border areas of Masenjeni, Mahenye, and Chitsa the worst affected. So serious was the problem that plans in 1926 to create a game reserve joining together Gonarezhou forest, the adjacent Mozambican areas, and Kruger had to be shelved.

In 1937, the Rhodesians alerted their Portuguese neighbors about a disturbing southwesterly spread of *ndedzi* from Manica Province in Portuguese East Africa (PEA) into the Honde-Rupembi River borderlands. Discussions about possible responses continued with little Portuguese urgency. The situation continued to deteriorate. In 1942, during the Portuguese minister for the colonies' visit to Salisbury, a memorandum was handed to him concerning the *ndedzi* threat from Portuguese territory. In response, Lisbon opened a large area along the border east of Chipinge to indiscriminate game elimination. However, Chief Entomologist J. K. Chorley was skeptical about whether the measure was a permanent solution.[19]

As the situation on the Rio Savé unraveled, Dr. de Sousa, Mozambique's *Chefe de Missao a Combate as Tripanossomiases* (Chief of the Sleeping Sickness Mission), informed his Rhodesian counterpart of another *mhesvi* presence in Catandica, very close to the adjacent border area of Nyanga. Chorley now feared that both the Ruya and Kaerezi rivers north of Chipinge might already be infested. The Southern Rhodesia Trypanosomiasis Committee (SRTC) tasked the Native Commissioner of the Nyanga District to investigate. The Portuguese government's point men for this interterritorial cooperation—de Souza and Veterinary Surgeon de Souza Santos, the latter based at Chimoio—did likewise.[20]

Out of the growing rapport emerged a bilateral approach to the *ndedzi* problem in Rio Savé. In July 1945, Southern Rhodesian and Portuguese authorities conducted a joint investigation to ascertain *ndedzi* positions in Mozambique south of Rio Savé and assess the possibility of it crossing over into Gonarezhou Game Reserve and Kruger National Park. Chorley, Conservator of Forests E. J. Kelly Edwards, Director of Veterinary Research D. A. Lawrence, and government ecologist R. R. Staples represented Southern Rhodesia. That same year, Chorley also participated in a meeting with the East African Standing Committee on Tsetse and Trypanosomiasis.[21] In 1948, two officials of the *Missao*, Dr. da Andrade Silva and Dr. Jose Marques da Silva, visited Salisbury to review the fly problem in Catandika and Rio Savé.[22]

I did not find any archival record for the period from 1946 to 1957 concerning these tripartite consultations. The next entry is from 1958, when Andrade Silva and Rhodesia's new director of Tsetse and Trypanosomiasis

Control, John Ford, held two meetings. The second of these was a tour of the Savé-Runde under the guidance of Dr. R. J. Phelps, the entomologist in charge of the area. Both sides made a sizeable professional staff available for technical evaluations of possible strategies on the ground.[23] Two years later, at Andrade Silva's invitation, two entomologists from Phelps's Savé-Runde area of jurisdiction "made a most useful visit" to the Sitatonga Hills inside Mozambique, earlier the scene of Swynnerton's groundbreaking study. We now know from interviews with Timothy Sumbani and Mugocha Mavasa, two veterans of the spraying and game-destruction campaigns, respectively, that several *mafrayi* were recruited locally and armed with nets to accompany Phelps.[24] In one hour of flyrounds, they collected specimens of both *mhesvirutondo* and *mhesvirupani*—not just on the Rio Savé, but also on the Guvulweni.[25]

Based on this research, South Africa, Mozambique, and Rhodesia convened a meeting in Lourenço Marques in November 1960 that established the Interterritorial Standing Committee for Tsetse and Trypanosomiasis Control in South-East Africa (ISCTTCSEA). This was the body that would coordinate cross-border pesticide spraying operations going forward among the three countries. South Africa, Mozambique, Northern Rhodesia, and Southern Rhodesia were members, whereas Angola, Botswana, and South West Africa (now Namibia) would send "observers" (Robertson and Kluge 1968, 19). The hosting triangulated between Lourenço Marques, Pretoria, and Salisbury. Subsequently, ISCTTCSEA convened before every spraying operation to receive updated reports on the previous year's results and to plan for the next. Among other things, these meetings focused on logistics: the quantity of *mushonga* required, numbers of spraying team leaders, spraymen, numbers and types of vehicles for each of the three parties, and agreement on precise limits of spray areas (Robertson and Kluge 1968).[26]

In 1961, ISCTTCSEA convened in Lourenço Marques to, inter alia, review the southward movement of *ndedzi* on either side of the Southern Rhodesia-Mozambique border and its threat to Kruger. South Africa immediately offered to dispatch a team to search *zvikukwa* (chrysalises) as a way of determining the altered presence and extent of *ndedzi* in the Savé-Runde area since Phelps's Guvulweni-Rio Savé study the previous year. The team started searching for *zvikukwa* on either side of the border in November 1961 and completed its mission in January 1962, recommending that a joint spraying campaign with dieldrin be commenced in the late dry season (September–October). By then trees would have shed their leaves, bar the evergreens of the Guvulweni drainage system, where *ndedzi* were forced to concentrate to survive the heat and predators.[27]

The subsequent ISCTTCSEA meeting approved this recommendation. Three preliminary steps were also drawn up as a blueprint for all subsequent annual sprays. First, the maintenance of old and cutting of new access tracks would be assured so that spraying teams could get as near as possible to the spraying area using motor vehicles. The mapping was conducted with aerial photographs and then translated to the ground. Second, the siting and construction of temporary camps were planned for spraying personnel for the duration of the operation. And third, a detailed plan was prepared for the next year's spraying, entailing the stereoscopic examination of aerial photos of the entire spray area, marking all "spraying lines" the teams would follow. Such lines included drainages, contact zones between vegetation types, motorable access tracks and roads, and paths of *ndlopfu* and *vanhu* in areas of heavy *ndedzi* density. Large-scale spraying maps were also prepared; on these, the spraying team supervisors marked the ground their team had covered for the day (Robertson and Kluge 1968, 20).

Throughout the 1960s operations, 3.1 percent dieldrin emulsion, prepared from specially formulated 18.6 percent emulsifiable Dieldrex 15 T concentrate was used. The deposits remained lethal to *ndedzi* for four months or longer after spraying. Until 1964, motorized Schefenackers were used, "but these proved to be highly susceptible to stoppages and breakdowns and, owing to their extreme noisiness, made difficult the control of movement of the operators" (Robertson and Kluge 1968, 21). The South African team supervised this work, and the Rhodesians provided fuel, engine oil, Schefenacker motorized knapsack sprayers, and *mafrayi* recruited locally.[28]

The spraying in the Savé-Runde basin began in 1962 as a joint operation involving South Africa and Rhodesia. This and similar operations in Mozambique were designed to reduce the threat of invasions of *ndedzi* across the Limpopo into the Kruger National Park and to deflate *ndedzi* pressure on the Savé-Runde basin corridor. G. K. Gillett was in charge; locals in Masivamele area remember him well by his nickname, *Ngungunyana*, after the king of Gaza.[29]

By October 1962, it was hoped that *kupureya* would reduce fly pressure building up on the forty-mile long, ten-mile wide protective barrier of discriminative clearing along the eastern side of the Chikombedzi-Malvernia stretch of the Lourenço Marques railway line. To facilitate the cross-border spraying operations against *ndedzi* inside Mozambique, the Tsetse Branch had bulldozed parallel lines five miles apart through the very sandy forest country between the Rio Savé (north) and the Malvernia-Lourenço Marques railway line (south). In between these strips, tracks had been cut at five-mile intervals to allow vehicles to deliver *mushonga* and *mafrayi*, who were then

unleashed onto the blocks of forest with their DDT-filled *mishini* (Thomson 2001, 49).[30] The Nyamasikana, Guvulweni, and Chepfu drainages were sprayed, with the treatment confined almost entirely to vegetation along and around rivers, pans, road verges, and contact zones.[31] The following year, as some teams re-sprayed the Nyamasikana, others descended on the Benji drainage line.

In 1964, the switch was made from motorized sprayers to handheld Favori-Colibri, prepressured, knapsack sprayers: "Once the minor teething troubles with these latter had been overcome, they were found to be much more satisfactory and free from breakdown" (Robertson and Kluge 1968, 21). In 1964–1965, the international spraying operations south of the Runde raged on for the third successive year. For eleven months, no *ndedzi* was caught on the flyrounds, barring that part of the sprayed area where only two annual treatments had been meted out. In March 1965, the South Africa Division of Veterinary Services officers "generously offered" pesticide, increased staff, and transport to cushion the Rhodesians' "heavy commitments" on the Zambezi fronts. In preparation for spraying, two hundred miles of roads were opened with *mabhurudhoza* in the areas lying between the international border, the Guvulweni River, the northeast to southwest game fence, and the Runde River. All the drainages, roads, and vegetation contacts targeted for spraying were demarcated on aerial photographs, with the information used to produce working maps. The total area to be sprayed was 800 square miles (sq. mi.).[32]

The operation began on July 27, 1965, and ended on October 12. It involved five teams of local Hlengwe and Ndau *mafrayi*. Three of them worked under *Madhebheni* (*Durbanites*, as the South Africans from the KwaZulu operation were called locally) supervision and covered the Savé Runde area. *Madhebheni* would "take the medicines in the tins, line up teams recruited from our villages here *pawaya yemakurundundu*, *vachipureya* (at the crude fence, spraying), heading in the direction of Mupfichani."[33] The other two worked under Rhodesian supervision and sprayed the north Runde area from Chipinda Pools to the Savé and from the Chivonja Hills to Hippo Valley Estates. They all used the Favori-Colibri pneumatic knapsack sprayer.[34] On July 12, 1967, six teams of *mafrayi* operating under *Ngungunyana* set off again. Two of them operated for some time inside Portuguese territory. The operation pioneered the use of "a parallel line spraying technique in the rather ill-defined tsetse habitat" of the Centre Road, Kapiteni, and part of the Chivonja Hills. These parallel lines were spaced four hundred yards apart to allow for command and control.[35] No further spraying was considered necessary, and the operation was ended.[36]

In March 1968, ISCTTCSEA resolved to confine all spraying operations to the south of the Runde, with the Kapiteni-Masenjeni border area as the major focus. Southern Rhodesia would do the planning and cutting of the necessary trace lines and then upgrade them into tracks, the *Missao* would provide two *mabhurudhoza*, and the South Africans would contribute transport and fuel. In April, the serious work began. *Ngungunyana* and *mafrayi* took to the bush first, cutting the new access-track system. Seven teams of *mafrayi* (two under Rhodesian and five under South African supervision) were deployed with 5 percent DDT.[37] In 1969, Kapiteni was re-treated, with a focus on the Mutezwa, Bepi, and Hyfananga drainages.[38]

Meanwhile, on the Mozambican side, flyrounds and survey catches showed the need for more intensive treatment of the Upper Mahungwe drainage and the featureless country within eight miles of the border. The 5 percent DDT suspension applied in grids four hundred yards apart had failed to eliminate *mhesvirutondo* from the area. The branch became anxious about DDT's efficacy compared to the 3.1 percent dieldrin emulsion used prior to 1968 and about what rate of application was best suited to parallel line spraying. Thus, at its annual meeting in Salisbury in 1969, ISCTTCSEA endorsed the modification of the parallel line spraying technique and a large-scale field comparison of 5 percent DDT and 3.1 percent dieldrin. The experiment showed that both treatments were highly effective, but DDT was the much cheaper option and just as efficient as dieldrin. The parallel line spraying operation applied DDT suspension at the rate of 381 gallons per square mile on the Rhodesian side and 263 gallons per square mile in Mozambique, compared to 284 gallons of dieldrin. These rates were all very much higher than those achieved in conventional spraying, and they proved far more effective than the older method used in 1968.[39]

After the eighth annual joint spraying operations of the Rhodesia/Mozambique border area in 1969, 898 square miles had been treated: 141 in Rhodesia, 757 in Mozambique. Test herds were deployed at strategic points in the sprayed Gonarezhou area. The Upper Pombadzi, Lower Pombadzi, and Masanya test herds stationed on the north bank of the Runde (an area not sprayed in 1968 and 1969) did not contract *n'gana*. South of the Runde, six test herds had long been established at Chepfu, Guvulweni, Chivonja, Lisodo, Songwene, and Kapiteni, and they had also tested negative for disease by April 1970. Cases were recorded in two new southern Runde test herds established in November 1969, confirming results from catches in parallel bait ox surveys and cycle flyrounds.

Re-spraying was ordered. The ninth joint interterritorial spraying operation from June to September of 1970 thus focused on re-spraying the

Mutezwa-Kapiteni region and the Chitove-Tembwehata Pool area of the Runde. All eleven test herds in the Savé-Runde area tested negative in August and September.[40] The operation's success owed much to the sinking of six new boreholes in the spraying area by the Rhodesian Department of Water Development and the joint interterritorial team's extension of the geometric system of new parallel access tracks. D7 bulldozers were involved in the latter task, cutting "avenues" north from Main Road to the Kapiteni-Masenjeni Road and extending some of them south to the Mozambique game fence.[41]

The 1971 joint operation began in June and concluded in October and involved fifty-one Rhodesian and three Portuguese teams of *mafrayi*, nine more than the previous year. The Rhodesian spraying in the Chipinge, Bikita, Nuanetsi (Mwenezi), and Gaza West districts did not commence until August, because all teams were assisting in Mozambique, where the required spray area proved to be more extensive than previously thought. When it finally began, the operation in Rhodesia continued into October and fell afoul of the rains.[42] In total, 757 square kilometers had been sprayed.

Subsequent spraying with far smaller teams was aimed at maintaining the status quo in the Masenjeni-Chigamane consolidation line, the eastern limit of the campaign inside Mozambique.[43]

Kupureya Ndedzi: Doing Ground Spraying

Piet Barnard of Mapikule Village was one of the local *mafrayi* involved in several of the annual spraying campaigns. He recalls: "We were working under whites who were coming from South Africa—there was *Kambombo*, a white man whose name I don't recall, a tall very well built man, who was well-liked by all of us. We carried *zvigubhu* (tanks) for spraying. I did not know the name, but the *mushonga* was whitish in color. The spraying camps were in Mabote or further into Mozambique at Chinyezani. The headquarters was at Border B camp inside Zimbabwe."[44]

Staff Masungwini, a local villager, now a pastor, remembers seeing these spraying teams: "The tsetse people were at Chipinda near the river Guluje. They moved around spraying *ndedzi*, following *zvikoronga* (drainages). They sprayed here in Mambile going down all the way to Mpfichani beyond the Runde."[45]

Mafrayi say they were told to target places where *ndedzi* most preferred to refuge or rest, especially in large numbers. Such areas included woodlands and riverine fringe; along roads and paths of *vanhu*, *tihomu*, and *sviharhi*

through *xanyatsi* or *musasa* woodland; heterogeneous vegetation covering a large *tshuka* (termite mound); tree vegetation surrounding cattle pens; the tree and bush cover surrounding waterholes and dams frequented by game; the vegetation growing among scattered boulders at the feet of kopjes and small hills. Inside these areas, *mafrayi* targeted tree bark, overhanging branches, rot holes in trees, holes dug by *mhandzela* (anteaters) or *nhonci-nhova* (warthog), and holes in river banks and under fallen logs. In the trees and branches, however, application was usually restricted to bark of no less than six inches in diameter and larger overhanging branches, and from ground level up to a height of twelve to fourteen feet.[46]

With their Favori-Colibris packed with *chefu* (*xitsonga* for poison; not to be confused with *chepfu*, *chidzimbahwe*—i.e., DDT and later dieldrin), *mafrayi* were lined up ten yards apart along the edge of a five-mile block; on a given command, they marched through the block, spraying all the tree trunks and thicket stems and every fallen log and every *mhandzela* hole with *chefu*. At the other side, their canisters were recharged with DDT. They were realigned farther along the cut line, and then they marched into the next section of the strip to repeat the process. On they marched, from the Rhodesian border east into Mozambique and toward the Indian Ocean.[47]

The basic unit of the operation was the spraying team, composed of one tsetse field officer (TFO) in charge, one senior "African assistant" commanding *mafrayi*, one driver, eight *mafrayi*, eight carriers of *mushonga*, and a few other odd-job men. The unit was equipped with a five-ton truck, a Land Rover, four *mishini*, two charging pumps, and a bicycle front fork and wheel fitted with a cyclometer to measure the distances covered. Also included in reserve was an extra *mishini*, a running repair kit, and spares for the less durable parts.

The procedure of spraying was as follows:

> With the officer-in-charge leading the way with his marked aerial photograph, the team moves along, spraying the drainage line or contact, normally four abreast, but along narrow spraying lines only two abreast. As soon as the first of the four machines is empty, the whole team is stopped and all machines are recharged with insecticide. The mileage covered and all other relevant data are carefully recorded on a special field record form before the team moves on to discharge its new fill of insecticide. As the team proceeds, each sprayer operator covers a 15-yard swathe, spraying the boles and undersides of overhanging horizontal branches of all the larger trees within the spraying zone, up to a height of about 12 feet. Other important sites of application are the undersides of fallen logs or large rocks, rot holes and those dug by antbears. Special attention is also paid to all vegetation in the vicinity of water-holes. (Robertson and Kluge 1968, 21)

To measure spray effectiveness, changes in *ndedzi* catch were measured using cycle and ox flyrounds and at traffic control points like tsetse gates, and tests were conducted for *n'gana* incidence as well.

Vachena called *vatema* "spans" (*zvipani*), the term given to oxen yoked up to pull a plow or wagon; this led to the view of *kupureya* as *kubopwa pajoki* (being yoked on a yoke). The teams "moved forward in two spans of five, each span stopping simultaneously for refueling, and refilling with insecticide."[48] The spraying operations along the Chiredzi River, for example, were conducted in that manner, in a militaristic way:

> The RM [right marker] of Span 1 walks down the initial path, and acts as right marker for the relief operators of each machine, who work in front, keep the 40 yards dressing, and chop a path where needed.
>
> A *panga* man follows in the wake of No. 5 machine, and blazes a path to be followed by the RM of the second span. In turn, a path is blazed behind No. 10 machine to guide the RM of Span 1 on the next leg.
>
> Thus 44 men are required for the ten machines, plus another 4 at the vehicles. When the machines are moving parallel to the river, No. 1 machine works at the bottom of the bank, No. 2 at the top, and No. 3 dresses off from the top of the bank, there being 4 machines in each span. Sometimes a third machine would work in the river bed if the vegetation warranted it.[49]

While one *mufrayi* sprayed, the other would be recording the distance traversed during the insecticidal discharge "by means of a bicycle wheel fitted with a cyclometer."[50] River courses or narrow vleis required teams to operate simultaneously in two pairs to ensure that both sides were sprayed.

The Humani-Devure operations were conducted using the Chiredzi spray as a blueprint. For twenty-six days (between August 15 and September 15, 1960), ten teams of *mafrayi* started early in the morning. Each team was equipped with one Motoblo shoulder-mounted motor mistblower, covering 400–500 yd. blocks. The woodland zones to be treated were marked clearly on the operational map. All ten teams were supposed to cover a total surface area a mile wide and four to five miles long per day. Just as in Chiredzi, two men operated one *mushini*, two carried *mishonga*, one cut the path ahead, and two carried fuel and refueled the *mishini*. Five *mafrayi* designated as "survey hands" supervised the teams.[51] Before the operation began, fifty men cut spray paths in the thicket vegetation along the Tugwi River. In nine days, they had cut over one hundred miles of path. Some areas were so thickly forested that they had to cut tunnels through them, with tapestries of canopy above and on either side.[52]

For transport between the base camp and spray site, the ten teams were supplied with one five-ton long wheelbase lorry with a driver and one Land Rover pick-up truck.[53] Each machine took up ten five-gallon drums of

mushonga per day; only the five-tonner could carry enough for ten machines. Sixty-five to eighty empty five-gallon drums remained on the lorry. Dieldrex 15 was pumped from a raised point on the left, and one gallon was placed in each drum. From the bowser at the raised water point on the right, water flowed down an extension pipe to fill the charged drums up to the top.[54]

This proved to be a very rapid system; four men could load *mushonga* in two hours. All *mushonga* required for a full day's spraying sortie was mixed at the base camp in the afternoon the day before it was to be used and transported to the spray area on the five-tonner on the day of spraying. Gasoline for the *mishini* was carried in four-gallon drums, containing a 32:1 (gas to oil) mixture.[55] A gallon of 18.6 percent Dieldrex was pumped with the aid of a semirotary petrol pump out of the drum into another containing four gallons of water. A five-gallon drum of Dieldrex 15 T produced twenty-five gallons of 3.6 percent weight/volume (w/v) emulsion (the first coat of spray) and fifty gallons of 1.8 percent dieldrin emulsion (the second coat after two months). This figure varied; in the 1966 operation in the north-eastern districts of Mudzi and northern Nyanga, the Tsetse Branch used a 3.1 percent emulsion formula.[56]

Thirty miles of track were cut to enable the five-ton lorries to carry *mafrayi*, *michini*, and *mushonga* along the Savé and Tugwi Rivers. On the latter river, a low-level bridge was constructed to shorten the distance between the operational camp and the sites of spraying. The lorry carrying *mushonga* followed the spraying team closely, on tracks when they were available or across country. Ready access to *mushonga* was essential; when the distance between the team and lorry widened to half a mile, supplying *mushonga* became a serious problem, because each *mushini* consumed two drums per hour. After loading their *mishini* and *mushonga*, the spraying teams clambered onto the back of the lorry. Sometimes, a couple of Jeep pick-up trucks were available.[57]

The workday started at 6:30 a.m., when all the men would board the trucks that were already loaded with *mushonga* drums mixed the day before. On disembarking on site, the teams—clad in protective overalls but no shoes, gloves, goggles, or headgear—began the technical and muscular work of *kupureya*. The *murungu* instructed the teams to line up at the start line forty to fifty yards apart. With all tanks loaded with *mushonga*, the teams started forward, each along a defined axis until they reached the end of the designated block, four to five miles away.[58] The spray tanks were usually empty within five to fifteen minutes depending on the type of vegetation; tree boles were sprayed on one side only.[59] The *murungu* strictly instructed the men to fill spray tanks without any splashing to avoid both self-poisoning and waste. Therefore, *mafrayi* were supposed to first pour

mushonga into a bucket and then pour more carefully into their *mishini* using a funnel.[60] It was the duty of the TFO to closely supervise the application of *mushonga*, and he constantly moved among *zvipani* (spans), explaining and demonstrating spraying techniques whenever there was a problem. He was the on-site mechanical engineer, walking behind and driving all *zvipani*, repairing any machines that broke down, and seeing to it that distances between *mishini* were maintained, that all *zvipani* were kept in line, and *mushonga* properly applied.[61]

The *mushini bhoyi* (machine boy, as the sprayman carrying the pneumatic machine was called) was a very important player in this technical process. He was supposed to keep the largest aperture on the dosage slide, to obtain and dispense a coarse droplet capable of issuing a more persistent deposit compared to a fine droplet. A larger aperture had the advantage of releasing *mushonga* more rapidly, thereby increasing the spray coverage rate and making the rate of progress faster.[62] *Mafrayi* were supposed to achieve an even *mushonga* distribution, and each spray target demanded a different approach. For instance, a single tree bole or small bush required a brief discharge of mist. A large hollow thicket demanded a prolonged discharge, the bombardment creating a cloud of mist inside the thicket. The *mufrayi* deposited *mushonga* on all vegetation within three to four yards of the spray line, either side of it, and from the ground up to a height of eight to ten meters into the tree branches and thickets.[63]

Conclusion

In *Transient Workspaces*, I showed that the presence on the borderlands of poachers and illicit labor recruiters like Cecil Bvekenya Barnard forced neighbors Southern Rhodesia, Portuguese East Africa, and South Africa to cooperate in the 1910s and 1920s. In the 1930s, the mobilities of African Coast Fever, FMD, and then *ndedzi* from Mozambique—as passengers in/on *mhuka* and *mombe*—led to the abandonment of plans to create a vast transboundary game reserve (Mavhunga and Spierenburg 2009). The escalating movement of *ndedzi* from the Rio Savé area of Mozambique to the south and west in the late 1950s shocked the three territories into establishing ISCTTCSEA and commencing one of the biggest, most sustained spraying campaigns in the history of anti-*mhesvi* operations. This interstate cooperation was forced upon southern African territories by *mhesvi*.

As a site, *kupureya* thus became a transient laboratory in which *mishonga* and *mishini* became experimental material and in which new forms of *ruzivo* were produced. At that site, *vatema* were not just tools of empire

but key intellectual agents and experimenters. The *mishini* and *mishonga* were placed in their hands to destroy *ndedzi* and end its pestiferous mobilities. The transient work of *kupureya* has been examined foremost as a workplace populated by *vanhu vatema* under the yoke (hence a span, *chipani*) of *murungu*/*muchena* who supervised them but did not personally handle *mushonga* and *mushini* (barring giving brief instructions). *Kupureya* has been analytically repositioned not just as the execution of *murungu*'s orders, but as work demanding new and preexisting modes of *ruzivo* on the part of *mafrayi*. We have seen *mishini* put to work in roles they were not originally planned for, coming in as *potential* rather than *actual*, *proven* means and ways of spraying *mhesvi*. The emphasis on *potential* is important because, as shown, no inbound thing comes into Africa as technology a priori; it proves itself as such in the hands of the people, as they deploy it to perform specific tasks. The rapid turnover of *mishini* shows that things that were technological (fit for purpose) in one part of the world (Europe or North America) were utterly useless in another (Africa).

It bears reemphasizing that the central actor in *kupureya* was not *murungu*; he did not do the spraying. Rather, it was *mufrayi*, the applicator of *mushini* and *mushonga*, who could tell whether *mushini* was working or not. Here too, the *ndedzi* presence in punishing terrain ensured that only *vatema* could do such exacting work, based on their longstanding presence and experience in the countryside. Tellingly, the fate of all these artifacts of North America's and Europe's industries—the Four Oaks, Motoblos, Schefenackers, Colobris, and so on—and their becoming or failing to become technology in Southern Rhodesia depended on the experience and opinions of *vatema*. Their *hunyanzvi* (expertise) was based partly on the experience acquired from continued *kupureya* and the experience with each *mushini*, the problems it caused, and how a new one solved them or made them worse. It also derived, more fundamentally, from *mweya* (spirit) of *husiki* (creativity) and *kushingirira* (resilience), or creative resilience drilled into *vana* (children) in the professoriate of *chivanhu* (custom—defined not simply as frequent repetition of the same act, but as means and ways and as methods of doing, living, and deploying).

The chapter has not only shown how these men were organized and conducted *kupureya*, but also engaged their views of what they were doing, as revealed in their memories. The combined written, oral, and field-observed evidence not only shows how dangerous a site of work *kupureya* was; this arduous work has been shown to be as much about exterminating a *mhesvi* as it is a site of applied knowledge production on the move.