**Technically Subversive: Encrypted Communication in the
South African National Liberation Struggle**

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Abstract

This dissertation investigates an encrypted communication system (ECS) that was developed by the African National Congress Technical Committee (ANC TC) and operated by a number of South Africans, Dutch and Canadians especially who were active in the South African liberation movement in the 1980s and early 1990s. The ECS allowed freedom fighters on the ground in South Africa to communicate secretly and transnationally with the exiled senior leadership of the African National Congress (ANC) based in Lusaka, Zambia via London, Great Britain. The encrypted communication system was integrated as part of Operation Vula in the mid-1980s, an operation that aimed to launch a people's war and ultimately liberate South Africans from apartheid. The ECS ultimately expanded to at least nine different locations across the African, European and North American continents.

The aims of this dissertation are threefold. First, to provide a comprehensive account of the encrypted communication system (ECS) from the perspective of those who participated in it. Second, to analyze and understand the ECS from three perspectives: the ECS as a social and political project set up by the Technical Committee, from the standpoint of the politics of infrastructure based on historical and contemporary accounts, particularly in the Global South, and as rooted in the history of media and communication in revolutionary and liberation struggles. And thirdly, to bring Black, Caribbean and African radical traditions into the fold of communication and science and technology studies.

Methodologically, this thesis employs mixed data collection methods based on empirical and archival materials. Freedom fighters who developed and operated the system were interviewed through one-on-one semi-structured interviews in South Africa, the Netherlands and Canada. Archival research was also carried out in personal and publically-accessible archives in South Africa, the Netherlands and Great Britain.

Résumé

Cette thèse porte sur un système de communication crypté (SCC) qui a été développé par le Comité technique du Congrès national africain (CT ANC) et exploité par un certain nombre de Sud-Africain.e.s, de Néerlandais.es et de Canadien.ne.s qui ont participé au mouvement de libération de l'Afrique du Sud dans les années 1980 et au début des années 1990. Le SCC a permis aux combattant.e.s de la liberté sur le terrain en Afrique du Sud de communiquer secrètement et de manière transnationale avec les hauts dirigeants en exil du Congrès national africain (ANC) basé à Lusaka, en Zambie, via Londres, en Grande-Bretagne. Le système de communication crypté a été intégré dans le cadre de l'opération Vula, une opération qui visait à lancer une guerre populaire et, à terme, libérer les Sud-Africain.e.s de l'apartheid. Le SCC s'est finalement étendu à au moins neuf lieux différents sur les continents africain, européen et nord-américain.

Le but de cette thèse est triple. Premièrement, fournir un compte-rendu complet du système de communication crypté (SCC) du point de vue de celles et ceux qui y ont participé. Deuxièmement, analyser et comprendre le SCC selon trois perspectives : le SCC en tant que projet social et politique mis en place par le Comité technique, du point de vue de la politique d'infrastructure basée sur des récits historiques et contemporains, en particulier dans le Sud global, et ancré dans l'histoire des médias et de la communication dans les luttes révolutionnaires et de libération. Et troisièmement, faire entrer les traditions radicales noires, caribéennes et africaines dans le giron de la communication et des études scientifiques et technologiques.

Sur le plan méthodologique, cette thèse fait appel à des méthodes mixtes de collecte de données basées sur des documents empiriques et d'archives. Les combattant.e.s de la liberté qui ont développé et fait fonctionner le système ont été interrogés dans le cadre d'entretiens individuels semi-structurés en Afrique du Sud, aux Pays-Bas et au Canada. Des recherches ont également été menées dans des archives personnelles et accessibles au public en Afrique du Sud, aux Pays-Bas et en Grande-Bretagne.

Acknowledgements

The idea for this dissertation came about in a graduate seminar on sabotage organized by Professor Darin Barney in the winter 2015. Darin had invited me to the seminar when I was a project administrator working for Media@McGill. A year and half later, I embarked on a PhD with him as supervisor. Darin has been a caring, generous and thoughtful supervisor throughout my PhD studies. I am also grateful to Professor Gabriella Coleman who invited me to join her reading group Bits, Bots and Bytes (BBB) prior to becoming a graduate student and who has always been generous in her advice, encouragement and interest in my research project. I also extend my thanks to Professor Carrie Rentschler for her generosity prior to and during the course of the PhD. Finally, I would like to thank the entire faculty and staff of the Department of Art History and Communication Studies (AHCS).

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Acronyms

AABN	Anti-Apartheid Beweging Nederland (Dutch Anti-Apartheid Movement)
AAM	Anti-Apartheid Movement
ANC	African National Congress
ANC TC	African National Congress Technical Committee (or TC)
BCM	Black Consciousness Movement
BSSRS	British Society for Social Responsibility in Science
CES	Community Exchange System
CTTE	Cape Town Talent Exchange
CPSA	Communist Party of South Africa
DTMF	Dual-Tones Multi-Frequency
DLB	Dead-Letter Boxes
ECS	Encrypted Communication System
FLN	Front de libération nationale
FRELIMO	Frente de Libertação de Moçambique
ISP	Internet Service Provider
MK	Umkhonto we Sizwe
NEC	National Executive Committee
PAC	Pan-Africanist Congress
SANNC	South African Native National Congress
SACP	South African Communist Party
SASOL	South African Synthetic Oil Limited
SfP	Science for the People
ST4P	Science and Technology for the People

SWAPO	South West Africa People's Organisation
TANU	Tanganyika African National Union
TC	Technical Committee (or ANC TC)
ZANU	Zimbabwe National Union
ZAPU	Zimbabwe African People's Union

Introduction

The time comes in the life of any nation when there remain only two choices - submit or fight. That time has now come to South Africa. We shall not submit and we have no choice but to hit back by all means in our power in defence of our people, our future, and our freedom.

Manifesto of Umkhonto we Sizwe, 16th of December 1961

This dissertation examines an encrypted communication system (ECS) that was developed by the African National Congress Technical Committee (ANC TC) and operated by a number of South Africans, Dutch and Canadians who were active in the South African liberation movement in the 1980s and early 1990s.[1] The ECS allowed freedom fighters on the ground in South Africa to communicate secretly and transnationally with the senior leadership of the African National Congress (ANC) based in Lusaka, Zambia via London, Great Britain. While the initial communication nexus was between Durban, London and Lusaka, the ECS would later be operated from major cities in South Africa, namely, Cape Town, Durban, and Johannesburg as well as from Amsterdam, York, in Great Britain, TallCree, in Alberta, Canada and Harare. It was also tested in Paris, but never operationalized. The encrypted communication system was integrated as part of Operation Vula in the mid-1980s, an operation that aimed to launch a people's war and ultimately liberate South Africans from apartheid.

In the 1960s, the South African national liberation movement saw its leaders imprisoned, or forced underground or into exile. As a result, the leadership of the African National Congress (ANC), the Pan-African Congress (PAC), and the South African Communist Party (SACP), all of which had been banned, no longer had a public presence in South Africa. Those who

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[1] It is to be mentioned that a few Americans, Belgians, British and Germans were also of assistance.

continued the struggle were forced to do so clandestinely, or from locations outside the country. The externalization of the national liberation struggle led by the banned political parties, far away from the masses, required a number of new responses to deal with the situation. Twenty years later, in the mid-1980s, Operation Vula and the ECS became a response to this situation for the ANC, SACP and Umkhonto we Sizwe (MK), the military wing of the ANC, with the purpose of bringing key leaders back from exile to steer from the ground the machinery of mass movement against the apartheid regime.

In the early 1980s, the ANC Technical Committee recognized that because of the externalized status of the national liberation struggle, a means of rapid, secret and transnational computer communication was needed. Over almost a decade, the ANC Technical Committee experimented with telematics (computers + telephone), programming and encryption, and came up with an early version of the ECS, which was to be included in Operation Vula from the start. From then on, the ECS was to be improved and updated during its few years in operation. While the successful deployment of an encrypted communication system is remarkable at a time when the Internet as we know it today did not yet exist, the ANC already had a history of setting up clandestine forms of communication in order to deal with the challenges of leading the struggle clandestinely and from a distance. This included underground radio broadcasts, radio-pens, leaflet-bombs, invisible ink and handwritten cryptography, among others. It is mostly through the Technical Committee (TC) that the alliance between the ANC, SACP and MK experimented, developed and then deployed highly sophisticated computer communication strategies for sending vital information across borders in support of the armed struggle and for avoiding state censorship.

The TC was first started by the South African Communist Party (SACP) to assist the ANC in the liberation struggle, and later came to be known as the ANC TC. The SACP support for the ANC's goal of national liberation aligned with the 6th Communist International of 1928 where it was decided that "the role of communists in South Africa was to work with the nascent national movements (the ANC was specifically mentioned)" (Cronin & Mohubetswane Mashilo, 2015, p. 24). The SACP—known as the Communist Party of South Africa (CPSA) before it was banned in 1950, and re-constituted clandestinely a few years later under the name SACP—the ANC and MK came to work hand-in-hand during the national liberation struggle, and were all involved in Operation Vula.

Operation Vula was launched in the mid-1980s following decades of struggle that failed to dismantle the oppressive White[2] supremacist regime in place in South Africa since 1948 (Henderson, 1997; Motumi, 1994; Williams, 2000). It came right after the insurrectionary period of 1983-1986 where Black South Africans took the physical and political control of their townships, and the ensuing states of emergencies, which ended the insurrection (Ellis & Sechaba, 1992; Price, 1991). The operation aimed to (re)create the conditions for an armed struggle[3]— what was called a people's war—and facilitate the direction of the struggle by the physical return of the ANC, SACP and MK leadership to the country.

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[2] I have decided to capitalize the B in Black and the W in White to affirm that being Black and being White are races and that race is a social construct. The C in Coloured and I in Indian are also capitalized throughout this dissertation. While this gesture is to call attention to how Whiteness functions in our societies, I condemn the use of the capital W in White when it is being used by White supremacists to evoke racial domination and violence.

[3] In his autobiography *Long Walk to Freedom* Nelson Mandela (1994) compares the struggle in Algeria as resembling the most to the South African national liberation movement. Fanon and Mandela never met, since Fanon died of Leukemia in 1961 in the United States, but his book *The Wretched of the Earth* alluded to South Africa. Additionally, Fanon's ([1969]2001) ideas, writing and practice were of commensurable importance in the context of the late 1950s Africa. In 1958, Fanon argued and defended the Algerian method of armed struggle at the All-African People's Conference in Ghana thereby questioning the up to now prestigious non-violent Gandhian method used by former British African colonies to gain their independence (Young, 2006). Witnessing the successful Cuban Revolution in 1959, Fanon's ideas gained traction among national liberation movements in Africa (Young, 2006).

A people's war was a frequent strategy among colonized or oppressed countries from the 1950s onwards in places such as Algeria, China, Cuba, India and Vietnam. It was a concept first developed by Mao Zedong, but which took a life of its own in varying Third World instantiations (Liu, 2016). In the context of South Africa, a people's war was defined in the Green Book[4] as a "war in which a liberation army becomes rooted among the people who progressively participate actively in the armed struggle both politically and militarily, including the possibility of engaging in partial or general uprising" (O'Malley, 2007, p. 207).

As part of Operation Vula, an encrypted communication system was set up to facilitate secret and transnational communication between those in the field and the leadership in exile. Vula—short for Vulindlela, meaning "open the road" in Zulu (Braam, 2004; Henderson, 1997; O'Malley, 2007)—was envisaged at a time when there was a political crisis within the liberation struggle where the ANC had violently repressed some of its own recruits in Angola (Ngculu, 2010) and when the leadership was unable to agree on a political strategy to move forward with the struggle. Vula also happened in a South Africa that had seen an increased level of militarization of the apartheid state which many considered a context of near civil war inside the country and destabilization in the Frontline States (O'Malley, 2007). Operatives of the ANC, SACP and MK were routinely targeted by attacks and if arrested, tortured and/or killed either inside or outside the country.

Aims of the Dissertation

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4 Also known as the 1979 Report of the Politico-Military Strategy Commission to the ANC National Executive Committee. It is in the Green Book that the concept of a people's war begins to be part of ANC narrative.

The aims of this dissertation are threefold. First, to provide a comprehensive account of the encrypted communication system (ECS) from the perspective of those who participated in it. What was the ECS and how did it come about? This apparently simple question contains considerable complexity, which will be explored in this dissertation. In particular, the dissertation will seek to answer the following questions: What roles did the ECS play in the context of the South African national liberation struggle? How was the ECS organized, executed and operated technically? Who were the people involved in the ECS, and what were their backgrounds, roles and relationships?

To reflect on the operatives' experiences, interviews were conducted with those who developed, participated, used and/or supported the ECS in South Africa, the Netherlands, Canada, Great Britain and France. Archival research was also carried out in personal and publically-accessible archives in South Africa, the Netherlands and Great Britain.

The second objective of this dissertation is to analyze and understand the ECS from three perspectives: the ECS as a social and political project set up by the Technical Committee, historical and contemporary accounts of the politics of infrastructure, particularly in the Global South, and the history of media and communication in revolutionary and liberation struggles. For this second objective, I explore the following questions: What was the ANC TC, what were its science and technology influences and how did it assist the struggle over time? Answering these questions help explain the trajectory that led to Operation Vula and the ECS. How does the ECS represent and illuminate the politics of infrastructure, particularly in the colonial (anti-colonial/slavery, post-colonial, neo-colonial, de-colonizing) condition of the Global South? How should the ECS be situated in the history of media and communication in revolutionary and liberation struggles, particularly in the Global South and in anti-colonial/anti-slavery struggles?

The third objective takes the form of an intervention, which aims at weaving together the Black, Caribbean and African radical traditions with communication and science and technology studies. The work of connecting the distant past to the contemporary has been emphasized by current critical race studies scholars in communication and science and technology studies (STS) (Benjamin, 2019; Broussard, 2018; Noble, 2016) to bring light on the history of media and communication in movements for emancipation. The material I bring together in this dissertation supports anti-colonial and decolonial visions of the world. As with all knowledge production, mine is situated (Haraway, 1988). I started this research with an interest to unravel a technical practice I was amazed by and which I thought needed to be better known particularly within the Global North hacker movement. In the course of reading and writing, this initial focus shifted and led me to delve into an extremely rich tradition of communication practices within anti-slavery, anti-colonial and anti-apartheid movements. While I remain committed to shedding light on the ANC TC and ECS from those who participated in it, one of the goals of this dissertation, the arguments presented supports the resurgence of anti-colonial and decolonial communication practices. Being attentive to such communication practices is a political act in and of itself and as part of a long history of asymmetry and domination in knowledge production (Willems, 2014).

What I hope will emerge from these objectives and questions is a detailed account of the politics of and social relations embedded in the development and use of a communication system that demonstrates that researching a historical case study in the Global South advances our conceptual and practice-based understanding of communication, and science and technology

studies; a continuity within the Black, Caribbean and African radical[5] communication practices

to further goals of freedom; that communication systems are always part of larger socio, cultural,

economic and political processes; the crucial aspect of resistance to fight against injustices and,

the importance of the act of remembering to keep the history of resistance alive.

A Tech-Savvy Movement

Exploring the understudied intricacies of the ANC Technical Committee and ECS of

Operation Vula begs the question: Why is it so little known that the South African national

liberation struggle, mostly through the work of the Technical Committee, had a tech savvy

component? The African National Congress (ANC), Umkhonto we Sizwe (MK) and South

African Communist Party (SACP) have not been portrayed nor perceived as scientifically and

technically savvy entities fighting together to end apartheid. Further, researchers have argued

that the ANC, MK and SACP lacked military professionalism (Ellis, 2012; Duncan, 2018;

McKinley, 1997). This is despite the sabotage campaigns that relied on highly secretive

operational units, especially those carried out in the 1980s to strike a blow at the regime (Slovo,

1986; Wieder, 2013). The MK planned the sabotage of pylons, the South African Synthetic Oil

Limited (SASOL) fuel installations, electrical power stations, railway tracks, military bases and

police stations, among others (Ellis & Sechaba, 1992; Lester, 1996; Mandela, 1964; Peel, 1980;

Slovo, 1986). This is notwithstanding the development of an 'ANC Internet', which allowed

freedom fighters to communicate across borders secretly using encryption technology.

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[5] I use the term Black, Caribbean and African radical traditions to affirm that the Black radical tradition, the
Caribbean radical tradition and the African radical tradition are intrinsically connected. In doing so, I focus on the
commonality in their respective political projects for emancipation and liberation, and the retelling of history as a
liberation tool.

By contrast, the apartheid apparatus of the South African state is remembered as having been technologically advanced. Early on, the regime pursued technological projects designed to differentiate South Africa from other African countries, demonstrate its modernity through sophisticated technologies of surveillance and warfare, and impose various methods of population control ranging from passbooks to what would later become a sophisticated biometric system (Bowker & Star, 1999; Breckenridge, 2014; Edwards & Hecht, 2010; Hecht, 2012). The regime was able to achieve these thanks, in part, to international bank loans and trading activities with the international community (South African Democracy Education Trust, 2008a; South African Democracy Education Trust, 2008b). Canada, China, Great Britain, France, the USA and the USSR, among many other countries, were interested in trading with resource-rich apartheid South Africa because of high returns on investment/loans to South African enterprises (South African Democracy Education Trust, 2008a; South African Democracy Education Trust, 2008b). Companies from many of these countries were also involved in lucrative arms deals with the apartheid regime (van Vuuren, 2017). Throughout the later part of the struggle, anti-apartheid movements outside South Africa claimed that attempts were being made to automate apartheid using advanced computer technology (NARMIC/American Friends Service Committee, 1982; Komitee Zuidelijk Afrika, 1990) and called for a boycott of the sale of computers along with other technologies such as nuclear systems (South African Democracy Education Trust, 2008b; Edwards & Hecht, 2010).

Brief History of Apartheid and Resistance

From 1948 onwards the National Party, a nationalist White Afrikaner political party, established the legal framework of apartheid a word which means separation in Dutch and Afrikaner. Although segregation policies had already made their way in settler colonial South

Africa, colonized by both the Dutch and British empires, the apartheid regime implemented a more rigid framework of spatial and political division along race-lines.

Apartheid was a racial ideology that reproduced capitalist relations of production, which maintained cheap African labour for the benefits of settlers. Coupled with White economic privilege, apartheid was also about the political supremacy of White settlers. The White settlers that the apartheid regime had particularly in mind were Afrikaners, the decedent of the Dutch settlers, who they wanted to elevate into a position of social and economic privilege over the English-speaking mainly British population (Lester, 1996). The racial ideology of apartheid was accomplished through the implementation of a body of policy that banned the political participation of Blacks[6] in government, created an institutional racial classification system with Whites as the superior race, separated families based on race, uprooted Blacks into Bantustans (also known as homelands) and townships away from White areas. This was a sinister plan aimed at refuting the existence of a Black majority in South Africa and imposing passes, or passports, on Blacks to visit and work into the White areas.

Black resistance had already begun before the official national liberation struggle started in the early 1960s. In fact it is a response to the newly formed Union of South Africa in 1910[7] and its discriminatory policies that the South African Native National Congress (SANNC) later to be called the ANC was formed in 1912. It was a group composed of Black South Africans educated elite, which advocated for their rights to the British government and the newly formed

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[6] Here when I use the term "Blacks" I refer to the ways in which the Black Consciousness Movement (BCM) understood it: meaning that it includes Black, Coloured and Indian South Africans. The BCM avoided the label non-White as they favoured a terminology that was positively Black (Biko, 1979).
[7] In 1910, South Africa became a self-governing dominion of the British Empire unifying its Afrikaner and British territories. A few decades later it gained its full sovereignty.

country. The ANC strategy changed over the years starting from one of dialogue and petition, to mass mobilization and finally armed struggle; the latter being the main period of interest for this dissertation. In the early years of the ANC, petitions were sent to Britain and ANC members travelled with the hope of transforming the state of affairs in South Africa through dialogue. After 1948, mass mobilisation increased and took the form of strikes, protests and non-violent resistance. With the support of the ANC Youth League, a new ANC leadership was elected among which were Walter Sisulu and Olivier Tambo. This was the beginning of more militant actions such as boycotts, strikes and civil disobedience that culminated in the early 50s Defiance Campaign the largest non-violent resistance in the country pursued jointly with all racial groups. The first group of people who broke apartheid laws as part of the Defiance Campaign included Nelson Mandela (Lodge, 2011). Many followed suit throughout the country defying European-only entrance, sitting on benches reserved for Whites and violating other apartheid laws. The significance of the Defiance Campaign are many: it marks a period of non-racial cooperation, demonstrated the organisational skills of Black leadership, increased ANC membership and the United Nations recognised apartheid policy as an international issue, among others (South African Democracy Education Trust, 2008a; South African Democracy Education Trust, 2008b).

The official ANC strategy of armed struggle was to be initiated after the Sharpeville Massacre. On March 21, 1960, thousands of Black South Africans converged on police stations at the behest of the PAC to protest government-issued passes that required them to carry identification cards when outside their designated areas, essentially an internal system of passports used to maintain racial segregation (Lodge, 2011). The White police force opened fire on protesters, killing 69 people (possibly many more) and wounding others. In May 1960, just a few months after the Sharpeville massacre, the government proclaimed South Africa as a White

republic by organizing a Whites-only referendum. It is in this context and with the banning of the ANC that Nelson Mandela, Oliver Tambo and Walter Sisulu among many others formed Umkhonto we Sizwe (MK) the military wing of the ANC. MK was officially started on December 16, 1961 where a series of sabotage actions targeting apartheid infrastructures were coordinated. Many of the leaders of the ANC, SACP and MK who led a sabotage campaign and trained abroad to further a national liberation struggle were arrested in 1963 at Rivonia a suburb of Johannesburg where they were discussing Operation Mayibuye (meaning "take back our country") a strategy of guerrilla warfare to topple the apartheid regime. The trial took place in 1963-64 and led to the imprisonment of many of the ANC, SACP and MK leaders to Robben Island. During those years, many South Africans fled the country to continue to organise the resistance in the newly independent African nations, Britain, the USA and elsewhere.

Internationally the British, Swedish and American anti-apartheid movements were the first to organise mass solidarity movements (South African Democracy Education Trust, 2008a; South African Democracy Education Trust, 2008b). Their organising coincided with the 1952 Defiance Campaign and accelerated after the Sharpeville massacre. Churches, trade unions, non-governmental organisations, academics and concerned citizens were all allies in this international movement against apartheid. In Britain as elsewhere, the anti-apartheid movement (AAM) started advocating for campaigns of economic boycotts (consumer, trade and divestment), raised consciousness of the publics to the evilness of apartheid and pressured their governments to stop supporting the South African government. Many other anti-apartheid movements were created to support the struggle including in the Netherlands and Canada (Hope, 2011; Muskens, 2013).

With the absence of the ANC, SACP and the PAC inside South Africa, the 60s and 70s were nonetheless marked by experiments in resistance that showed cracks within the weapon-

heavy regime, and an attempt by Black South African students to bring to the streets new forms of politics developed on university campuses (Brown, 2016). On June 16, 1976, the horrors of the heavily militarized apartheid regime struck again when 176 students were massacred, shot mostly in the back, for demonstrating against the introduction of Afrikaans as the language of instruction in schools, and against police brutality (Brown, 2016; Heffernan, 2019). The students who took part in what would become known as the Soweto uprising had been emboldened by the South African Students' Organisation (SASO) who propagated the ideas of the Black Consciousness Movement (BCM) (Brown, 2016; Heffernan, 2019) and whose most famous figure was Steve Biko; by the Durban Black workers strikes of 1973; and by the collapse of the Portuguese empire in 1974 and the ensuing independence of Angola, Guinea-Bissau and Mozambique.

The pictures of the brutal police repression of the Soweto uprising emboldened South Africans and the anti-apartheid movements worldwide. The violent and deadly police reaction furthered the mobilization of a generation of South Africans in Soweto, but also across the rest of the country (Brown, 2016; Heffernan, 2019). Following the Soweto massacre and the assassination of Steve Biko in police custody in 1977, many students left the country clandestinely to join the ranks of MK in the Frontline States. Many of the Black South Africans who would come to be part of Operation Vula had taken part in and been politicized by the Soweto uprising (T. Mamela, personal communication, November 30, 2018; S. Tshabalala, personal communication, November 28, 2018; O'Malley, 2007). The 1980s would be a decade of increased resistance in the face of brutal repression committed by the apartheid regime.

The Uneventful Story of the Building of a Technical Infrastructure

The story of apartheid and the struggle to end it are reasonably well known. Typically, this is told as a story of major events and turning points (such as Sharpeville, Soweto, etc.) and the extraordinary courage, sacrifice and struggle of heroic individuals (such as Biko, Mandela, Tambo, etc.). As a case in point, the South African liberation struggle is probably best known internationally through the spirit of forgiveness of Nelson Mandela who, after 27-years of imprisonment, remained convinced of the need for a non-racial South Africa, and who became the first Black president of South Africa in April 1994. By contrast, the story I will tell in this dissertation is the uneventful story of technical infrastructures and the everyday work of the non-heroes who build, maintained and supported them. This, too, is the story of the struggle against apartheid—only from a different perspective.

It is understandable that during the national liberation struggle, the projects on which the ANC Technical Committee was working were largely unknown. The ECS in particular was part of a highly sophisticated quest to technically improve and enhance communications for the externalized ANC, MK and SACP-led efforts towards national liberation. In fact, the experimentation, building and deployment of the ECS during the 1980s were intentionally obscured from sight for strategic reasons, thereby contributing to its effacement from research and memory. But even after the end of apartheid, the Technical Committee, including probably its most well-known project, the ECS, remained largely out of sight and out of reach for many researchers—Edmunds (2014), O'Malley (2007) and Garrett & Edwards (2007) are exceptions when it comes to documenting the ECS.[8] Reasons range from difficulty interviewing

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[8] Many studies mention the existence of the ECS, but do not shed light on its history and how it functioned. From my understanding, none of the studies link the ECS to the history of the Technical Committee. They instead situate the ECS as part of Operation Vula rather than documenting the work done on it prior to being included in Vula.

participants—some are reluctant to be interviewed—to researchers passing over what they consider to be merely technical practices. In contrast, my dissertation aims at documenting this highly political practice of experimenting, developing and operating the ECS to demonstrate the importance of communication during a struggle for freedom. The interviews—some of which were granted to a researcher for the first time—and archival work, including messages exchanged through the ECS, allow for recasting the struggle against apartheid as a technological and infrastructural battle, putting a technical communication practice at the heart of a struggle for liberation. Moreover, by focusing on all those who operated and supported the ECS, rather than only focusing on the developers or Vula leaders, I tell a more holistic story of how revolutionary communication work in a liberation struggle, of the importance of solidarity and it helps recast women's role, whose contribution has been eclipsed from view, as essential to the functioning of the ECS.

As I will show in the methods section below, the archives I consulted for this dissertation project hold a number of documents on Operation Vula, the ECS and the ANC TC. Tim Jenkin, one of the main South African developers of the ECS, who was based in London and is an important informant for this project, has kept an extraordinary personal archive—some of which has now been donated to the Freedom Museum in Pretoria—including many of the messages exchanged through the ECS, interviews he conducted in the early 1990s with Vula operatives, and some of the technical equipment he used in London, among others. Moreover, the O'Malley online database hosts a wealth of fascinating and important interviews of South African freedom fighters, some of whom have since passed away and others whose interviewees are still under

Only the sections written by Mac Maharaj in O'Malley's (2007) book gestures towards the work of the ECS having been started before the beginning of Operation Vula.

embargo (i.e. not yet available for public reading). The O'Malley's platform includes the messages exchanged on the ECS that were discovered by the South African Security Branch in July 1990. As some of these are different from Jenkin's archived messages, they come to complement this message archive that I had access to in order to bring a more holistic picture of the conversations that took place from 1988 to 1991. The relative invisibility of the national liberation struggle's technical projects points to what Susan Leigh Star says about infrastructure, technological or otherwise: "[it is] by definition invisible, part of the background for other kinds of work" (Star, 1999, p. 380) and that the infrastructure might be perceived as an unexciting research object for social scientists (Star, 2002). While I will show below that Operation Vula and, at times, the ECS have been the subject of a number of personal accounts and academic publications, the Technical Committee remain largely understudied in the contemporary history of technology and communication studies.

The members of ANC Technical Committee experimented with cutting-edge technologies of the time despite the radically different context and conditions of the countries in which the ECS was to be implemented. These included videotext, telematics, telex, encryption and Dual-Tones Multi-Frequency (DTMF), among others. Star's reference (1999) to the invisibility of the infrastructure in favour of the work that infrastructure does—delivering heat from heaters, water from the tap or, in the case of Operation Vula's ECS, facilitating communication across borders in order to launch a people's war—explains, though only partially, why the TC and the ECS have largely remained out of sight, while Operation Vula has been the focus of much research. In this context, the TC and the ECS are obscured by the larger goals of the national liberation struggle and the controversy associated with Operation Vula. Further, in the case of the invisibility or "black-boxing" of the ECS (i.e., the rendering invisible

or inaccessible the technical operation of a given technology; or, its "becoming infrastructural") it is socially—not technically—produced and maintained. Black-boxing is socially produced by the conditions and relations in which the device or infrastructure is situated—the ECS was produced and used under conditions that demanded strict secrecy, and so the details of its operation were invisible to most. Now, in a different context (post-apartheid) these details can be surfaced in a manner they could not be previously.

Some of the work in this dissertation aims to show continuity in the use of the Technical Committee to assist at the science and technological levels the contemporary history of the South African national liberation movement (Chapter 1) and unveil the workings of the Technical Committee, with a special emphasis on the ECS (Chapter 2), rather than focus on the purely technical aspect of the system. Moreover, I look into the workings of the ECS as an example of a fugitive infrastructure that facilitated the exchange of messages for revolutionary goals (Chapter 3) and as a revolutionary communication practice (Chapter 4).

The members of the Technical Committee have not sought to draw attention to their technological accomplishments. Rather, they have waited for researchers, journalists and techies to come to them to understand how it was built and how it operated (T. Jenkin, personal communication, September 17, 2018). At the time, their technical work aimed to contribute to the ongoing struggle, and its secretive aspects were paramount. When it was understood that the ECS was no longer needed with the crumbling of the apartheid regime, the return of exiled operatives and the emergence of other militants from clandestinity, a few members of the TC turned their efforts to helping to get the ANC elected. They did that by setting up computer systems across the country in the run-up to the 1994 elections. They were acting in the present moment and adjusting themselves and their skills to reflect current needs.

As will be shown in the following chapters, I cannot claim that the ANC TC, Operation Vula and the ECS had a direct role in dismantling the apartheid regime—there is no evidence to back up such a claim. In fact, Operation Vula emerged when the apartheid regime was almost bankrupt, international banks had stopped lending to South Africa and international pressure from numerous governments, including the United States, Great Britain and the USSR[9] was mounting for the apartheid regime to negotiate with the ANC. Instead, my focus sheds interesting light on an understudied aspect of the development and use of communication technologies for and during a national liberation struggle. More to the point, the politics behind this initiative deserve attention, a politics that rests on the building of fugitive infrastructures that enable destabilizing actions. Fugitive infrastructures are essential components of any revolution, whether they take the form of maroon communities in the hills, the swamps or the inlands of a country (Roberts, 2015; Sayers, 2014), the Underground Railroads and Telegraph to guide slaves to freedom (Foner, 2016), or a fugitive communication infrastructure that sought to support the fight against apartheid. It is through these forms of politics that freedom lies. And often only in hindsight can such efforts be understood, highlighted and revealed.

What is striking in the communication and science and technology literature is the scant scholarly body of work on liberation movements' scientific, technical and communicational projects other than the use by social movements of the Internet (including corporate social media) to organize and coordinate their struggle (examples include the anti-globalization movement and the Arab Spring) or for mass communication purposes (such as the use of radio

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[9] Gorbachev was elected by the Politburo in 1985 as what would become the last Secretary General of the Communist Party of the Soviet Union and instituted *perestroika* and *glanost* even prior to the beginning of Vula. The Berlin Wall fell as Operation Vula was underway.

by the Algerian liberation movement, as documented by Frantz Fanon). Regarding the continent

of Africa, let's remind ourselves that not so long ago Manuel Castells (1998) wrote off the

continent of Africa as a black hole in the world wide web of the network society.

In the case of South Africa, the prohibition and censorship of mass communication in

opposition to the apartheid regime during the liberation struggle, and efforts to circumvent these

prohibitions, have been well documented. This includes work on Radio Freedom, which

broadcast revolutionary narratives abroad and into South Africa. It was extensively used by ANC

President Oliver Tambo to counter the externalized nature of the struggle, galvanize the masses

within South Africa and in the Frontline States, and is argued to have maintained the ANC's

hegemonic position (Davis, 2009; Lekgoathi, 2010). Communication practices also include the

use of freedom songs (Erskine & Palmer, 2017) and other forms of arts as a means to resist and

keep hope alive (Olwage, 2008; Seidman, 2007). Fewer works, however, have focused on

documenting the underground technological work of the South African national liberation

movement (Garrett & Edwards, 2007; O'Malley, 2007).

It is primarily historians (Baucom, 2001; Scales, 2010; Scott, 2018), revolutionaries

(Fanon, 1967; Guevara, [1960]1997; Mondlane, [1969]1983; Neuberg, [1931]1970) or

practitioners (Manning, 2003; Vigil, 1991) who have studied this dimension, and a handful of

computer scientists who have investigated hand-written encryption in revolutionary situations

(Hiệu & Koblitz, 2017), rather than communication or science and technology studies (STS)

scholars (Mavhunga, 2015). Exciting new accounts of post-revolutionary, state-led efforts to

build national communication systems have also emerged (Medina, 2011; Peters, 2016), but the

development and experimentation with communication technologies in a context of

revolutionary struggle remains understudied. This dissertation is part of an effort to show the

relevance of historical research that focuses on communication and technological efforts within a national liberation movement.

What seems to be distinctive about the projects of the Technical Committee including the ECS is that they were produced in the process of struggle. There was no clear blueprint or master plan designed by the leaders of the liberation struggle to bring about communicational and technological infrastructure. What the ANC, SACP and MK were mostly concerned about and actively working on was achieving a hegemonic position both inside the country and internationally as the only legitimate entity to be followed and supported during the national liberation struggle—over the Pan-Africanist Congress (PAC), also in exile, and the locally based Black Consciousness Movement (BCM)—and ultimately taking power in South Africa. To their credit though, it is important to stress that communication and other forms of technologies were deemed as important since the beginning of the armed struggle by given this responsibility to what they called the Logistical Department under which the Technical Committee was initially located (Operation Mayibuye, 1963). As I will show through archival work and semi-structured interviews, the ANC, MK and SACP leadership had an idea of the kind of technologies that could support their work. These were mostly technologies that aimed to strike a blow at the apartheid regime and its physical infrastructures, such as remote detonators for sabotage purposes. The idea of experimenting with cutting-edge communication technologies to further the goals of the revolution emerged as a result of many factors, including the frustration of being disconnected when on clandestine missions in South Africa, the tedious nature of using hand-written encryption across transnational borders, and the need to reconnect the leadership with its base.

A Contested and Contradictory History

The history of Operation Vula is a contested one, even more than 25 years after the end of apartheid. I enumerate below a number of the reasons why there is no consensus on Operation Vula and why it continues to be the subject of fierce debate. Based on a review of the scholarship, journalistic accounts and discussions I have had in South Africa with people who were involved in Vula and the ECS, and others who were not, I have been able to reveal a wide spectrum of views on the subject.

1) Some South African activists and scholars maintain that through Operation Vula, the ANC, an exiled and hierarchical organization, appropriated the accomplishments of local resistance movements and made it their own (McKinley, 1997; O'Malley, 2007).

2) For some, Vula was discredited following the publication of the book *The President's Keepers* in which journalist Jacques Pauw (2017) argues that members of the extended Vula network, particularly those who were involved in intelligence work, are today behind some of the major scandals of state capture (meaning the looting of the countries institutions for their own profit). This argument is also reflected in James Sanders's (2006) book who states that Vula's main legacy is to have inculcated in the mind of those who participated the importance of having one's own intelligence network.

3) Vula was seen by some ANC, SACP and MK leaders as an 'insurance policy': if the negotiation process failed, the ANC would still have some capacity to mount armed resistance (Truth and Reconciliation Commission, 1998; Kasrils, 2013; Sanders, 2006).

4) Operation Vula was not linked to any specific human rights violations apart from those perpetrated by members of the security forces against *Vula* operatives (Truth and Reconciliation Commission, 1998). However Vula is believed to have brought inside the

country a plethora of weapons that has continued to plague the country, particularly between the violent periods of 1991-1994 (Williams, 1995; Cock & Mckenzie, 1998).

5) Since Vula was a secret operation, most people within the ANC, SACP and MK were not informed about it, and became bitter as a result when the operation was discovered by the apartheid regime in July 1990 (M. Maharaj, personal communication, November 5, 2018). This perspective is in line with James Sanders (2006) who considers that Vula was an exclusive structure which was in direct contrast to the inclusive tradition of the ANC history.

6) Some say Vula is a myth, in the sense that its belief of launching a people's war existed more fiercely in the minds of those who participated in it than in reality and was blown out of proportion when it was discovered in July 1990 (Waldmeir, 1998).

7) When Operation Vula was discovered, the apartheid media portrayed it as a "red" plot (De Klerk, 1999). Historian Stephen Elis (2012) has also argued that Operation Vula was largely a communist endeavour.

8) Some researchers have argued that Vula was the ANC's most sophisticated operation (Henderson, 1997; Motumi, 1994; Williams, 2000).

9) It has been argued that Vula was too little, too late. Clandestinely sending a handful of high calibre ANC, MK and SACP operatives back into South Africa in the late 1980s missed the insurrectionary mass-movement of the early 1980s (Cherry, 2016).

10) Operation Vula was the result of the operational strategic crisis the ANC found itself in after 1986 (Barrell, 1993).

It is possible that Operation Vula was several, and maybe even all, of these things. To bring light to this contested history, I use a wide variety of sources for my analysis, including

oral history in the form of face-to-face and virtual interviews, archival work, participants' autobiographies or writings, academic literature, newspaper articles, as well as analytical and interpretative analyses. My dissertation does not seek to take a decisive position with regards to Operation Vula. Rather, I attempt to capture some of the contradictions and contested views, while remaining sympathetic to what was accomplished at the socio-technical level. I have chosen to believe my interviewees, and when possible corroborate their claims through other interviews and/or archival material. While corroboration does help to validate some of the facts and claims made, the secretive nature of the operation and the fact that some people, even today, did not know about Operation Vula or its scope—in some cases I informed participants of what they had contributed to—leave room for doubt. It is thus impossible to have a definitive and complete version of Operation Vula. Many of its corners are too blurry because of the many blind spots and the active act of forgetting—a posture many of my interviewees took to protect themselves and the movement at the time. What you did not need to know, you did not ask, and what you knew you actively tried to erase from your memory. All these reasons constitute barriers to developing a clear picture of this operation and the ECS.

What I attempt to do instead is to amplify the voices of those who took part in it, despite some of the contested and contradictory narratives coming from my interviewees and the material studied. Nevertheless, a picture of the operation, and mostly of the ECS, emerges from my material and the artefacts I was fortunate to have access to, including a few remaining pictures, some of the messages exchanged through the ECS, the ECS equipment, newspaper clippings, among others, that my interviewees generously shared with me.

Representation in the Media

The story of Operation Vula has been the subject of many journalistic accounts, particularly in South Africa and the Netherlands. Information about the operation first emerged in the South African media when it was discovered in July 1990 and soon was published in the British, Canadian, Dutch and American media, among others, mostly because of the stake these countries had in supporting negotiations and the involvement of some of their citizens. Many international media relayed the apartheid propaganda that presented Operation Vula as a communist conspiracy against the ongoing negotiations. At the time of the Vula discovery, Nelson Mandela had been released from prison and the ANC and other parties had been unbanned in February of the same year. The headlines in the South African and international newspapers initially read as: "'Red Plot' won't taint Mandela" (Breier,1990), "ANC official denies any blueprint for insurrection in South Africa" (Beresford, 1990b), "Plot claim threatens ANC talks" (Beresford, 1990a), "Maggie dragged into 'Red Plot' row" (MacLennan & Nyanka, 1990), "As ANC, de Klerk Negotiate, Rumors of 'Red Plot' Percolate" (Lyman, 1990), "7 Foreigners infiltrated SA: Claim" (Stirling & Sapa, 1990) and "Canadians accused of plotting apartheid's overthrow" (Schiller, 1990).

As time went by, the tone changed in the international press. The article "The Frontline state of a family in exile" (Maharaj, 1991) focused on the life of Zarina Maharaj and her two children while her husband Mac Maharaj, the commander of Operation Vula, was clandestinely infiltrated in South Africa. The article "Three Canadians praised for aiding rebel cause" (Schiller, 1991) provides a positive portrait of the three Canadians who supported Operation Vula in setting up safe houses in the country.

A now declassified American cable dated July 25, 1990, the date Mac Maharaj was arrested, entitled, "ANC denies conspiracy but evidence mounts," alluded to the red plot scenario also conveyed by the mainstream American media. An excerpt from the cable read as follows:

> Despite Mandela's disclaimers, the available evidence (mainly police leads to selected media) shows that an ANC underground structure is operating in South Africa, that it is dominated by communist party members and that it is well-armed and well-organized. It is also computerized. Police claim that they have 4600 pages of documentation from the Vula computer system, containing information on membership, code names, foreign support, finances, etc. (O'Malley, 1990)

What, exactly, did "computerized" mean to them in this context? In the declassified cable, the American embassy located in Pretoria understood that the ANC, MK and SACP's armed struggle had been facilitated by communication technologies, making computers at the heart of a geography of technological struggle. If the assumption that the boycott of the sale of computers had been put into effect for fear of automating apartheid, the fear of improved revolutionary goals through computer technology was now a reality the Americans were confronted with.[10]

In 1992, Conny Braam, the chairperson of the Dutch anti-apartheid movement (AABN), who had secretly helped mobilize for Operation Vula, published a book in Dutch. The book revealed not only the participation of many Dutch in Operation Vula, but Braam was also the

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[10] Many claims have been made about the technological surveillance capabilities of the South African apartheid regime. For instance, the former Chief Directorate of Covert Operations of the National Intelligence Service (NIS) has suggested that the Echelon program to which the British and the American secret services took part were picking up the signal made by the ECS and shared this information with the South African regime. They were however unable to read the messages because they were encrypted (Turton, 2010). Turton (2010) claims in his book Shaking Hands with Billy that the NIS knew about Operation Vula and the ECS even prior to its discovery in July 1990.

first to provide certain details about Vula and the encrypted communication system. The publication of her book was a bombshell in Holland: "The Dutch Version of Operation Vula" (Evans, 1992) and "Undercover agent" (Issacson, 1993). The book was released during a violent time in South Africa in the lead-up to the first democratic elections in 1994. What would become known as the "transition period" saw the assassination of Chris Hani, the Secretary General of the South African Communist Party (SACP), by a White supremacist and anti-communist, fierce street battles between the Inkatha Freedom Party—a Zulu nationalist organization—and the ANC, and violent battles between self-defence units (initially intended to protect communities in townships) and self-protection units (supported by the apartheid forces) in the townships (Cherry, 2000), among others. Moreover, it was a period when exiled South Africans who took part in the struggle were applying for amnesty to return to South Africa, and well before the South African Truth and Reconciliation Commission started its work in 1996 under the chairmanship of Desmond Tutu. Braam's book also came out prior to Jenkin's detailed article on the encrypted communication system, which was published in 1995 on the ANC website. Some were angered by Braam's book because they felt it was dangerous to publish such a story before the elections and, according to my interviewees, because it contained a number of exaggerated claims, especially regarding the ECS (M. Maharaj, personal communication, November 5, 2018; T. Jenkin, personal communication, September 17, 2018). Moreover, in 1991-1992, the latest version of ECS was still being used between Ronnie Press, one of the oldest South African members of the ANC Technical Committee, who was still based in the UK, and Jenkin who was back in South Africa. Operation Eugene had replaced Operation Vula when it was discovered in 1990 and consisted in the use of encrypted mails through a conventional telematics email system. While the 1991-1992 phase of Operation Eugene was largely dormant, except for the few

encrypted emails exchanged between Press and Jenkin, it was ready to be activated if negotiations failed or the elections were lost (T. Jenkin, personal communication, September 17, 2018).

Because her book made such a sensation, Braam and other Dutch supporters of Operation Vula, were invited onto a TV program called Sonja—the most watched talk show in the Netherlands at the time. This was the first time the story of Vula from a Dutch perspective was revealed to a wide public. They revealed that the Netherlands, especially Amsterdam, had served as a base for training Vula operatives in disguises, making or obtaining false passports for them, helping transform the gas tank of a bakkie (a South African pickup truck) into a hiding compartment to infiltrate individuals into South Africa, giving guidance for ECS development, and providing people to run safe houses in South Africa and the Frontline States, among others. The TV program also revealed that a KLM flight attendant had infiltrated computer disks, money and other items into South Africa for Operation Vula and the ECS (A. Voegelsang, personal communication, February 3, 2019).

More than 10 years after the publication of the book in Dutch, a translated version in English was published in 2004, and once again was the subject of many newspaper and magazine articles, including "Holocaust survivors funded Operation Vula" (Quintal, 2004) and "When Hope and History Rhyme" (Thamm, 2004). Other personal accounts about Vula emerged in the following decades, including Mandela's (Venter, 2018) personal letters in which Operation Vula is mentioned and a 2014 documentary entitled *The Vula Connection* (Edmunds, 2014). The film summarizes some of the more sensational aspects of Operation Vula and the ECS through a set of interviews with South Africans and Dutch.

Originality of the Dissertation

Vula has been one of the most written about operations of the South African national liberation struggle because it is still controversial, particularly with the recent South African story of state capture, and because it reads like a spy novel. Many books, articles and personal accounts touch on Operation Vula (Cherry, 2016; Jeffery, 2009; McKinley, 1997; Sapire & Saunder 2012; Shubin 2009; South African Democracy Education Trust, 2008b), but few have focused on the history of the encrypted communication system and the Technical Committee that was behind it. Many academic articles written about Vula have appeared in intelligence or counter-intelligence journals, and have focused on analyzing military aspects of the operation (Henderson, 1997; Motumi, 1994; Williams, 2000). An exception is Garrett and Edwards' 2007 article "Revolutionary Secrets: Technology's Role in the South African Anti-Apartheid Movement." The authors, who use a social movement perspective, highlight the ways Operation Vula mobilized information and communication technologies (ICTs) for social change. Their article is based on Jenkin's (1995) article and Ronnie Press'(1995) published biography, an interview with Jenkin and a review of the academic literature on Vula.

There are no major academic manuscripts or books that have been written on the ANC TC and ECS using extensive research and primary data. The distinctiveness with my study is that it is a full dissertation, not only an article, and it is based on extensive research effort in four countries namely South Africa, the Netherlands, Canada and Great Britain, including sources that have been previously unstudied or unavailable. Framing the development of the ECS prior to its inclusion in Operation Vula and as part and parcel of the ANC Technical Committee is also distinctive about my dissertation. By focusing on the role of women within the ECS, its Canadian, Dutch and Zimbabwean dimensions, the nuts and bolts of how the system was tested and how it evolved over time, this dissertation goes much further than Garrett and Edwards'

2007 article. The work that is closest to a scholarly manuscript on Operation Vula is *Shades of Difference: Mac Maharaj and the Struggle for South Africa,* written by Padraig O'Malley (2007) in collaboration with Maharaj, but is a broader look at Maharaj's life and is his recollection about Operation Vula and the ECS. I build on both of these works for my dissertation.

The originality of my research also lies in the fact that I had a chance to see, touch and reassemble the ECS equipment. Thanks to the generosity of Jenkin I have a digital version of the messages exchanged and was therefore able to study them properly. Moreover, many of my informants, particularly the Canadians and Dutch I talked to, have never previously been interviewed for an academic study on the ECS. In the methods section below, I specify which archives were consulted and some of the people I was able to interview.

Methods

My research relies on primary data that is housed in a few archives and on semi-structured interviews conducted with those who participated in Operation Vula, the ECS and/or the ANC TC. The first archive I examined was the O'Malley online archive, with a particular focus on the documents related to Operation Vula and the ECS. This online archive hosted by the Nelson Mandela Centre of Memory contains interviews conducted between 1985 and 2005 by Professor Padraig O'Malley with many key personalities who have influenced South Africa's political history, and was the basis for his book *Shades of Difference: Mac Maharaj and the Struggle for South Africa.* It also has an impressive collection of some of the messages exchange on the ECS. These messages are a good complementary resource to those provided by Jenkin.

From September and December 2018, I conducted fieldwork in four physical archives located in Cape Town, Johannesburg and Pretoria. Specifically, I visited:

1) The University of the Witwatersrand Historical Papers research archive, situated at the William Cullen Library. It contains a number of documents and newspaper clippings related to Operation Vula, and contained critical information for my research. In particular, there is the collection from Ronnie Press that was crucial for understanding the history of ANC Technical Committee and his involvement in the ECS. The personal archive of Ronnie Kasrils is also located at the Historical Papers and was important to understand Kasrils' contribution to Vula. Ronnie Kasrils, who gave me access to his collection, was an important figure in the struggle and played a key role in Operation Vula being infiltrated in the country in 1989.

2) The Nelson Mandela Centre of Memory and Dialogue in Johannesburg has a collection of papers related to Operation Vula. It is also where Lucia Raadschelders, the main operative of the ECS in Lusaka, worked as an archivist before her untimely death during my fieldwork. The Centre organized a commemoration day where many of the former Vula operatives were present and spoke beautifully about her contribution to the struggle.

3) The University of Western Cape-Robben Island Mayibuye Archives, in Belleville, Western Cape, gave me access to an interview transcript with Nelson Mandela about Operation Vula.

4) Freedom Park, a museum located in Pretoria, to which Tim Jenkin donated two years ago his technical equipment, but which is not yet available for the general public to consult. For a number of political reasons, an exhibition of the replica of Jenkin's technical room in London has never been given the go ahead. This is where I had a chance to manipulate, touch and reassemble the ECS equipment.

My fieldwork in the Netherlands was conducted between January and March 2019. In Amsterdam, The International Institute for Social History gave me access to a rich archive of the Dutch Anti-Apartheid Movement (AABN) including newspaper articles published about Vula. Given the large number of Dutch who participated in Operation Vula, visiting the archive was essential after my South African fieldwork.

In January 2020, I conducted archival work at the Bodleian Library at Oxford University. Ronnie Press gave them a collection of his work 11 years ago, but until January 2020 it was not catalogued and not made available to researchers. To my request back in 2018, Press's daughter pressured the library to make his collection accessible. A year and a half after my request, the collection which is composed of historical documents of Press time in South Africa, Ghana and Great Britain in addition to his published and unpublished work on science and technology is now accessible to researchers. In Oxford, I also consulted the Howard Barrell papers which are composed of a collection of interviews with ANC, MK and SACP leaders who were involved in Operation Vula. The interviews were conducted prior to the discovery of Vula, but are still valuable to understand the turn to armed struggle from the 1960s onwards. They include interviews with Joe Slovo, Mac Maharaj, Oliver Tambo, Ivan Pillay and Jacob Zuma, among others. While in the UK, I also conducted archival work at the British Library in London as they have a good collection of British newspapers. This collection gave me access to the representation of Operation Vula through the British Press.

In addition to archival research, I conducted 37 one-on-one semi-structured interviews with women and men who were involved in the Technical Committee, who helped develop and/or used the ECS or who contributed in different ways to Operation Vula. Most of the people

I interviewed were in South Africa, but I also interviewed people in the Netherlands, Canada, Great Britain and France.

My interviews with Tim Jenkin and our frequent email correspondences were crucial for this research. I have been in contact with Jenkin for the past six years, exchanging emails, speaking on the telephone and meeting face-to-face. Jenkin generously gave me access to his personal private archive. He has kept many, but not all, of the messages exchanged through the ECS, the *Coder program: Instructions for use* manual he shared with freedom fighters on how to use the system, newspaper clippings about Vula, the transcripts of interviews he conducted with Vula comrades, and an incomplete and unpublished manuscript he wrote in 1992 when he settled back in South Africa.

I was also fortunate to interview some of key people involved in the ECS including Mac Maharaj, the commander of Operation Vula, Janet Love, Vula's communication officer, Zarina Maharaj who helped test a very early version of the system in Lusaka, Susana Tshabalala who was the operator of the system in Durban, Totsie Memela, who was helping Vula cadres to infiltrate inside the country, among others. I made a concerted effort to trace back, convince and interview as many South African women in addition to women from other nationalities as their contributions have been understudied. There are however a number of people, mostly South Africans, I could not interview for this research—some declined to be interviewed, others only accepted to chat with me provided I did not include them in my dissertation, some never replied to my requests and some were unavailable at the time—despite my repeated requests. I was

unable to interview Ivan Pillay the coordinator of Vula in Lusaka, having a court case[11] on him at the time I visited South Africa. Having said that when I attended Raadschelders' memorial, Pillay was the master of ceremony and talked about his days as the coordinator of Vula in Zambia and his work with Raadschelders. In the circumstances, he was generous enough to put me in touch with his brother in Alberta allowing me to understand part of the untold Canadian dimension of Vula. To further unravel the Canadian dimension I interviewed 5 Canadians and to better understand the extent to which the Canadian government was aware of Vula, I made five Access to Information and Privacy (ATIP) [12] requests in December 2018. I am still waiting to receive the requested information. Furthermore, while I met and spoke to Gebuza at Raadschelders' memorial, he was the Deputy Commander of Operation Vula, I was never able to have an official sit down with him. There are other South Africans who declined being interviewed, such as those involved in the Harare Vula connection and those, except one, who were part of the Cape Town Vula connection[13]. Thus, the Harare and Cape Town chapters of Vula are not well documented in this research.

I was able to find and interview a good number of Canadians and Dutch who set up safe houses in South Africa and the Southern African region, Conny Braam who was the Dutch coordinator for Vula in Amsterdam, the Dutch KLM flight attendant who brought material

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[11] Ivan Pillay, a former Commissioner of the South African Revenue Agency (SARS), was at the time of my fieldwork in South Africa under investigation by the Public Protector for among other things irregularly procuring or authorizing the intercept of communication of other South African government departments/units to investigate corruption matters. The Public Protector's report was criticized by Pillay and his lawyer when it came out in July 2019 and they contested the report. In February 2020, the judge concluded that Pillay was a victim of state capture and no wrong doing had been done.

[12] I sent ATIP requests to Global Affair Canada, Canadian Security Intelligence Service, Ministry of National Defense of Canada, Communication Service Establishment and Library and Archives Canada.

[13] As I show in chapter 1, Mac Maharaj does not consider the group that was set up in Cape Town to host Chris Hani as part of Operation Vula. However, since the member of the group I interviewed considers himself as having been part of Vula, I include this location in the story.

clandestinely into the country, two Dutch technicians that experimented with a variety of technologies before the implementation of the ECS, two operators of the ECS in Zambia and one in TallCree (Alberta), the person who tested the ECS in Paris, in addition to interviewing a Dutch actor, costume designer, physiotherapist among others all of whom supported Vula and the ECS. The generosity of all my informants in sharing their stories and personal archives has made it possible to bring new information to light in this dissertation.

When unable to interview a number of South Africans who were part of Vula, I rely on secondary sources such as interviews made by other researchers (such as Howard Barrell, Tim Jenkin and Padraig O'Malley, among others) and/or what my interviewees told me about them and their roles. This remains a limitation of my dissertation.

Content of the Dissertation

Each of the chapters in this thesis focuses on a distinct aspect to better understand the ANC TC, the ECS, Operation Vula and the context in which they were born and operated. The first chapter, "The Technical Subversives and the Turn Toward Armed Struggle," gives a broad overview of the rise of armed struggle in South Africa from the late 1950s onwards by focusing on two operations, namely, Operation Mayibuye and Operation Vula. I show that an official group called the Technical Committee had been created and was included in the 1963 Operation Mayibuye, the discovery of which by the apartheid regime led to the arrest of the leaders of the ANC, MK and SACP. The Technical Committee was reborn in exile in the United Kingdom and was active throughout the struggle, designing and making technical artefacts for the rank and file. The Technical Committee adopted and fostered an approach called science and technology for the people (ST4P), which as I demonstrate was influenced by the launch of Sputnik 1, the Chinese and Russian use of science and technology and the writings of Russian and Irish

communist scientists. Focusing less on the controversies surrounding the strategies and tactics of the ANC, MK and SACP, while still acknowledging them, allows me to shed new light on the struggle from a science and technology perspective.

The second chapter, "Wooden Keys, Soldering Irons, Glue and Computers: A Revolutionary Toolbox," follows the development of the ECS from the early 1980s to its discovery in July 1990. I historicize the experimentation of the ANC Technical Committee with computers, programming and encryption, in particular prior to its integration within Operation Vula. I first demonstrate that the ECS was not born out of Operation Vula, but rather came out of the Technical Committee's experimentation with newly available technical artefacts in the UK and later in the Netherlands. By tracing this history, I am able to counter the repeated assumption that the ECS was born out of Operation Vula (Braam, 2004; Henderson, 1997; Garrett & Edwards, 2007; Williams, 2000). Second, by decentering and deprivileging the developers' role in the system, I reveal the impressive and complex human network that was required to enable the ECS to develop and function. I show that the ECS was equally comprised of both technical and human networks, assembled into one. By doing so, the roles and contributions of Black, Indian, Coloured and White South African women, in addition to White women of foreign nationalities, are clearly made visible. While no women were officially part of the ANC Technical Committee, they were nonetheless essential actors and contributors to the development and operation of the system.

The third chapter, "The Politics of Apartheid and Fugitive Infrastructures," situates the ECS as part of a long history of resistance through the building of fugitive infrastructures that resonated with the Black, Caribbean and African radical traditions. This chapter seeks to recast South Africa in terms of a cartography of infrastructural struggle with an attention to the

infrastructure of communication. In this context, apartheid infrastructures are first discussed to highlight the historical continuity of infrastructures of dispossession and impoverishment of Blacks and Indigenous peoples. In particular, I examine the building of railways, which set the groundwork for the infrastructural manifestation of settler colonialism, White supremacy and, later, apartheid in South Africa. In opposition to apartheid infrastructural power, I propose the concept of fugitive infrastructure to highlight the resistance of Black South Africans and their allies. I suggest that the ECS can be understood as a (fugitive) infrastructure of marronage, whereby the system comprised not only an instrument for coordinating resistance to the apartheid regime but also a materialization, at the level of infrastructure, of a potential alternative future for Black South Africans.

The fourth chapter, "Revolutionary Communication," situates the ECS in the history of media and communication in revolutionary and liberation struggles, particularly in the Global South, anti-colonial and anti-slavery struggles. The specific role of communication in the history of movements for social change is not uncharted. Underground radio, songs and other forms of art have been widely documented. However, in this chapter I highlight the importance of revolutionary communication not only in terms of propaganda, informing global audiences and international solidarity appeals, but also in the building and maintenance of secretive people's and technical infrastructures, as an important material practice in the quest for revolutionary movements to transform societies and bring down structures and systems of oppression.

In the conclusion, I reflect on the contributions and implications of this dissertation in terms of understanding the history and role of the ECS in the struggle against apartheid in South Africa, and thinking about the role of communication and infrastructural politics in revolutionary and liberation struggles more generally. I then end asking a set of questions about who are the

new revolutionaries and give a few examples of contemporary movements and groups constructing the basis for their communication and technological practices in resistance to current injustices in South Africa.

These chapters offer a set of narratives about the ANC TC and ECS to illustrate the relationship between science and technology studies, the history of a national liberation struggle and communication studies. Based on archival research and semi-structured interviews, the first two chapters reveal details about the approach that informed the Technical Committee and how the ECS came about. The last two are more interpretive in orientation, arguing the ECS represents a fugitive infrastructure and a form of revolutionary communication. Together, they form a story of how the South African national liberation struggle, through the creation of a Technical Committee, developed sociotechnical practices and technical artefacts that bring together the history of Black, Caribbean and African resistance with science and technology studies. We have much to gain from understanding the ways in which national liberation movements mobilized science and technology to further their goal of emancipation against colonialism, imperialism and domination. This dissertation represents an effort in that direction.

Chapter 1

The Technical Subversives and the Turn toward Armed Struggle

Because there were no scientific tools with which to grasp complexity, socialists and humanists did the best they could […] they set up a committee.

Ronnie Press, New Tools for Marxists, December 3, 1994

The South African national liberation movement's engagement with science and technology is not commonly known. In fact, it has yet to be considered as advancing our understanding of science and technology from a national liberation movement's perspective. In this chapter and the next, I situate the African National Congress Technical Committee (ANC TC) at the heart of these engagements. The ANC TC was a group made up of South Africans, amateur or trained scientists and technologists, initially based in South Africa. The group started thinking about and organizing around science and technology before and as part of the turn towards armed struggle in 1961. The members of the Technical Committee were to go into exile in Great Britain following the arrest and imprisonment of their leaders in South Africa and were to continue their work from there.

This chapter tells the early history of the ANC TC and focuses on the thoughts and influences of one of its early members, Ronnie Press. It documents the science and technology for the people (ST4P) approach that emerged in the late 1950s and which was to inform the ANC TC throughout its existence. Much of the history presented in this chapter on science and technology for the people has remained within the archives, hidden from view in part because of the Technical Committee's clandestine work, Ronnie Press's self-effacement and an uncatalogued archive. A newly catalogued archive at the Bodleian Library, which shed light on digitally available South African newspapers and magazines, has made it possible for me to

show the scientific and technological thinking and practice of the Technical Committee from the 1950s onwards. I also situate the ANC TC within the larger context of global conversations around science and technology at the time.

Telling the history of the ANC TC in this chapter and the next reveals new facets of the South African national liberation struggle. First, it shows that the Technical Committee's approach to science and technology for the people was influenced by major Cold War events such as the launch of Sputnik 1 and technological and scientific development in Russia and China, among others. It was not only state actors, such as the American government, that were influenced by Sputnik 1, sparking an ambitious scientific and technological research program that was to lead to the creation of the Internet (Abbate, 1999). It was also to influence the scientific and technological orientation of a national liberation movement. Second, rarely do we hear of the sophisticated scientific thinking and technological initiatives of the South African national liberation movement, and the roles scientists and tech savvy freedom fighters and their allies played in supporting freedom in South Africa through the mediation of communication technology.

This chapter has two intertwined objectives. First, I give an overview of the history of the turn towards armed struggle from the late 1950s up to Operation Vula. Focusing on the history of the ANC, MK and SACP resistance helps further explain the trajectory that led to Operation Vula and the ECS. This is done primarily by elaborating on two operations, namely Operation Mayibuye (1963), the brainchild of the MK High Command leadership from inside South Africa, and Operation Vula (1986-91), a clandestine operation concocted by the leadership in exile. These two operations embody, at the very least rhetorically, the strategy of guerrilla warfare and people's war that were advocated by the leadership, although, both were eventually discovered

before they could be fully implemented. Focusing on Operation Mayibuye is important as it is where a Technical Committee within the structure of the national liberation movement first appears. After this beginning, the Technical Committee was to be an official feature throughout the struggle.

It is the turn towards armed struggle—a general term used in the ANC strategies and tactics documents encompassing sabotage, guerrilla warfare and people's war—that led to the creation of the ANC Technical Committee (ANC TC), a group that was to later develop the ECS. The context in which the ANC TC's scientists and techies were thinking about science and technology in the 1950s was rooted in the Cold War arms and nuclear race, a technological battle between the USA and the USSR and a period in which the Republic of South Africa was investing time, money and energy in a form of science and technology that fostered domination, oppression and militarism, including nuclear weapons (Hecht, 2011, 2012; van Vurren, 2017).

Second, this chapter examines a particular idea of science and technology conceived during the struggle, especially in its beginning in the 1950s and 1960s, and which was to continue to inform the scientists and techies who were involved in the ANC Technical Committee throughout the struggle. The ANC TC was initially formed by scientists and war veterans who were members of the South African Communist Party (SACP). It would later be referred to as the ANC TC because its members were tasked with assisting the struggle led by the ANC. The TC's approach to science and technology was influenced by an excitement about the science and technology coming out of China and the USSR, underpinned by the belief that devices and machines could be used for the benefit of people's liberation as opposed to militarism, and in opposition to the type of science and technology conducted by the Republic of South Africa, which pursued a philosophy of "scientific racism" and eugenics. I demonstrate in

this chapter that while the strategies and tactics of the alliance between the ANC, SACP and MK changed over the years—from sabotage to guerrilla warfare to people's war—their science and technology for the people approach was sustained. By taking science and technology for the people as one of the entry points in telling one of the South African resistance stories from the late 50s onwards, I make visible the role played by science and technology within the movement.

In this chapter I focus only on the story of how science and technology for the people was conceived and applied by the ANC Technical Committee, especially prior to the development of the ECS, which will be the subject of the next chapter. I do this because it is in the writings of one of its early members, Ronnie Press, that the idea first appears, and because it is the ANC TC that was responsible for developing the ECS, the main subject of research for this dissertation. What becomes clear in this chapter is that the members of the TC were not simply makers and suppliers of technical artefacts, they were actively engaged in thinking about the politics of science and technology in the context of a liberation movement and the Cold War.

The material for this chapter comes from archival work undertaken at the Bodleian Library, Oxford University, which includes the Ronnie Press Collection and the Howard Barrell papers. The Ronnie Press Collection is an archive of 10 boxes, donated by Professor Ronnie Press, who taught chemistry at the Bristol Technical College before he passed away in 2009. It is composed of his published (at times under a pseudonym) and unpublished work on science and technology, including draft notes on technological development, recollections on how he assisted the struggle, invoices of technical artefacts he bought, and a series of bureaucratic papers from South Africa, Ghana and Great Britain where he lived and worked. As highlighted in this dissertation's introduction, the content of this archive was catalogued as a result of my efforts to have access to Press's memories. He was a less visible figure within the movement—though he

was one of the 156 arrested during the 1956 Treason Trial—and as such his life, thoughts and achievements have not yet been given the credit they deserve in the realm of science and technology. The collection at the Bodleian Library is unique because it is distinctly different from the content of the archive he gave to the Historical Papers at the William Cullen Library at Witwatersrand University in Johannesburg, which I also consulted. As such, this archive gives considerable insights into his understanding of science and technology for the people and his lifelong dedication to the ANC TC, specifically, and to the struggle for freedom more generally. To complement Press's collection, I consulted digitized South African newspapers (*Fighting Talk* and the *New Age* in particular) in which Press and other scientists wrote in the 1950s.

Dr. Howard Barrell's historical papers have also been consulted for this chapter. Over the course of a decade, Barrell, first as a journalist and then as a PhD student, interviewed the leaders of the South African liberation struggle regarding the evolution of ANC, MK and SACP tactics and strategies. Most of the interviews he conducted were before Operation Vula, and those conducted after it was discovered only peripherally address Vula. These interviews are nonetheless of interest in understanding the turn towards armed struggle and its continued importance for the exile leadership. Finally, other secondary sources were consulted in an attempt to make sense of the controversial history around operations Mayibuye and Vula, all of which feed into this chapter.

The Turn to Armed Struggle

At the end of the 1950s, the possibility of armed resistance had become a major topic of discussion among South Africans. The SACP, banned in the early 1950s and reconstituted underground in 1953, had about half a decade of underground experience when it came time to make the decision to turn toward sabotage (Barrell, 1993). It had set up small units of saboteurs

who carried out attacks and were to become the forerunners for MK (Barrell, 1993). Some of those who experimented with explosives and who trained comrades on how to handle them became part of the early formation of the Technical Committee. In 1959, the Pan-African Congress (PAC) spilt with the ANC for several reasons including the question of race[14], Africanist politics and the issue of armed struggle (Lodge, 2011). It also felt the ANC was not militant enough and too attached to a particular understanding of the Gandhian method of non-violence.[15] According to Barrell (1993), it is only in mid-1961 that the ANC National Executive Committee (NEC) approved of the decision to adopt sabotage with the creation of Umkhonto we Sizwe (MK) in June 1961[16]. The decision to up the ante was taken more than a year after the Sharpeville massacre on March 21, 1960,[17] the imposition of a state of emergency and the banning of the ANC and PAC among others. The newly formed MK was officially launched on December 16, 1961.[18] On that date, a number of attacks on apartheid infrastructure were launched throughout the country as part of a sabotage campaign. Communication and transport infrastructures in particular were targeted by saboteurs, including cutting the wires of the

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[14] The ANC's collaboration with the SACP, which was perceived as White led to a split within the ANC and then the creation of the PAC.

[15] Gandhi started developing his non-violent methods when he was in South Africa in the early 20th century and went on to further them in India. Initially, his methods inspired the civil disobedience movement in South Africa as many of the ANC leaders and other political parties had respect for Gandhi. Two observations are important here. First, while Gandhi's method advocated non-violence, he was not against the use of violence when necessary (Young, 2001, 2006). Second, recent South African scholarship has documented Gandhi's time in South Africa which is less rosy than the picture often painted of him: he supported the British Empire, had disdain for Africans and had prejudice toward Indian indentured workers (Desai & Vahed, 2015). Acknowledging this past is important in order to de-deify Gandhi's perception and his method, particularly in the West, and making him human, with flaws and prejudice.

[16] This was at the time when South Africa held a referendum for Whites only that led to the decision on May 31, 1961 to leave the Commonwealth and become a republic.

[17] The March 21, 1960 demonstration was organized by the PAC and not the ANC. The PAC had decided to quickly organize a demonstration against the pass laws to eclipse an ANC demonstration planned for March 31, 1960.

[18] December 16 is an important day for Afrikaners as it commemorates the Battle of Blood River, where the Boers, after the 19th century Great Trek from the Cape to what is now known as Kwazulu-Natal, went on to win a battle against the Zulus.

telephone system, breaking down railway tracks and electricity stations (Slovo, 1986). Police

stations and government buildings were also targeted.

On July 11, 1963, a year and a half after the beginning of the sabotage campaign, the

leadership of the ANC, MK and SACP was arrested at Liliesleaf Farm, a suburb of

Johannesburg. The arrest led to the apartheid regime's discovery of Operation Mayibuye

(meaning "take back our country"), which set out a course of action to take back South Africa

from White supremacist domination and put in place a revolutionary democratic South Africa

based on the Freedom Charter.[19] Mayibuye was to be implemented through a variety of means,

the most detailed and controversial of which was the launch of guerrilla warfare.[20] The plan was

supposed to be discussed by the leadership on the day of their arrest, but was cut short by the

apartheid regime's intervention.

The idea of guerrilla warfare was influenced by both the context inside the country—such

as the Zeerust and Pondoland Indigenous and peasant revolts,[21] of the late 1950s and early

1960s, respectively, against the Bantu administration (Simpson, 2019) and the Pan-African

Congress's Poqo[22] uprising in the Cape, and outside the country—the Algerian and Vietnamese

liberation struggles, and the newly minted and successful 1959 Cuban revolution. The Cuban

revolution, in particular, gave the strategy of guerrilla warfare waged by a small elite group of

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[19] The 1955 Freedom Charter was a statement of the core principles of the vision of a non-racial South Africa. It was written by the ANC and its allies under the banner of the Congress Alliance.

[20] Operation Mayibuye was controversial within the MK High Command. Barrell stresses that some of the main arguments against this course of action i.e. the launched of guerrilla warfare included the strength of the apartheid security forces, the unity and determination of White South Africans in keeping their political and economic domination, and their claims to be Indigenous to South Africa (Barrell, 1993). There was also a lack of support from nearby countries still under British and Portuguese colonial rules, the near absence of natural harbours, such as dense forests, from which to launch guerrilla attacks, and the lack of arms for the struggle, among others (Barrell, 1993).

[21] Both were heavily repressed by the apartheid regime.

[22] Poqo (meaning "only us") was the armed wing of the Pan-African Congress (PAC).

revolutionaries a legitimate status internationally and had eclipsed the Gandhian approach

(Young, 2001, 2006). In addition to armed struggle, Cuba's liberation strategy was based on

economic sabotage. Using leaflets, Castro and the rebels showed peasants how to form sabotage

squads and burn the big sugar cane and tobacco plantations, which were the main source of

revenue of the Batista dictatorship (Anonymous, 1958).

Reading the 10-page Mayibuye document[23] is extremely instructive. In only a few pages,

the document sets the course for guerrilla warfare, a very contentious subject among the ANC,

SACP and MK leadership at the time, and among scholars past and present (Barrell, 1993;

Benneyworth, 2017; O'Malley, 2007; Simpson, 2019). The draft plan, which allegedly was never

approved (Benneyworth, 2017; Simpson, 2019), stated the unlikeliness of a general uprising

within the country, and instead expressed the need for a guerrilla operation. In a short article

written by Joe Slovo (1986) entitled "The Sabotage Campaign," he stated that Mayibuye was

designed for "the return of people[24] who had been sent out to be trained as guerrillas and aim

simultaneously to prepare politically for their return to the country" (p. 24). The document

asserted that "as in Cuba, the general uprising must be sparked off by organised and well

prepared guerrilla operations during the course of which the masses of the people will be drawn

in and armed" (Operation Mayibuye, 1963, p. 1).

The core and most contentious part of Operation Mayibuye was its plan to have four

groups of 30 soldiers arrive by sea or air, supply arms and other material to the local rural

population which were to integrate the guerrilla units in their quest to liberate a few zones within

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[23] There is a shadow of doubt as to who wrote the Mayibuye document. O'Malley (2007) says it was the following trio of SACP members: Joe Slovo, Govan Mbeki and Arthur Goldreich. Simpson (2019) only mentions Slovo and Mbeki, while Benneyworth (2017) mentions Slovo and Goldreich as authors of the plan.

[24] Before the arrest at Liliesleaf Farm, operatives, including Nelson Mandela, had been sent for military training to China, Algeria, Morocco, the Soviet Union and elsewhere (Mandela, 1994; Naidoo, 2012; Slovo, 1986) so that they could carry out armed struggle.

the country. The idea was that the planes or ships would be provided by the newly liberated

African states as a gesture of solidarity (Slovo, 1986). The strategy of arriving by air or sea

rather than by land was favoured because before 1975[25] South Africa was largely surrounded by

apartheid friendly countries. As I show in Chapter 3, these countries extended a form of

apartheid infrastructure beyond South Africa's borders by protecting the regime from armed

resistance coming from neighbouring countries. In this context, it is not surprising that the

geographical insularity of a country like Cuba and the strategic success of its guerrilla warfare

were regarded as one of the models to be followed (Operation Mayibuye, 1963).

The scholarly focus on Operation Mayibuye has largely been limited to how guerrilla

warfare was to unfold and how unrealistic the plan was—some of its main critics called it a

school boy's prank or phantasmagorical (Barrell, 1993; Benneyworth, 2017; O'Malley, 2007;

Simpson, 2019). Scholars, however, have given less attention to other initiatives present in the

document, namely, the importance of simultaneously launching a propaganda campaign both

inside and outside the country. The document stresses the general "call for unprecedented mass

struggle throughout the land, both violent and non-violent" (Operation Mayibuye, 1963, p.3).

Apart from the core plan of how guerrilla warfare was to unfold, which Slovo (1986),

with the benefit of hindsight, said was naive, the reader of the Mayibuye plan can see the extent

to which many of the other strategies included in the plan were in fact implemented over the

decades. The Mayibuye document asserts the vital importance of a complete boycott of South

African goods and products, the importance of enlisting the support of international trade unions,

raising a storm at the United Nations, raising funds for the continuation of the struggle, arranging

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[25] Mozambique and Angola became independent from the Portuguese empire in 1975. Zimbabwe was under a White supremacist regime until 1980 and Namibia was under apartheid rule until 1990.

for radio facilities to influence public opinion both inside South Africa and abroad, arranging to flood the country with leaflets and appointing a National High Command in Dar es Salaam, among others.

Before the Liliesleaf Farm arrest took place, Slovo fled South Africa with a copy of the Mayibuye document. He was tasked with consulting Oliver Tambo, the president of the ANC, and other members of the external leadership about the plan (Benneyworth, 2017). Because of the arrest of the ANC, MK and SACP leaders in South Africa, further discussion of Mayibuye never happened. Instead, the 1963-1964 Rivonia Trial took place where most of the leadership was imprisoned including the young Mac Maharaj, future commander of Operation Vula, who spent 12 years in prison on Robben Island before he was released in 1976. This arrest was a terrible blow to the national liberation movement and pushed current and future freedom fighters out of South Africa in what would be referred to as the external mission (Ellis, 2012). From there on, the main goals of the ANC, MK and SACP were to attempt to re-enter the country to overthrow the apartheid government. It never happened, but the closest it got was the organization and implementation of Operation Vula, which will be explored in the latter part of this chapter.

Particularly interesting for this dissertation is the fact that the Mayibuye document speaks of the existence of a Technical and Supply Committee. This committee was located under the Logistics Department and was responsible for manufacturing and building stocks of arms and explosives, organizing the storage of supplies and training, and acquiring equipment to facilitate communication (Operation Mayibuye, 1963). Writing in hindsight, Slovo (1986) pointed to the importance of thinking about the means of production: "internally we had decided on a very

extensive programme of beginning to manufacture our own equipment inside the country in preparation for the implementation of Operation Mayibuye" (p. 25).

Two observations are important to make here. First, the Mayibuye plan shows that the ANC, SACP and MK were already designing, manufacturing and distributing their own technical and communicational artefacts while underground in South Africa through a Technical and Supply Committee. A Technical Committee continued to exist in exile in the UK, this time not for a specific operation, or at least not before Operation Vula, but to manufacture equipment for the struggle as a whole. The name and the function of the committee, located under the Logistics Department, imply that the leadership was thinking in terms of infrastructure to move goods and people and later bits and bytes, in addition to manufacturing equipment. Cadres with the necessary skills and knowledge were building technical artefacts to further the struggle (such as radio transmitters, printing presses, home-made broadcast systems and time bomb devices), and couriers were necessary to carry messages, equipment, and artefacts clandestinely along a physical infrastructure. In Chapter 3, I conceptualize this clandestine technical and people's infrastructure as fugitive. Characterizing an infrastructure as such locates the South African liberation efforts in a long history of Black, Caribbean and African resistance, and brings together Black, Caribbean and African radical traditions with science and technology studies.

Launching an armed struggle meant that scientific and technical knowledge, skills and experimentation were paramount. In spite of this, the ANC TC, including their official and unofficial members, many of whom I introduce in Chapter 2, have received little credit or recognition for their work. This speaks to the low level of attention given to technical and scientific skills within the struggle and the lack of attention by scholars to a scientific and technical practice that existed within the South African national liberation movement. Instead,

what has dominated the scholarship is the controversy over the strategies and tactics adopted by the struggle as exemplified by Operation Mayibuye and Operation Vula (Barrell 1993, Benneyworth, 2017; O'Malley, 2007; Simpson, 2019).

I now turn to the ideas and context that influenced the science and technology approach that informed the ANC Technical Committee throughout the struggle. I delve into the sources of influence of this approach and interrogate it from the perspective of those who developed it, particularly in its early phase. I do this by drawing first on the writings of Ronnie Press and, second, on a handful of Irish scientists whose work was republished in anti-apartheid publication in South Africa in the mid- to late 1950s. What is clear is that this story of science and technology cannot be divorced from the historical actors themselves and the national and international context in which they were acting.

The ANC Technical Committee

In his autobiography, Ronnie Press describes the TC as follows:

[The ANC Technical Committee was a] subcommittee set up by the South African Communist Party. Its job was to provide technical assistance for the African National Congress. Being a scientist, an engineer and more important still one who loves to potter about making things, I was chuffed to be asked to join the Party's group of technical "subversives." Before this, I had been working freelance so to speak. (Press, 1995, p. 82)

Members of the South African Communist Party (SACP) created the TC to assist the ANC's struggle inside the country a few years after the 1948 election of the National Party in South Africa. In those days, Indians, Coloureds and Whites who wanted to support the ANC's

goals[26] could do so through their involvement with the SACP, the South African Indian

Congress, or many other organizations.[27] While the TC was created by the SACP, it soon came

to be known as the ANC TC while in exile.

One of the key members of the ANC TC was Ronnie Press. Press, a White Jewish South

African, had completed his PhD in 1952 in chemistry at Witwatersrand University in

Johannesburg. He learned his practical technical and scientific skills from his parents—his

father was a cinematograph operator and his mother was a shorthand typist—and from his own

curiosity about how things worked (Press, 1995).[28] While doing his PhD, Press's access to the

university library led him to read a small pamphlet on Marxism and modern science written by

Maurice Cornforth, one of the influential thinkers of the British Communist Party. This pamphlet

had a major influence on his thinking and prompted him to read Irish and British communist

scientists including JD Bernal and Sam Lilley in addition to more classical and banned texts such

as Lenin, Marx and Engels (Press, 1995). Press's reputation as scientifically and technically

savvy gained traction in South Africa as early as the 1950s with his work within trade unions. He

joined the SACP in 1955 when it was an underground organization. The SACP was banned by

the National Party in the early 1950s only a few years after apartheid became formal state policy,

and prior to the banning of the ANC, PAC and other political formations.

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[26] What is important to understand here is that the ANC believed in the position that all who lived in the country could stay and call it their home, provided they accepted full equality and freedom for all.

[27] Only after the Morogoro Conference in 1969 did the ANC membership opened to what was then called 'non-Africans' i.e. non Black Africans. In the 1985 Kabwe Conference, the ANC National Executive Committee (NEC) also became open to them.

[28] There is little information about Ronnie Press's wife Sibyl and their daughter Estelle and the extent to which Sybil influenced him and his thoughts. The fact that she had schizophrenia and needed to take Stellazine to avoid erratic behaviour might be yet another factor in his sensitivities towards science and technology for the people.

The Communist Party of South Africa (CPSA) was created in 1921 by White workers, many of whom were mine workers and socialists. Before arriving in South Africa, many of its members had experienced workers' struggles in Europe and had been inspired by the first workers' state in Russia after the Bolshevik Revolution (Ellis & Sechaba, 1992). Their relationship with the ANC, initially fraught with tensions, solidified during the 1950s, particularly around the Freedom Charter, and during the armed struggle.

In the mid-50s, Ronnie Press was asked by Percy John "Jack" Hodgson[29]—a South African of British origin who was organizing the White mine workers, was part of the Technical Committee and became one of the co-founders of MK—to make a device that could set off explosives from afar. From then on and before exile[30] Ronnie Press's scientific and technological abilities were embraced in South Africa's communist and trade unionist circles.

A key event that was to further Press's thoughts about science and technology for the people was when he spent a month in China in 1956 after attending a peace conference in Stockholm as a scientist for the SACP. At the conference, he was encouraged to approach Chinese delegates to obtain an invitation to visit China, meet Chinese scientists and witness their new production facilities less than a decade after the 1949 Chinese revolution. Upon his return to South Africa, Press (1956) wrote an article for the *New Age*[31] newspaper entitled: *In Peoples*

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[29] Hodgson fought for the British Army in the Second World War in the North African Campaign. He was one of the founding members of the Congress of Democrats aligning anti-fascist Whites with the Congress Alliance led by the ANC. Because of his military experience, and his knowledge of explosives gained in the mining industry, he was tasked to train the first MK soldiers for the sabotage campaign.

[30] He was to leave South Africa for London in 1963 and settled in Bristol with his family.

[31] The *New Age* (1953-1962) which was known as the people's newspapers often carried stories about China, the USSR, Cuba, the newly independent countries of the Global South or their struggle to obtain independence, in addition to discussions on how science could be used for purposes other than militarism.

China I saw Science in the Service of Man.[32] The *New Age*, a newspaper close to the ANC, was founded by trade unionists, university professors and communists initially under the name *The Guardian* before it was banned and renamed. It is Ruth First, who was working at the newspaper, who asked him to write a story about his visit.[33] She had visited China together with her husband, Joe Slovo, two years earlier and had enthusiastically described the new science the people were mastering (First, 1954). What most impressed Press as a scientist was the Chinese effort towards mass science.[34]

Ronnie Press also wrote about science and technology in the left-leaning and anti-apartheid South African magazine *Fighting Talk*. This magazine was a radical political and literary journal. In both the *New Age* and *Fighting Talk* publications in the mid- to late 1950s, two Irish communist scientists stand out for their writing about science and technology: JD Bernal and Sam Lilley.[35]

As I show below, Press's ideas about science and technology can be traced back to the influence of Irish communist scientists Bernal and Lilley especially who in turn were impacted by two Soviet scientists, Nikolai Ivanovich Bukharin, the head of the Academy of Science's

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[32] This title is reminiscent of Irish communist scientist J.D. Bernal who in 1939 wrote the book the *Social function of Science* whose Chapter XIV was entitled: "Science in the Service of Man." In his autobiography, Press (1995) writes that at the time he was not yet fully aware of women's liberation and in hindsight he should have given it another title.

[33] Ruth First was a South African scholar, journalist and anti-apartheid activist killed by a parcel-bomb sent by the South African regime when she was living in Mozambique. She was the only South African woman who was part of the MK High Command at Liliesleaf Farm.

[34] Mass science means different things to different people. Robert C. Hsu (1979) understands it as scientific experiments done by the masses i.e. made by the peasants and workers in their attempt to achieve technological self-reliance. Press states in his autobiography that he was later horrified by the devastation of mass science on the Chinese people as implemented by Chairman Mao, and the persecution of scientists. While Press does not explicitly state his understanding of mass science he is likely understanding it as the Chinese policy that led to a severe famine and the death of millions hence focusing on how it was abused for ideological and political reasons.

[35] In the UK, the writings of communist scientists were to influence the 1970s British Society for Social Responsibility of Science (BSSRS).

section on the history of science, and the Ukrainian scientist Boris Hessen,[36] who travelled to the

UK in 1931 and spoke at the Second International Congress of the History of Science and

Technology in London (Sheehan, 2007, Werskey, [1978]1988). Bukharin argued that scientific

theorists needed to be closely linked to those who applied science for the social function of

science to be realized. He asserted that in a capitalist society this could not be fully achieved

because intellectuals were placed above and divided off from manual workers (Werskey,

[1978]1988). On his side, Hessen argued that the social, economic and political environment

influenced the development of science and that "science could not advance in a society which

restricted technical progress" (Werskey, [1978]1988, p. 143). In *The Visible College*, Gary

Werskey ([1978]1988) writes that JD Bernal[37] was electrified by the Soviet scientists and it is

this encounter and his following visit to the Soviet Union, which pushed him to investigate the

question of how science relates to society and how it can be used for society. He had come to

believe that science in a socialist context was to further the world and its people while capitalism

prevented the development of science for the good of humanity (Werskey, [1978]1978). The

1930s and '40s context in which JD Bernal was writing was one of the rise of fascism and then

the fight against it in Europe. Communist scientists who took part in the Second World War

strongly believed that science and technology, if used responsibly, could help defeat fascism.[38]

During the war, JD Bernal undertook a study of the impact of bombing on people and buildings.

After the war, JD Bernal became the vice-president and then president of the World Peace

Committee thereby working against the militarization of science and technology. The other

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[36] Bukharin, Hessen and other scientists perished during Stalin's purges.

[37] Gary Werskey writes: "Bernal's *Social Function* can be credited as the intellectual godfather of the social studies of science movement in Britain" (2007, p.419).

[38] The Irish and British communist scientists were not only active as scientists, they were organizers, active in the left, in the media and most active during the Second World War (Werskey, 2007).

scientist whose articles were reprinted in the *New Age* and *Fighting Talk* was Sam Lilley (1957a, 1957b). Lilley was a computer pioneer who was one of the earliest speakers to broadcast on mathematical machines (computers) and artificial intelligence (AI) on the BBC and who worked in ballistics during the Second World War.

Focusing on a number of articles written by Press and a few reprints from JD Bernal and Sam Lilley gives a window onto how science and technology was represented and understood prior to and during the turn to armed struggle within anti-apartheid South African circles. The event that sparked a series of articles on science and technology was the launch of the Russian satellite Sputnik 1 on October 4, 1957. Two weeks later, on October 17, 1957, Ronnie Press published in an article in *New Age* entitled: "A Guide to Sputnik – For the Man in the Street." Clearly impressed by the news, Press wrote that Sputnik 1 was the result of all scientists' efforts and the workers who had backed the project. Press's excitement with Sputnik was three-pronged. He wrote that it was a scientific achievement that allowed learning about the Earth, and would have direct value to the masses since satellites would improve television, radio and telephone communications. He concluded by asking how such technical advancement could in fact help fight injustice, oppression and apartheid.

In the history of the Internet, one of the common stories of the launch of Sputnik 1 is how it angered the United States because it showed that the Soviet Union was technologically more advanced (Abbate, 1999). As a result, in 1958, the Advanced Research Projects Agency (ARPA), later to become ARPANET, was set up within the Department of Defense with the explicit purpose of doing scientific research in the technological sphere to surpass the Soviet Union scientifically and technologically. The common story of the Internet has until now not told us how the Sputnik achievement had an impact on South Africans who were resisting the

apartheid regime. Sputnik's impact on Press's thinking re-affirmed the importance of science and technology for the benefits of the people who were fighting against apartheid and was to lead to the development of the ECS in the early 1980s. In fact, I show in Chapter 2 that satellite communications through radiophones was to be used as part of ECS.

Following Press's article on Sputnik 1, the *New Age* ran a three-part article series entitled: "Why Sputnik came from Russia" (Bernal, 1957; Lilley, 1957a, 1957b). In those articles, Irish scientists J.D. Bernal and Sam Lilley, who both contributed to the understanding of the relationship between science and society, explain the relationship between science and 'planning,' the importance of science and technology education in the USSR's successful launch of Sputnik 1, and the Soviet preoccupation with automation.

In those articles, it was argued that the relationship between science and planning led to the technological achievement that was Sputnik 1. This relationship was also intrinsically linked to the investment educating the masses about science and technology, whose labour would then be used for planned production goals and lead to economic development for the masses. The progress of science was perceived to be intimately interwoven with societal progress. Soviet education was given as an example to follow where, in a short period of time, research institutes were created and an emphasis was placed on science and technology education for the masses. This was seen as a way to remedy discrepancies between a long oppressed and dominated proletariat composed of peasants and workers who had not been given such opportunity before the Russian Revolution. Another important topic discussed was automation, which was believed to be the way forward for socialist nations. Instead of understanding automation as compromising and deskilling the labour force, as was the case in capitalist economies, automation was understood as enabling nation-building in a communist system. "Soviet

preoccupation with automation can, of course, be traced back to historical necessity; it is a natural development in building up a powerful industrial potential, starting from a population which was almost wholly unskilled technically to begin with" (Lilley, 1957a, p. 5). Lilley also suggested that automation in the USSR was more advanced than in the West, except that "it is behind and notably so in those promising numerical controls of the punched card or tape type" (Lilley, 1957b, p. 5). These ideas that were circulating in the late 1950s within radical South African circles influenced the Technical Committee in its quest to assist the liberation struggle at the science and technology level. Soon however members of the TC were to leave South Africa and relocate in the UK.

During the 1950s, Press was arrested several times and was represented at least once by lawyer Nelson Mandela. In December 1956, Hodgson and Press were arrested during the 1956 Treason Trial (Press, 1995). Several years later, this trial led to full exoneration for all. During the state of emergency in the 1960s, Hodgson fled South Africa. Press was released from prison and was banned from any type of legal political organizing since he had been arrested under the Suppression of Communism Act of 1950, legislation that banned the SACP and any group subscribing to communism. Press also decided to leave South Africa. After spending a year as a university professor under the Nkrumah government in Ghana—the first African country to gain its independence from British colonial rule—Ronnie Press started working at the Bristol Technical College in the UK as an inorganic chemist. This is where he was to dedicate the rest of his life to the struggle. The ANC TC, as I show in more detail in Chapter 2, was to develop an experimental practice in the ways in which it thought through and used science and technology. Further, it attempted to teach basic scientific and technical knowledge and draw from the knowledge of a variety of people to improve and test their artefacts. It was to later use computers

and their automation capabilities to increase the pace and frequency of encrypted communication in their development of the ECS.

What did *The People* Mean?

When referring to its science and technology approach, Ronnie Press used the expression *the people*. What did *the people* mean in this context? Alain Badiou (2013) reminds us that the term *the people* is not necessarily progressive and that context is what gives it a political orientation. Badiou (2013) stresses that the term was widely used as a political category during liberation struggles where the expression referred to a desired state whose existence was forbidden. Oppressed and colonized people everywhere had been denied their freedom and the possibility to identify as constituting a people (Badiou, 2013). Just like the Russian and Chinese revolutions, this expression used during liberation struggles designated a political process of achieving freedom.

The emancipatory politics associated with the term is well expressed in the South African resistance context. A people's war, which I further develop below, signalled that social transformation through a national liberation struggle by the oppressed meant the dismantlement of the apartheid state. A people's war was to be carried out in part by Umkhonto we Sizwe, the people's army. In addition to this were the people's protest and people's resistance, which meant that Blacks were demonstrating and fighting against apartheid policies. People's unity signified that Black, Indian, Coloured and White were united in their fight against apartheid, and people's education alluded to the fight against the apartheid system, which imposed an inferior education for Blacks.

Placing *the people* at the centre of science and technology recognized that scientific and technical knowledge, access and their application was important in a liberation context. As science and technology education was not widespread within the South African rank and file, with the majority barred from studying science and technology under apartheid, the ANC TC set out to write how to's, and developed tools and devices to be used to carry out the struggle. The first document I want to highlight is an innocuous artefact, a penguin fiction crime novel entitled *Smart-Aleck Kill,* by Raymond Chandler (1964) that was found in Ronnie Press's collection. The cover of this novel hides the content of a handbook entitled: *Umkhonto we Sizwe: An Elementary Handbook on Explosives*. In this handbook, believed to be written by Press and a few others while they were still inside the country, the introduction discusses how science and technology can be used by the people. The opening lines read as follow: "This little book deals with the manufacture and use of simple homemade explosives. The purpose of the book is to help spread this knowledge among our people so that we can fight the enemy more effectively" (Chandler, 1964, p.1). The how-to knowledge imparted relied on readily available kitchen equipment, such as sugar, kitchen timers, plastic bottles and light bulbs. The handbook explained the turn to sabotage and armed struggle as a means to overthrow the apartheid regime and replace it with a revolutionary democratic South Africa based on the Freedom Charter. It stressed the fact that there was no prospect for achieving freedom by peaceful means only. The handbook makes clear the importance of the diversity of tactics to achieve freedom, including strikes, demonstrations, boycotts, non-collaboration campaigns, sabotage and guerrilla warfare. Temporary sabotage activities that can be learnt from the handbook are framed as complementing the actions of the masses. The goal of the sabotage tactic is to drain the resources of the enemy, and as such must aim at political and economic targets including railways, communications, docks, storage

facilities and industrial production. The handbook finally urges those reading it to carefully study its contents as explosives had to be handled with great delicacy.

An important window on Press's (1990) understanding of science and technology for the people is his unpublished paper housed at the Bodleian Library entitled *Some Notes on the History of Technical Assistance to the Struggle for Freedom in South Africa.* This paper documents the types of technological and communicational artefacts he designed mostly while in exile to serve and be used by the people. When Press talks about the devices he made, he often highlights that more complex ideas were tested, but rarely adopted because they could not be used properly by the people on the ground. Press reveals that many of the devices fell flat because there was no enthusiasm for them in the field (Press, 1990). For technical artefacts to be widely adopted they needed to be accepted and used by the rank and file rather than the rank and file being forced to adopt them. One of the technical artefacts widely adopted in the early 1970s was a portable audio broadcasting tool. Since Press had expressed doubts that the international short-wave radio broadcasts prepared by Radio Freedom could in fact be easily heard by the people mostly because the apartheid state jammed the airwaves, he decided to create a broadcast tool to counter such problems. The broadcasting tool he designed sought to increase the chances of South Africans hearing radical broadcasts not from afar, but from nearby. He drew his idea from the early 1960s when he helped test a broadcast system in Soweto that used a tape recorder linked to an amplifier and loudspeaker to broadcast messages from a moving car. These were his first attempts at broadcasting pro-ANC messages in a township to a mass audience despite the banning of the ANC. In the early 1970s from exile, he was asked to develop a similar broadcast system, but smaller and independent of a moving car, which was seen as too expensive for many comrades to set up in the field. The small box he designed included an audio amplifier connected

to a tape recorder which would be left in a crowded area by a freedom fighter and, thanks to a

timing device, would play a short message (for about five minutes) once the operative was away.

Press reveals that these devices were highly successful in the field and accompanied the leaflet

bombs, which I will further document in Chapter 2, in broadcasting audio messages. Press

suggests that in the lull of the early 1970s, prior to the Soweto uprising in 1976, these small

"technical devices […] contributed significantly to the arousal of the masses" (Press, 1990, p. 6).

Because of the popularity and effectiveness of these small box broadcast devices, Press upgraded

them and they were smuggled into the country from the mid-1980s to 1989.

For freedom fighters to be able to travel and cross the South African border with the

different technical artefacts, Press set up a camouflage school in Lusaka. The school sought to

train comrades on how to make fake suitcase bottoms and how to empty cans to hide explosives

(Press, 1990). Press (1990) singled out women in classic sexist "nimble fingers" thinking by

saying "female comrades were by far the best in the preparation and manufacture of such

material. They had the patience and the skill" (p.15). Female comrades were largely used for

low level and less dangerous work including communications work because of patriarchy within

the liberation movement (Cock, 1989, 1994). As such they were used as couriers to carry

technical artefacts or messages because they were considered more innocuous than men and less

likely to be arrested. These ideas about female comrades were extended to the ECS as they were

recruited to operate the system. In this context, the female operators of the ECS were initially

seen as doing "simple" secretarial work, but as I will show in the following chapters their work

became an essential part for the functioning of the ECS.

Press's commitment to and belief in science and technology is reaffirmed in an article he wrote in February 1981 regarding personal computers. Entitled "Education for Liberation," he hinted at what he was already doing in terms of trying to develop the ECS. Press wrote:

> To become, for example, a computer engineer you need mathematics, laboratory facilities, a workshop, specialised books and tools, microprocessors and computers to work on and to build, skilled teachers and knowledgeable foremen who will guide and assist, days off from work to study at college or university and occasional week or month courses at special international centres. (Press, 1981, para. 6)

In hindsight, we know that in 1981 Ronnie Press had started experimenting with computers and programming as is detailed in Chapter 2. The idea was already taking shape that long-distance encrypted communication was to become essential to coordinate actions between the exiled leadership and the freedom fighters that were to be infiltrated on the ground in South Africa. What Press describes in the above excerpt is his own life trying to get literate about computers and programing for the benefits of the liberation struggle. What is not said however, and this will be further explored in Chapter 2, is that the development of British telematics (computer + telephone) was to give the ANC TC new opportunities for long-distance communication using computers and the telephone system. As a declining power geopolitically and at the manufacturing level, Britain decided to invest massively in telematics as a way to launch a new information economy (Carey & Elton, 2009). The British Post Office had been researching and investing since the late 1960s in a broadcasting technology called videotext which was envisioned as delivering information services into homes and displaying it on television sets. The service called Prestel was a commercial failure, but became instrumental for the ANC TC in building the ECS.

Press gave further insights in his article "Education for Liberation" by contrasting the possibility of learning about computer engineering in exile, as he and Jenkin had done, with the impossibility for Blacks to do so under apartheid. "There is no education that can be given to us by the South African regime which will equip us for the modern world" (Press, 1981). In other words, apartheid South Africa prevented both the education of Black South Africans, as well as that of White workers who, he said, were kept in ignorance and taught racist ways of thinking. Press believed that only in a revolutionary democratic South Africa could people independent of their race have a chance to learn science and technology. But before attaining this goal, science and technology for the people would be used within the liberation struggle.

Press's commitment to science and technology came with a vehemently anti-militarist stance. While he was simultaneously working tooth and nail on the ECS in the late 1980s, together with Tim Jenkin, he made a strong anti-militarist case in an article he published in 1988 (under the pseudonym E. Reed) in *The African Communist* entitled "How 'Star Wars' Undermines the Fight for Peace." In this article, he stressed that most capitalist countries' investment in science and technology was part of a "capitalist drive for war and world domination by the military industrial complex" (Reed, 1988, p. 51). This type of science and technology used for militarism was in stark contrast with his orientation of science and technology that favoured people's liberation. In the context of the Cold War, where massive investment in science and technology was devoted to militarism, Press did not perceive the strategies of guerrilla warfare and the later people's war as furthering militarism, but rather as forms of legitimate resistance and self-defence. As I show below, many scholars in hindsight were to understand the actions of the ANC, MK and SACP as furthering militarism. But in

Press's article it is clear that he did not see his participation in the ANC TC as antithetical to his commitment to anti-militarism.

I now turn to the historical context that led to the adoption of the strategy of the people's war and the emergence of Operation Vula in which the ECS was to be included. The goal is to provide a better understanding of the difficult context in which Operation Vula came about and why it remains so controversial today. I will return to the story of science and technology within the liberation movement in Chapter 2, following a general discussion of the strategic move toward Operation Vula.

From People's War to Operation Vula

In October 1978, a group of ANC, MK and SACP leaders, including Oliver Tambo and Joe Slovo, travelled to Vietnam to meet with the Vietnamese leadership and learn from their experiences in fighting the war against the French and the Americans. In Vietnam, Mao's concept of the people's war was used by Võ Nguyên Giáp, the commander-in-chief of the Viet Nam People's Army. His articles were translated and compiled in 1961 in the book *People's War, People's Army*. In this book, Giáp ([1961]1978) understands the people's war as a peasants' war under the leadership of the working class. A people's war was a just war, he wrote, seeking "the overthrowing of imperialism and the defeat of the feudal landlord class, the anti-imperialist struggle being the primary task" (Giáp, [1961]1978, p. 11).

Even prior to the English translation of Giáp's book, the strategy of the people's war was being advocated in different forums. As a case in point, Jean-Paul Sartre in a speech at the World Peace Council in Helsinki in 1955 reproduced in *Fighting Talk*, juxtaposed the use of nuclear bombs by a country such as the United States to the concept of a people's war. He described them as "two opposing characteristics of our times" (1955, p.10). For Sartre "a people's war is

conducted against an aggressor, an occupying power or a colonial power. A people's war can only be a war of defense or of liberation (1955, p.10). Sartre asserted that nuclear weapons, the tools of oppressive minorities were a threat to humanity, not a people's war or a people's army, which can be wiped out by a bomb.

The visit to Vietnam by the ANC, MK and SACP leaders came in a particular conjuncture. First, in the post-1976 Soweto uprising, there was a debate within the ANC as to how to build a political base in South Africa while the leadership was in exile and many South Africans were joining the ranks of the ANC and MK in the Frontline States. To steer the revolutionary potential within South Africa, it was believed that the ANC needed to be rooted inside the country. Mac Maharaj, who had just been released from Robben Island, was put in charge in 1977 of the new Internal Reconstruction Department set up by the ANC to tackle this challenge. Once out of prison, Maharaj criticized the ANC for being too militaristic and for neglecting political mobilization and organization in its strategies and tactics. Learning how the Vietnamese had brought together the military and political aspect of their struggle was one of the reasons why the delegation was sent to Vietnam (Sisulu, [2002]2014).

Second, the visit to Vietnam coincided with P.W. Botha's rise to Prime Minister of South Africa. Already in 1977, as minister of defence, Botha had implemented his pro-military stance through his "total strategy." As he believed there was a "total onslaught" against South Africa coming from inside and outside the country, measures were necessary for a total strategy to keep White domination alive. Starting in 1979, he expanded the militarization of South Africa to unprecedented levels and prevented political negotiations in favour of military solutions (Duncan, 2018). From that time onwards, covert operations were carried out by death squads,

which became widespread both inside and outside South Africa. The 1980s saw increased levels of kidnapping, poisoning, torture and killing of political activists.

The high-level team that visited Vietnam wrote a document entitled *The Report of the Politico-Military Strategy Commission to the ANC National Executive Committee*. A number of strategies were debated within this document such as the need to increase mass mobilization and to recognize that true national liberation cannot happen without social emancipation. Two options were presented: 1) seize power through a nation-wide general insurrection or 2) conduct a protracted people's war including a partial or general uprising (African National Congress, 1979). It is however only in late-1983, after the United Democratic Front (UDF) was created in South Africa to boycott the White referendum that was proposing to give limited political rights to the Coloured and Indian populations, that Joe Slovo produced a discussion document entitled *Planning for Peoples' War*. This document seriously envisioned moving from guerrilla war towards people's war (Barrell, 1993). The beginning of an insurrectionary moment in different parts of South Africa in the mid-1980s, the campaign against conscription and the increased recruitment of Blacks in the security forces among others turned the tide towards Slovo's idea of the people's war[39], an idea that until then had been questioned (Barrell, 1993).

In 1985, the ANC organized the Kabwe Conference in Zambia. It was the second National Consultative Conference of the ANC to be held in exile after the 1969 Morogoro Conference. What the Kabwe Conference did was elect, for the first time, non-Africans to the ANC National Executive Committee, including Maharaj and Slovo. Scholars have argued that

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[39] Not all scholars agree with this reading of the people's war. In her book People's War: New Light on the Struggle for South Africa, Anthea Jeffery (2009) has a very negative engagement with the term. Her book focuses on the death of civilians and understands the combatants and civilians as "weapons of war (hence the term, 'people's war')" (Jeffery, 2009, p.36).

the conference failed to agree on a political strategy and as a result was unable to seize the insurrectionary moment in South Africa to further the revolution (Barrell, 1993; Legassick, 2002). Additionally, the Kabwe Conference was considered the result of a crisis in which the remotely located ANC, SACP and MK were unable to understand the local situation and unable to come up with answers (Barrell, 1993; Legassick, 2002).

Speaking to Jenkin in 1993, Janet Love reveals that it was about two months after Kabwe that Tambo and Slovo decided that people needed to go back home to steer the liberation struggle. Criticizing the impact of exile on the struggle, she states that "this 'remote control' leadership is extremely destructive and causing us not to make significant advances, causing us not to be able to strategize properly" (Love, 1993, p.14). Love recalls the moment when cadres like her were identified to prepare themselves to go undercover:

> What happened was that very soon after Kabwe I managed to get agreement that I would be able to be sent back into the country full time. There were various people going back at this time but there was a combination of things. On the one hand there were people from the leadership level identified, like Mac [Maharaj], Ronnie [Kasrils], Chris [Hani], [Jacob] Zuma and others. This was at first decided by Joe [Slovo], and OR [Tambo]. But when they made a start it wasn't one thing. It was trying out a whole number of things which basically began to take shape as time went on. (Love, 1993, p.14)

Janet Love was among the first people who were asked to get ready for training and infiltration back into the country. After training in Cuba, she was infiltrated inside the country prior to what would be referred to as Operation Vula.

Operation Vula was officially launched in 1986. The aim of the operation was to facilitate the direction of the struggle through the physical return of the ANC leadership to the country. By

sending senior leadership inside the country it was thought to give overall political and military guidance to the struggle and launch a people's war. Vula was funded with a 100,000-rand donation from the exiled South African Joel Joffe (O'Malley, 2007). As a lawyer, Joffe was part of the team that defended the arrestees at the Rivonia Trial, including Maharaj. It is thanks to this money that the members of the ANC TC, whose work until now had been done on a voluntary basis, could work full time on the ECS. Tim Jenkin's work, which will be detailed in the following chapter, was now completely focused on making the ECS for Operation Vula.

The beginning of Operation Vula is a contested history among scholars. Stephen Ellis (2012) dates the beginning of Operation Vula to the 6th SACP meeting held in Moscow in November 1984, where the Party is said to have decided to expand its activity inside South Africa. Ellis's argument is based on the fact that he believes Vula was a communist endeavour, bringing to the fore another controversial aspect of Vula. He specifies that: "The SACP's sixth congress took a decision to expand work inside South Africa, anticipating the secret decision taken by the ANC's national executive in 1986 to launch Operation Vula" (Ellis, 2012, p. 255). O'Malley (2007) and Thula Simpson (2010) on the other hand, date Operation Vula to one of the meetings that followed the Kabwe Conference. After the conference, the NEC had agreed to meet every two months following its inability to agree on a course of action. Following one of these meetings, a group of senior leaders, including Slovo, Hani, Zuma and Maharaj, decided during a tea break in early 1986 to infiltrate a group of leaders into South Africa. It is believed that Maharaj circulated this idea of combining the internal leadership that had emerged during the insurrectionary period with the external mission leadership, some of whom were to be infiltrated into South Africa. The aim was to develop an integrated politico-military leadership structure within South Africa that would coordinate all facets of the struggle and be in direct

communication with the leadership in exile. Maharaj's idea, which was submitted by Hani, was accepted during the informal caucus and the matter was put before the full NEC. Maharaj was then asked to write a short report where he refined his thinking. His idea was to divide South Africa into regions, with each one in direct communication with Lusaka (O'Malley, 2007, p. 249). Maharaj stressed that the name Vula was selected for the region he was going to be infiltrated into, that is, Natal and Witwatersrand (O'Malley, 2007). O'Malley's (2007) description of Operation Vula reflects Maharaj understanding of Vula when he states that the operation aimed to:

> provide local all-around leadership, working with the internal leadership in Natal and Witwatersrand, in order to bring effective coordination of underground political work, mass mobilization, and military activity. It was to set up the infrastructure for a people's war, including on-the-spot military recruitment and training, and the importation and caching of arms. (p. 244)

Maharaj states that he was working on the basis that the other commanders of other regions (Western Cape, the Eastern Cape, and others) would select other names for their regional operations. Further, Maharaj (O'Malley, 2007) differentiates the endeavour of the SACP as highlighted by Ellis to send people inside the country, such as with the initial sending of Janet Love—who was to be recruited as part of Vula once already in South Africa—and Operation Vula where he argues he was the first sent in the country in August 1988 along with Vula's Deputy Commander Siphewe Nyanda.

Conclusion

In this chapter, I have documented the turn towards armed struggle and have emphasized the importance of science and technology in this endeavour. On the basis of archival material, I

show that an ANC Technical Committee was created specifically to assist the liberation struggle via its first operation, called Mayibuye, and that this committee continued to exist in exile assisting the ANC, MK and SACP-led struggle. One of the contributions of this chapter is to trace the history of the existence of a tech-and science-savvy committee whose roots were not in Operation Vula, but rather date back to the early years of the resistance.

The ANC TC's science and technology practice was influenced by their views on Chinese and Russian technological innovations, but they came to develop their own ways of thinking about and doing science and technology within the struggle. By bringing out the science and technology for the people (ST4P) approach, as developed by the ANC Technical Committee, I shed new light on the history of the South African liberation struggle. While past and current scholarship on this particular period have been dominated by the failure of the liberation struggle to live up to its promises, and categorizing Operation Mayibuye and Vula as failures or ill-conceived, my intervention rather focuses on how rich, inventive and intentional their science and technology approach and practice were.

Until now, the South African national liberation struggle has not been identified as being part of the history of science and technology. What this chapter does is document just that: a science and technology practice located under the wing of the ANC TC and which was at the service of the liberation movement. Further, their science and technology practices deserve to be seen as keeping company with radical science movements such as the British Society for Social Responsibility in Science (BSSRS) and the American Science for the People (SfP) that were both most active in the 1970s. These movements, which were addressing the issue of science and society, were largely grounded in academia, oriented towards academic discussions and tied to radical journals, though it is important to mention that the SfP had ties with non-academic radical

groups (Botelho, Chard, & Schmalzer, 2018; King & Levidow, 2016). The ANC TC, on the

other hand, was less of a space for discussion and more of a space for rapid experimentation to

come up with devices and tools that could be used by the rank and file. There was never an open

dialogue between these movements mainly because the ANC TC was clandestine, but they had

similar concerns which manifested in radically different contexts and conditions. What these

movements were doing was to affirm science and technology's importance at a time when the

New Left was losing interest in science and technology. All three were putting the people at the

centre of science and technology instead of militarism, corporatism and a fetish for science and

technology. As BSSRS and SfP slowed or died down in the 1980s, the ANC TC kept working

clandestinely to develop the ECS. In the next chapter, I document in detail the steps taken by the

ANC Technical Committee to come up with the ECS.

Chapter 2

Wooden Keys, Soldering Irons, Glue and Computers: A Revolutionary Toolbox

In this chapter, I focus on the technological ingenuity and inventiveness of the ANC Technical Committee and their allies as they developed and operated the ECS in the 1980s and early 1990s. By documenting the committee's experimentation with different types of communication devices and hardware, I reflect upon the communicational and technological practices that emerged in the run up to the ECS. I situate the development of the encrypted communication system within a larger history of communication and technological development within the movement. I demonstrate that the encrypted communication system did not come out of the blue nor did the experimentation start with Operation Vula in the mid-1980s; it came after lengthy and continued efforts over many years of exploration with communication technologies to find a way to communicate faster and more securely across borders and in radically different contexts and conditions.

In this chapter, I continue to historicize the ANC TC by focusing on the 1980s and early 1990s, and ask the following questions: How did the ANC TC come up with the ECS? How were the ANC TC and their emergent forms of communication technologies perceived and used by the ANC leadership? How can we understand it today? How Operation Vula's encrypted communication system (ECS) was developed, executed and operated technically.

This chapter aims at dismantling a few myths. First, it counters the repeated Cold War assumption that South African freedom fighters only learned and trained in secret communication in the Soviet Union, China, East Germany or Cuba (Naidoo, 2012; J. Love, personal communication, October 19, 2018; T. Mamela, personal communication, November 30,

2018). From the 1960s onwards, many were indeed trained in secret communication abroad

where they learned handwritten cryptography, book codes, invisible ink and dead letter boxes

(DLB)[40], among other techniques. While South Africans relied heavily on such methods, a few

nonetheless feared that these countries, particularly the Soviet Union, were more interested in

controlling, surveilling and to some extent deciphering, if need be, their communications, than

giving them the tools they needed for the revolution (T. Jenkin, personal communication,

September 17, 2018; M. Maharaj, personal communication, November 5, 2018). In his

unpublished biography, Jenkin (1992) stated that when the Soviets and East Germans "did give

equipment it was never their high-tech stuff but their old-fashioned, discarded stock" (ch.4,

p.13).

In the 1970s and 1980s, computerized encryption already existed, particularly in the

United States (Garrett & Edwards, 2007; Levy, 2001), but members of the ANC TC and their

comrades did not fully trust it because they believed backdoors existed (T. Jenkin, personal

communication, September 17, 2018; F. Guntenaar, personal communication, February 11,

2019). Consequently, early on, the ANC TC recognized the need to build an encrypted

communication system. In one of my regular email correspondences[41] with Tim Jenkin, he

clearly referenced this: "Victory over Leviathan requires another approach: create, don't fight.

Create something new without announcing it and quietly get on with developing an alternative

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[40] A DLB is a method used to pass items or information between two individuals at a secret location.
[41] In this email, Jenkin suggests that this practice might be used by today's hackers. In talking about European hackers he said: "I had found quite a degree of negativism amongst the hacker community that I met in Europe. There was almost a feeling of desperation in that every effort to overcome the intrusions of the state is met with even deeper intrusions. It is a battle that can't be won. I explained that our approach was not to fight the state or confront it on its own turf. That is/was a losing strategy. Instead, we operated 'outside the box' where they never expected us to go. It was a David and Goliath situation. A couple of rank and file amateurs came up with a system that not only worked but completely outwitted them [the apartheid regime]" (T. Jenkin, personal communication, February 4, 2019).

that is out of sight and that they cannot imagine!" (T. Jenkin, personal communication, February 4, 2019).

One of the aims of this chapter is to show the vital role of those who developed the encrypted communication system for a revolutionary purpose. Their work was not simply technical, it involved intellectual work to imagine and ground their practice in what Ronnie Press refers to as science and technology for the people as elaborated upon in Chapter 1 and under conditions of oppression and scarcity. It involved connecting with subject matter experts to solve technical challenges, going to tech trade fairs, training operatives to use the ECS, many of whom had never used a computer before, and believing that they could pull this off despite the lack of initial support from the leadership.

While today technical and programming skills are highly sought after, back then acquiring such skills was not immediately understood as bringing value in supporting the liberation struggle. In fact, according to my archival work and interviews, the African National Congress (ANC), Umkhonto we Sizwe (MK)—the ANC's military wing—and South African Communist Party (SACP) leadership feared computer technologies because they did not understand them (Press, 1995; T. Jenkin, personal communication, September 17, 2018; J. Tshabalala, personal communication, November 23, 2018). Furthermore, the early focus was on destabilizing apartheid through sabotage—making and fortifying movement security through the mediation of communication technologies was not seen as essential by the leadership.   It was not until Mac Maharaj, the commander of Operation Vula, and his partner Zarina Maharaj, a mathematician and former Xeros system analyst, understood the significance of having access to a secret communication infrastructure that it would be integrated into Operation Vula and approved by the leadership. Even Nelson Mandela came to use the system to communicate with

the leadership in exile while he was in Victor Verster Prison, before his release in February 1990 (Mandela, 1994; O'Malley, 2007; Venter, 2018).

This chapter also seeks to make a contribution to the history of digital media and communication studies. By historicizing the experimentation of the ANC Technical Committee with the ECS even prior to being integrated in Operation Vula, I am able to demonstrate that this practice came out of a process of emergence within a liberation struggle rather than led only by blue-print design. Such a methodological process gave them free rein to inquire, test, try, fail and accidently succeed. No visionary leader, be it Nelson Rolihlahla Mandela as co-founder of MK and later imprisoned on Robben Island, Olivier Tambo the President of the ANC or even Joe Slovo the MK chief of staff, thought about its design or even the necessity of using emerging computer communication technologies for the benefit of the struggle. The ANC leadership in exile neither understood nor prioritized experimenting with computers. The types of communication technologies that were prioritized were Radio Freedom, for mass propaganda purposes, and military type technologies such as weapons and bombs, for sabotage purposes (T. Jenkin, personal communication, September 17, 2018). Despite the leadership stance that only some technology was useful for liberation, the ANC TC had the freedom and relative autonomy to explore with technology provided they fulfilled their mandate and the technical requests[42] that came in. Without their relentless obsession and hard work over decades, the ECS might not have seen the day. While Operation Vula and the ECS in the mid-1980s became an ANC President's project—Oliver Tambo signed on to this project in addition to the newly elected member of the ANC NEC and MK Chief of Staff Joe Slovo—it was only once the ECS came to be highly

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[42] The ANC TC had frequent requests from the leadership such as providing detonators and other device for sabotage purposes. It was their mandate to fulfill these requests.

regarded by Mac Maharaj that it started to be supported by other members of the ANC, MK and SACP leadership.

Documenting the history of ANC TC and focusing on some of its main members as done in Chapter 1 and this Chapter reveal that scientists and technologists within the movement were not simply technicians. They were networkers, trainers and visionaries. They were experimenters and developers in their own right, trying to put their vision of science and technology for the people into practice for freedom fighters and for the revolution. While the Technical Committee was fully committed to the hierarchical approach of the ANC, MK and SACP leadership, the armed struggle and the belief in a non-racial[43] society, historicizing the TC demonstrates that their projects were not always directed from above. What was driving their obsession was their commitment to the struggle and their vision of an encrypted computer-based system. Moreover, their resourcefulness and relentless process of experimentation, coupled with a dedicated solidarity network and the computer related technological progress of the time helped them to make it possible.

It is these qualities that make this consistent with at least one history or conceptualization of hacking[44]. While neither Jenkin nor Press identified themselves as hackers back then, this framework is nonetheless helpful to use in hindsight. The recognition that Jenkin has received from the security, hacking[45] and lock picking communities in the form of invitation to speak and

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[43] This term was used consciously by the ANC as opposed to a term like multi-racial society. In a press conference in Lusaka on 25 June 1985 following the Kabwe Conference, Olivier Tambo suggested that this term of non-racialism meant that there will be no racism of any kind (Tambo, 1985b). For them the term multi-racial did not address the question of racism.

[44] Hacking as a practice emerged in the 1950s within a small group of MIT computer aficionados and flourished over the years to include the free and open source software movement (F/OSS), among many others.

[45] The hacking community in Berlin organised in 2018 a visit for Tim Jenkin to meet Julian Assange in the Ecuadorian embassy. Before going to the meeting Jenkin told me that he walked around the building to see if

awards[46] for his achievements is a testament to considering his practice as hacking (T. Jenkin, personal communication, September 17, 2018). Jenkin has also come to identify as a hacker (a good one!) later in life (Toupin, 2016; T. Jenkin, personal communication, September 17, 2018).

Hacking can loosely be defined as a practice that involves tinkering with a range of technologies. When referring to what hackers do and why they do it, Gabriella Coleman (2012) points to the importance of producing freedom through software collectively. This is partly what the members of the ANC TC did in the process of building the ECS. Indeed, they realised that to gain freedom (technical freedom and freedom from apartheid) they needed to hack hardware in order to free it from its designed constraints, and invent their system to come up with a home-made encrypted computer system.

Further, to ease the development process, the ANC Technical Committee did use existing state and business technologies of the time. In the late 1970s and throughout the 1980s, European states, particularly through their post offices, sponsored technological projects, including Prestel in Britain, Minitel in France, Memocom in the Netherlands and BTX in Germany. These projects sought geopolitical, economic and technological advancement particularly in light of the dominance of the United States and its Advanced Research Projects Agency Network (ARPANET) based on the TCP/IP protocol, which would become the basis for the Internet. Apartheid South Africa also came to sponsor a telematics project called Saponet (South African Post-Office Net) in the late 1980s. As such, the story of the ECS is located within a larger

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Assange could escape. He felt that the security might not be that tight despite all of the surveillance cameras. When Jenkin suggested the possibility of escape, Assange did not seem to consider it! (T. Jenkin, personal communication, September 26, 2018).

[46] In 2018, he received the RSA conference award for Excellence in Humanitarian Service.

context of technological development, particularly state sponsored and business orientated technologies.

The ANC TC's attempts to build on emerging communication technologies in the 1980s happened within a computer affluent Europe; a context whereby the TC could be exposed to and have access to a wide variety of devices and hardware in addition to expertise, manufacturers and tech trade fairs. However, as we will see, the physical location of freedom fighters in a country with different technological and infrastructural means did not completely preclude them from thinking about computer based secret and transnational communication. Indeed, at the same time that the ANC TC was experimenting with computers, another attempt at creating encrypted communication was underway in Lusaka within the ANC intelligence bureau called the Green House.

With the Cold War as the backdrop, this micro-history of the ECS is part of a larger geography of technological struggles. Focusing on the ANC TC's larger liberation goals through the mediation of communication technologies, I show that players other than states and businesses had a stake in the development and usage of sophisticated forms of communication technologies. Their purpose was not to further a state's national economy or geopolitical position, nor was it a for-profit initiative. It was about furthering the goals of the revolution and ultimately contributing to the liberation of South Africa from apartheid.

Jenkin Joins the ANC Technical Committee

Tim Jenkin, who became a member of the ANC TC in 1981, was first trained in the mid-1970s on how to use leaflet bombs developed by members of the ANC TC and was deployed in 1975 in Cape Town to do just that. Leaflet bombs were a less typical form of broadcasting than

radio for mass communication, such as Radio Freedom. Small detonators would launch leaflets with revolutionary messages into crowded areas. The purpose of these airborne leaflets was to wake up South Africans to the anti-apartheid cause (Edmunds, 2014; Jenkin, 1987). Primarily used in the 1970s, leaflet bombs were a device to spread ANC written material and news in a country where the ANC, MK and SACP and their messages were banned. Tim Jenkin had been sent to Cape Town to run a small printing press and a leaflet bomb cell (Jenkin, 1987). He and a colleague printed leaflets at night and made them "explode" in crowded areas during the day. The small detonation in public areas, creating a shower of airborne leaflets, attracted attention, informed South Africans and defied apartheid censorship. In 1978, Jenkin and his comrade, Stephen Lee, were arrested for these audacious acts and sent to jail for 12 years under terrorism charges, a sentence they cut short by picking the locks in the prison—it took Jenkin and two others, Stephen Lee and Alex Moumbaris[47], one-and-a-half years to craft a set of 10 different wooden keys to escape, and return to London as a refugee (Jenkin, 1987).

In talking about his time in Cape Town operating the underground printing press, Jenkin (1992) writes that "it was our comms that prevented us from adapting to the new revolutionary situation[48] and made us feel increasingly irrelevant" (ch.1, p.10). He describes the feeling of being completely cut off from anyone in the ANC, MK or the SACP running his leaflet bomb cell as follows: "Our incommunicado propaganda cell was like a factory without telephones to take the orders and operating in an environment without railways and roads to move the goods. Our hopelessly inadequate forms of contact were a rein holding us back" (Jenkin, 1992, ch. 1, p.10).

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[47] Alex Moumbaris who later relocated in France was to test the ECS from Paris.
[48] The Soweto uprising occurred in 1976 when Jenkin was in South Africa.

With his understanding of the challenges in the field, Jenkin joined the Technical

Committee on a voluntary basis with a personal mission to improve communication between the

field and the leadership in exile (T. Jenkin, personal communication, September 17, 2018).

Before he could do this, his status had to be resolved since he had temporary United Nations

(UN) refugee papers. Britain was hesitant to give papers to someone who had been convicted of

"terrorism" and who had escaped from prison. While this was being sorted out, the ANC sent

him to Canada for six weeks to give talks about his escape (T. Jenkin, personal communication,

September 17, 2018).

Once back in London, he started working during the day as staff member of the

International Defense Aid Fund (IDAF), an organization that advocated for South African

political prisoners and raised money for them. At night and on weekends, he trained freedom

fighters on concealment work and on how to handle dead letter boxes, handwritten encryption

and other anti-surveillance type of work. Jenkin turned the spare room in his girlfriend's

apartment in Finsbury Park into a training centre for his students and a place to store his tools.

His involvement with the ANC TC was unpaid, sporadic and had to be squeezed into his already

busy schedule, until he started working full time for Operation Vula in 1987.

On his second meeting with Press in 1981—he was introduced to Press by another

member of the TC Aziz Pahad because he was also known as a technical person and Press was

looking for a technical assistant—Jenkin recalls Press saying:

> There were too many academics in our movement who refused to get their hands dirty. A
>
> true revolutionary did not mind mucking about with soldering irons and glue. There was
>
> more to the struggle than reading books by Marx and Lenin, writing articles and engaging

in endless debate about the national question, armed struggle, insurrection and the like.

(Jenkin, 1992, ch. 3, p. 3)

From Breaking to Making Security

In the early 1980s, the ANC TC's work focused mostly on how to best break the security of the apartheid regime by facilitating sabotage. This was the type of work that was seen as most useful for the movement and was commissioned by the ANC, MK and SACP leadership (T. Jenkin, personal communication, September 17, 2018). Some of the work related to communication, such as deciphering hand-written encryption received from the field, and some of it was more about camouflaging explosives to target apartheid infrastructure such as electricity pylons and police stations.

The ANC TC started digging further into how to make security for the movement, rather than mostly breaking apartheid security. It is because of their spirit of experimentation, their relentless curiosity about how things are made, the tedious task given to them of deciphering and enciphering messages from the field, and a deep belief in improving secret and transnational communication, that the ANC TC started investing time and energy in the security of the movement, as opposed to destabilizing that of the regime, by making its communication faster and more secure. The work on secret and transnational communication through computers was rooted in the belief that secure lines of communication needed to be opened between freedom fighters on the ground and the leadership in exile. While their hope was to strengthen freedom fighters' communication, there was no initial blueprint; it became what it did through their experimentation, their willingness to learn new skills, and having to deal with contexts and conditions, including technological and infrastructural, that were different between Great Britain, South Africa and Zambia. Through a process of emergence whose end was unknown from the

time it started, the TC soon invested in making and fortifying security through the mediation of computer-based technology.

As seen in Chapter 1, Press had long been thinking and writing about the use of computers for resistance purposes. But it is not before a co-worker of his pushed him to put his thinking in to practice in the chemistry lab he was directing that he started experimenting himself with computers:

> I only became interested in and developed the use of computers in the control of the equipment in the [College] laboratory due to the interest in the subject by Jim [a technician at the lab] who asked me to order a computer so that he could get to know something about computing. This was way back in the early 1980s before the first PCs had hit the High streets. (Press, 1995, ch. 3, para.155)

The ANC TC soon had the idea of trying to using computers for basic encrypted communication and both Jenkin and Press started learning the Basic programming language[49]. Upon understanding how computers could be used to provide security for the struggle and in turn communicate secretly and at a faster pace, Press said:

> I thought that the movement could simply type out messages on a computer, it in turn would change the letters into [American Standard Code for Information Interchange] ASCII code, add a random number, and bingo a coded message. The message could be saved on cassette tape and the tape sent into the country where it could be decoded. There were a number of things wrong with the system but the concept was basically correct and,

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[49] BASIC (Beginners' All-purposed Symbolic Instruction Code) was created at Dartmouth College with the intention of having every undergraduate students use a computer and a computer language in the early 1960s.

as history proved, quite workable. I bought a small computer and started the learning

process. (Press 1995, ch. 3, para. 177)

Press was at that time more advanced with computer programming, but Jenkin soon

became addicted to programming: "It was almost impossible to drag yourself away from the

keyboard until the program did what you wanted it to do" (Jenkin, 1992, ch.3, p. 8). His

newfound passion was coupled with an attention to the beauty of code. Press had asked Jenkin to

work on a program he had started to write. For Jenkin, Press' code was a mess or as he said a

"complete bird's nest" (Jenkin, 1992, ch. 3, p.13). Jenkin's and Press's approaches to

programming were completely different. Jenkin says:

> I liked everything to be neat and structured; he [Press] just wrote down the steps as they
>
> came to mind. Every line of his program jumped to another line and after a while I got
>
> completely lost. The program was full of peeks and pokes which are obscure
>
> programming instructions that talk directly to the computer's memory. These gave me no
>
> clue as to what the program was doing. (Jenkin, 1992, ch. 3, p.13)

An attention to the beauty of code is characteristic of many hackers and brings to the fore

the aspects of craft and craftiness (Coleman, 2012, 2016). Since to hack is about "quality and

excellence in technological production" (Coleman, 2016, p. 162) it requires long hours of work

often in solitude and the craftiness that emerges is an expression of aesthetic that can be seen

through code writing and an appreciation for the beauty of code.

If they were to work on this together Jenkin thought that they needed to have beautiful

code to make him happy. Jenkin (1992) emphasized this aspect when saying: "Ronnie preferred

something that 'worked' no matter how it looked. Embellishments were a waste of time and

didn't add to the essential functioning of a program or device. I preferred something that looked good and gave you confidence" (ch. 3, p. 14).

Instead of working on Press's code, Jenkin decided to try to rewrite it. His reasons were not only for the sake of code aesthetic, he was thinking from the point of view of himself as a user, not just a programmer, and was thinking about the leadership and freedom fighters who had likely never used computers before. To convince them to use the system it needed to be simple and technically understandable. Even though his attempt at rewriting Press's code was a failure—because he only worked on the interface rather than how the program worked—from then on his approach to programing the ECS took shape with freedom fighters (or users) in mind. Ultimately, what both Jenkin and Press were trying to figure out was whether and how computers could open up new ways of communication that went beyond simply automating hand-written cryptography.

The technologies they experimented with had their limits and they needed to find ways to work around them. After trying a number of computers to see what each model had to offer, such as the Sinclair ZX81 and the Oric Atmos, the pair invested in Commodore 64s, the most popular computer at the time, and bought modems. In reading the instruction manual, Press understood that he could communicate from modem to modem, but when it was time to test it between London and Bristol, it did not work (Press, 1995).

In his unpublished biography, Jenkin retells the story of Ronnie Press phoning the modem manufacturer after being unable to communicate between London and Bristol with their respective computers and modems. The manufacturer confirmed that modems could only communicate at a distance of less than 50 metres, but suggested they use Prestel. An

abbreviation for Press Telephone, Prestel was a service offered by the UK Post Office using the Viewdata technology. The British Post Office administrations had been using a videotext system and launched its commercial version in the 70s. This new technology bridged the telephone with the television (or the computer screen). Other countries, such as France, Germany, the Netherlands and apartheid South Africa, were to also experiment with this technology. In France, the Minitel[50] allowed people and businesses to search for information, interact online and under certain conditions produce content and services (Mailland & Driscoll, 2017; Schafer & Thierry, 2012). In Germany, the German Post Office had been working on BTX and, later, both the Netherlands and South Africa created their telematics system, respectively called Memocom and Saponet. Both the Dutch and South African telematics systems were experimented with by Press and Jenkin and would be integrated in later versions of Operation Vula's ECS to exchange encrypted emails.

During their experiments with Prestel, Jenkin and Press realized that the encrypted messages based on ASCII values were producing characters that were unacceptable to Prestel. They came to understand that the solution lay in abandoning the American standard ASCII[51] codes, a character encoding standard for electronic communication, and instead create their own code. Since Prestel was unable to accept some ASCII symbols, Press and Jenkin decided to let this convention go. What they did was to "assign our own values to an alphabet that we designed

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[50] The French government was developing a project based on videotext format called the Minitel (Mailland & Driscoll, 2017; Schafer & Thierry, 2012). The Minitel was conceived as an interactive technological project and was based on the interconnection between an analog network—the telephone network—and a digital network—the French owned packet switching Transpac network—that created a *télématique* (telephones + computers) environment.

[51] ASCII was developed from the telegraph code and was first commercialized by Bell for its seven-bit teleprinter. Bell then developed their code for other devices.

ourselves then if the values we gave to the characters were low enough the sum of two of them would always produce characters acceptable to Prestel" (Jenkin, 1992, ch. 3, p.17).

By creating their own alphabet, they were adding a security dimension on their program which was already secured due to the encrypted layer, which meant that no one at Prestel could read their messages (Jenkin, 1992). Furthermore, the coding program as Jenkin called it was meant to send single character of a transmitted message. Therefore if one character got corrupted, only that one was unreadable[52].

Press worked on an updated version of their encryption and this time the Prestel system received the message without a glitch. A few weeks later, Press phoned Jenkin to tell him he had sent him an encrypted message, which Jenkin could see in his mailbox and decipher. Jenkin logged off from Prestel and saved the message on a Commodore 64 datasette, a device somewhat similar to a cassette recorder. Datasettes were widely used in Britain with the Commodore 64 because as opposed to the American manufactured Commodore 64, computers they did not come with floppy drives. They had come up with the idea of using datasettes or cassette tapes to hold encrypted message because they could be carried across borders by foot couriers and read on similar computers. At that time they did not know that regular cassette tapes (rather than Commodore 64 datasettes) were to be integrated as part of the first workable version of the ECS in South Africa.

The first very early version of the system was taking shape. However, in 1984, when Aziz Pahad and Joe Slovo were invited for a demonstration in London so that the pair could

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[52] This is the reason why the reader of this dissertation will encounter a few gibberish characters within the excerpts from the encrypted messages.

show them what they had been working on, it went all wrong. They were unable to decipher one of the messages sent via Prestel.

Further work needed to be done on the system[53], but at that point, Jenkin was juggling this computer based project with a very busy life: a full-time job, and evenings and weekends devoted to training activists, handling their communications, pursuing his relationship, and writing a book about his escape from Pretoria prison. To write his book and to work on encryption, Jenkin had bought a Sinclair QL computer. His aim was to work on random numbers to perfect the automation of a one-time pad pre-shared secret key. Until now South African freedom fighters had used a hand-written form of cryptography using what was known as the most secure form of encryption i.e. the one-time pad.[54] A one-time pad is a form of symmetric cryptography which pairs a plaintext with a pre-shared secret key. For it to work, both parties need to be privy to the secret key to encrypt and decipher messages. Jenkin recalls the numerous difficulties he had creating a one-time pad based on computer-generated random numbers:

> We spent a lot of effort attempting to produce workable encryption and transmission
>
> systems but seemed to be getting nowhere. There were many problems: a lack of funds, a

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[53] In his autobiography Jenkin also recollects a few interactions he had with Jacqueline Molefe the only Black South African woman in a position of leadership within the ANC National Executive Committee who was the head of communications appointed in 1983. The ANC TC had provided her with a Commodore 64 in 1984, but she was not really impressed with what it could do. A year later, when she was presented with an early version of the ECS she had deemed it too complicated for the rank and file to use and had rejected the idea. Instead, she had decided to use a Soviet-supplied hand-written communication system combined with radio communication. Comrades were asked to use tiny booklets of random numbers glued together around the edges to encipher a message, which was then channelled through radio communications. The fact that she had decided not to approve of an early version of the ECS had frustrated Jenkin. He writes: "While Jackie was no doubt competent at her job but I could not help wondering if having a woman in charge of communications in the entire region was not symptomatic of the low esteem given to communications by the ANC". (Jenkin, 1992, chap. 5, p. 11)

[54] One-time pads were widely used by freedom fighters. As a case in point, a one-time pad was found on the dead body of Che Guevarra in Bolivia. He used one-time pads to communicate secretly with Fidel Castro.

lack of expertise, a lack of 'experts' on whom to call and most of all a lack of interest by

the chiefs. We often wondered if we were wasting our time but the vision of a

computerized communications system drove us forward, despite the odds. (Jenkin, 1992,

ch. 3, p. 20)

The ANC, MK and SACP leadership was not particularly interested in computer based

encrypted communication. They did not really understand the capacity of new computer

technology and did not see how it could be useful for the liberation movement. Jenkin writes:

For a start the only tool most of them can handle is an AK or limpet mine. If they have to

carry everything into the country on their backs and if they take a computer they won't be

able to use it because there's no electricity in the townships where they have to hide out.

Even where there is power, how can they use it secretly in an overcrowded shack? A

computer would be so out of place in a township everyone would know about it in five

minutes. (Jenkin, 1992, ch. 4, p. 1)

Up until this point, Jenkin and Press had concentrated on the development of their system

for a Western type environment that was unlike the one in which it was meant to be used (Jenkin,

1995). Even if comrades could use it in the safe houses located in White areas, the South African

government was bound to surveil the telephone lines and trace them back (T. Jenkin, personal

communication, September 17, 2018). Press suggested that their priority be to have the encrypted

communication system work between London and Lusaka, in the belief that there would be fairly

safe ways to test and use it in Zambia. However, they needed to determine if Zambia's

infrastructure could host such system.

In late 1985, Press went to Zambia for a South African Congress of Trade Unions

(SACTU) National Executive Committee meeting. He took a Commodore 64 and modem with

him to test them from Lusaka. The plan was to attempt to connect to Prestel from Lusaka and send a message to Jenkin's mailbox. But the modem could not connect, or would for only a few seconds and then the line would drop. When it did connect, the sound was too faint and the echo too loud to make it work. Jenkin recalls:

> The computer and modem capacity were shown to several people in Lusaka, but it was deemed too complicated to use. Further there was no one with the expertise to use them and they couldn't be carried into the country on foot. They were also aware that using a computer would attract the police. They came to the conclusion that an ordinary modem would not work between Lusaka and London. (Jenkin, 1992, ch. 4, p. 10)

The lesson was clear: being away in the UK brought both advantages and challenges for the Technical Committee. One of the main advantages was being in a country that was developing all types of new computer-based technologies. However, it kept the TC away from the reality on the ground. It was only when Jenkin and Press tested their prototype in Zambia that they realized the extent to which technologies for a Western-based environment needed to be adjusted to the infrastructural scarcity and conditions on the ground in a country like Zambia. South Africa's context and conditions represented yet another difficulty.

While Zambia could be visited by both Press and Jenkin to test their system and talk to the ANC in exile, apartheid South Africa was a no-go zone—the ANC TC members were all *persona non grata* and the strategy of operatives getting back into the country underground had not yet fully materialized. This meant that they required the support of anti-apartheid activists, many of whom were Dutch, to test the feasibility of the ANC TC's ideas and bring detailed information about specific technological infrastructure on the ground in South Africa.

In the White areas, White South Africans had good communication infrastructures; they also had easy access to computers and hardware (J. Cherry, personal communication, October 6, 2018; R. Goodes, personal communication, October 13, 2018). Consequently, in those early years it was the wealthy and infrastructurally affluent White areas that the ANC TC had in mind when experimenting with an encrypted communication system, rather than the South African townships or rural areas with poorer infrastructures.

Location: An Inhibitor of Emergence?

Being in exile in the UK allowed the members of TC to read magazines and books, go to libraries, technological trade fairs and exhibitions, seek advice from other techies, and access software, among other things. It was an environment that allowed the ANC TC to flourish. Jenkin (1992) argues in his autobiography that being in the "Third World" prevented them from being exposed to technology. This seems to be only partly true based on my interviews. Indeed, a handful of South Africans interviewed had been trained in computer programming for intelligence work in the region. John Tshabalala, a.k.a. Comrade Movers, who was part of the intelligence bureau in Lusaka, is a case in point. He received training at a college in Lusaka to support ANC intelligence work based at the Green House—the house where counterintelligence and intelligence work was conducted. In Lusaka, he was trained in programming languages, including Pascale (J. Tshabalala, personal communication, November 23, 2018). Following this training, he succeeded in setting up an encrypted system based on Microsoft Basic, a program that could be stored on a floppy disk. This encrypted system was meant for intelligence officers located in the Frontline States to exchange encrypted intelligence reports with those based in Lusaka at the Green House. However, those encrypted reports had to be transported by couriers

as Comrade Movers had not been able to find other ways to send his encrypted computer messages over long distances using a computer or telephone.

When Comrade Movers wanted to communicate with Barry Gilder in Botswana—Gilder was an intelligence officer whose cover was working for the Canadian solidarity news service— a courier would have to carry the floppy disk with the encrypted report or message hidden inside a chocolate box or a cleaning powder box (B. Gilder, personal communication, October 23, 2018; J. Tshabalala, personal communication, November 23, 2018). Much like Jenkin and Press who felt that the leadership did not support the ANC TC in London, Comrade Movers said in an interview:

> At the Green House, I was the only one able to use computers back then. They [leadership] were very afraid of computers. "How can so much information be in a disk?" they said. So they were very much afraid. My chief did not trust computers […]. He was a person who was from the old school of thoughts. (J. Tshabalala, personal communication, November 23, 2018)

Comrade Movers left Soweto for Angola in 1976 after the Soweto uprising. He had received an electrical and plumbing training in a technical school in South Africa. During this time under apartheid, he could have never studied computer programming as a Black person. When he was in Angola in a training camp, the ANC identified his technical and typing abilities and sent him to learn computers in Lusaka. Just like Jenkin and Press, he had the idea to automate a one-time pad using computers. He had this idea when he went to Cuba to learn a more advanced form of handwritten encryption in 1984-1985.

During the 1980s, a handful of people outside of the ANC TC were experimenting with encryption in an attempt to make safe, secure and fast computer-based communication systems.

In this sense, location did not prevent freedom fighters from coming up with the idea of using and developing the automation of a one-time pad through computers for the struggle. However, being less exposed to what was possible in terms of technology such as with the telematics systems and having less of an environment to consult other subject-matter experts, seems to have played a role in Comrade Movers not being able to go further with his project.

What is becoming apparent with these examples is that "location" was a factor playing in two interconnected ways. First, the way in which differences between the infrastructural and other conditions on the ground in London, Zambia and South Africa presented a challenge for the development and operation of encrypted systems. Such as in London, it was possible in Lusaka to come up with a computer-based encrypted program, but the challenge was how to move these encrypted messages through a computer system. In Lusaka, there was not a lot tech companies they could reach out to, tech trade fairs to go to, no telematics system they could test and as will be shown below the phone infrastructure was deficient. Second, the location of the makers presented a challenge for them in developing their design. If you were based in London, the infrastructural and technological conditions present there made you forget or ignore the conditions in Zambia, which both Jenkin and Press were unfamiliar with. For the South Africans based in Zambia, you were less likely to be made aware of the new emerging technologies, except of course if you were part of or cooperating with the ANC TC. As I will show below, the ANC TC was to work with Zarina Maharaj based in Lusaka to test the system and find ways around technical and infrastructural challenges.

These examples come to question the "universality" and "borderlessness" often attributed to digital technologies. This is an argument made by Anita Chan's (2013) in her study of state-led technological innovation in Peru, where she debunks the techno-universalist assumption

present in the West. The story of the development of the ECS in the 1980s is another example that dispels the belief in the easy portability of communication technologies. If the ANC TC would have relied only in systems developed in and for a western environment (telematics, ARPANET, TCP-IP, telephone system, etc.) they would likely not been able to communicate secretly between three continents.

Incorporating the Encrypted Communication System into Vula

The last section of this chapter focuses on a detailed account of how the ECS came to be integrated in Operation Vula and the network of people who contributed to its functioning. I let the data collected through my interviews and archival work speak for itself, reaffirming the importance of a process of emergence through experimentation and the crucial network of comradeship and solidarity that was sustained as a result of the nature of the ECS, its testing and deployment.

Until 1986, Jenkin had only been working part time on developing the system. But in late 1986, Aziz Pahad who had a year earlier been elected on to the ANC's National Executive Committee (NEC) and who was based in London approached him to say that money was found to allow Jenkin to leave his job at IDAF and work full time on what would become the ECS. Mac Maharaj had gone to the South African, Joel Joffe, who had served as a defence lawyer for the ANC leadership at the 1963-64 Rivonia Trial including Maharaj, who was now living in Britain and had made a fortune, to fund what would later be known as Operation Vula (O'Malley, 2007; M. Maharaj, personal communication, November 5, 2018). Joffe gave 100,000 Rand for Operation Vula (O'Malley, 2007).

During that year, Jenkin was introduced to Conny Braam, the chairperson of the Dutch anti-apartheid movement (AABN) in the Netherlands and a Communist party member. Braam who had co-founded the AABN in 1971 was well known among exiled ANC and SACP members. She was asked by Maharaj to secretly help Operation Vula by providing disguises and recruiting Dutch people for a variety of tasks including setting up safe houses in Southern Africa. Because of the history of Dutch colonialism in South Africa, Braam explained that "we managed to get hundreds of thousands of Dutch people involved in small or big ways" including boycotts, demonstrations, street marches and Operation Vula. During one of their first meetings, Braam showed Jenkin a Dutch Text Tell (later to become a PX-1000 when sold by the Dutch Philips company). Floris Guntenaar, a Dutch circus artist, had shown Braam the small Text Tell machine that some clients who hung out at the café where he worked as a cook had developed (F. Guntenaar, personal communication, February 11, 2019). The Text Tell was a small computer that could be used to write encrypted messages and send them via the public telephone system to another Text Tell machine. This telematics system had been tested in Amsterdam and it worked well. With Jenkin's help, it was tested between England and the Netherlands and it worked well. However, Jenkin said that the Text Tell machines in Zambia "were just too weak for the tough line conditions of African phone systems" (Jenkin, 1992, ch. 5, p. 16). His encounter with the Text Tell would be yet another inspiration. He had been struggling with "how to record the tones that a modem produced so that they could be sent down a phone line" (Jenkin, 1992, ch.5, p.21) just like the Text Tell did. As will be shown below, the use of tones on the telephone keypad was to be integrated in the system on the South African side.

To ease the users of the system and further the ANC TC's approach to science and technology for the people, Jenkin develop a simple computer interface for the ECS. With the

help of Press and Tony Threw, a South African friend from IDAF, Jenkin came up with an interface that could be user-friendly: "I designed a single program […] for typing the messages, that could copy, save, delete, print and rename files and that did the enciphering and deciphering. I gave the program the totally uncryptic name 'Coder'" (Jenkin, 1992, ch.5, p.13). The continued act of experimentation leading to an incipient transnational communication system, combined with working in a milieu where people were devoted to dismantling the apartheid regime, helped to create an environment conducive to innovation.

In 1987, Jenkin went to Lusaka to train comrades on how to use radio equipment. One night, he received a visit from Zarina and Mac Maharaj. Mac was the Commander of Operation Vula and his wife, Zarina, was a mathematician based in Lusaka, who worked for the United Nations, and then the British High Commission, and had a keen interest in computers. In Lusaka, they had a computer they had bought in Mexico. Zarina's former husband, who had been an engineer at Rolls-Royce in London, was now completely dedicated to the struggle and had been trying to learn programming to be used for the struggle, but without much progress (M. Maharaj, personal communication, November 5, 2018; Z. Maharaj, personal communication, January 30, 2019; Maharaj, 2006). Before meeting Jenkin, Mac had inquired about the ANC TC's activities:

> In my investigation, I went to Slovo and I said: I have picked up that in London you have a group of technicians who have also been looking at technology. Their focus had been at that time, whatever Tim was doing with his own communications, they [leadership] were just ignoring it. They were more interested in remote control detonation, especially the car bombs. (M. Maharaj, personal communication, November 5, 2018)

Jenkin explained to them what he and Press had been experimenting with and talked about computers, one-time pads, Prestel, and the newly available British service Telecom Gold. Telecom Gold was an early commercial British email service that was launched in 1982 and which they had recently come across. Telecom Gold was designed in such a way that it made its system compatible with the phone, telex and fax systems. This integration feature came in handy for testing an early version of the ECS. It was better than Prestel as it had an error-checking protocol built-in (T. Jenkin, personal communication, September 17, 2018).

Mac brought Zarina to the meeting because of her knowledge of technology. "I had a safeguard in Zarina because I don't know anything about technology. But I would ask Zarina is this feasible? You are a system analyst. Does it work? Is this in any way possible?" (Mac Maharaj, personal communication, November 5, 2018). From there on, it was agreed that Zarina would test whether Telecom Gold could be used from Lusaka to communicate with Jenkin in London. Zarina tried to phone Telecom Gold to send a message to Jenkin, but it did not go through, but it was to function after many attempts. The other method she was tasked to try was to send a message via the phone system to be received by an answering machine in London. However, the answering machine was cutting her off when she was trying to send a message through the phone system. Jenkin said:

> As a last resort, I sent Zarina a modified telephone to which she could connect her tape recorder or the tone pad directly. This cut out the acoustic connection where some of the volume was being lost, but when she tried it the answering machine still chopped her messages. The fault, I concluded, was definitely the answering machine. It was designed to hold on while a voice spoke to it, but it didn't like the tones—they were designed for signalling purposes not for sending messages. (Jenkin, 1992, ch. 5, p. 15)

Though Zarina downplays her role in the following quote, she nonetheless was instrumental in testing the ECS. She recalls:

> I was merely part of the testing. We needed to test if the system worked from a telephone. I had to use a telephone; I had to send a message via the phone signal through the system to see if it got through. (Z. Maharaj, personal communication, January 30, 2019)

> In April 1987, Jenkin visited Braam and Guntenaar in Amsterdam and raised the problem

of the answering machine. Guntenaar had a friend who could provide modified answering machines that would not stop if a fax-type bip message came in or the tape ran out in the answering machine. Before these hacked answering machines were sent to London and Lusaka, Jenkin in London and Zarina in Lusaka decided to communicate via a combination of telex and Telecom Gold. A telex machine was a public switched network similar to the phone network that could send text-based messages across distances. Diplomats and journalists had been using them post-Second World War and it was the preferred means of long distance communication by the ANC leadership in Zambia (T. Jenkin, personal communication, September 17, 2018).

Zarina sent one-time pads encrypted telexes to Jenkin's Telecom Gold mailbox. This was quite convenient for Jenkin because it spared him from having to manually encrypt and decrypt messages, having to deal with invisible ink or other types of message concealment. Jenkin said:

> For me this way of doing things was great as I could use my 'one-time pad' program to do both the enciphering and deciphering. No secret ink was required; everything was electronic. Lusaka, of course, had to do it by hand and they were not so happy about that. (Jenkin, 1992, ch. 5, p.15)

> When the modified answering machines arrived in London, Jenkin tested them by

sending direct and taped encrypted messages from public phone booths all over London. The

encrypted bip bip bip messages were well received and decrypted. To automate the process

electronically on the Lusaka end, the Technical Committee had to find a way to make a modem

understand encrypted tones coming from a tape recorder. Jenkin stated:

> I knew that it was possible to record modem tones and play them back into a modem as I
> had once recorded an entire Telecom Gold session by tapping the phone line. When I
> played back the recording, the modem was fooled into thinking that it was
> communicating with a real modem and the entire session could be displayed on the
> computer screen. (Jenkin, 1992, ch.5, p. 20)

To fool the modem, Jenkin turned to an acoustic coupler modem. The technically-savvy

cousin of a co-worker of his had shown him what these coupler machines could do. Jenkin and

Press had also succeeded in buying one at a tech and surveillance trade fair in London. To go

regularly and fairly anonymously to these tech and surveillance trade fairs the pair had set up a

company they called Rapid Best. Coupler modems were already being used by journalists to

communicate with their reporting agencies in the Global South where phone lines were usually

full of static and noisy (T. Jenkin, personal communication, September 17, 2018). The

particularity with the acoustic modem was that as an interface it transformed the data text, or

more generally the electric signal, into an audio format into and out of a telephone. Jenkin

"assembled a little program that opened the serial port and sent a disk file to it. Sure enough the

modem sang the sound of the file. Eureka! The big breakthrough" (Jenkin, 1992, ch.5 p.24).

In July 1987, Mac travelled to London. He informed Jenkin about a special mission in

which he would be infiltrated back into South Africa. This mission was confidential. Not even

Ronnie Press was given the details. The encrypted communication system was to be integrated

into the mission, allowing daily communication with Lusaka for political direction and logistical

work. To do this, Jenkin was provided with the computer he wanted: A T3100 with a 20 Megabyte hard drive. Now that it worked between London and Lusaka, the challenge was to make sure it would work in and with South Africa.

Two observations about what can and cannot move are made here and are relevant for what is to follow. First, during this period, some things (certain people [Whites, non-South-African], money, some kinds of information, commodities) could move or be communicated easily between places like London or Amsterdam because there were infrastructures configured to support that sort of movement. However, because of the mismatch between the material and infrastructural conditions in Europe and those on the ground in Zambia a response needed to be well thought through. This point reflects what is allowed to move between the geographies of the North and South, and between the Souths, and what is not, and how the management of such movement is not "natural" but instead accomplished—and, in the case of the ECS, contested—infrastructurally.

To test the system in South Africa, Jenkin mobilized his network in the Netherlands. Since Conny Braam was in the know about the special operation, and had been commissioned by Mac to find people who would organize the disguises of those who would be infiltrated back into South Africa, she was a natural comrade. Braam found a jack of all trades by the name Frans Boonekamp to go to South Africa to find out everything he could about the phone booths (C. Braam, personal communication, February, 7, 2019). Boonekamps's first task was to make an inventory of the location of all phone booths in three cities, Johannesburg, Pretoria and Durban, which would facilitate the work of those who infiltrated the country by enabling them to send messages on tape recorders from phone booths (F. Boonekamp, personal communication, February 22, 2019). In order to show how the receiver in the phone booths worked, Boonekamp

cut one of them using his Swiss Army knife, and then brought it to his hotel room and took

pictures of the inside wiring (F. Boonekamp, personal communication, February 22, 2019).

Jenkin had also instructed him to record the sound of each number on the telephone keypads of

as many phone booths as possible. To do this, he had agreed that he would phone a buddy of his

several times during his South African trip. When Boonekamp came back to the Netherlands he

shared the outcome of his mission with Braam, and then travelled in October to London to be

debriefed by Jenkin. In addition to sharing the pictures he took, and the material he brought back,

Booneekamp also brought back paper advertisements of telephones, including a brand new

mobile phones in a suitcase that were then available in South Africa. Since Jenkin had not been

to South Africa in a decade, and cell phones were quite new in the UK, he had not thought they

were available in South Africa (Jenkin, 1992).

One of the first people to be infiltrated in South Africa in 1987 was an MK commander

named Janet Love. Love was infiltrated as part of the SACP effort and was later officially

integrated in Operation Vula after one year of lying low in the country (J. Love, personal

communication, October 19, 2018; O'Malley, 2007). After years of requests to go back to South

Africa as an underground operative, Love who was based in Lusaka was asked by Joe Slovo a

few months after the 1985 Kabwe Conference to start preparing herself for underground work. In

an interview conducted by Jenkin, Janet Love (1993) said:

> Joe Slovo's initial conception of my going in was because he felt things were so
>
> embryonic and problematic in terms of cohesion and real discipline and security that he
>
> felt that I should go in and should form with very specific people a very small tight unit
>
> whose only function was in the field of propaganda [such as printing facilities]. At that

> stage the promise of getting better communications was not enacted. It was not a reality
>
> yet, that was the vision. (p.14)

Love was soon sent to Cuba to learn about operating underground, the art of disguises, the skills

of security and methods of secret communication (J. Love, personal communication, October 19,

2018; Jenkin, 1992). This was before Operation Vula set up its own training infrastructure in the

art of disguises (done in the Netherlands) and secret communication (done in London or Lusaka).

In 1987, MK Commander Siphiwe Nyanda, a.k.a Gebuza, was called to Lusaka from

Swaziland for a special mission. He was told he would be part of a mission to go back to South

Africa to build an underground structure and serve as its deputy commander. In an interview

with Jenkin, Nyanda (1993) said:

> After coming back from the GDR [for training] I was sent to the Netherlands where I met
>
> Comrade Conny Braam and there I became aware that there was already a network of
>
> people that had begun to be set up by the structure that Comrade Joe Slovo had set up. It
>
> was only after I had been to Holland that I got to find out that Comrade Mac was also
>
> involved. (p.1)

For this special mission, a small collective of people was constituted and composed of Mac,

Gebuza, Joe Slovo and Ivan Pillay. Pillay was the organising force in Lusaka and served as the

coordinator of Operation Vula. Mac and Gebuza became the first top commanders to be

infiltrated back into South Africa.

At the same time, White Canadians and Dutch people were being recruited to set up safe

houses in South Africa to host Operation Vula operatives and to support the ECS. Rob and Helen

Douglas went to Johannesburg in March and May 1987, respectively. They had been recruited in

Toronto by Mac who was visiting the country. They were recruited through the intermediary of

the Canadian ANC Representative Yusuf Saloojee and the Communist Party of Canada. Helen and Rob had been active in the Vancouver chapter of the anti-apartheid movement, were members of the Communist Party of Canada and were admirers of some of their parents' friends who had been involved in the International Brigades during the Spanish Civil War (H. Douglas & R. Douglas, personal communication, September 27, 2018). They waited a year and a half in South Africa before Mac contacted them once he was in the country. From 1987 to 1991, another White Canadian, Susan Grabek, and Dutch people, such as Maria Kint, Gert Reijs, Gonne Kruijer and many others, were sent to South Africa or to the Frontline States for the same purpose.

By the end of 1987, Jenkin had a working version of the ECS and it was being tested all over London. Jenkin also suggested to Braam to start communicating through the ECS. Jenkin brought all the computer equipment to Amsterdam and trained Braam on how to use it. They felt it was too dangerous to communicate by phone and they were using the Text Tell less and less. This device had initially offered "strong DES encryption, but this was replaced in 1984 by an NSA-supplied alternative algorithm" (Crypto Museum, n.d., para. 17). So by March 1988, the ECS expanded to Amsterdam. This connection now gave Braam a safe link with Lusaka, although indirectly through London. It immediately gave a boost to her work as it allowed her to ask questions and report progress on the numerous projects she was working on (Jenkin, 1992).

In early January 1988, Jenkin recruited a Briton, called George, who was sent to South Africa to test the ECS and buy the mobile phone in a suitcase Boonekamp had earlier identified on a South African advertisement. He succeeded in phoning London from his hotel room using a tape recorder with a recorded encrypted message. It worked well and was deciphered on the London end (Jenkin, 1992). However, he did not test it from a noisier public phone, only from a

hotel room, and he did not manage to buy the mobile phone in a suitcase (Jenkin, 1992). When Jenkin and his partner went on holidays in the Canary Islands, Jenkin tested the system from there, and it worked well (Jenkin, 1992).

In February, Mac visited London for an ECS demo, which worked smoothly. Zarina would be the first to be trained in London to, in turn, train others, such as Gebuza, from the Lusaka end, and would start operating the system from Zambia (Z. Maharaj, personal communication, January 30, 2019). She came in mid-May 1988 and tested the system from London, while Mac was in Lusaka trying to receive and send messages. Earlier in March, Jenkin was instructed by the leadership in Lusaka to get six phone lines. "We want at least six separate lines' had been the instruction from Lusaka. One for each direction to and from South Africa, a pair for backup and a pair for future expansion" (Jenkin, 1992, ch. 6, p. 27).

As Press did not and could not know about many details of this special operation that had yet to be named, he was not to be privy to the deciphered messages. Only Jenkin was. At home, Press was soon assigned two phone lines, which would be used between Lusaka and London: one to send encrypted messages and the other to receive them. Encrypted messages received on Press's phone line and answering machine were sent for decrypting to Jenkin. Because Jenkin's request to receive more than one phone line was delayed by several months, he used a system called Voicebank. Voicebank was an electronic voice mail service offered by British Telecom (Jenkin, 1992). He was able to get two Voicebank lines: one to receive messages and the other to send them. This set-up was reserved for the South Africa end. To know when a message was received, Jenkin used a pager that beeped when a message came in.

By June 1988, the system was working between London, Lusaka and Amsterdam. The infiltration into South Africa was about to start and they would soon be sending encrypted messages from South Africa. While there was a lot of pressure coming from Lusaka to have everything set up, Jenkin describes his understanding regarding the responsibility of the ANC TC:

As far as I was concerned Ronnie and I were the 'Technical Committee' and as such were obliged to respond to any technical requests put to us from whatever quarter. All requests had equal status and we dealt with them in turn. We were neither the property of any particular structure nor did we feel that anyone could monopolize us. (Jenkin, 1992, ch. 6, p.30)

In April 1988, Conny Braam recruited a KLM flight attendant named Antoinette Voegelsang to bring the necessary computer material down to South Africa. She was to make an excuse to fly regularly the Amsterdam-Nairobi-Johannesburg route. In early May, Jenkin went to Amsterdam to meet her. She was tasked with buying the mobile phone in a suitcase, which George had failed to buy, and bring regularly encrypted floppy disks, letters, money and anything else that was given to her from operatives on the ground (A. Voegelsang, personal communication, February, 3, 2019). Voegelsang was also given one of the Text Tell to communicate with Jenkin back in London regarding her travel schedule to South Africa. Jenkin would then make sure packages were sent to her on time.

On July 31, 1988, Mac and Gebuza were infiltrated back into South Africa from Swaziland by Totsie Memela and Ivan Pillay (T. Mamela, personal communication, November 30, 2018; O'Malley, 2007). Once Mac was inside the country, he phoned Jenkin using the Voicebank phone line to tell him he had arrived and needed the computer equipment to be sent

as soon as possible so that he could start using the ECS. Once Mac was in South Africa, Voegelsang was tasked with bringing him the computer equipment needed, the floppy disk and a message from Jenkin with the proper phone numbers to use to send messages to London. Jenkin's floppy disks were initially hidden in a book that a bookbinder had crafted in the Netherlands specifically for that purpose (C. Braam, personal communication, February 7, 2019). However, due to a lack of time to properly conceal the computer disks, Voegelsang carried them in her KLM uniform pocket instead (A. Voegelsang, personal communication, February 3, 2019). After a few failed attempts to buy the mobile phone in a suitcase, she arrived at the Johannesburg airport in late August 1988, was picked up by a young student named Claudia Manning, who was recruited to work for Vula in Durban (C. Manning, personal communication, November 16, 2018). On August 23rd, Voegelsang went to buy the cell phone from a White South African salesman and brought it to Mac in a hotel room. Initially, Mac was not able to use the cell phone in a suitcase to call London because he did not know how it worked. When he was finally able to operate it, Claudia Manning would drive him to Zoo Park in Johannesburg—a park located in a posh White area—where he would put the antenna on the top of the car, phone London and send the messages via satellite (C. Manning, personal communication, November 16, 2018).

Prior to being able to use the satellite phone, which did not require going to a phone booth, and once the computer equipment was infiltrated into the country, Mac started sending successfully encrypted messages through the ECS to Jenkin from public phones. There was some corruption while sending the first message to Jenkin because of the noise made by the coins that regularly needed to be inserted in the phone booth to call London, but the message was still

clear. Jenkin recalls how excited he was to see the first message appear on his computer and the process involved in getting it there:

> Here it was in my hand, a message that had been typed by a comrade in hiding, inside South Africa. It had been enciphered, modulated by a modem, saved on a cassette, sent down a phone, transmitted half way across the world by cable or satellite, recorded on an answering machine, reassembled by my modem, deciphered by my computer and, finally, turned into ink dots on a piece of paper. That same message had been through at least ten transformations to get into my hand: computer binary, electrical pulses, modem tones, magnetic signals, telephone signals, all of these again in reverse and then to ink on paper. (Jenkin, 1992, ch. 7, p. 14)

What is interesting here is how this quote from Jenkin fixes on the complex technical network that transmitted the message, while somewhat forgetting the equally impressive and complex human network that was required to enable it all. As I have shown until now, the truth is that the ECS was equally comprised of both these technical and human networks, assembled into one.

As the leader of Operation Vula, Mac was responsible for bringing the political and military dimensions of the struggle which before Vula had largely been separated. Among his tasks was the highly political work of making contact with aboveground organisations such as the United Democratic Front (UDF)[55]. But before starting this work, Mac had the task of finding comrades who had been infiltrated back into the country and those who had set up safe houses and were "sleepers," such as Janet Love and Helen and Rob Douglas, among others who were

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[55] The UDF was created in 1983 to contest the new South African constitution which gave minimal political rights to Indian and Coloured but not to Black South Africans.

based in Johannesburg. Mac needed to bring them together as part of Vula and give them tasks. Because of her knowledge of computers and desktop publishing, Love was given the responsibility of the communication officer in Johannesburg and became the main operator of the ECS sending and receiving encrypted messages. In Durban, Gebuza had a whole team working with him and had recruited Susan Tshabalala to operate the ECS from Durban. After operating undercover in Botswana since 1981 for MK, Tshabalala was called back to Zambia at the end of the 80s. "I was taken to OR president the then president of the ANC and he then explained to me that I would be going somewhere but before I am deployed to wherever I need to go to Holland" (S. Tshabalala, personal communication, November 28, 2018). When she arrived in Durban after her disguise training in Amsterdam, she was taught by other South African women how to use the ECS because she had not been trained in London or in Lusaka before being deployed.

The first messages sent through the ECS started anticipating Mandela's release and the necessity to open a channel of communication between him and Oliver Tambo in Lusaka. These discussions were held during the last days of August 1988. A few days later Mac found the newly available phone-card public phones. In late September, Mac got a pager so that he would know when a message was awaiting for him on the London answering machine.

This new communication infrastructure brought renewed energy and galvanized the leadership in Lusaka. Jenkin wrote: "On the part of the leadership in Lusaka the inertia of the old ways was soon swamped by the dynamism of those at home… now they could feel involved in the day-to-day planning of an ongoing project" (Jenkin, 1992, ch. 8, p. 3). In London, the ANC TC was soon overwhelmed with requests that the ECS facilitated. Jenkin said:

Any notions that […] we were simply going to be the communications 'hub,' a sort of halfway house linking the 'spokes' from South Africa and Lusaka, were soon dispelled. A multitude of requests and instructions flooded in from both sides. Deposit money in this bank account, collect so many thousands of pounds from the ANC office and forward it to this destination, buy more tape recorders, prepare and send us these documents, and more. (Jenkin, 1992, ch. 8, p. 3)

In describing what Mac wanted him to do, Jenkin said:

He wants all the press statements issued by the ANC London office, *Umsebenzi*, major articles by our leaders, in fact just about everything the office here produces that we can put on disk. That's apart from all the gadgets they want and the other things I have to do like get money to them and go to Holland. (Jenkin, 1992, ch. 8, p. 11)

In September 1988, one month after the ECS started running, Ivan Pillay was visiting London and told Jenkin he should buy a cell phone so he could avoid being tied to finding a public phone each time he wanted to listen to a message that had just arrived. "Each time the bleeper went off I had to hop on my bicycle and go to a public telephone to listen to the message" (Jenkin, 1992, ch. 8, p. 3).

To support the ANC TC, Pillay put Jenkin in touch with a Dutch couple, contacts of Braam, who had been working in Swaziland for the ANC and who were now living in York, England. They agreed to prepare and collect ANC material and publications to send to South Africa via the ECS. Jenkin visited them in York and showed them how to operate the encrypted communication system. They would upload files on the Telecom Gold email system as they became ready and Jenkin would send them down to South Africa. York became yet another link to the ECS.

In Lusaka, no one was yet responsible full time for communication. Zarina had to take care of it despite working full time and singlehandedly caring for two young children, with her partner Mac having been infiltrated into South Africa. Zarina had asked the ANC leadership to work full time for Operation Vula as a communication operative in Lusaka, a task that would enable her to stay at home with her two children, but her request was denied (Z. Maharaj, personal communication, January 30, 2019). In early October 1988, Zarina had a car accident and had to be hospitalized. No one else had been trained to operate the system from the Lusaka end. As Ronnie Press was in Lusaka in October for a SACTU meeting, he trained a comrade Archie Whitehead on how to operate the ECS. Commenting on the context and conditions in Lusaka, Press said:

> Computers were a rarity. Electric power was not available in the outlying regions […]. They had to run off car batteries. They had no technical experts with whom they could discuss the problems. They even had the difficulty of insects making a home in their computers and ants seeking sugar grains once dropped into their keyboard. But most difficult of all they had the problem of bringing the culture of a movement based on law and humanities graduates, labourers and the semi-skilled into the technological age. (Press, 1995, ch. 3, para. 194)

Whitehead and/or Pillay would operate the system before Lucia Raadschelders arrived in December 1988. Raadschelders, a Dutch anti-apartheid and women's rights activist who had been working for many years for the AABN in Amsterdam went to London to receive training on how to use the ECS and was then sent to Lusaka to act as the main operative of the ECS. Lucia had been recruited by Braam to work for Vula after having worked for the ANC in Swaziland where her cover had been discovered (L. Raadschelders, personal communication, October 16,

2018; Broadcast Radio Netherlands, 1993). She was first hosted in Zarina's house, where there was a phone line and an answering machine—one of the few houses in Lusaka with such a set-up.

At the end of October 1988, Jenkin started seeing the name Operation Vula on the messages sent. Until then, he had no idea the project he was working on had a name:

Around the end of October I began to notice the mention of 'Vula' in several messages. Up to this point I had no idea that the 'special project' on which I was working was called 'Operation Vula.' So secret had been its preparation that no one had even let on that the project had a name! (Jenkin, 1992, ch. 8, p. 16)

With the ECS functioning well, Janet Love and Susan Tshabalala in South Africa, were not only sending information about the realities on the ground, and communicate logistical or organizational information, but also it allowed them to get publications into South Africa, including classic ANC publications as well as publications like *Umsebenzi*, the SACP quarterly newsletter, *Sechaba* and *Mayibuye*, both ANC newsletters, which many were produced in London (Jenkin, 1992; J. Love, personal communication, October 19, 2018; O'Malley, 2007). Now, each new newsletter issue could be almost instantly received, printed and distributed within South Africa at almost the same time as it appeared in Britain. Content could also be adapted to reflect realities on the ground in South Africa (J. Love, personal communication, October 19, 2018; M. Maharaj, personal communication, November 5, 2018). There was no need to have foot couriers deliver them from Lusaka, or from the UK. While print propaganda cells already existed inside the country and published material (Cherry, 2016), these new printing infrastructures in Johannesburg and Durban were a welcome addition to the underground publication landscape.

Later, in 1989, Barbara Heron's house in Lusaka was used to send and receive messages to and from London.[56] Heron's house replaced Zarina's who had left Lusaka to relocate to the UK after her car accident. Heron was the country director of CUSO, a Canadian NGO that was sending Canadian volunteers to work abroad. Since the 1960s, CUSO's work in Southern Africa had supported the anti-apartheid struggle. Heron had just been assigned one of the rare phone lines by the Zambian government at the request of the Canadian ambassador, who needed a means to safeguard Canadian volunteers in case of emergency (B. Heron, personal communication, April 5, 2019). After Mac came to install one of the special answering machines in her house, Raadschelders together with a second Dutch woman named Ineke Vos came regularly to use the phone. In September 1989, Vos was recruited and arrived in Zambia to help Raadschelders operate the communication system. Vos had been trained in computers back in the Netherlands and was familiar with programming and how to send emails. In an interview with Jenkin, Raadschelders (1993) said:

> She was brought out to assist with the computers. Sometimes I would have computer problems. I didn't know anything about computers so they thought it would be good to have somebody who is more into programming, etc. and it would allow me to do more travelling for Vula. There was now a standby person to do the comms. If I had got ill or whatever, she could take over. You can't put everything on one person. (p.41)

In the daytime, Vos taught programming and computers skills first in a governmental school and then an international school in Lusaka (I. Vos & L. Vos, personal communication, March 3, 2019).

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[56] Until I met and interviewed Barbara Heron in April 2019 in Toronto, she had not known that the phone system installed in her house had been used for Operation Vula.

Vos said, "I met Tim Jenkin once when he visited Lusaka, I don't remember when it was, he had to upgrade the communication system" (I. Vos and L. Vos, personal communication, March 3, 2019). Jenkin had upgraded the ECS, which was now using Telecom Gold to send messages from Lusaka. Since there was no national telematics system in Zambia, international phone calls had to be made to connect to London, making for extremely expensive telephone bills. The agreement that Heron had with the ANC was that the bills would first be covered by CUSO, but later reimbursed by the ANC. This was in a context where the Zambian Kwacha was nose-diving by the day due to the debt crisis and structural adjustment programs imposed by the International Monetary Fund (IMF) and the World Bank (WB) in the late 1980s (B. Herron, personal communication, April 5, 2019; Macmillan, 2009).

In December 1989, Jenkin started using GeoNet, a European based commercial service (not a state run email service) to upload all of the South African magazines and newsletters produced in Great Britain making them accessible to a wider public. In one of his messages, Jenkin singles out one leftist South African group called WorkNet (later to be known as SangoNet) that was accessing their accounts regularly to download the magazines and newsletters. WorkNet[57] was a South African NGO founded in 1987 to facilitate the labour unions fight against apartheid. Through GeoNet they were able to find, print and distributed banned information for the trade unions.

By 1990, the ECS—with London as a central hub—was an extended network spanning three continents, Africa, Europe and North America (as it will be shown below), through four different telematics systems: Telecom Gold in Great Britain, Saponet (in 1989) and MicroLink

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[57] Worknet was a South African organisation part of Interdoc, a network of civil society connected early on to the internet, which later became the Association for the Progress of Communication (APC).

(starting in 1990) in South Africa, ComputerServe in Canada and Memocom in the Netherlands (starting in 1990). The ECS was based on a centralized structure, where Jenkin's house was the main node through which each communication went. Using the metaphor of a motorcycle wheel to describe the system, Jenkin said:

> So each new place where there were activists became a new spoke and we maintained London as the hub. So after a while it does begin to look like a spoke wheel of a motorcycle all these spokes coming out of London, then we had this connection with Conny Braam in Amsterdam, that was another leg, then Alex Moumbaris was in, the guy I escaped with, was in Paris, was supposed to recruit people so we had another leg going there, and we had some people in the north of England who were preparing documents, also involved a little bit with Conny for disguises, so there was another leg there, and the Canadians were also recruiting people for Operation Vula so that we had this leg going [close] to Edmonton. And then they started having some guys in Harare in Zimbabwe, so then we had a leg there and Cape Town and people who were roaming around the place in South Africa. (T. Jenkin, personal communication, September 17, 2018)

The Canadian leg of the system was in TallCree, an Indigenous reserve in northern Alberta. Ivan Pillay's brother, Joe Pillay, had been trained by Jenkin who had travelled to TallCree in May 1989. Joe Pillay had fled South Africa with his Canadian partner Barbara after having been abducted from Swaziland where he was a teacher, and tortured by the apartheid regime (Roskam & Dittrich, 1990). They settled in TallCree where he worked as a school teacher. With Vula, he was tasked to recruit sympathetic Canadians and to "further the anti-apartheid struggle in terms of getting more Canadians conscious and forcing the government to take a more strident stance against apartheid" (J. Pillay, personal communication, October 31,

2018). Joe Pillay explains the problems he had in operating the system from TallCree, problems that were not unlike the ones in Lusaka:

> The challenges were sometimes just not having electricity, but the big problem was getting through the dial up network to make communication. The other problem was that there was not very much technical help if something went wrong with the computers. You had to get to the city or find someone who knew about computers. (J. Pillay, personal communication, October 31, 2018)

Referring to Joe Pillay's computer set up in TallCree, Jenkin recalls:

> Joe had a phone line, a full-size PC and a modem so he could access email services. We probably used CompuServe. The software I brought him was the first encryption system I had developed for email usage. We did not use the acoustic system with Joe; it was full-on email. (T. Jenkin, personal communication, November 2, 2018)

As for the Paris leg of the system, it was never fully operationalized. Jenkin and his friend, Alex Moumbaris, with whom he had escaped from Pretoria Prison, were using a Dutch Philips PX-1000. Jenkin visited Moumbaris in Paris in August 1989 to train him on how to use the PX-1000 and discussed possible recruitment of French activists for Southern Africa. The assassination of the ANC's representative to France, Dulcie September, in March 1988 in Paris, and suspicions around her replacement, contributed to the failure to operationalize this leg of the ECS (T. Jenkin, personal communication, November 2, 2018; A. Moumbaris, personal communication, November 10, 2018).

The Harare leg of the system was set up at the end of May 1990, just about one month before Vula was discovered in South Africa. Geraldine Fraser and Jabu Moleketi had the ECS

equipment in their house and Jenkin came to install it. The goal was to send direct messages between Harare and Lusaka, but the discovery of Vula cut it short.

In early July 1990, the Durban Security Branch arrested two Umkhonto we Sizwe operatives in Durban and found in their possession floppy disks containing a list of operatives' names, safe house locations and UK phone numbers, among many other things (Garrett & Edwards, 2007; Henderson, 1997; O'Malley, 2007). By first arresting Mbuso Shabalala and Charles Francis Ndaba, the Security Branch discovered Operation Vula and the encrypted communication system. Additionally, when they followed Gebuza to his safe house in Durban, they discovered the unencrypted printouts of some of the messages that had been exchanged on the ECS. It's a set of human errors that revealed the existence of Vula, the ECS and its messages. It is only then that the apartheid government realized the extent of the technical sophistication of the South African liberation struggle.

Everyone who had come in to Gebuza's safe house on that day was arrested. They were brought to the police station where they were imprisoned for about two months. Mac was to be arrested a few days later. The Canadians, Helen and Rob Douglas, whose house had been raided in Johannesburg and Susan Grabek fled South Africa and returned to Canada. Among the Vula operatives, both those still underground (such as Janet Love and Ronnie Kasrils) and those arrested, most received amnesty in the following months. However, it was later revealed during the Truth and Reconciliation Commission (TRC) that Shabalala and Ndaba, who had disappeared after their arrest in July 1990, had been murdered.

Despite Vula's discovery, the encrypted communication system continued to be used for one more year when Jenkin, upon hearing of the bust, changed the encrypted keys. In 1991,

Jenkin went back to South Africa after getting his amnesty claim accepted. Raadschelders and Vos stopped working for Vula at around the same time. Ronnie Press stayed back in England and was responsible for Operation Eugene, the new name for Vula and kept contact with Jenkin through encrypted emails.

> 'Eugene' was a name derived from the letters U G, meaning the 'underground'. When Vula's original mission was winding up in 1990, I was going back to SA to convert the Vula network into an internal operation. We wanted to keep London connected to the network but it could no longer be called Vula because it was just Ronnie. It became 'the underground' > 'UG' > 'Eugene'. (T. Jenkin, personal communication, March 28, 2019)

Once back in the country, Jenkin started working for the ANC, setting up computer networks throughout the country in the run up to the 1994 election. Once the ANC was elected in April 1994, Jenkin put together a team to create and manage the websites of ANC ministries and parliament and to set emails for the ANC. Geert Reijs and Gonne Kruijer, a Dutch couple who had been setting up a safe house in Swaziland during the Vula years, came to work with him (G. Reijs & G. Kruijer, personal communication, November 26, 2018). Braam had put them in touch when they left Swaziland to relocate to South Africa because they were both very proficient in computers, programming and system administration. In talking about Jenkin's continued technical drive and ingenuity, Reijs said:

> Before the election in 1994, he did set up a very sophisticated system to get the data from all the different regions of South Africa to the HQ in Joburg. […] They could compile them [the data] and see what the election trends were. (G. Reijs & G. Kruijer, personal communication, November, 26, 2018)

After they stopped working for the ANC in the early 2000s, Jenkin and Reijs set up Umbezeni Communication Company and worked together designing websites mostly in South Africa for about a decade. Jenkin then went his own way and created his own online community exchange system which I will come back to in the dissertation's conclusion. He is still working on this system in his early 70s.

Conclusion

In telling part of the history of the ANC Technical Committee, its members and supporters, this chapter has offered a historical and chronological lens of how the ECS came to be specifically, and more broadly how a national liberation movement has come to integrate communication technologies to its struggle. The lessons from this story are multiple: the ECS represented the maturation of a longer history of technical activity as shown in both this Chapter and the previous one; material factors such as uneven access to expertise, machines and infrastructure differed depending on the country; the mobility of data was related to the mobility of bodies and technologies; and the role of women was crucial, even if less prominent. Paying attention to this history lends a critical eye as to how communication technologies emerge during a process of national liberation. The exile status of the ANC, MK and SACP leadership spread over several countries did not ease the process of communication across borders, and their distance from realities on the ground brought major challenges. Without a strong infrastructure of dedicated people and funds to support the material infrastructure this encrypted communication system might have never seen the light.

It is not possible to claim that the ECS contributed significantly to the dismantling of the apartheid regime. There is no evidence to that effect. However, what is clear is that it is an incredible example of the development and use of a secretive form of communication technology

with the aim of organising the efforts of the exile leadership with the efforts of underground operatives through Operation Vula. In the two next chapters, I turn my attention first to the politics of infrastructure to show the political significance of such a system, and then I focus on the meaning of revolutionary communication.

Chapter 3

The Politics of Apartheid and Fugitive Infrastructures

In this chapter, I seek to represent and illuminate Operation Vula and its encrypted communication system (ECS) through accounts of the politics of infrastructure. Considering the ECS through the lens of infrastructure provides insights into a geography of infrastructural struggle that was at play from settler colonial to apartheid times. The ECS was a response to the sedimented infrastructures of apartheid, a strategy of infrastructural disruption, and an infrastructural opening onto an alternative future. When I use the term infrastructure, I am referring not only to the materiality of objects that facilitate or constrain the circulation of goods, ideas and people (Larkin, 2013; von Schnitzler, 2015), the signs and symbols (Larkin, 2008) that represent them, and the people that come to constitute them (Simone, 2004). Infrastructure consists of a political terrain that exerts power and reinforces inequalities on the one hand, and represents forms of resistance as a response to it on the other hand.

To discuss the politics of infrastructure prior to and during the South African national liberation context both inside and outside the country, I examine two interconnected concepts: namely, apartheid infrastructure and fugitive infrastructure. By focusing on those two classifications, I seek to recast South Africa in terms of a cartography of infrastructural struggle with an attention to infrastructure of communication.

To examine the concept of apartheid infrastructure, I build on Antina von Schnitzler's (2015, 2016, 2018) understanding. For her apartheid infrastructure represents socio-technical assemblages of materiality, discursive, fiscal, and organizational forms and relations (von Schnitzler, 2016). The political project of apartheid took form through infrastructural modalities

of power such as the segregation of the Black population in the Bantustans and townships, the mobile restriction imposed on them with the carrying of identification cards when in White areas and the forced splitting of family when the regime identified members in a different racial categorization. The way apartheid infrastructure constrained and unable movement mediated the economy, political and social life.

von Schnitzler (2015, 2016, 2018) locates apartheid as having operated infrastructurally a few decades prior to and in the run up to the 1948 election of the White supremacist National Party, and during their longstanding and contested regime until the 1994 democratic elections. Moreover, she argues that apartheid infrastructure has been carried through in democratic times, particularly with such technological devices as water and electricity meters and has impacted the notion of the liberal subject and the meaning of citizenship.

von Schnitzler's work is relevant for my research as it theorises the tendency of infrastructure to materially foreclose and/or open political possibilities. I build on her understanding of apartheid infrastructure to move into new territory. My account of infrastructure is different from hers in three main ways. First, I focus on communication infrastructure not water and electricity meters. This choice brings new insights into how apartheid infrastructure works. Second, I take a longer historical frame that articulates apartheid (and fugitive) infrastructure with prior colonial infrastructure. To understand the preconditions that set the stage for the emergence of apartheid infrastructure, especially those that have transport and communicative dimensions, I go back to the history of Dutch and British settler colonialism. Focusing on the railways, the pass laws and technologies of surveillance allow me to bring to the fore how colonial and White supremacist infrastructure set the stage for apartheid and continued to expand during that era. Third, I give a specific attention to transnational

infrastructure by examining how apartheid infrastructure operated inside the country as von Schnitlzer does, but also outside of it. This transnational dimension is relevant for how the aforementioned colonial infrastructure operated, was funded and is critical for my case study since one of the reasons why the ECS was developed was precisely because of the externalized dimension of the struggle.

To oppose apartheid infrastructural power aimed at dispossession, segregation, oppression and White supremacy, I propose the concept of fugitive infrastructure to highlight the resistance of Black South Africans and their allies. This concept was first articulated by Deborah Cowen (2017) to demonstrate that infrastructure is not only about domination and violence, but also a means of transformation. To further Cowen's concept, I build on recent theorization of fugitivity in contemporary critical Black, Caribbean and African studies, in relation to practices such as marronage (flight and fugitivity) and slave resistance in the Greater Caribbean and the United States, among others (Bush, 1990; Diouf, 2014; Foner, 2016; Roberts, 2015). The maroons built autonomous communities away from the system of slavery, attacked White farms and plantations, and fought enslavement in pursuit of revolutionary goals. Marronage represented a refusal by slaves to be governed by this system and posed a threat to this unjust dominant order. As Cedric Robinson ([1980]2000) suggests, marronage proves the existence of a Black radical consciousness and praxis and, for this reason, it is a productive concept for thinking about the forms of struggle against apartheid in South Africa. In what follows, I will suggest the ECS can be understood as a (fugitive) infrastructure of marronage, whereby the system comprised not only an instrument for coordinating resistance to the apartheid regime but also a materialization, at the level of infrastructure, of a potential alternative future for Black South Africans.

In the case of the South African national liberation struggle, I consider the ECS a fugitive infrastructure built by freedom fighters who refused to be governed by apartheid parameters. The very existence of a fugitive infrastructure and the praxis associated with it threatened the apartheid state. In terms of its functioning, the ECS was part of a clandestine operation, whose communication system was unknown to most—including the apartheid regime, and the majority of ANC, MK and SACP rank and file and leaders—and whose operatives were active underground in South Africa and elsewhere with the aim of striking a blow at the apartheid system. With excerpts from messages exchanged through the ECS, I show how the communication system, in addition to the people supporting it formed and acted as a fugitive infrastructure.

Apartheid Infrastructure[58]

In her short essay entitled "Ends," Antina von Schnitzler (2015) suggests that the South African apartheid regime deployed its power, both material and symbolic, through infrastructure. At the material level, apartheid infrastructure took the form of segregated public facilities for Whites and Blacks in the forms of bathrooms, schools, beaches, benches, etc. At the political level, Blacks were restricted and they were barred from participation in national government. At the symbolic level, the apartheid state created a false narrative that argued that the homelands or the Bantustans—the reserves on which Black South Africans were forced to relocate—gave Blacks sovereignty, when in fact they stripped them of their South African citizenship.

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[58] In what follows, my description and analysis of these two interconnected concepts is somewhat linear, I start by explaining what is an apartheid infrastructure, what it allowed and what it constrained, and then moves on to fugitive infrastructure. In spite of this arrangement, in no way does this structure aims to obscure the constant resistance to colonial and apartheid infrastructures. Where there was oppression and dispossession there was always resistance.

Antina von Schnitzler further develops the concept of apartheid infrastructure in her book *Democracy's Infrastructure*, in which she examines the prepaid water and electricity meters in post-apartheid South Africa. She uses the term apartheid infrastructure to refer to the racist state apparatus that exerted power and through which power operated including administrative power, and technical forms of accounting, measurement, and identification (von Schnitzler, 2016). She examines how apartheid infrastructure operated on three levels: it restricted the mobility of Blacks, created a racial economy and segregated public spaces.

To better understand what apartheid infrastructure is and does, von Schnitzler (2015) argues that infrastructure is more than a research object. It is an epistemological point of departure that allows for an examination of sociotechnical assemblages while also going beyond them to reflect how the past is carried through to the present. In using a particular infrastructure as a vantage point, she is able to ask new questions on post-apartheid democracy and trouble the periodization of history, which sees the democratic era as representing a break from apartheid. In fact, what she demonstrates is that the historical intellectual and political conjunctures are embedded in the built infrastructure, and inevitably carry elements of the apartheid era into the democratic era (von Schnitzler, 2015).

To understand the preconditions for apartheid infrastructure in South Africa and beyond, I suggest that it is necessary to go back to the beginning of the massive dispossession and impoverishment of Blacks and Indigenous peoples[59] in South Africa with the arrival of Dutch

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[59] The question of Indigenous people, also known as the San and Khoekhoe, in South Africa is very contentious. They were the first inhabitants, but the South African government does not recognize them as such. Under apartheid, they were classified as part of the Coloured category. The Black South Africans on the other hand are descendants of the Bantu who came to inhabit the southern part of the African region during the third and six century from central Africa. The issue of land redistribution in South Africa only acknowledges those who lost their land with the

settlers in the mid-17th century followed by British settler colonialism starting in the 18th century. While von Schnitzler acknowledges the colonial impact on infrastructure, her main point of departure is the early 20th century where she locates the development of segregation. By taking this further back in time, I am able to examine some of the preconditions that set the groundwork for the infrastructural manifestation of settler colonialism, White supremacy and later apartheid in South Africa and White minority rule in the Southern African region. Examining the building of the railway, in particular, to access newly discovered minerals reveals how infrastructure operated to colonize, dispossess, racialize and ultimately highlight how the rivalries between, and then the union of, the British and the Afrikaners contributed to the rise of the legal system of apartheid (Rotberb, 1988). Already in those early days, infrastructure constituted a geography of struggle that, despite continued resistance, remade the territory, was based on the exploitation of cheap Black and subaltern labour, contributed to furthering an ideology of racial stratification, was funded by and benefited empires, particularly Britain, and represented visions of the future.

Grounding this study in the history of extractive, colonial and imperial infrastructure in South Africa is important for at least three reasons. First, European colonization and the European regime of race produced a process of othering Africans and conferring upon them a status inferior to Whites (Robinson, [1980] 2000); Wolfe, 2016). This process not only condoned the practice of slavery for centuries, indentured labour and colonization, but also came from European perception of Africans technological inferiority (Cohen, 2003; Larkin, 2008; Lester, 1996; Mavhunga, 2014, 2017). Second, making the link between the colonial past and apartheid

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Natives Land Act in 1913, but Indigenous people lost their land during the period of colonization. Their activism today is about gaining the status of First Nations, and amend the Restitution of Land Rights Act of 1994 to include them.

South Africa reveals continuity in the narrative used by the apartheid regime which glorified European colonization for bringing about progress to South Africa. The apartheid regime viewed the colonization of South Africa, especially through the Dutch East India Company, as the beginning of the period of the modern nation state (Ward, 2009). European infrastructure development such as the building of railways and telegraph was central to sustain such progress narrative. Third, taking the study further back in time is part of a call made by today's South African activists, many whom were part of #FeesMustFall, #RhodesMustFall and the larger decolonial movement, and their claim that it is necessary to go back in history in order to understand the ongoing dispossession of Blacks and Indigenous people, specifically in South Africa, but also globally.

From Settler Colonial to Apartheid Infrastructures

To colonise South Africa Dutch and British settlers built and used communication and transportation infrastructure to oppress and dominate. It was through the Dutch East India Company (*Vereenigde Oostindische Compagnie* or VOC) that the first supply station at the De Kaap (the Cape) was established. The Cape was to become a vital and strategic node for Dutch and European transportation and communication networks, and the VOC became a tool for empire building, colonialism, and a three-tiered colony for slaves (slave colony), convicts (penal colony) and exiles (forced migration colony) (Ward, 2009). The White Dutch settlers who arrived with the VOC became known as the freeburghers, or Dutch farmers. As early as the mid-17th century, they used slaves (primarily from Madagascar, Mozambique and South and East Asia) to work on their farms and develop their rural economy (Worden, 1985). The Dutch system of slavery introduced mobility restrictions based on race in the 18th century. The first identification card was developed to recognize good slaves from bad ones, thereby

differentiating them from fugitives who fled inland to join maroon communities and strike a blow at White Dutch slavery (Lester, 1996; Worden, 1985). This early identification system sought to control the mobility of slaves, much like the system created by the apartheid regime to expand segregation.[60]

When the VOC went bankrupt in the late 18th century, after a reign of almost 150 years, their White indentured workers were set free. As they further settled in the Cape and beyond, the freeburghers encroached on and stole more and more land from Indigenous inhabitants and Blacks, who were in turn pushed further inland and came into competition with other groups. Settler colonialism furthered a long and complex process of dispossession of Blacks across the country through the remaking of the territory. This process was intensified during the Great Trek around the mid-1830s when the Boers migrated further inland by wagon trains or caravans pulled by oxen or horses, following the British takeover of the Cape. Upon seizing the Cape, the British established a more complex administration in Cape Town, prohibited the slave trade, and abolished slavery, among other things. These actions infuriated the Boers who saw them as an attack on their "way of life" (Lester, 1996; Worden, 1985; Strage, 1973). The Boers' Great Trek led to the creation of two landlocked republics in the interior of South Africa: the Orange Free State and the Transvaal. The Boers' idea of the frontier (similar to that of the British and other colonial powers) was rooted in the ideology of *terra nullius* by which they gave themselves the right to occupy Africans' lands. In creating their two republics, the *trekboeren* (during the Great Trek, the freeburghers referred to themselves as the *trekboeren* or frontier farmers) destroyed the

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[60] Pass systems were also used in other settler colonial contexts such as in 19th century Canada where Indigenous people's mobility in the Canadian Prairies was restricted by requiring them to carry a special travel document to go outside of their reserves (Williams & al., 2015). Twentieth century British occupied Kenya introduced the Kipande, which restricted the mobility of Kenyan males above the age of 15 (Anderson, 2000). Permits or pass systems are currently being used by the Israeli government to restrict the mobility of Palestinians 16 years of age and over.

fabric of the Africans' way of life and land tenure systems and established their own territory based on Afrikaner nationalism, isolationism and semi-nomadism (Strage, 1973).

In the 19th century, the continued appropriation of land and the minerals beneath in addition to the racialization of the economy expanded under British settler colonialism[61]. Diamonds were discovered in Kimberly and then gold in Witwatersrand. This propelled South Africa's first diamond and gold rush, with the goldfields—the largest in the world—completely changing the face of the territory and landscape.[62]

The Briton, Cecil Rhodes, and his company De Beers created a monopoly on diamond extraction in Kimberly funded largely by the House of Rothschilds. Reducing the price of digging required the construction of a railroad in order to bring cheap Black migrant labourers from across Southern Africa and a telegraph for faster communication between distant locations. The White workers coming from all over the world were deemed too expensive (Storey, 2015). With De Beers, Rhodes developed prison-like barracks covered with nets to prevent African workers from throwing diamonds to smugglers on the other side (Storey, 2015). Imprisoning African labourers in compounds for six-months at a time increased the efficiency of Rhodes' mines and created what was perceived to be a safer environment for the Whites, thus contributing further to racial segregation (Storey, 2015). Keeping African labourers in compounds became widespread in the mining industry and furthered a mode of surveillance with

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[61] It is not only the British Empire that appropriated the continent of Africa. The late 19th century Scramble for Africa aimed at dividing the continent among European powers at the 1884-1885 Berlin Conference. Until the Berlin Conference only about 10 % of continent had been colonized; after the conference European powers possessed more than 80% of its territory (Harlow & Carter, 2004).

[62] Skyscrapers build next to giant mine pit holes in present day Kimberley are a constant reminder of the history of mineral extraction where dynamite was first used to dig deeper holes (Rotberg, 1988). In Johannesburg, tailings dumps have accumulated over more than a century next to the townships, giving them the appearance of sand dunes and completely transforming the landscape. The dunes are so toxic that they are poisoning the townships' residents and animals and nearby sources of water.

control towers watching over Black workers, who were routinely subjected to strip searches for the theft of diamonds (Storey, 2015).

Over the years, Rhodes built up an enormous fortune, and became one of the richest men in the world. He pushed for laws favourable to his industry, White domination and the ascendency of the Cape, and then became the Prime Minister from 1890 to 1896. He also pushed for White settler colonialism through his British South Africa Company (BSAC), a scheme that enabled him to create a settlement in Harare with the wider aim of conquering present day Zimbabwe (Southern Rhodesia), Zambia (Northern Rhodesia) and Malawi. Building the railway in the Southern region underpinned his extractivist and economic development ambitions for the exclusive benefit of White settlers, which served as the foundation for White minority rule in Southern Rhodesia until 1980. For Rhodes, building a railroad and telegraph—essential tools of political, economic and social control (Storey, 2015)—north of the Transvaal also allowed him to encircle and somewhat contain the expansion of the Boers republics.

Rhodes' colonial and imperial ambition furthered his appetite for the construction of a railway and electric telegraph to connect the British Empire from the Cape to Cairo. This giant imperial infrastructural project[63] was designed, in part, to help supply more African labourers to the South African mines and ensure British domination over the entire continent. The railways coupled with the telegraph were seen as the Empire's armature, its transport and communications backbone. It furthered White domination with the conquest of territory, allowed to move troops faster and control the trade in precious minerals, ultimately destined for London.

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[63] The railway was never completed. A link between Sudan and Uganda was missing.

At the time, one of Rhodes' primary concerns was to unite South Africa under the British flag (Davis & Wilburn, 1991). To do so, Rhodes spoke against the rights of Africans to vote to gain Afrikaner support and as he thought that they would cling to their land and prevent progress, that is, mining and industrial development (Brown, 2009). Further, Rhodes believed he needed a common African policy across the territory. In the Boer Republics, Blacks had already been stripped of their voting rights. He started moving Blacks onto reserves in the Cape and in Rhodesia in order to give their land to White settlers. By 1895, Rhodes had "established all the key foundation of an apartheid regime" (Brown, 2009, p. 273), and had used his near monopoly control of the newspapers in the Cape to gain acceptance of this regime (Brown, 2009).

In 1895, Rhodes and his associates supported the Jameson Raid an operation that sought to foment an insurrection among White British miners in the Boer controlled Transvaal Republic and overthrow its Prime Minister, with the goal of gaining full access to its minefield and preventing the Boers from thwarting Rhodes' imperial advances in the north. The raid failed and precipitated the second Anglo-Boer War. Rhodes lost his premiership in the Cape, Transvaal tightened its grip over the goldfields and "ultimately motivated the Afrikaner-controlled consolidation of segregation in the future Union of South Africa and thence apartheid" (Rotberg, 2019, p. 641).

Rhodes' extractivist projects in Southern Africa were also facilitated by the introduction of a pass system, designed to control the mobility of Black migrant labour to and from the mines. This identification system was developed before the implementation of apartheid, but was harnessed by the apartheid regime, which perfected control over railway infrastructure and the

lives and mobility of the Blacks within South Africa and the Southern region.[64] It "was the

mining corporations demand for a system of identification to bind migrant labourers to the terms

of their long term contracts" (Breckenridge, 2014, p. 68) that allowed or constrained the mobility

of Black migrant labourers. While there were major failings in the system, in theory those found

not carrying passes were subjected to imprisonment a situation which permitted the state to

register them as fugitives (Breckenridge, 2014). This technology of identification, as Keith

Breckenridge (2014) demonstrates, was based on fingerprinting designed by the British

eugenicist Francis Galton, who furthered the links between race (racism) and evolutionist

thinking.

The construction of Southern Africa as a geography of extraction, imperialism and

colonialism was accomplished by and through infrastructure at every stage. These infrastructures

included the building of a network of railroads, a telegraph, the imposition of a series of

identification systems and surveillance oriented barracks for Black and White mine workers.

These infrastructures were implicated not only in the development of an extractive economy, but

also in materializing the racism that structured and enabled that economy. As we will see, the

crucial role of infrastructure continued in the development of the apartheid regime in South

Africa, and in resistance to it.

With the end of the second Anglo-Boer War, a new state emerged in 1910 called the

Union of South Africa. The new state excluded Blacks from political power, policed and taxed

them more efficiently than before and implemented racial segregation policies (Posel, 2011).

Measures were put in place to remove the wealth, land and bargaining power of Blacks, forcing

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[64] This railway infrastructure paved the way for Oppenheimer's Anglo-American company, among other extractive companies, to exploit and control the region's minerals.

them to work in the mines, factories or on White farms. Two years later, in 1912, the Black

educated elite rose up against these injustices and formed the South African Native National

Congress (SANNC), which would later become the ANC, to lobby the Union of South Africa

and Great Britain to give them full rights.

In the early 20th century, the Union of South Africa implemented segregation policies by

creating homelands or reserves to separate the Black population from the White, Coloured and

Indian population in certain regions. Racism and White supremacy were implemented through

the passing of multiple laws restricting the mobility of Blacks. In 1913, the Land Act[65] marked

the beginning of territorial segregation, with less than one-tenth of the territory designated for

Black reserves, and the prohibition of Blacks from leasing or buying land outside of these areas

(Lester, 1996). The cities began to be segregated—Blacks who left the reserves lived in

informal settlements in the cities—and their city access was limited and reduced by means of the

Native Urban Land Act of 1923 (Lester, 1996). After the Great Depression and the Second

World War, the National Party was elected in 1948 on a White supremacist and Afrikaner

nationalist platform. The National Party set out to implement a system called apartheid which

built on the idea of separation and segregation not only between Blacks and Whites, but also

among Black, Coloured and Indian South Africans and made it official law.

Apartheid was a system of economic, social, legal, racial and spatial engineering. It

denied Black, Indian and Coloured South Africans political rights, rights to assembly, ownership

of lands, and their everyday lives were policed and governed in terms of whom they lived with,

where they worked, prayed, travelled, shopped, or sat down and, what they owned and consumed

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[65] It would only be replaced in 1991.

(Posel, 2011). Apartheid was an ideology of White supremacy, apartness, and racial capitalism where Blacks were economically subordinated and at the service of Whites. Apartheid was also a mode of rule enacted through a series of laws which created a whole system of White domination (Posel, 1991, 2011). Its legal infrastructure prohibited Black political rights, constrained mobility, speech, publication, organization and assembly. In South Africa at the time only about 4 million White people out of 30 million could vote (Sales, 1984). All the others were prevented from casting their votes and having their voices heard regarding political decisions taken by parliament.[66]

To put in place their system of White supremacy and segregation, Pretoria passed the Population Registration Act of 1950 classified people according to race (Bowker & Star, 1999). The broad categories were White (Europeans), Bantu (Black Africans), Coloured (mix-raced, Malay, Indigenous people and Chinese) and Indians (South Asians from the former British Indian Empire). Moreover, the Group Areas Act of 1950 put in place the infrastructure to physically separate people according to race. The apartheid regime also set up Bantustans, through the Promotion of Bantu Self-Government Act of 1959, where only a small percentage of South Africa was reserved for Blacks. Ten Bantustans were created, which territorially separated the Black majority along tribal lines, and enabled the White minority government to claim that there was no Black majority. The segregation scheme that Pretoria had designed was to push Black people in the Bantustans, removing them from the White South African political system, and telling them it was their way to have nominal political rights. The aim was to have South

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[66] Apartheid as a system of domination was however not static (Beinart & Dubow, 1995); it not only changed over time due to internal and external pressures and constant resistance, it was also full of failures (Breckenridge, 2014; Posel, 1991, 2011). In fact, its rigid racial boundaries were constantly contested and allowed for porosity (Posel, 2011).

Africa for the Whites. But Blacks considered the Bantustan as labour camps (Sales, 1984). The urban Black population was forced into townships far from White areas, largely without the possibility of owning land, since land ownership was reserved for Whites.

During the decolonization period in the 1950s onwards, four territories, namely, Angola, Mozambique, Rhodesia and Namibia, remained under colonial, White minority rule or apartheid (as in the case of Namibia) and gave support, tacit or otherwise, to South Africa during the first 25 years of apartheid. They formed a barrier or invisible wall, which enveloped South Africa's apartheid regime. All of these countries had established relationships with South Africa and "represented a buffer zone between South Africa and the forces of African nationalism and black political power to the North" (Price, 1991, p. 39). The emergence of liberation movements in Portugal's African colonies, combined with internal resistance in Portugal led to the collapse of the Portuguese dictatorship in April 1974 and the White supremacist buffer zone in the Southern African region as Mozambique and Angola gained their independence. The newly elected governments in the region opposed apartheid and supported the South African national liberation struggle thereby changing the power dynamic within the region (Price, 1991). A few years later, the anti-colonial war in Southern Rhodesia was won by the national liberation movements (The Zimbabwe National Union (ZANU) and Zimbabwe African People's Union (ZAPU)), and the country was renamed Zimbabwe in 1980. South Africa was now surrounded by independent African countries, most of which opposed apartheid and offered material and political support to the South African national liberation movement.

Once the White supremacist buffer zone had been destroyed, apartheid South Africa started attacking the newly elected governments and the ANC located in those countries through a policy of destabilization. Following the Soweto uprising in 1976, Black South Africans were

leaving South Africa to enroll in the resistance. The Frontline States, particularly Mozambique, received political refugees, many of whom were sent for military training in Angola using the railway infrastructure (Ngculu, 2010). Moreover, the infiltration of MK cadres back into South Africa to launch sabotage attacks in the 1980s was made possible through bases in Mozambique and Swaziland, among other Frontline countries. It is in this context that the apartheid regime unleashed its military might, since the invisible wall had disappeared. The apartheid regime in the mid-1970s invested heavily in its military technological infrastructure in an effort to protect itself, and attack the liberation movements and the governments that supported them.[67]

In the early to mid-1980s, the townships rose up in insurrection against the system of apartheid following a constitutional reform that gave minor political rights to South African Indians and Coloureds, but not to Blacks, because of the terrible economic situation in the country and Pretoria's decision to increase service charges to use infrastructure such as buses, rent, schools and an increase in sales tax among others (Barrell, 1993). The regime was able to contain the spread of the revolt in the White areas mostly because of its transportation, military and surveillance infrastructures. The fact that the townships had been built far away from the White areas and were connected usually only by one road contained the spread of the insurrection. The townships had been designed to be surveilled and to contain any potential outbursts of violence. Through military might, the South African regime was able to contain the insurrection almost two years after it began. It was at this point that Operation Vula was approved and started moving forward with its plan to infiltrate top leaders back into the country.

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[67] For example, apartheid South Africa supported many rival groups and created counterinsurgencies in the southern region, including RENAMO in Mozambique and UNITA in Angola, in an effort to destabilize these countries, and kill ANC and MK operatives who had established their bases or training camps in those countries. It also operated and monitored the activities of the ANC abroad, and bombed their offices in London and Paris. In France, they allegedly assassinated the ANC representative Dulcie September (van Vuuren, 2017).

Apartheid Infrastructure and the Repression of Dissent

In this section I show how "apartheid infrastructure" not only inherited the tradition of colonial infrastructure and facilitated extraction, exploitation, and racial segregation (as described in the preceding section) but also established material conditions in which organizing and carrying out political opposition to this regime was made extremely dangerous.

In the early 1960s, political organisations such as the ANC, PAC, and many others were banned. Association with these organizations, or even just the perception of association, led to repression and imprisonment. It became increasingly difficult and dangerous to organise resistance from within South Africa. The attempt by the leaders of the ANC and the SAPC to launch guerrilla warfare as shown in Chapter 1 had been thwarted following their arrest and imprisonment.

Apartheid also consisted in a massive system of thought control. Many Whites had no idea of the brutality of the system. In his autobiography, Tim Jenkin (1987) refers to his own ignorance about apartheid, its consequences and his political awakening when he left South Africa for a leisure trip in the UK. This system aimed at suppressing knowledge, ideas and information that criticised the tenets of apartheid. It is in part through the education system, segregation between races and media censorship that thoughts were controlled, and conformity and orthodoxy were enforced (Merrett, 2001). Pamphlets, books and other publications that pertained to the struggle were prohibited and sanctions were applied when one was discovered with such material or worse when one was found publishing this material. Only through underground channels could these publications be found. Further, in fear of corrupting the mind of South Africans, Pretoria delayed the introduction of television in the country until 1976

(Posel, 2011) and jammed the airwaves to prevent people from listening to Radio Freedom

(Mosia, Pinnock, & Riddle, 1992; Mosia, Riddle & Zaffiro, 1994)**.**

While adaptive and reformist measures were put in place in the late 1970s and early

1980s, the apartheid regime furthered its surveillance and policing/military infrastructures

through repression, infiltration, violence, incarceration, and the militarisation of society.[68] When

P.W. Botha became Prime Minster of South Africa in 1978, he implemented his pro-military

stance through his "total strategy." As he believed there was a "total onslaught" against South

Africa coming from inside and outside the country, measures were necessary for a total strategy

to keep White domination alive. During his time in government, he furthered the militarization

of South Africa and prevented political negotiations while favouring military solutions (Duncan,

2018). Deborah Posel (2011) argues that state brutality[69] was necessary to reassure supporters

of the regime and to intimidate and threat those who resisted.

In June 1986, Pretoria implemented yet another state of emergency which was aimed at

taking back the control over the insurrectionary condition in the townships, a move which was

successful. Increased restrictions were imposed on the media leading to the banning of domestic

and foreign journalists from covering protests and the actions of the security forces against

resistance. Pretoria suspended defiant newspapers and started targeting individual journalists.

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[68] The establishment of South Africa's intelligence dates back to the creation of the Republic in 1961 and the declaration of armed struggle in South Africa. Over the years, Pretoria set up numerous infamous and feuding police and military intelligence agencies that were tasked with collection and analysis of intelligence, surveillance and operational units (Duncan, 2018). It is also important to mention that the UK Government Communications Headquarters (GCHQ) signal intelligence supported the apartheid regime by sharing collected information about the liberation movement through its British High Commissions in the Frontline States (Duncan, 2018). GCHQ feared the increased presence of the Russians and Cubans on the continent of Africa. Both GCHQ and the American National Security Agency (NSA) had to leave Simon's Town, a small village located close to Cape Town, in 1975 when NATO imposed an armed boycott. From that time onwards they were based in the Frontline States.
[69] Covert operations carried out by the Civil-Cooperation Bureau (CCB) became widespread both inside and outside South Africa in 1980s and saw the kidnapping, poisoning, torture and killing of political activists.

The increased repression against the media was part the police and military culture in South Africa. In fact, the period of 1986-1990 was described as "one of struggle over an understanding of the reality of the South African condition, a battle for the means of communication and the power of persuasion" (Merrett, 2001, p. 55).

These accounts demonstrate that apartheid infrastructure was not just about facilitating the extractive economy and enforcing racism, but also about containing and repressing political resistance. It is in the context of increased levels of repression and violence within the country that Vula and the ECS emerged as fugitive infrastructure that was necessary to evade the grip and gaze of apartheid infrastructure on the organization of political resistance. It is apartheid infrastructure that led Black activists and their allies to develop a fugitive consciousness and strategy.

Fugitive Infrastructure

I now turn to fugitive infrastructure as a way to demonstrate the relationship between apartheid and resistance infrastructure, and the threat the latter represented to the dominant order. Without apartheid infrastructure and the particular context and conditions associated with the liberation struggle, the fugitive infrastructure developed as part of the ECS and Operation Vula would have likely never become a reality. What are fugitive infrastructures and what do they do is the subject of this section.

Since the first Dutch and British settlers set foot in South Africa, resistance to enslavement, land grabbing and other processes of dispossession took the form of slave rebellions, marronage, armed struggles, strikes, and mass mobilization. From the 1960s through to the 1980s, resistance also took the form of sabotaging physical apartheid infrastructure such as

police stations, pylons and oil refineries (Ellis & Sechaba, 1992; Lester, 1996; Mandela, 1964). In addition to targeting apartheid infrastructure, the anti-apartheid struggle built its own infrastructure (physical, technical and people-based) as a way to counter, disrupt and, ultimately, dismantle apartheid.

The fugitive aspects of the South African national liberation infrastructure lie in part in the refusal to be governed by the laws and ideas of apartheid and the dream of freedom. The townships insurrection from 1984 to 1986 is a critical example of making entire communities ungovernable and thereby threatening the very existence of the apartheid order. Rendering the townships ungovernable happened in a context where Black South Africans understood the new 1983 constitution as a declaration of war. The constitution furthered the denationalization of Black South Africans, attempted to coopt Indians and Coloured with political rights and with governmental employment opportunities, in addition to coopting the leaders of the Bantustans and placing Black collaborators as mayors of townships (Sales, 1984). It is in this context that the Blacks who were most affected by the new constitution decided to make apartheid ungovernable, a move that Indians and Coloured followed. Such strategy was discursively bolstered by Oliver Tambo's broadcast on October 10, 1984, on Radio Freedom, calling for an acceleration of the revolutionary process with concrete measures on how to make apartheid unworkable through a people's war. Further, in his July 22, 1985 address to the nation, he reaffirmed the call in saying "we must continue to make South Africa ungovernable and apartheid unworkable" (Tambo, 1985a).

Ungovernability describes the mobilization of popular uprising as a means of political liberation and thereby expanded the role of everyday people in the struggle. You did not have to be part to the rigid hierarchies of MK to make apartheid unworkable, all in the country who

wanted to bring down apartheid could be a part (Chance, 2015). While not all organizations, such as the newly created United Democratic Front[70] (UDF), agreed with the means used to become ungovernable (such as sabotage, armed struggle, etc.), they too asked their followers to make apartheid unworkable and make the country ungovernable using general strikes, stay-aways and boycotts, among others. The message of ungovernability resonated throughout the country and was taken up by large swath of people.

I understand Operation Vula as an extension of the revolutionary and ungovernability strategy exemplified by the township insurrections and the call made by the ANC to make apartheid unworkable. Indeed, Vula aimed to strengthen and steer the revolutionary forces on the ground in two main ways. First, by clandestinely sending ANC, MK and SACP leadership figures back into South Africa through an underground transport infrastructure to steer the organisation of a people's war. Second, by building and fortifying a secret transnational communication infrastructure that sought to transmit messages and facilitate the circulation of weapons, money and people to support the revolutionary forces. The clandestine character of the ECS, the fact that the cadres in South Africa were constantly facing the threat of arrest, and that the system itself was in full operation for only three years, from 1988 to 1991, are characteristics that define this infrastructure as "fugitive". Fugitivity underlay the ways in which Operation Vula recruited and sent people clandestinely into South Africa to build an underground network of people and safe houses, and the extreme secrecy associated with making this infrastructure, even within the ANC, MK and SAPC structures and among the families of those allies. Using the term fugitive infrastructure to understand this South African national liberation praxis is a way of

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[70] UDF was a non-racial coalition of civic, church, students, workers and other organisations which was formed in 1983 with the new constitution.

connecting it to the Black and Caribbean radical resistance tradition more broadly. The concept of fugitive infrastructure helps to shed further light on the resistance politics of ungovernability and the role of building and maintain technologies under such conditions.

Where infrastructure can dominate and dispossess, it can also enable struggles and threaten the dominant order. Deborah Cowen (2017) terms *fugitive infrastructures* those infrastructures of resistance that engender certain forms of transformation. She suggests that "alternative worlds require alternative infrastructures" (Cowen, 2017, p. n.d.). Fugitive infrastructures "are assembled to do different things, for different people, and according to different systems of value" (Cowen, 2017, p. n.d.). This notion first succinctly developed by Cowen provides interesting insights when applied to the South African national liberation struggle.

Before focusing on what fugitive infrastructure is and how it manifests, I provide a brief overview of the responses to the emergence and consolidation of apartheid infrastructure. There were many responses to the oppressive infrastructures: some sought to interrupt and ultimately break the infrastructure that reinforced apartheid. As seen in Chapter 1 and 2, this was initially pursued by the ANC Technical Committee (ANC TC), which sought to strike a technological blow to the apartheid regime. Interrupting apartheid infrastructure went hand in hand with everyday forms of resistance.

South Africans within the country resisted and interrupted the apartheid infrastructure on a daily basis through small acts of resistance and contestation. In talking about everyday forms of peasant resistance, James Scott (1985) refers to these acts as weapons of the weak. Scott (1985) states that these forms of resistance "require little or no coordination or planning; they make use

of implicit understandings and informal networks; they often represent a form of individual self-help; they typically avoid any direct, symbolic confrontation with authority" (p.xvi). Black South Africans were collectively contesting and defying apartheid laws and policies through gatherings, marches and pass burning, among many others.

Major uprisings by Black South Africans in the Vaal triangle townships erupted in 1984. The uprising, which transformed into an insurrection, not directed by any political party, spread to other townships across the country. Black South Africans were able to take control of their townships and made them ungovernable in relation to the maintenance of apartheid. In doing so, they created new forms of infrastructure composed of people's committees, people's courts, education crisis committees and health-care committees (Barrell, 1993; Price, 1991). They also set up their own Black trade unions, women's organisations and student's organisations. A whole new Black people-centered infrastructure largely free of apartheid ideology existed from 1984-1986, before it was crushed and taken back by the apartheid regime. Despite the barricades erected around the townships, mostly by the youth who manned them (Price, 1991), the regime used states of emergencies to break the insurrection.

As in most cases of structural inequality and exploitation, the relationship between domination and resistance take the form of call and response: resistance tactics arise in response to the specific strategies of domination which, in turn, respond to these tactical resistances with various forms of repression. Infrastructure is implicated at every stage of this cycle. In the case at hand, Black activists in South Africa responded to the domination exerted by the regime in ways that were left open by apartheid infrastructure. The regime responded by expanding and intensifying that infrastructure, tightening its grip on the political organization of resistance. One of the responses by exiled freedom fighters was the development of fugitive infrastructure, such

as Vula and the ECS, intended to evade that grip and, thereby, recover the possibility of resistance and an alternative future.

The insights from fugitive thinking and practice open up an interesting window onto understanding this infrastructure. Mobilizing the fugitive character of an infrastructure draws on the wisdom, power and praxis of past Black and Caribbean radical fugitive[71] and resistance struggles. While the term fugitive is rooted in a particular historical context, and lived experience of slavery, it can be useful in a context like the struggle against apartheid, especially as it refers to building an infrastructure of resistance, such as the ECS.

In *Freedom as Marronage*, Neil Roberts (2015) theorizes fugitivity or marronage as a space of freedom. He defines marronage as "a group of persons isolating themselves from a surrounding society in order to create a fully autonomous community" (Robert, 2015, p.3). During the system of slavery in South Africa, the Greater Caribbean and elsewhere, one of the ways to flee slavery was to escape and become a maroon. Maroons took to the interior of South Africa, and in other places, maroons fled to the hills or swamps (Diouf, 2014; Roberts, 2015; Sayers, 2014). There, they established autonomous communities separate from the colonizers' slave labour system and racial ideology. They made themselves ungovernable to an order they were rebelling against and instead created their own system that reflected and materialized their aspirations and dreams of freedom.

Marronage, like apartheid, is defined by a logic of separation. To practice marronage is to establish an existence separate from a structure of domination to which a person or group of

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[71] Maroon communities have been set up in many parts of the world including in Angola, Brazil and India among many other countries. I single out the Black and Caribbean tradition because of the scholarship I draw from.

people is involuntarily subjected. The distinction however is between a separation that is imposed, involuntary and freedom-denying (apartheid) and separation that is wilfully enacted voluntary and freedom-affirming (marronage). Each implicates infrastructure, in its own way. Moreover, as a form of separation, both apartheid (as we have seen above) and marronage have spatial qualities. Marronage achieved spatial separation via flight to remote and inaccessible geographies.

In the case of South Africa, resisting enslavement took the form of attempted slave rebellions against the Dutch in 1799-1801, and in Cape Town in 1808 and 1825, against the British (Worden, 1985). Such slave rebellions occurred during and after the Haitian revolution (1791-1804) led by Toussaint Louverture—Haiti was the first successful slave rebellion leading to an independent Black republic, and inspired many other attempted uprisings, particularly in the Greater Caribbean (Scott, 2018). As Cape Town was an international trading port, boats carried with them not only goods and people, but also stories, including accounts of the French revolution and its Enlightenment ideals (Lester, 1996). It should be mentioned that such ideals also had an impact on the Boers who also wanted their independence and freedom from the British (Lester, 1996).

In his book, Roberts (2015) criticizes the dominant understanding of freedom as binary. He argues that freedom is usually understood either negatively—as a lack of freedom and marronage as a flight from slavery—or positively—when slavery was abolished freedom was to follow—forgetting that freedom might in fact be experienced within a third space, a liminal space, within a larger situation of unfreedom. Acts of freedom within a third space may be enacted in the day to day resistance to an oppressive condition, such as finding freedom among maroon communities, but marrons as freed slaves also actively participated in revolutions.

Roberts (2015) argues that fugitivity or marronage is part of a wider ecology of freedom practice; a larger repertoire of democratic actions that Haro and Cole (2019) say involve acts of lawbreaking, concealment, secrecy, and flight as fundamental in unjust situations.

Conventional accounts of fugitivity cast it as the transit from a state of oppression or danger to a state of freedom or safety, states that are arranged in binary and linear relationship. Roberts' (2015) account suggests that the condition of fugitivity is, itself, a state of freedom, a state that exists simultaneously within and beyond a condition of oppression. "Freedom is not a place, but a state of being" Roberts argues (2015, p. 8). More so, fugitivity might in fact be an essential dimension of revolution (Robert, 2015). Roberts (2015) argues that to understand the Haitian Revolution, the entanglements between fugitivity/marronage and revolutions are vital. Maroons were revolutionary (freed) slaves or descendants of slaves who actively participated in organizing and fighting for emancipation. In fact, a maroon, Boukman Dutty, originally from West Africa, together with the priestess Celine Fatiman, participated in the vodou ceremony Bois Caïman, an important event that helped to catalyze the beginning of the Haitian Revolution (Robert, 2015; James, [1938] 2001; Verges, 2019). This is just one example of the crucial character of fugitivity. Moreover, many maroons participated in spreading the word about the French Revolution and showing the contradiction between the ideals of the French Revolution and the refusal to give Black people in the French colonies freedom and the right to self-determination (Scott, 2018). Maroons, along with other actors such as freed slaves, were active in spreading news about the revolution in Haiti and in the Greater Caribbean with the hopes of triggering other revolutions against Dutch, English and Spanish colonialism (Scott, 2018). The fugitive maroons were thus engaged in revolutionary communication as I show in Chapter 4 and agents of mass revolutions (Roberts, 2015). It's in this context that maroons and the autonomous

communities they built may be represented as acting materially and symbolically as fugitive infrastructure.

Another prominent example of fugitive infrastructure is the case of railroad and telegraph infrastructure as technologies of flight from slavery in the American south (Cowen, 2017). Between 1830 and 1860, the Underground Railroad formed a series of local networks in rural and urban areas in the South and North that communicated with each other and assisted fugitive slaves in gaining their freedom. The clandestine communication and transportation infrastructure was operational in the North and South, although in the South it was mostly slaves who escaped on their own, and received assistance from a few people along the way (Foner, 2016). Through the Underground Railroad, Foner (2016) estimates that about 30,000 slaves escaped to freedom, but as he revealed that in 1860 there was still four million slaves in the South. This fugitive infrastructure had not destroyed the institution of slavery. However, what the Underground Railroad did in the North was to sustain political resistance against the enslavement of Black people, a crucial catalyst of the American Civil War of 1861-1865 (Foner, 2016).

The Underground Railroad took advantage of emerging technology and the recently built and developing railroad infrastructure and employed a great deal of ingenuity to support slaves in their quest for freedom. Fugitives used modern modes of transportation such as trains and ships and often used false identification papers and disguises (Foner, 2016). With the emergence of the telegraph in 1844 in the United States, the conductors and operatives of the Underground Railroad "telegraphed ahead announcing their [the fugitives] impending arrival" (Foner, 2016, p. 104). More so, after reaching freedom in the North or in Canada[72], Foner (2016) shows through historical records that fugitives not only talked about the Underground Railroad which allowed

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[72] I need to stress that slavery also existed in Canada.

them to escape, but also about the Underground Telegraph. "By the 1850s, many escaped slaves appear to have been able to communicate with loved ones in the South. There is an underground telegraph, the abolitionist Thomas Wentworth Higginson observed, as well as an underground railroad" (Foner, 2016, p. 205).

Vula's Fugitive Infrastructure

The history of fugitive infrastructure and marronage sheds light on the political character and significance of Operation Vula and the ECS. Such infrastructure comes to light and available for analysis after the fact, for the act of revealing it during a struggle for emancipation would endanger those who were involved in making and operating them. In the following, I show how the ECS and Vula as fugitive infrastructures were operationalized, and how they were made out as much as people as objects or hardware. They enabled intimacy, made tactical use of apartheid infrastructure and facilitated forms of flight when danger was looming. Overall, the significance of fugitive infrastructure lies in the politics it enables.

Because of its fugitive nature, the ECS and Vula's infrastructures needed to be sustained and cultivated through a network of people. In *People as Infrastructure: Intersecting Fragments in Johannesburg*, AbdouMalik Simone (2004) expands our understanding of infrastructure from one that is restricted to physical systems, such as railways, highways, pipes, wires, and cables, to one that focuses on people's activities in the city. He argues that it is through the "complex combinations of objects, spaces, persons, and practices" (Simone, 2004, p. 408) that life is produced and reproduced in a neighbourhood like Hillbrow in Johannesburg. Simone's concept is helpful in understanding the ECS and Operation Vula as fugitive infrastructures that were composed of people as much as they were composed of technical hardware. As was shown in Chapter 2, the ECS required, from its experimental phase through to its operational phase, the

willingness of many people whose privileges (racial, gender, financial, technical or geographical) were assets. White foreigners were recruited to set up and run safe houses to host underground operatives and some of the equipment needed to make the communication infrastructure function. Moreover, the majority of those who operated the ECS were women as this task was seen as more clerical, less dangerous and less prestigious than being implicated in acts of sabotage, strategic thinking or decision making work in which fewer women were involved within the ANC, SAPC and MK (Suttner, 1993, 2007, 2008).

People were instrumental to the constitution and maintenance of Vula and ECS as fugitive infrastructures, including those who developed, tested, operated and supported them, in addition to those who hosted fugitive operatives and equipment in their safe houses. Taking such a position of understanding people as infrastructure in a fugitive context also aims to decenter or shift the focus away from the sole developers (Burrell, 2012; de Laet & Mol, 2000) of the technology and as a way of making visible the armada of people needed to build, operate and support the ECS and the work of Vula.

To set up the local safe house infrastructure, White international allies who pretended to be friendly to the apartheid regime were sent to South Africa to build part of the infrastructure of deception. In total, 15 safe houses were set up: five in Johannesburg and 10 in Durban (Lyman, 1990). While running the safe houses, the Dutch and Canadian allies had to blend in with apartheid society, which involved finding a job and a house to live in that was often different from the safe house, buying a car, building a social network, and so on. They were initially given money to settle in South Africa, but needed to quickly become financially independent for their day to day living. They were responsible for hiding weapons in their safe houses, hosting the computer equipment, buying needed materials, such as the hundreds of phone cards used to

phone London via the public phone system, and so on. Their Whiteness and the fact that they were foreigners unknown to the regime—the White South Africans who were part of the struggle were well known by the regime and hence could not play that role—allowed them to navigate the apartheid infrastructure relatively freely.

International allies used to their advantage the segregated infrastructure of the White areas to find the best spot for a house or flat that was to host the operatives. Helen and Rob Douglas had been recommended by the Communist Party of Canada, who Mac Maharaj had reached out to in the hopes of finding people who would support them with Vula. Helen and Rob Douglas had been supporting their local anti-apartheid chapter in Vancouver before being asked by Maharaj to part take in Vula[73] with the task of setting up a safe house. The Douglas's were given strict parameters and instructions by Vula leaders for the selection of the safe house. They needed to pay attention to the street and neighbourhood where the safe house was to be located. The Douglas's had to look for a house in Johannesburg that had a small separate cottage on the property where a Vula operative could stay, such as Maharaj, who pretended to be an Indian Canadian businessman. They were instructed that the safe house needed a garage door with an electronic motor so that the Vula operatives who had the remote control could just come and go as they wished and be invisible (H. and R. Douglas, personal communication, September 27, 2018). The infrastructure that was built to protect the Whites, in this case a gated house in a White area, was used to the benefits of the fugitive infrastructure. For one year and half the Douglas's waited in Johannesburg to be contacted by a Vula operative. It was a lonely

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[73] Helen and Rob Douglas did not know they were recruited to be part of Operation Vula.

experience, which led them to think the ANC had forgotten them (H. Douglas and R. Douglas, personal communication, September 27, 2018).

Being an underground operative was not easy and it took a toll on people's lives. One of the Canadians, Helene Douglas, remembers that: "Running a safe house is not just providing shelter, […] people are in dire situations and you will need to be a shoulder to cry own or [be an] emotional support. It was very human" (H. Douglas, personal communication, September 27, 2018). Those who manned the safe houses provided infrastructural and emotional support for clandestine operatives who were under high pressure, far away from family and friends, and needed to use a computer to type, encipher and decipher messages. In this context, the safe houses acted as an infrastructure of intimacy (Wilson, 2016) providing respite, proximity and relative safety and security for brief periods. Those who manned the safe houses were also in need of genuine human relations as they were isolated in their own work having to pretend being people they were not. Such infrastructure provided relational support where people met and reaffirmed their own commitment for the struggle.

Intimacy with and attachment to loved ones located outside of South Africa was enacted through the ECS. The underground operatives used the communication system not only to organize transnationally, but also to obtain news from loved ones and reaffirm their family commitments. In the following message dated from September 27, 1988 Zarina Maharaj (1988) exemplifies this level of intimacy when she wrote to her husband Mac Maharaj a few months following his infiltration in South Africa.

Thanks for lovely message on tape. Delighted at your progress and only hope all continues well. Never lose your deep sense of security we want to see you again in one piece! The children are marvellous; Milou reasons it would be better to wait for you if it

means when you come back you'll be well enough for him to play with you robustly without worrying about your knee etc. Joey reckons she'll play gently if you're not well because of returning sooner! They're amazingly good about it. I'll tell you all about rest, job, S and L, etc. once we have direct communication. Keep strong and brave; we're very proud of you. All my love Gemma and kids. (para. 14)

Deception was essential to a successful fugitive infrastructure. Before his infiltration into South Africa, Mac Maharaj fabricated a story that he was gravely ill and had to go to Moscow for hospitalization. The idea was that if the ANC, MK, and SACP rank and file believed this story, the apartheid regime would too. After spending time building their cover stories, Maharaj and Nyanda went to Amsterdam for disguise training and then flew to Swaziland. On the day of their infiltration, in July 1988, Maharaj and Nyanda crossed into South African border by foot and by car. This was a dangerous endeavour given that the border was usually guarded by police and their dogs. However, knowledge of the rural Swazi areas by Totsie Memela, an ANC and Vula operative tasked to infiltrate people in South Africa, was essential. Originally from a working class background in Soweto, Memela left South Africa for Swaziland after being involved in the 1976 student uprising. After studying and living for many years in Swaziland, she knew the country well and had an extended network of trusted peers. It is in part thanks to her friends who monitored the border that Totsie, Maharaj and Nyanda were able to cross safely. Memela (2002) recalls:

It didn't even take 15 minutes for us to move from the house which was on the Swazi side to the main road which was in SA [South Africa], but you needed to make sure that at the time that you do that that there's no patrolling of the borders. You needed to make sure that it's safe therefore you needed to monitor, to check the area all the time but it was easy

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because I had a family that was close they could watch what was happening on the border

24 hours without a problem. (para.155)

Operatives less known or unknown to the apartheid authorities started arriving in South

Africa using more formal means of entry via the Johannesburg airport and technologies of

deception, namely counterfeit passports and disguises. These technologies allowed for mobility

and concealing one's identity and served to disrupt and counter apartheid infrastructure. The

following message taken from an ECS exchange shows the importance of the choice of port of

entry and deception mechanisms.

Suggest infiltration should be legal entry either by road via Bay or by air, again via Bay.

So we think key issues are ensuring she get the necessary documents IN TIME. These

are: (a) Passport wh[ich] will enable her to enter Bay. (b) Passport wh[ich] will enable her

to enter RSA [Republic of South Africa] by air from Bay or by road from Bay. Important

that this should therefore have the right entry/exit stamps. (c) Identity Book based on

appearance she will live under inside, with driver's licence entries. (Anonymous, 1988,

December 24, para.14)

Many of the counterfeit papers were obtained through the solidarity movement operating in the

Netherlands, via the network based in Lusaka or through the Durban intelligence network

(O'Malley, 2007). In the Netherlands, Conny Braam had recruited Dutch actors who trained

Vula operatives in how to develop a new persona. She recruited a Dutch dentist who made false

teeth to change the facial appearance of operatives, wig and makeup artists who helped with

disguises, and a photographer who prepared the false passport photos. Psychologists and

physiotherapists were also recruited to help with relaxation and self-hypnosis exercises, and they

made cassette tape recordings of these techniques in Dutch and English that operatives copied

when in the Frontline States and in South Africa (M. van Gils, February 9, 2018). Deception in the form of papers, physical appearance and behaviour were essential to navigating the apartheid infrastructure in the open, and could only be removed when inside a safe house.

Some of the operatives also used modified cars that could safely hide explosives, arms and other packages. Janet Love's car had an enlarged gas tank in which one part was used to hide the weapons she was carrying. Through the ECS, she was told the location of the dead letter box (DLB), a hideout spot, where weapons, money or any other packages were to be picked up. Once the DLB was picked up a confirmation needed to be sent via the ECS. Here is an example of instructions received to pick up the DLB "Toyota":

From intersection of R513/highway N1 going to Pietersburg in North-East of

Pretoria, take highways direction Warmbaths & Pietersburg. Drive for +/- 15 km,

till you see on left roadsign: ? Mabbonstraal Pyramid. Then immediatly turn left, cross

highway on bridge, get to opposite direction on highway going to Pretoria. KM 0 from

the bridge. Drive exactly 9,2 km & you'll roadsign:

PRETORIA

152 Zambesi-Rylaan 2,0

148 Stormvoelweg   6,0

145 Middestad   8,5

Once at roadsign, drive exactly 100 metres: you'll see on left side, +/ 15 metres from

highway, medium-sized tree, followed by second smaller tree 2 metres on & then another

small tree 2 metres from second. The 3 trees are parallel to highway. Behind the 3 trees

there's a barbed wire 70 - 80 cms from the trees. Go to SECOND tree trunk. DLB is

situated +/- 40 cms from base of trunk, between trunk & barbed wire. Soft earth covered

with leaves - easy to find. (Anonymous, 1988, August 20, para. 5)

Sending such messages through the ECS allowed operatives to pick up the package fairly quickly

at a specific location. Being powered by new and quick communication technology, Vula

allowed operatives to move faster.

The fugitive infrastructure was also facilitated by the apartheid infrastructure. Fugitive

infrastructures often make unintended, tactical use of the very infrastructures that have been

developed to serve the regime that oppresses them. Operatives used to their advantage

apartheid's advanced communication infrastructure of public telephones to send messages back

to London. Apartheid South Africa had invested in public communication infrastructure quite

early on to set itself apart from the rest of the African continent, and be closer to Europe in terms

of the services it gave to its White minority. In addition to this tactical use of the public phones,

Maharaj and his assistant Claudia Manning drove to the segregated and quiet White parks of

Johannesburg to furtively send messages to London via a radio phone that had been bought and

brought clandestinely by the KLM flight attendant who regularly flew from Amsterdam to

Johannesburg and handed over to Maharaj. Erecting an antenna on the top of the car in the

middle of a White park was no safer than using the public telephones. Manning remembers:

We would drive to Zoo Lake in a quiet spot and he [Maharaj] would use the car phone to

send these messages and made the sound of an old fax machine. And the signals were

very terrible. Right at the end, just before it went through often the signal would lapse and

we would have to start again. That area had often police cars that would patrol because

this was a White park and we were always terrified that somebody would come to find us.

(C. Manning, personal communication, November 11, 2018)

Even as this fugitive infrastructure was conceived, built and operated, the apartheid infrastructure continued to bear down upon it in decisive ways. Victor Verster Prison, where Mandela spent the last years of his imprisonment, was part and parcel of the elaborate apartheid infrastructure. In addition to constraining his movement, and facilitating spying on him, it also served to isolate him from other comrades on Robben Island since the prison is located about 70 km outside of Cape Town in the Western Cape. Negotiating this apartheid infrastructure required a deep knowledge of it and an ability to use the cracks and holes in the system in order to use the ECS to communicate with Mandela. While I show below how Mandela's messages reached Oliver Tambo in Lusaka through the fugitive infrastructure, the message below alludes to the difficulty in cracking apartheid surveillance infrastructure in an effort to speak to Mandela. "We agree about the impossibility of meaningful consultations at Victor Verster on the scale & for the purpose intended" (Anonymous, 1989, May 2, para.1).

Before Mandela's release in February 1990, he and Tambo exchanged messages through the ECS. It is through Mandela's former lawyer that a book with a secret compartment built specifically for this purpose in the Netherlands was first handed over to Mandela with a message hidden in the book binding (C. Braam, personal communication, February, 7, 2019). Mandela then wrote a message and hid it in the binding. Then the messages written by Mandela were typed by a Vula operative, usually Janet Love who was the main communication officer for Vula, and then sent by the ECS for Tambo or Alfred Nzo to read via Jenkin in London. Ismail Ayob, one of Mandela's former lawyer recalls:

> Mac Maharaj (and his Vula colleagues) decided that I should carry messages between O
> R Tambo and Nelson Mandela inside the hardcover of innocuous books. I passed on the
> first book to Nelson Mandela in that form. His response was that it was easier for me to

carry his notes in and out of the prison in my pocket. He said that there was nothing more the apartheid government could do to him if a note was found on me. I continued to pass on numerous messages both ways in the normal course. There was no doubt that our conversations were monitored both inside the visiting room and later within the house and the garden outside. (I. Ayob, email communication, October 4, 2018)

A fugitive infrastructure needed to rely on intelligence to avoid being caught and at times allow for flight. Operation Vula had privileged information on the workings of the apartheid regime in part because the intelligence branch of the ANC, SACP and MK based inside and outside the country had sources inside the police and a number of informants within apartheid institutions.[74] The message below exemplifies the strong surveillance infrastructure and social control function of the South African police and Security Branch, and the need for Vula to exfiltrate one of theirs who had been discovered.

Enemy surveillance has steadily increased. Our great advantage is we have two sources there. Somehow (not clear at present how) they have unearthed one place we use. The place is under care of Kevin. Enemy has mounted surveillance, including video cameraing movement in & out of the place. […] However enemy has been inside place, taken stock of everything inside, & are observing to see with whom etc. Kevin is connected. At present they have mis-identified Kevin. […] We will have to ship him out. (Anonymous, 1989, June 8, para.16)

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[74] This is one of the reasons why Operation Vula is so controversial today because Jacob Zuma was the head of intelligence when Vula occurred. Zuma is the former President of South Africa who looted the country (also known as state capture) for his personal gain and was accused of rape by 'Khwezi' (Gqola, 2015) but has been acquitted in court of the latter. There is currently a Judicial Commission of Inquiry into Allegations of State Capture examining the extent of his involvement. It is also the subject of a documentary film by Rehad Desai and Anita Khanna (2020) entitled How to Steal a Country.

In this case, the ECS facilitated one form of flight away from danger. Despite the precautions taken by the operatives with the help of informants inside the government, it was hard to fully escape the power of apartheid infrastructure.

When Nyanda was arrested in one of the safe houses in Durban in mid-July 1990, one month after the beginning of the dismantling of the Berlin Wall and six months after the liberation of Nelson Mandela in February 1990, the underground workings of Vula and its communication infrastructure were unravelled. On July 14, 1990, Janet Love (1990) sent an urgent message to Jenkin in London.

> VERYURGENT   VERYURGENT   VERYURGENT
>
> Attn Kay [Joe Slovo], Pete [Ivan Pillay], Norman [Alfred Nzo] and John [Tim Jenkin]
>
> (John [Jenkin] please pass this to Mike [Lusaka] immediately)
>
> It appears that Vula may be facing serious and major casualties. […]
>
> This morning, Friday, Shireen [Rashinda was Maharaj's Secretary] spoke to Suzy [Janet Love] and indicated that it looks like Paula [Susan Tshabalala] has been taken. The comrades drew this conclusion because Paula's car which had not been there earlier is outside the house and Paula has not responded to message. BIG PROBLEM RE COMMS because it seems that Paula was in the habit of carrying around the programme disk and the files. […]
>
> Theo [Maharaj] and Suzy [Love] met and began process of relocating people and material to places unknown to Carl [Nyanda] and clearing out places; In the absence of Theo [Maharaj], Suzy [Love] is continuing with this. Other decisions eg regarding some of the infrastructure support people will need to be made on Daniel [Ronnie Kasrils] and Theo's [Maharaj] return. […]

John [Jenkin] please do whatever you can to erase back files from ML [South African telematics Microlink] and anything else you may think of. (July 14, para 5)

To this urgent message, Jenkin (1990) replied:

Oh dear!

I have changed the password to your ML[Microlink] so no one should be able to log it without knowing the new password. […]

it appears that someone logged it at 18h45 your time on Saturday 14th. Was this you? Do you know about this? You & Lobby [Durban]) purged two msgs on Saturday. […]

Please note how many times you call the receive number as we can then

check. There is a counter on the machine to tell how many times it has

been accessed. If the enemy calls it to test, it will be counted. It will indeed be serious if

the enemy gets the book as then they will be able to undo all previous msgs sent using it,

assuming they recorded all the msgs. […]

dear me. what are we going to do? (July 15, para. 6)

The password to the South African telematics system Microlink, which had just started being used in the spring of 1990, was soon closed and Jenkin preferred to switch to using the Dutch public electronic mail service, a telematics system called Memocom.

The apartheid regime also included an infrastructure of psychological and physical torture, which was employed when the Vula operatives were arrested. Love writes that the suspicion was that Charles Ndaba, one of their operatives, had been taken by the police and had spoken about some aspects of Vula. She wrote the following to Lusaka via Jenkin in London:

In term of how it happened, Theo [Maharaj] has indicated that seems that last weekend Mbuso [real name] & Charles [real name] were caught which involved in particular

mission. Arising out of that enemy was able to locate particular meeting venue and went

there and waited for whatever meeting would occur there whenever. There is a suspicion

that Charles has been talking. (Love, 1990, July 15, para.7)

During the Truth and Reconciliation Commission (TRC), which started in 1996, it was

revealed that both Charles (believed, but never proven to be an informant) and Mbuso, who had

disappeared in July 1990, had in fact been murdered by the Durban Security Branch. Their

murderers applied for and received amnesty for their abduction, torture, assassination and the

unlawful disposal of their remains (Truth and Reconciliation Commission, 2001). Their assassins

confessed during the TRC that both men had been shot and "their bodies were wrapped in

hessian, tied to two concrete poles, and dumped into the river" (Truth and Reconciliation

Commission, 2001, para. 13). Their murders happened around July 6, 1990. A few days later a

huge police operation discovered Vula.

The Vula operatives who were arrested were sent to police stations for interrogation.

Some were tortured as MK and Vula deputy commander Nyanda's report highlights in a message

sent via the ECS.

> While Captain Davidson was questioning me Captain Botha came into the office
>
> demanding that I tell them who ??'s source in the police force was and said
>
> that I know "The Owl". I said I do not know. He called Captain Davidson to
>
> another office and when the latter came back they said I was taking the whole
>
> security branch as fools and began punching me on the chest. His assistant from
>
> Newcastle came behind me and fastened a towel around my eyes. They led me to
>
> another room and despite my protestation put something like a jacket which made
>
> it impossible for me to move my hands and legs. They laid me on the floor and

began sufocating me with some rubber. Captain Botha kept asking who our

informant in the security police was. I said I do not know. They repeated the

suffocation a few times and I was taken out of the jacket but interrogated in

the blindfold by Davidson's assistant who repeatedly hit me all over the body

with fists. The blindfold was only removed in the morning and since they were

refusing to give me a chair to sit on I sat on the floor and refused to stand

up despite threats to assault me. After about an hour Davidson told them to

give me a chair but after about 15 minutes I was dozing off and he ordered me

to stand up if I am going to fall asleep. (Anonymous, 1990, September 11, para.6)

Upon arresting and torturing a number of Vula operatives in Durban and discovering the

communication system and the messages exchanged, the South African surveillance apparatus

was able to unravel the final pieces of the puzzle. Finding the computer equipment, some of the

printed messages and encrypted disks in the Durban safe house revealed to the apartheid regime

the sophistication of the ECS, Operation Vula and its aim to launch a people's war. The other

safe houses were soon found in Durban and Johannesburg. The Canadians and others, whose

names were on the charge sheet and who were accused of terrorism, fled back to Canada and

other destination to avoid arrest (H. and R. Douglas, personal communication, September 27,

2018). The South African operatives had to go deeper underground to avoid arrest.

More than 4000 pages of messages exchanged (including the printouts of ANC and

SACP newsletters and leaders' statements) were found by the Security Branch mostly in the safe

house that Nyanda, Tshabalala and others were using. They had kept those messages rather than

destroying them as had been instructed in Jenkin's detailed Coder Manual.

F3: Delete messages on disk

Through F3 any file on any disk placed in the drive may be deleted. You must not

delete any files on the 'PROGRAM' or 'DATA' disks, however. For security reasons all

files - plaintext, enciphered and deciphered - should be deleted from the 'MESSAGE' disk

as soon as they are no longer needed. (Jenkin, 1988, p. 3)

With the thousands of messages discovered at the safe house, the Security Branch

discovered the existence of Vula, its purpose and that it had set up an international network of

almost instant communication with London.[75] While Vula operatives still underground were

trying to figure out what the apartheid regime had discovered in the safe houses, the following

message was sent highlighting some of the discovered material.

From Raoul's [Durban] places: 2 x T1000 [laptops]; two-way radios brought by

Stevenson [the Belgian couple Christiane Ramseyer and Franquin Jacques (Jack)]; TNT;

10 mini-limpets; 2 x SPM; 21 grenades; 4 x Stechkin; 3 x Makarov; 1 AK; some

detonators.

From Cynthia [Johannesburg]: 1 x T1000 and 2 x pistols and 1 x makarov (from N&J

[Canadians Rob and Helen Douglas] in robbery) and 1 x colt; 2 x DLB petrol tanks.

(Anonymous, 1990, July 29, para.15)

The significance of a fugitive infrastructure lies in the politics it enables rather than trying

to measure the impact it had on a political system. Operation Vula and the ECS did not put an

end to apartheid in and of itself. What it did do, and this is where its significance lies, is that it

allowed an infrastructural politics of resistance and solidarity to exist and operate clandestinely.

To sum up, fugitive infrastructures are always responsive and adapted to the particular material,

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[75] It is unclear if and when they understood that the ECS also linked other locations such as Amsterdam, Harare, Lusaka, TallCree and York.

technical and social circumstances in which actual struggles take place. Accounts of both guerrilla movements and marronage have emphasized the importance of inaccessible and remote geographies as enabling these forms of resistance. In the case of South Africa, such geographical conditions were not present—as a result, resistance had to be organized on the basis of leadership in exile and internal activists who could not take refuge in remote and inaccessible locations. As a result, the human and technical elements of Vula and the ECS as fugitive infrastructures were adapted to these conditions.

Conclusion

In this chapter, I have demonstrated that infrastructure was equally implicated in the long history of the imperial, colonial and apartheid systems of exploitation and domination in South Africa as it was in resistance to these systems. Both the apartheid regime and the liberation movement deployed their power through infrastructure in overt and covert struggles. In chronicling aspects of the history of apartheid and fugitive infrastructure in South Africa and elsewhere, I have shown that while they each have their own specificity, the development of an infrastructure of resistance is a response to an infrastructure of domination. In the case of apartheid South Africa, the sheer existence and operation of a fugitive infrastructure composed of people who refused to be governed by unjust laws threatened its order and demonstrated the continued existence of African radical resistance.

Digging into the politics of infrastructure in South Africa and beyond has revealed the historical formation and arrangements that have led to apartheid infrastructure as much as the constant and tirelessness responses of resistance to them. Colonial pass laws, railways and mining barracks facilitated the extraction of precious minerals to enrich European empires, companies and their shareholders, on the back of Black and subaltern labour. Apartheid

infrastructure severely stifled Blacks' social, economic, political and cultural rights, but it did not fully restrict and constrain their agency, mobility, resistance, hopes and dreams. Resistance movements have always disrupted White supremacist practices under settler colonialism and apartheid using everyday forms of resistance, sabotage and the building of fugitive infrastructure to create spaces where the freedom to act and resist is possible.

White supremacist infrastructure is, unfortunately, not a remnant of the past. It is alive and well today and continues to facilitate racism, patriarchy and forms of (neo)colonialism. In this context, fugitive infrastructure is built and used today by those who need it the most and by their activist allies. Acknowledging and valuing Black and subjugated radical resistance traditions enable us to gain new insights into how to resist oppression—both old and new.

Chapter 4

Revolutionary Communication

They stuck to their vodouism because it formed a secret means of communication. But when the revolution actually took place, Toussaint and ah, his officers were very severe against vodouism. They thought it was a backward [means?]. But undoubtedly, I have no doubt as time goes on that vodouism, not only before 1791 but afterwards, was a secret means of communication between Haitians.

CLR James, *The Black Jacobins Reader* (Forsdick & Høgsbjerg, 2017, p. 340)

This chapter considers the ECS as developed as part of the ANC TC as a case of revolutionary communication, by which I do not mean communication that "changes everything" (a quality often attributed to communication technologies) but communication under revolutionary conditions. I situate this chapter in the history of media and communication in revolutionary and liberation struggles, particularly in the Global South, and anti-colonial and anti-slavery struggles. Here, I situate the ECS primarily as part of the "pre-commercial Internet" and "pre-social media" history of media and communication practices in revolutionary and national liberation struggles. This chapter aims to recover the specific role of communication in the history of movements for social change that sought to transform societies and bring down structures and systems of oppression. The work of connecting the radical past to the present has long been emphasized by Black, Caribbean, African and Asian scholars among others (James, [1938]1989; Gopal, 2019; Kelley, 2002; Prashad, 2007; Robinson, [1980]2000), and more recently by Black feminists who have highlighted the intersection of critical race studies and communication and/or science and technology studies (Broussard, 2018; Noble, 2016; Benjamin, 2019). Inspired by their work, I bring the communication and technological practices of the South African national liberation struggle into conversation with a handful of examples from the

radical Black, Indigenous, Caribbean and African radical traditions. Specifically, I consider how slaves and free Blacks communicated prior to and during the Haitian revolution of 1791-1804, how the Cuban revolution led by the 26th of July Movement used communication, how radio was used and thought of during the Algerian war of independence, how the *Frente de Libertação de Moçambique* (Liberation Front of Mozambique or FRELIMO) mobilized communication, how the Internet was used to further the Zapatistas struggle, and finally I focus on some communication practices used during the South African national liberation struggle. By placing the ECS in the context of accounts of these movements, I hope to highlight the significance of communication and the technologies that mediate it under revolutionary conditions, such that we might begin to think about revolutionary communication as a distinct category of historical and contemporary inquiry, in a manner that nevertheless does not centre technology as primary or autonomous "revolutionizing" force.

By the term "revolutionary communication" I mean to indicate practices of communication undertaken under conditions of sustained, organized struggle to achieve liberation from, or comprehensive transformation of, an unjust or oppressive regime. Revolutionary communication is thus related to, but distinct from, the types of communication developed and used by social movements during protests, or in post-revolutionary state formations. The context and conditions in which social movements have built or used communication and technologies (such as within Indymedia and Arab Spring) are all important. All have led to a variety of significant technological and communication practices that have been widely documented (Gerbaudo, 2012; Wolfson, 2014). The same is true of recent accounts of post-revolutionary, state-led efforts to build national computer systems, such as in the case of the Cybersyn network under Salvador Allende's socialist government in Chile (Medina, 2011) and

the attempt to build a civilian nationwide computer network in the Soviet Union (Peters, 2016).

Instead, I focus on a handful of examples of revolutionary communication that occurred in the

context of political organizations or groups that specifically struggled for revolutionary

transformation or national liberation. This is an admittedly limited and limiting category, but I

think it accurately reflects the character of the ECS, in a way that folding it into a category with

social movements and post-revolutionary state initiatives would not.

The accounts I examine are ones in which armed struggle as a means of resistance and

self-defence was present (Dorlin, 2017). The refusal of regimes to relinquish modes of rule such

as slavery, colonialism and apartheid, and the resistance against these gross injustices meant that

armed struggle was inevitable. This necessitates a final, normative, qualification concerning the

category of revolutionary communication as I am developing it here. Many political movements

resort to violence to achieve their goals, including the overthrow of existing governments. The

struggles I am referring to here are limited to those that have at their core a commitment to

freedom and democracy, and exclude those that simply seek to replace one system of slavery,

oppression and injustice with another.[76]

Revolutionary communication is inseparable from the politics of infrastructure. To

communicate under conditions of oppression requires physical, technological and human

infrastructures for messages to be composed, gathered, circulated, and leveraged for

revolutionary purposes. Railways, roads, maritime and aerial corridors, ether and undersea cables

have all been necessary at some point or another for revolutions to be organized, promoted and

accomplished. Furthermore, differential control over and access to communication

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[76] Here I am referring to the likes of ISIS, Al Qaeda and Boko Haram, which are not included in my understanding
of revolutionary struggle and revolutionary communication.

infrastructures is one of the means that oppressive regimes typically use to enforce rule and suppress opposition. This creates conditions in which oppositional actors are forced to undertake extraordinary measures in order to engage in the sorts of communication that are necessary for their struggle. This includes the development of autonomous, parallel clandestine infrastructures.

Through firsthand accounts, freedom fighters and other revolutionaries in multiple contexts have told their stories about developing or using different modes of communication during liberation movements (Jenkin, 1995; Lenin, [1902]2008; Manning, 2003; Guevara, [1960]1997; Mondlane, [1969]1983; Neuberg, [1931]1970). Research conducted on the communication aspects of national liberation struggles has focused on radio (Baucom, 2001; Davis, 2009; Fanon, 1967; Lekgoathi, 2010; Mosia, Riddle & Zaffiro, 1994; Scales, 2010; Soley & Nichols, 1987; Vigil, 1994) and media artefacts such as posters (Seidman, 2007), photography (Gaule, 2017; Minkley & Rassool 2005; Newbury, 2010), and music (Ansell, 2004; Olsen, 2014; Olwage, 2008). Other forms of communication have also been examined, including biometrics (Breckenridge, 2014) and cryptography (Hiệu & Koblitz, 2017; Lazarowich & Smithx, 2015; O'Malley, 2007).

In some of this work, scholars have considered the role of communication in revolution explicitly. For example, Julius Scott's study (2018) of communication during the Haitian revolution stresses the importance of the sea as the medium through which revolutionary messages travelled. Mosia, Riddle and Zaffiro (1994) explore revolutionary radio as a medium during struggles for national liberation by African liberation movements. Soley & Nichols' (1987) research on the use of radio during movements for independence employs the term "revolutionary electronic communication." While these authors gesture towards something called revolutionary communication, none of them systematize the concept. As such,

revolutionary communication as a category or concept remains to be specified within

communication studies scholarship and deserves our attention. As I will show below,

revolutionary communication is much more than the use of conventional media to disseminate

revolutionary messages. The qualities and characteristics of the conceptualization include the

following: revolutionary communication is an important factor in the progress of revolutionary

struggles; it mediates under revolutionary conditions; it helps sustain a revolutionary mood

among a large audience and/or a small group of revolutionaries in favour of the struggle; it takes

different forms of governance (centralized, decentralized, etc.); it equally requires an

infrastructure of things and a network of people; while it is focussed on national struggles it

implies internationalism, mediating the support and assistance of friendly governments and/or

people abroad; it includes both overt and underground forms of communication, and includes

publicist and secretive strategies; and, crucially, it relies upon the design, implementation,

operation and maintenance of communication infrastructures directed at accomplishing a

revolutionary goal, often under repressive conditions, including exile.

These qualities and characteristics arise from the cases I briefly review and discuss

below. My purpose in raising these cases is to: place the ECS story in the historical context of

communication practices in other revolutionary and liberation movements, make the key claim

that technical and infrastructural dimensions of communication are as important as the content

and publicist dimensions in understanding revolutionary communication, reiterate the central

importance of the human infrastructure behind and articulated with the technical infrastructure,

distinguish between this and the ideological claim that "technology", "the Internet", "social

media" are inherently and autonomously transformative or liberating, and affirm that a key

characteristic of "revolutionary communication" is that it is directed *politically* to transformative and/or revolutionary (not conservative) ends.

Six Accounts of Revolutionary Communication Practices

Revolutionaries have always used different forms of technologies and communications to reach their ultimate goal of liberation. They accomplished their goals either by disrupting or seizing the communication infrastructure of the powers that be or by building their own communication infrastructure on top of existing ones. In the literature on revolutions, Ho Chi Min, who was writing under the pseudonym Neuberg ([1931]1970), writes of the importance for insurgents of taking control of the telephone and telegraph services of the enemy and being able to operate them. His stance was inspired by the October Revolution and Lenin's view that telephones and the telegraph needed to be seized to connect to all factories, regiments and all points of fighting for a revolutionary situation to reach everyone. Communication was also a way for a revolutionary mood to be achieved, as Flatley (2012) writes in *How a Revolutionary Counter Mood is Made.* In this article Flatley (2012) builds on Lenin's text *What is to be Done?* to examine the importance of the newspaper in reporting mistreatment of workers and as a result contributing to a revolutionary mood among the masses. Taking the case study of the Dodge Revolutionary Union Movement (DRUM), Flatley (2012) stresses the importance of the distribution of a Black workers' newspaper in 1968 Detroit factories. He argues that the DRUM newspaper launched as part of the revolutionary moment in Detroit created significant political unity among Black workers who read about stories of racism that resonated with their own experience. Flatley (2012) argues that this affective force was reached through the thick description of racist assaults which made the Black reader (re)experience an assault at the hand of a White person. The newspaper was not only central as an organizational tool, but also

enabled the workers to keep their political commitment and mood alive. The examples below all involve the setting up or the disruption of an existing communication infrastructure for purposes that encompass both the organizational and affective dimensions of revolutionary communication.

Communication and the Haitian Revolution

As a starting point to building an account of revolutionary communication, I draw from the book *The Common Wind: Afro-American Currents in the Age of the Haitian Revolution* by Julius S. Scott (2018). Scott challenges our understanding of how the Haitian revolution, the first and only successful Black slave revolution, took place by showing that it was intimately bound up with communication via the sea. His premise disrupts our common understanding that this revolution occurred in an isolated place (known at the time as Saint-Domingue), but rather through and with the sea as a medium that allowed for communication (Starosielski, 2015).

The context in which the Haitian revolution took place was one in which Haiti critically represented two-thirds of France's overseas trade and constituted the greatest individual market for the European slave trade (James, [1938]1989). Slavery was fundamental to the emergence of mercantile capitalism in the Western world and colonial powers wanted to keep and protect this system in order to continue to profit from it. The infrastructure of the ship was instrumental in this process of dispossession as it allowed for the transportation of goods and people. While the colonial ship furthered racial capitalism, exploitation and colonialism, it also enabled news to spread. In particular, it allowed Black men who had gained their freedom to work on colonial ships and take advantage of their mobile existence to

spread news of the 1789 French revolution and the abolition of slavery in other empires to the greater Caribbean. A few years later, Black sailors brought news of the Haitian revolution to nearby colonies with the hope of inciting other slave colonies to revolt.

For communication to operate and function within the Haitian revolution, it required a whole network of people—freed slaves, runaway slaves, sailors, musicians, hagglers and traders—to bring such news to foreign lands. In addition to a network of people, an infrastructure composed of ships, harbours and taverns was paramount for revolutionary communication to be carried through and exchanged, and for sharing what Flatley (2012) calls a revolutionary mood. During the Haitian revolution a revolutionary mood was sustained through emancipatory stories that travelled on the island, and newspapers and pamphlets coming from the metropole. These stories were not about misery and maltreatment, but about announcing the French revolution and the end of slavery.

Already in his magnum opus, *The Black Jacobins*, CLR James ([1938]1989) had identified the importance of free Blacks and maroons as carriers of messages, and the importance of the small size of the island in facilitating communication. He writes "long before the bus and the taxi, the small size of the islands made communication between the rural areas and the urban quick and easy" (James, [1938]1989, p. 392). While CLR James highlights the importance of the geography of the island in facilitating communication, Scott (2018) emphasizes how the sea and colonial ships acted as media of revolutionary communication. Free Blacks who worked on ships had access to information about new political developments in Europe. As such, they could bring back news about the French Revolution through stories and artefacts (such as pamphlets and newspapers) and discussions about the end of slavery in various imperial locations. When a ship arrived in a port after a trip to Europe, Scott (2018) describes how a

motley crew of people met and discussed revolutionary developments in France and elsewhere in the taverns, away from the ears of slave owners. The information then spread to the rest of the island by word-of-mouth and usually reached slaves before it reached their masters (Scott, 2018). The ship represented a crucial infrastructure of communication that allowed movement and communication to spread across long distances, for colonists as well as for those resisting them. In the 18th and early 19th century, the ship was the medium of long-distance communication par excellence (Scott, 2018). It inadvertently provided a means for free Blacks to exercise a degree of freedom in a space of general unfreedom and to contribute to the struggle against slavery, as knowledge providers and messengers. Working on colonial ships, free Blacks resisted colonial authority and the system of slavery that otherwise constrained the lives of Black people, and ultimately contributed to bringing down the system of slavery. Their limited access to infrastructures of mobility together with their commitment to ending slavery made them essential actors in the process of revolutionary communication. In fact, their actions were so disruptive and threatening to the colonial empires that colonial administrations eventually moved to prohibit Blacks from working on colonial ships (Scott, 2018).

Free Blacks, runaway slaves and slaves were highly skilled, they were organized and they knew how to advance the struggle against slavery. Scott (2018) argues that they utilized a "combination of news and rumours to advance their interest independently" (p. 78). It was not Toussaint Louverture, the leader of the Haitian revolution, who organized them and asked them to bring news from Europe. This occurred independently. As such, slave owners and the colonial administrations were unable to restrain the spread of communication. This suggests an important quality of communication under revolutionary conditions: revolutionary politics are organized, but the communication that sustains them is not necessarily centrally organized or controlled.

Stories spread by word-of-mouth and were shared with nearby colonies. Word-of-mouth was particularly important because Black, Caribbean and African cultural traditions favoured speech, and because colonial laws restricted literacy among Blacks (Scott, 2018), although some Blacks had reading and writing skills. Documents too were important for the spread of communication, such as newspapers, books and letters that arrived by ships. After the French Revolution, printing presses were acquired and gave birth to a new breed of political gazette in Haiti (Scott, 2018). It is in this political context that the sea emerged as a channel of communication during the revolution, and ships its medium (Scott, 2018).

Communication during the Algerian War of Independence

An important anticolonial scholar, thinker and freedom fighter who alerted us to the subversive nature of radio in a revolutionary context is Frantz Fanon ([1959]1968, 1967). In his classic text *Ici la voix de l'Algérie* (This Is the Voice of Algeria), Fanon traces the changing perspective of radio in Algeria during the war of liberation. Fanon stresses how radio as a communication technology was transformed under the conditions of the revolution. More precisely, Fanon argues that in 1956 a real shift occurred in the listenership of Algerians who were encouraged to listen to the Voice of Algeria[77] broadcasts. The *Front de Libération Nationale* (National Liberation Front or FLN) had decided to set up through its technical branch (*la section technique*) a secret mobile short wave radio that was broadcasting from inside Algeria[78]. The broadcast included information on the fighting, the history of the Algerian people, political and military commentaries, patriotic songs, and religious sermons encouraging

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[77] Two earlier radio programs one from Egypt and the other from Tunisia broadcast information about the liberation struggle. However, the first broadcast of the secret mobile radio from the mountains in Algeria occurred on December 16, 1956 with the slogan: *Sawt El Djazair El Moukafiha* (Here is the Voice of Free and Fighting Algeria).
[78] The short wave radio transmitter was transported by truck.

commitment to the country's freedom and independence (Granjon, 2017). Until then radio had

not been a popular medium among Algerians because both the medium and the language of

transmission were associated with the oppressor. When tracts were distributed announcing the

existence of the Voice of Algeria including the broadcasting schedule and wavelength, Algerians

started buying radio sets to listen to the revolutionary broadcast. Algerian radio technicians who

had been apprentices with Europeans started opening shops for the selling of second hand radio

sets and came to innovate in producing battery powered radio in a country that for the most part

lacked electrification. The production of these listening devices adapted to the Algerian reality

was not centrally organized or controlled by the FLN. In Fanon's account there was no technical

committee responsible for producing these battery powered radio sets, it was rather the context

and conditions in which the revolution was happening that pushed apprentice technicians to use

their skills for the revolution. The innovation of battery powered radio which made listening

accessible to Algerians, especially those in the *duwars* (villages of tents) or *mishtas* (hamlets)

was not initially understood by the French. Once a family, group of houses, *duwars* or *mishtas*

acquired a radio, the broadcasts brought to them the message of the revolution. The broadcast

described the heroic battles of the FLN and the collapse of the occupying power. The broadcasts,

Fanon informs us, were in three languages (Arabic, French, and Kabyle) unifying the experience

of the revolution, making them almost universally accessible to Algerians and disassociated the

French language from its historical association as the language of oppression.

Fanon (1967) suggests that the purchase of radio sets, whether battery or electric

powered, did not mean "the adoption of a modern technique for getting news, but the obtaining

of access to the only means of entering into communication with the Revolution, of living with

it"(p.8). In other words, Algerian were not simply listening to the broadcast or adopting an

information technology for narrow instrumental purposes, rather, something changed in their disposition as a result of their participation in the broadcasts as listeners. This new collective disposition resembles the aforementioned discussion of the revolutionary mood. In a similar vein to the Haitian Revolution, the stories depicted the heroism of freedom fighters and the coming defeat of the French occupying force and through the broadcasts sustained a collective revolutionary disposition.

When the French authorities understood the power of the Voice of Algeria as a force coming from outside the disciplinary mechanism of the colonial state, they passed a series of laws to prohibit the sale of radio sets to Algerians in order to restrict their access to the broadcasts. Further, as the French forces were unable to take hold of the transmitter—they tried to bomb the truck that carried the transmitter—the only way to silence this revolutionary voice was to try to jam the airwaves. Despite these jamming attempts, Fanon highlights that Algerians were actively trying to listen to the broadcasts in what he refers to as a battle of the waves:

> In the course of a single broadcast a second station, broadcasting over a different wave-length, would relay the first jammed station. The listener, enrolled in the battle of the waves, had to figure out the tactics of the enemy, and in an almost physical way circumvent the strategy of the adversary. (Fanon, 1967, p.9)

Even if Algerians could often not hear the words of the broadcasts, and rather heard the static of the jamming, they would nonetheless claim they had. In fact, the existence of the revolutionary broadcast was sometimes more important symbolically than being able to grasp every word and every sentence of the broadcast. Every evening "Algerians would imagine not only words, but concrete battles" (Fanon, 1967, p. 10) which strengthen the national consciousness. The Fanonian scholar Nigel Gibson (1996) comments in regard to Fanon's essay

that the radio was given "the role of mediation in the revolutionary process" (p. 280). By listening to the underground radio broadcast, where revolutionaries told their stories of the struggle and/or when people imagined them, Algerians were involved in a process of nation building. Gibson (1996) suggests that the broadcast gave the Algerians "a sense that they were the authors of the new nation" (p. 280).

In the English translation of the Voice of Algeria, the term fugitive is added to the text by the translator to specify the condition of the hunted or tracked broadcast. The broadcast represents fugitive sound (Scales, 2010) that is chased after by both the French to silence it and by the Algerians to hear it and thereby feel part of the revolution. The radio started as a tool and technique employed by the colonizers with their meanings and inscriptions. It inadvertently became a tool for the revolution, not only through the content of Voice of Algeria broadcast but also performatively, as the mere technical possibility of the broadcasts, against all odds and attempts to suppress, confirmed that the revolution was alive. By changing the features of the technology to adapt to the context and conditions it faced, the Voice of Algeria made itself accessible to a wide population, and supported the creation of a new disposition among Algerians. It is this Voice of Algeria, in words both real and imagined and in a fugitive infrastructure sustained under great pressure that kept the revolutionary mood alive among Algerians.

Cuban Revolutionary Communication

In *Guerrilla Warfare*, Che Guevara ([1960]1997) provides a manual for how to take state power. From a communication standpoint, his practical handbook documents the communication strategies and tactics used during the Cuban revolution. He asserts that building communication infrastructures including telephone lines and roads are crucial for revolutionary movements. He

identifies the advantage of building telephone lines on top of trees as being invisible to the enemy from above and thus providing security for necessary strategic communication. His understanding of communication is one that includes transportation infrastructure, such as using roads to communicate with comrades further away. In specifying how the messages should be carried on the roads by messengers, he suggested that they should be oral if of small importance, and coded in writing if of great importance (Guevara, [1960]1997).

Che Guevara ([1960]1997) also specifically addresses the role of women in communication, recognizing them as messengers who bring "communication between different combatant forces, above all between those that are in enemy territory" (p. 112). Women's involvement as carriers of messages that travelled from one place to another was strategic, since Guevara saw women as being less susceptible to being identified as guerrilla fighters by the enemy and, if caught, he believed the punishment would be less harsh.[79] In this understanding, the gender of a woman was understood to be a form of deception that could to be used for furthering the goal of the revolution.

For Che Guevara, propaganda was paramount for a revolution. He speaks of two kinds of propaganda: first, internal propaganda within the liberated zone and, second, external propaganda, outside the liberated zone and outside Cuba. Once the guerrillas took hold of a liberated zone, they had to set up a hospital, a cigar and cigarette factory, a shoe factory, a printing press and a radio transmitter, among others (Guevara, [1960]1997). It is through radio in particular that the second type of propaganda outside the liberated zone and Cuba was accomplished.

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[79] Guevara does not speak of the possibility of sexual violence or rape as a weapon of war if a female comrade was taken by the enemy.

Radio Rebelde (Rebel Radio) is not explicitly mentioned in Che Guevara's handbook, but Soley & Nichols (1987) suggest that it should be understood as part and parcel of his theory of guerrilla warfare and hence deserves attention. The idea was that free radio should be used in the guerrilla zone and ought to reach a large audience outside of it (Soley & Nichols, 1987). The radio, which was approved by Fidel Castro, started functioning in the liberated zone of the Sierra Maestra on February 24, 1958. Those who came to operate the radio had previous experience with either clandestine newspapers or radio and were not all Cubans (Soley & Nicholas, 1987). Radio Rebelde was not the first or only radio to be used prior to and during the Cuban revolution. Radio had long been used in Cuba as part of a resistance strategy (Soley & Nichols, 1987).

Initially, Radio Rebelde could only transmit 300 metres from the location of the transmitter, situated in a hut deep in the jungle of the Sierra Maestra (Soley & Nichols, 1987). The radio was a highly centralized system with 7RR, the name of the main transmitter located in the Sierra Maestra, as the hub (Soley & Nicholas, 1987). Only when the main transmitter was being repaired, which was frequently because of the harsh conditions, would another transmitter take the lead temporarily (Soley & Nichols, 1987). Initially, Rebelde used a 20-metre shortwave transmitter, which was more appropriate for long-distance broadcasting but limited the listenership in Cuba from the main transmitter. What Cubans did to counter this technical problem was to listen to the rebroadcast from other countries on shortwave (Soley & Nichols, 1987).

About a year after the launch of guerrilla warfare, Castro's July 26 Movement triumphantly entered Havana to take hold of the government abandoned by a fleeing Batista. By then, Radio Rebelde had grown from a small clandestine radio with few listeners into a network

of 48 transmitters connected to many foreign stations being listened to in the Caribbean, Latin America and the United States (Soley & Nicholas, 1987). The network of 48 transmitters was called *La Cadena de la Libertad* or The Chain of Freedom. It had been broadcasting bulletins of military victories, speeches, poems, music and personal messages coming from revolutionaries telling their mothers they were still alive (Soley & Nicholas, 1987). What the authors reveal though is that for Che Guevera's revolutionary theory, it was crucial that the broadcast occur from within the liberated zone.[80] In this way, the radio was an important operational tool for the guerrilla movement: "They conveyed military information, integrated the different rebel units and boosted morale of revolutionaries" (Soley & Nichols, 1987, p.171). The radio also served to further Castro's status as the leader of the revolution, and at a symbolic level the station became a lightning rod for the vast majority of Cubans who opposed the regime. What Rebelde did was open a direct channel of communication for the population to be part of the resistance (Soley & Nicholas, 1987). While Soley & Nicholas (1987) do not specifically address the question of a revolutionary mood or a revolutionary collective disposition the way they talk about Rebelde does gesture towards it.

This case furthers our conceptualisation of revolutionary communication by showcasing a centralized form of communication practice. Communication with the sea prior to and during the Haitian revolution and communication among those who listened to the Voice of Algeria was not centrally organised, within the July 26 Movement communication was highly centralized and controlled. This suggests that both centralized and decentralized modes and structures of

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[80] The radio's prime importance was clear given that the transmitter became a top military target and the government constantly tried to jam the airwaves. Even the CIA, which backed the Batista regime, set up or sponsored clandestine stations to rival Radio Rebelde and demonized Castro in a battle of the airwaves (Soley & Nichols, 1987).

communication have roles to play in revolutionary settings, and that accounts of revolutionary

communication must be attentive to the multiple ways in which it may be organised, governed

and controlled in any given context.

TANU's Solidarity and FRELIMO's Use of Communication

Solidarity between newly independent countries and ongoing national liberation struggles

on the continent of Africa and beyond has been well documented (Mandela, 1994; Wieder,

2013). Support was not only extended through the hosting or training of freedom fighters, but

also in terms of communication. In the 1950s and 1960s, Egypt gave the FLN, ANC and

SWAPO (South West Africa People's Organisation, Namibia's liberation movement) access to

its airwaves (Mosia, Riddle & Zaffiro, 1994). But it was Tanganyika[81], under President Julius

Nyerere, that became pivotal for many national liberation movements, particularly in the 1960s

and early 1970s. African liberation movements waging their struggle for national independence

had their headquarters in Dar es Salaam. The cooperation between Tanganyika and the liberation

movements was reinforced in the 1967 Arusha Declaration with the Tanganyika African

National Union's (TANU) Policy on Socialism and Self-Reliance. The declaration stated that

TANU ought "to co-operate with all political parties in Africa engaged in the liberation of all

Africa" (Arusha Declaration, 1967). In 1968, Nyerere extended his cooperation to the realm of

communication by buying stronger transmitters and providing an external service through Radio

Tanzania (Mosia, Riddle & Zaffiro, 1994). This external service powered by shortwave gave

African liberation movements' access to the airwaves, which enabled them to broadcast to their

population back home. This included the ANC (South Africa), FRELIMO (Mozambique),

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[81] In 1964 Tanganyika and Zanzibar united to form the United Republic of Tanzania.

MPLA (Angola), SWAPO (Namibia), ZANU/ZAPU (Zimbabwe) and many others. The freedom

fighters involved in radio production were often trained in Cuba, German Democratic

Republic (GDR) and the Netherlands and were given access to Radio Tanganyka studio time,

and provided with nominal fees for them to survive (Mosia, Riddle & Zaffiro, 1994).

Communication was a fundamental dimension of the revolutionary process in

Mozambique. As the country was considered a province of Portugal, the colonial

administration's communication through radio, newspapers and schooling was about Portugal

and the White Portuguese experience. The *Frente de Libertação de Moçambique* (Mozambique

Liberation Front or FRELIMO) was officially formed in Dar es Salaam out of three liberation

movements in 1962 and the armed struggle was declared on September 25, 1964. While the

armed struggle was announced from exile, it was nonetheless spearheaded by people both in

exile and on the ground across Mozambique. Exile radio combined with on-the-ground

communication, including posters, photography and caricatures became important tools for the

revolution. The Belgian sociologist scholar Armand Mattelart (1979) suggests that before the

declaration of armed struggle, FRELIMO had already started its publicist work to prepare the

population on the ground. In the regions where they actively used propaganda before the

beginning of the armed struggle they saw a striking difference compared with the regions where

they did not in terms of the involvement of people in the armed struggle (Mattelart, 1979). Under

FRELIMO's Department of Propaganda and Information, the radio news bulletins *Voz da*

Frelimo, which were broadcast from Tanzania initiated at the onset of the armed struggle, had

two main purposes: 1) to encourage colonialists fighting the war to leave it; 2) to communicate

with FRELIMO cadres on the ground who had the mandate to teach what they had learnt to the

local population who often did not have radio receivers (Mattelart, 1979; Soley & Nicholas,

1987). The Portuguese[82] attempted to jam the airwaves and mounted propaganda campaigns in the form of radio programs and pamphlets to counter FRELIMO's publicist strategies. To reach an audience outside of Mozambique, the Department of Propaganda and Information broadcast news bulletins in French, English and Portuguese. FRELIMO also had foreign filmmakers who visited the liberated zones and made films as a way to create support in Europe and beyond.[83]

The challenges identified by FRELIMO regarding communication were threefold: the attitude of the literate cadres; the lack of sensitivity towards the importance of communication (Mattelart, 1979); and the poor network of communication within the country (Mondlane, [1969]1983). The cadres who were literate and were producing information material from outside of the country were said to have class prejudices and lack appreciation of the importance of communication for the people (Mattelart, 1979). Even if they were sent into the liberated zones, it was believed that the milieu would not be sufficient to transform their class biases. Those selected needed to have a real desire to connect with and understand the popular masses and FRELIMO needed to continue to work on their political education. The third aspect is revealed in Eduardo Mondlane's ([1969]1983) book[84] entitled: *The Struggle for Mozambique*. The poor network of communication in Mozambique was countered by making people part and parcel of an infrastructure of revolutionary communication on the ground. Mondlane ([1969]1983) states: "Perhaps, by cementing personal contacts, it established a nation-wide

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[82] As in South Africa (until 1976), television did not exist in Mozambique. It was seen by the colonizer as too dangerous in exposing the population to ideologies other than Portuguese dictatorship. Once national liberation was won, a decision had to be made as to whether they would refuse television or defer it (Mattelart, 1979).
[83] Black Americans, Italian, French, Swedish and Soviet filmmakers among others made documentary films in the liberated zones, showing them in Europe and beyond. In this way they furthered the international movement for the liberation of the country.
[84] Mondlane completed a PhD at Northwestern University and took a professorship position at Syracuse University, while continuing to study the situation in his country. He later became the head of FRELIMO. He was killed by a parcel bomb in Dar es Salaam in 1969.

network of communication, which extended among old members as well as those still at school, and which could be used by a future underground" (p.61).[85]

What this case adds to an understanding of revolutionary communication is twofold. First, a commitment to internationalism from newly independent nations in Africa who had control over their communication was important for liberation struggles' publicist strategies. Second, publicist strategies alone were not enough when access to communication technology was scarce. The presence of revolutionaries on the ground who interacted with the local population was also crucial. It is they who were the agents of revolutionary communication.

Communication and the Zapatistas

The Indigenous Zapatista Army of National Liberation (Ejército Zapatista de Liberación Nacional or EZLN), known as the Zapatistas, staged an uprising on January 1, 1994 the day the North American Free Trade Agreement (NAFTA) agreement took effect. Three thousand Indigenous women and men rose up against the Mexican government and initially took control of a few municipalities next to the Langdon Forest in Chiapas. Even though the EZLN had existed for 10 years prior to the uprising their *Primera declaración de la Selva Lacandona* (First Declaration from the Lacandon Forest) made their existence public. In their declaration of war, they stated that they had tried all peaceful means possible before resorting to an armed struggle. Their uprising was simultaneously against the Mexican government, neoliberalism (i.e. pro-market, pro-business and anti-worker/peasant) and 500 years of ongoing colonial oppression. It

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[85] A decade after starting the armed struggle in Mozambique, the Portuguese dictatorship collapsed in 1974 and FRELIMO took power in the newly independent country. Mozambique was then soon engulfed in a long and violent civil war between FRELIMO and the anti-communist Mozambican National Resistance (RENAMO) backed by the White supremacist Rhodesians and South Africans who torn the country apart.

represented a struggle for work, land, freedom, democracy, justice and peace among many other goals.

What the Zapatistas and the wealth of scholarship about them tell us about their communication practice is relevant for this study of revolutionary communication. Particularly interesting is Harry Cleaver's (1995) article *The Zapatistas and the Electronic Fabric of Struggle* in which he documents how the ideas of the EZLN revolution have been carried throughout Mexico and the world via a communication practice he calls a new electronic fabric of struggle, referring to the ways in which the Internet was used. The Mexican government's repressive military action against the EZLN uprising pushed the Zapatistas to retreat in the mountains twelve days after the beginning of the battle. Cleaver (1995) writes that the paucity of mainstream media coverage and repression by the army failed to isolate and stifle the struggle because interviews with SubCommandante Marcos were done with independent journalists and Zapatistas communiqués were widely distributed by fax and emails. Initially, it was Mexicans who were inspired by the words of the Zapatistas who typed or scanned the communiqués through PeaceNet[86] and on listservs. They were quickly picked up by activists, Indigenous groups, humanitarian organisations and NGOs who were concerned about human rights and feminists who were concerned about gender-based violence.

To rally support for their vision of the world and to protect themselves, *encountros* (gatherings) were organised by the Zapatistas in Chiapas and then were self-organised outside of Mexico. These gatherings produced a number of documents, speeches and reports that were widely circulated on the Internet. Cleaver (1998) suggests this communication about the Zapatistas was initially spontaneous, but it became more organized over the years, in part

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[86] Peacenet was a computer network which provided low cost access to the Internet.

because of the *encountros*. Cleaver (1995) writes that the Zapatistas won the "war of words, images, imagination and organization" (p. 1). The publicist strategies used by the Zapatistas in the form of declarations and communiqués, the numerous interviews SubCommandante Marcos gave and the communication work done by activists, independent journalists and NGOs from all over the world made the Zapatistas' economic and political vision of revolution resonate internationally. A flow of constant emails went out on listserves, daily action alerts were circulated and websites about the Zapatistas were set up, maintained and updated in multiple languages to reach a wide audience (Cleaver, 1995).

Communication around the Zapatistas was such that a myth started early on. Scholars such as Manuel Castells et al. (1995) wrote that Marcos had "organized a solidarity movement on the Internet and was able to transmit his messages and information, even under extreme circumstances, from a desktop computer connected to a primitive but efficient transmission system" (p.28). Castells et al. (1995) wrote that the Zapatistas will be remembered as the first informational guerrilla movement in history: the guerrilla movement that created a media in order to diffuse its message" (p.28). Cleaver (1998) clarified this myth writing that "EZLN has not played a direct role in the proliferation of the use of the Internet. [...] Although there is a myth that Zapatista spokesman Subcommandante Marcos sits in the jungle uploading EZLN communiqué from his laptop, the reality is that the ELZN and its communities have had a mediated relationship to the Internet" (p. 628). Their communication practice is quite different in that the "Zapatista messages have to be hand-carried through the lines of military encirclement and uploaded by others to the networks of solidarity" (Cleaver, 1998, p.628). This is because the Zapatistas were cut off from electricity and telephone systems in the Lagunda Forest specifically, but also in Chiapas more generally where the population did not have access to a reliable

communication infrastructure. As with the ECS in Lusaka and TallCree especially, and in several other cases discussed here, access to communication infrastructure is a consistent challenge for revolutionary movements.

In his study of digital rebellion, Todd Wilson (2014) argues that Indymedia, which emerged in Seattle in 1999 as part of the anti-globalization movement, was influenced by the Zapatistas. He writes "the EZLN blue print for communications channels connecting movements of resistance from all over the world which emerged out of the first EZLN *encuncontro* led to the formation of the Indymedia movement" (Wilson, 2014, p.37). Activists realised that by using the Internet and other means of communication they could become the media rather than rely on mainstream media that did not represent their worldviews and did not represent them well. A widespread collective disposition of wanting to "become the media" through alternative media and organise resistance globally through anti-globalisation summits would be carried through for about a decade.

Cleaver (1995) concludes his article urging activists to abandon the command and control strategies used by party-led revolutions in favour of consultation and coordination using advanced communication technologies and the practices they enable. Like many, he equates the idea of a world without high-command to how the Internet was perceived as a distributed infrastructure in the 1990s. For most, the Zapatistas' contribution to the history of revolutionary communication rests on the publicist strategies carefully staged and crafted by Subcommandante Marcos, wearing a balaclava and smoking his pipe. However, the relative success of these strategies also relied on an international solidarity movement of people who translated, circulated and posted information on the Internet, which suggests the importance of the technical and

infrastructural (including human infrastructures) dimensions of the Zapatistas' revolutionary communications.

The Case of Communication in the South African National Liberation Struggle

Many elements of the communication strategies and practices discussed in the cases surveyed above are consistent with those that took place within the South African national liberation struggle, including aspects of the ECS which have not yet been fully addressed. As discussed in Chapter 1, the draft document entitled 'Operation Mayibuye' set the course for guerrilla warfare in the anti-apartheid struggle. The document also acknowledges that in addition to having guerrilla fighters on the ground in South Africa it needed to "further coincide with a massive propaganda campaign both inside and outside South Africa and a general call for unprecedented mass struggle throughout the land, both violent and non-violent" (Operation Mayibuye, 1963, p.3). The document recommends that once the guerrilla warfare starts, the political authority set up in secrecy in a friendly country will simultaneously launch a massive propaganda campaign to win international support for the struggle. It specifically states that this campaign includes, among other things, a complete enforcement of the South African boycott, enlisting the support of international trade unions to refuse handling war materials and other goods intended for the South African government, raising a storm at the United Nations[87], arranging for daily radio transmission to the world and to the people of South Africa, flooding the country with leaflets announcing the commencement of the armed struggle, and calling upon the population to rise against the government. The Mayibuye document confirms that the national liberation movement in South Africa also pursued publicist communication strategies.

[87] It specifically mentions that the UN should intervene in South West Africa, present day Namibia, which was administered and occupied by South Africa since 1915.

However, as documented throughout this dissertation, the case of the ANC TC and ECS adds

two considerations to conventional accounts of the publicist elements of revolutionary

communication. First, the importance of non-publicist, clandestine strategic and tactical

communication, and second the demands of setting up, operating and maintaining an

infrastructure for accomplishing this under repressive conditions, including exile.

To illustrate these considerations, I provide three short examples of how fugitive media

and communication[88] strategies functioned and how varying levels of encryption operated. The

first example I take is Radio Freedom, which had elements of both publicist and fugitive-

infrastructural communication. Before the MK High-Command was arrested at Rivonia, Radio

Freedom broadcast clandestinely from inside the country (Davis, 2009; Lekgoathi, 2010).[89] At

that time the technology of the radio was understood as an important tool to master as part of the

national liberation struggle, as it had been used successfully in Cuba and Algeria, among other

places.[90] After a few years of radio silence following the arrest at Liliesleaf Farm, the broadcast

was relocated to a number of countries including Tanzania—where the Nyerere government gave

it 15 minutes of airtime per day—and to Zambia where the exiled ANC leaders were relocated

after a fallout with Nyerere (Mosia, Pinnock & Riddle, 1992). Revolutionary messages that were

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[88] I prefer using the term fugitive media to clandestine media or communication as Soley & Nichols (1987) do, because the former term is consistent with the Black, Caribbean and African radical traditions. Fugitive media/communication refers to the type of media that were prohibited and illegal because of the association with a banned political party and revolutionary content, rather than those that were legal, but critical of the South African regime. While mass media critical of the regime including the foreign press had to face all sorts of barriers, these are not the types of media/communication I am referring to here.

[89] It was Denis Goldberg, one of the arrestees, who was the main radio engineer behind Radio Freedom and the transmitter was put together by a physics professor from the University of Cape Town (Goldberg, 2016).

[90] In the early 1960s, ANC and MK members left the country to be trained on how to operate a radio transmitter in various countries (Simpson, 2019) and the SACP had sent South Africans in China to be trained in radio engineering (Naidoo, 2012).

broadcast included statements from exiled leaders, news reports and banned music (Davis, 2009; Lekgoathi, 2010).

The producers of the broadcast could do their work in exile without too many constraints. This allowed the ANC to keep a presence inside South Africa through mediated sound and to further support among anti-apartheid activists and international donors.[91] Meanwhile, it was the listeners who faced threats and many challenges in the act of listening. As with Algeria, Cuba and Mozambique, a law existed that punished those caught listening to the broadcast in South Africa. Listening was further limited by the apartheid state's regular jamming of the airwaves and prohibition of selling shortwave radios on which such broadcasts could be heard (Mosia, Pinnock & Riddle, 1992). The sound of Radio Freedom was therefore fugitive inside South Africa just as the sound of the Voice of Algeria had been.

Fugitive printing presses were also part of the arsenal of the South African national liberation movement. In South Africa, there were multiple types of fugitive printing presses. Below, I focus only on two that figured in my fieldwork: 1) those worked by small-cell units of operatives who were often students recruited on the ground by clandestine ANC operatives and 2) those worked by units of young White intellectuals sent from London. The first type is well described by Janet Cherry (2016) who discusses how printing press communication units in the mid-1980s worked and the dangers of being involved in such units.

> […] manual typewriters can more easily be linked to a specific typist, who presses some keys harder than others. The message would then be photocopied, so that the imprint of the typewriter was not detectable. Using gloves, the page or pages would be put in an

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[91] After the 1976 Soweto uprising, funders from the European Nordic countries in particular started channelling money to Radio Freedom (Lekgoathi, 2010).

envelope and sealed, then posted from a postbox remote from the unit's residences.

(Cherry, 2016, p. 7)

Like Cherry, who was part of one of those cells, those who printed the banned material such as pamphlets, SACP, MK or ANC news bulletins also distributed them by mail, during funerals or other gatherings (Cherry, 2016).

In the mid-70s, the London headquarters of the ANC, through its SACP members Yusuf Dadoo and Joe Slovo, was sending young White South African intellectuals into urban areas in South Africa to set up printing presses with the idea of supporting the development of an urban guerrilla force (Barrell, 1993). As seen in previous chapters, Jenkin was recruited to do just that. Before being arrested and jailed for 12 years under terrorism charges for leaflet bombing—the mass distribution of handouts through harmless leaflet launchers, which would disperse their contents in crowded areas—Tim Jenkin operated a small printing press cell in Cape Town from August 1975 to 1978. The leaflet bombing device designed by the Technical Committee was developed and tested in the UK, given the high risk of being discovered in South Africa.

In these two cases, paper, printing presses and communication cells made up of activists were fugitive infrastructures because it was illegal to distribute information that supported the liberation struggle and the banned political parties. Just like the clandestine sound of Radio Freedom, these fugitive media had the publicist purpose of disseminating information to a mass audience in public settings. In this sense they were different from the ECS, which aimed to coordinate actions among a handful of revolutionaries. My point is that all of these media were fugitive in the sense I have been discussing here, and that their technical and infrastructural qualities were as important as their various contents to their function as means of revolutionary communication. If the category of "revolutionary communication" is to be meaningful, it must

account for both the content or meaning of messages and the technical and infrastructural qualities of media.

This is well illustrated by the case of the ECS. When the ECS started functioning in September 1988, publications such as the SACP news bulletin *Umsebenzi* were compressed through encryption and saved on a floppy disk in London. To move the floppy disk all the way to Johannesburg, Jenkin had to fly to Amsterdam to bring the disk to Antoinette Voegelsang, a KLM flight attendant. She would then deliver the floppy disk to an operative, who initially was Maharaj, and then the newly recruited Claudia Manning. Operatives on the ground then decrypted, printed and distributed the publication locally and widely. During the initial phase, Voegelsang, the KLM flight attendant, was essential to carrying the fugitive disk across borders. Later, the publication was to be posted online and downloaded directly by different groups inside and outside South Africa as I have shown in Chapter 2.

The use of encryption represents another aspect of the technical implications of revolutionary communication. When the ANC, SACP and MK were banned in the early 1960s, a whole new coded language was elaborated. Developing new modes of communication was essential since freedom fighters suddenly found themselves cut off from each other on the one hand, and the leadership cut off from its constituency on the other. In his unpublished biography, Jenkin (1992) talks about the early development of "doubletalk"—a way of concealing what was being discussed in writing or orally so that only those who knew the codes were able to understand the messages. Jenkin gives the example of the coded language of gardening being used to refer to political activities.

> If you were a gardener you were involved in 'illegal' politics and if the weeds grew
> amongst your flowers then you were being infiltrated. Fertiliser and compost were

propaganda and literature; pests and funguses were the police and informers. So

developed a range of languages that had a second meaning. (Jenkin, Chapter 1, p. 2)

In the case of the messages exchanged on the ECS, the use of double coding was for extra

secrecy. In order to plan for the worst, that is the discovery of the ECS, freedom fighters agreed

to use doubletalk. Such doubletalk was used in particular for sensitive information such as the

name of the people involved and the name of location. As the following message from the ECS

shows, written code was changed frequently. The hope was that if the codes were changed

frequently Pretoria would not be able to access the whole set of encrypted messages if they were

discovered.[92] Below are the code names[93] assigned after Vula was discovered.

Herewith a new codename list from Mike (Helene):

People:	Places:
Theo = Roy	Eastern Cape (Ruth) = Gea
Ron = Neo	CT (Doris) = Sheila
Carl = Evan	Boris = Howard
Edith = Tina	Ramon (Canada) = Clive
Arthur (GM) = Steve	Lobby = Raoul
Lucy = Fanny	Monica (France) = Popo
Miles = Paul	Lucy's place = Fanny's place
Pete = Chris	Jessy = Cynthia
Kay = George	Cleo = Sue

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[92] I personally had to learn the different layers of code to properly read the messages exchanged. However, since not all of the codenames are traceable, there are people and places I have not been able to identify.
[93] I have put them in a table to make the reading easier, but in the ECS no table was used, just spacing. I have also included only a few of the coded words.

John = Adrian	Mike = Helene
[…]	[…]

(Anonymous, 1990, July 16, para.15)

As part of the ECS, multiple forms of encryption existed: the algorithmic automation of a one-time pad, doubletalk within the encrypted text, encryption at the level of algorithmic compression (PKZIP) to reduce a file's size on the floppy disks and, at a later stage, the ECS's use of two types of encrypted disks, one for low-security messages and the other for high-security messages. The difference between the two disks was that with the Disk Version (for low-security messages) the random data came from a disk (generated by another computer) while with the Keyword Version it was generated as the enciphering/deciphering takes place. This multilayer of encryption was somewhat helpful when the ECS was discovered because the regime was not in full possession of the information that circulated on the ECS, it took them longer to understand what was discussed, they did not know all of the people who were involved or all the locations where the ECS was rooted (T. Jenkin, personal communication, September 17, 2018). However, despite the encrypted multi-layering, it was the unsecured communication practices of freedom fighters that revealed the extent of the Vula Operation and its sophisticated communication system.

In Chapter 2, I identify the ECS as a centralized communication infrastructure. In this respect, the ECS departed from ideas about distributed and redundant architecture as the key to designing robust communication networks (Abbate, 1999; Barney, 2000; Galison, 2001). Because the ECS was a system of revolutionary communication and was part of banned political organisations, its security relied upon a level of secrecy that operatives believed could only be achieved through centralization. Part of safeguarding the ECS as a fugitive infrastructure was

this centralization: only a handful of people could know about it and operate it. The centralized aspect of the communication infrastructure was part and parcel of the mentality of a political organization of banned parties and affiliated organizations. This is in strike contrast to the consultation and collaboration practice of the Zapatistas, for example, whose communication practices tended in a more publicist direction. For Operation Vula, the ECS served a more logistical, organizational function and its centralized infrastructure meant that only a few people knew of its existence, including the Technical Committee in London and those who participated in operating it from different corners of the world. The centralization of the ECS was also partly the result of the primary goal of connecting the two main figures of the movement as seen in Chapter 3, that is, Mandela (in prison) and Tambo (in exile) who had been separated since the early 60s. As part of Operation Vula, Mandela sent messages through the ECS when he was at Victor Verster Prison outside of Cape Town in the late 1980s (O'Malley, 2001; Venter, 2018). The system facilitated discussions about the negotiation strategies with ANC President O. R. Tambo, and ANC Acting President Alfred Nzo when Tambo had a stroke in August 1989— thereby deceiving apartheid negotiators who thought that they were only in talks with Mandela (I. Ayob, personal communication, October, 4, 2018, T. Jenkin, personal communication, September 17, 2018; M. Maharaj, personal communication, November 5, 2018; J. Love, personal communication, October 19, 2018). In a 2001 interview with Padraig O'Malley, Mandela revealed that it was thanks to the ECS that he received the Harare Declaration, a document that outlined the ANC strategy on how to negotiate with the regime and the parameters of negotiation (O'Malley, 2001).

In this context, revolutionary communication entailed developing the technical skills required to design, operate and maintain these systems and methods. To learn methods of secret

communication, internationalism in the form of training extended to those who were freedom fighters. Once individual freedom fighters were trained, their task was to pass on their knowledge on to others. In this way, many South African freedom fighters learned about radio transmitters, dead-letter boxes, hand-written encryption, and more. However, communication tactics and strategies were not automatically transferrable from one place to the other. Rather they were adapted to the context and conditions specific to the struggle and the emerging types of communication technologies. [94]

Training freedom fighters across many continents and books by revolutionaries required and performed the circulation of revolutionary knowledge and methods, including communication practices. Those who were trained in secret communication came back with new practices they could teach others and, in some cases this led to new thinking about communication. Being exposed to and trained by other liberation movements across geographies (from Africa to Asia, Europe or Latin America) and time periods (from techniques developed in 1950s, 60s, 70s and 80s) constituted yet another aspect of revolutionary communication. This is well illustrated by an example already seen in Chapter 2, where Comrade Movers thought about automating encryption with computers during training in hand-written encryption in Cuba. Freedom fighters were also cautious when it came to the internationalism of foreign powers such as East Germany or the Soviet Union. In the same chapter, I also highlighted Jenkin's view that neither country gave the South Africans their most sophisticated equipment but instead gave them their old discarded technical and communication equipment. This point is also made by

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[94] In none of the material I have read and consulted through my South African fieldwork, did I encounter the words communication or technological transfer, a concept that is often used today when discussing how the Global South "modernizes" communication and technology. For me, this terminology carries colonial ideas about the Global South, as if they were unable to creatively adapt or better create their own means of communication. Hence, I refrain from using it.

Maharaj who tells the story of when he was invited by the head of a Russian military group based in Angola and enticed to use their communication system.

> He was offering me that our communication be beamed to a satellite, picked-up in the Soviet-Union and be made available to us. I did not accept his offer because I saw it as not suitable for us. It meant that they would be in control of the content of the messages going and coming, we would not have control of that and secondly I worked from the premise that whatever they were offering me would not be their most advanced systems. It would most likely be a system that has already been detected in the Cold War. (M. Maharaj, personal communication, November 5, 2018)

This example is demonstrative of how they were thinking about the meaning of revolutionary communication. The issue of autonomy, understood as control over their own communications, was a central, infrastructural preoccupation of the freedom struggle.

Further, Mac reveals that Vladimir Shubin, who was a high-level Soviet official involved in supporting the South African national liberation struggle, was trying to find out what they were developing in terms of communication. Maharaj recalls his interaction with Shubin:

> He said: Comrade Mac come on, share your communication. And I told Shubin. We laughed. Shubin: Let's be honest with each other. You will not give me your communication system that is not yet caught. You want me to give you our system that has not been caught. No. Fair Square. You give me a system that you are developing that has not been caught, I'll share ours. But otherwise no deal. I know your offer. It came through in Angola. But I quietly ignore it because it would put the control on you. But what Shubin knew by then is that yeah we are in real time contact. (M. Maharaj, personal communication, November 5, 2018)

To be in control of their communication system, also meant that certain devices needed to be doctored to force their compatibility with others. In Chapter 2, I showed how the Technical Committee modified a number of technological devices so that they could speak to one other. Once the system was functional, it took two years for the ECS to expand to at least nine different locations across three continents. The ECS was used in Africa (Cape Town, Durban, Harare, Johannesburg and Lusaka), Europe (London, York, Amsterdam and tested in Paris) and North America (TallCree).

Conclusion

My focus in this chapter was to capture a handful of examples grounded in varying revolutionary contexts and conditions to shed light on the analytical category of revolutionary communication. What I hope comes out of this chapter is an interest to rethink the history of national liberation struggles from a revolutionary communication perspective, as well as to think carefully about the status of technical infrastructure and the practices associated with it in relation to this category. It is clear that liberation struggles have had a deep interest in communication and have had to develop the means to carry it out, for a variety of purposes. In many ways, the effort to communicate relatively autonomously is definitive of revolutionary struggles. This chapter has sketched the role and function of communication across a number of setting in order to contextualize the communication practices of Operation Vula and the ECS, and has suggested the ways in which the latter might inform the study of revolutionary communication more generally.

These cases provide a basis for centering the role of technical knowledge and practices, and infrastructure, in the study of revolutionary communication, in way that avoids the ahistorical

character of claims about the allegedly 'revolutionary' character of technologies such as the

Internet and social media (such as those that were so prominent during the Arab Spring) and

recent discussions on the Fourth Industrial Revolution (4IR) (meaning machine learning,

artificial intelligence and big data). In these rhetorics, the language of revolution has been

coopted and commodified in ways that yoke these technologies to maintenance of the status quo,

rather than to political practices and movements aimed at its transformation (Barney, 2007;

Dean, 2009). One of the most notable examples was during the Arab Spring where the claim was

made that it was a "Facebook or Twitter Revolution" an effort that was part of the branding of

platforms (Gerbaudo, 2012; Tufecki, 2017). Today, it is the belief that the 4IR should be

embraced by South Africa and many other countries from the Global South to alleviate poverty

and improve people's lives, when it is far from clear that such state and capital led initiatives will

do much more than enrich existing economic and political elites, including those from the Global

North. The effect is to diminish the category of revolutionary communication relative to

historical instances where real revolutionaries developed and deployed communicational and

technological practices that involved more than widespread use of existing commercial

platforms, and in which the revolutionary character of these practices could not be reduced to the

independent influence of the technologies themselves. Just as this chapter has shown that

attention to the technical and infrastructural elements of media is necessary to any

conceptualization of revolutionary communication; So, too, has it demonstrated that such

elements are never independent of the dedicated human agents who work, typically at great risk,

not only to design, operate and maintain these systems, but also to direct them toward

transformative political outcomes. In the case of Operation Vula and the ECS, this meant the end

of apartheid in South Africa. This suggests a much more historically and politically robust

conception of 'revolutionary communication' than the conservative rhetorics of contemporary

technological fetishism might allow.

Conclusion

"According to the philosophers data constructs the world as we know it. When we lose data we make the world a smaller less welcoming place." These are the opening words to Ronnie Press' CD-ROM archive of his life in the struggle, compiled during his retirement in the early and mid-2000s and consulted at the Historical Papers at Wits University. Dr. Press's personal records combined with the archives of and interviews with other social actors have allowed me to tell the story of the ANC Technical Committee and one of its most sophisticated projects, the encrypted communication system (ECS). The voices that emerge from the archives and interviews are those of individuals, but they were also shaped by a collective practice of struggle and a global history of resistance located in a larger context and milieu. Without the active and continued dedication of freedom fighters to meticulously preserve their memories and the memory of what the movement accomplished, through their personal archives, the world would indeed be a smaller, less welcoming place. The telling of history can be used as a liberation tool, but more credibility needs to be ascribed to knowledge production and scholarship produced in the Global South, and more memoirs should be written by Black South African women in particular.

In this dissertation, I have shown the existence of an organized Technical Committee that can be traced back to at least the early 1960s when the ANC, SACP and MK alliance turned to armed struggle. With the arrest of most of the leadership at Rivonia, charged with sabotage and imprisoned for life, many South African freedom fighters fled the country and relocated to the UK to continue the struggle, including resurrecting the Technical Committee. After decades of technical experimentation in the early 1990s, the ANC TC ceased to exist as an underground

group that produced technical artefacts and communication infrastructures for the armed struggle. Coming back to South Africa after years of exile and in a context that included the dissolution of the Soviet Union, some of its members re-organized to provide technological support for the 1994 elections, which saw Nelson Mandela from the ANC become the first Black president of South Africa.

In this dissertation, I provide a detailed account of how the encrypted communication system (ECS)—probably the most ambitious and sophisticated technological project of the ANC TC—as a technical and people's infrastructure came about, its influences, who was involved, and how it was built, updated and supported over the years to assist the struggle against apartheid. I situate the ECS in a long tradition of fugitive Black, Caribbean and African resistance and as part of what can be called revolutionary communication, and show that the experimentation with computers, encryption and long-distance communication started before its integration as part of Operation Vula, and was fully realized as part of it. Despite the repressive apartheid government surveilling and actively suppressing the resistance efforts in South Africa, neighboring countries and elsewhere, the regime was unable to completely stop the national liberation movement's publicists and fugitive means of communication, which persisted over decades. Even with the jamming of radio broadcasts, the shutting down of underground printing presses and the discovery in July 1990 of Operation Vula and the ECS, the resistance bounced back and new attempts and practices emerged as a result and in the context and conditions of the time. In the process, what is revealed is a geography of technological and infrastructural struggle at play during the South African national liberation struggle.

As a tri-continental communication infrastructure, the ECS had a number of characteristics including being centralized, territorialized, fugitive, revolutionary, precarious and

ephemeral. It was centralized since London was the main hub of the ECS, as all communication

passed through there. Indeed, every communication sent by freedom fighters through the system

went via London. It was territorialized because physical location and the context and

surrounding conditions impacted the choice of technology, practice and people mobilized. It was

fugitive in character as both the communication infrastructure and the people developing and

operating it had to be underground or actively hiding their practices. It was revolutionary

because the communication infrastructure was built with the aim of supporting the armed

struggle using both publicist and non-publicist tactics. In fact, what makes a communication

practice revolutionary is not its unique and allegedly transformative technical characteristics but,

rather, its insertion into a revolutionary context comprised of committed actors deploying a

multiplicity of techniques that include, but cannot be replaced by, the medium itself. It was

precarious because technical communication failures and glitches, especially in the early days

were common, and the ECS was ultimately discovered due to human error. Lastly, it was

ephemeral since it was meant to last only as long as necessary. There was never the intention of

commercializing the ECS or making it a state project. It was to be used until it was deemed no

longer relevant. These characteristics, which have been explored in the dissertation, were part of

the politics associated with communicating across geographies during the anti-apartheid struggle.

Part of the work of this dissertation has been to document the ideas, approaches, practices

and experimentation of the two main developers of the ECS. However, I have shown that

without the people who supported them along the way and who operated or tested the system

throughout its existence, the ECS would have never become what it did. It needed South African

women to operate the system back home, White Dutch women to operate the system from

Lusaka, White foreign nationals to set up safe houses, deliver packages and test technical

equipment in South Africa, a group of artists and other professionals in the Netherlands to prepare freedom fighters to take on new personas before re-entry in their country, the help of country-based communist parties, exiled South Africans, country specific anti-apartheid movements and friendly states that funded the struggle, among others. By making visible the extended network of people that supported the ECS, I shift the study away from an exclusive focus on the developers of the system.

Nevertheless, the historical relationship between technology, maleness and Whiteness cannot be ignored. Numerous scholars have shown the long history of technology and White masculinity, the obscuring of the roles of women in technological practices and the active pushing out of women in computing in EuroAmerica (Dunbar-Hester, 2014; Ensmenger, 2010; Hicks, 2017). The ANC Technical Committee was no exception to this practice. In fact, the archival work and semi-structured interviews I have conducted show a bias against women despite their skills and roles. For instance, the references to "nimble fingers" as framing part of the conversation on why women are good at assembling certain technical artefacts, or why a Black woman was named Chief of Communications for the ANC, could only be understood as the ANC giving less importance to communication and technology, and adhering to sexist stereotypes, repeated during some of my interviews, that women do not understand technology. The fact that women were not officially part of the ANC Technical Committee was not a coincidence or the result of their lack of understanding of technology, rather it was a systematically constructed exclusion. Gender and race analysis are important here because the idea that White males, including of South African origin, have been the prime movers of science and technology through history needs to be challenged. The same holds true for perceptions of who were the movers and shakers of the national liberation struggle, which all too often exclude

Black women. Questions that remain to be examined are: How exactly were women excluded from the ANC Technical Committee? How did the absence of South African women, or from an even more radical political perspective, the absence of an intersectional feminist perspective, within the TC influence the ways in which problems were approached and methods selected?

The South African women I interviewed who had unglamorous functions and tasks, including Janet Love, Zarina Maharaj, Totsie Memela and Susan Tshabalala, among others, viewed their roles in relation to science and technology, communication and the struggle as part of a larger whole. Rather than framing their experiences as one of exclusion from science and technology, except for Maharaj who was outspoken about her exclusion from operating the ECS from Zambia, for the most part, they framed what they did as being part of a wider collective of people striving together to liberate their country and its people. Except for Maharaj, none of the women I spoke to have documented in writing or assembled an archive of their lives within the struggle. When asked why, they all replied that their contribution was minimal and unworthy of documenting compared to other comrades who had, in their views, made more significant contributions. Notwithstanding, their understanding of collective freedom is worth noting as it reminds me of Robin Kelley's (2002) writing on the Black radical imagination, which was understood as a commitment to liberating all people, and necessitating the reconstruction of social relations. Reconstructing new, free and democratic communities are ongoing struggles that are still fought today by Black feminists, LGBTQI+ people, students, activists and the poor in South Africa.

Contributions and Implications

The main contribution of this dissertation has been to provide a comprehensive account of the ANC Technical Committee and the encrypted communication system (ECS) from the

participants' standpoint. The dissertation also brings an analysis and understanding of the ANC TC and ECS as a historical, social and political project, as an instance of the politics of infrastructure, and as part of the history of media and communication in revolutionary and liberation struggles. Aside from documenting these sociotechnical practices by a specific group of actors and interpreting them, this dissertation opens the following interconnected inquiries:

First, how does this study fit into the history of the Internet? How can the history of the Internet include rather than exclude stories about national liberation movements? What I suggest is that documenting the story of the ANC TC and the ECS adds richness to and a layer of complexity to the history of the Internet as we know it today. As I have shown, the launch of Sputnik 1 was a first spark to think about communication across borders, and to fight against injustices and apartheid. Historically, the launch of Sputnik 1 has been remembered as creating a fierce science and technology battle between the United States and the USSR, which was a catalyst for developing the Internet, but not as inspiring a national liberation movement in pursuing science and technology for the people.

The expression the 'ANC Internet' was used by Lucia Raadschelders, one of my interviewees, to encapsulate what the ECS was all about. As I have described, the 'ANC Internet' connected a handful of computers operated by freedom fighters located on three continents using a pre-existing telecommunication infrastructure including telematics systems in Britain, the Netherlands and South Africa. Just like the Internet today, the 'ANC Internet' was a political object that had cultural meanings. On the one hand, it was used to support the organizing of the armed struggle conveying the idea of revolutionary communication. On the other hand, when it was discovered, it was demonized as a communist plot and framed as counterproductive to transition and "talks about talks." The expression the 'ANC Internet'

resonates quite well with current discussions about technological, digital and network

sovereignty (Couture & Toupin, 2019) used within social movements (Haché, 2014, 2017; Nitot,

2016), indigenous groups (Duarte, 2017; Kukutai & Taylor, 2016) and countries such as China

and Russia (Budnitsky & Jia, 2018), among others.

Second, what does this study provide to communication and science and technology

scholars that they might not have paid sufficient attention to or not adequately studied? By

recovering a micro-history of communication and science and technology during the anti-

apartheid struggle through the practice of the ANC TC, I make visible an engaged and vibrant

tradition of contestation in the ways in which South African revolutionaries turned to thinking

and using science and technology and other forms of communication to further their struggle.

What I show is that the knowledge and technical artefacts developed as part of the ANC TC were

marked by the circumstances of their production. In this context, science and technology within

the South African national liberation struggle was not used to compete against other nations or to

gain market dominance, it was used to further liberation from a White supremacist regime. The

case examined here demonstrates that the South African national liberation movement was

implicated in the history of science and technology and communication from the outset. To avoid

falling into the trap of South African historical exceptionalism, the following questions need to

be asked: Did other national liberation movements have technical committees that supported

their struggle at the science and technological levels? How did they use science and technology

and fugitive forms of communication to further their liberation struggle? How can their fugitive

communication practices further our understanding of science and technology?

I have pointed to the potential relationship between the radical science movement and the

ANC TC and its science and technology for the people approach. It has been well documented

that through the Vietnam War a strong antimilitarist and radical science movement emerged in Europe and the United States, which took the shape of the British Society for Social Responsibility in Science (BSSRS) and the Science for the People (SfP) movement among others. Where does the resistance against apartheid fit in these movements? Did apartheid science and technology have a role to play in influencing these movements outside of the creation of the secret ANC TC and its science and technology for the people (ST4P) approach? By calling for more research on these topics, the goal is not to fetishize science and technology in national liberation movements, but rather to show that such practice has likely existed within many liberation struggles, that it might have influenced or been influenced by other movements or at the very least co-existed with them, but it has yet to be properly documented and appreciated.

Third, what are the ongoing myths about science and technology that need to be dismantled? The belief that science and technology comes from the West, that the Western world has mastered science and technology and that digital technologies have emancipatory and democratizing capabilities remains widespread. This is despite the fact that feminist and post-colonial science and technology scholars in addition to critical African communication scholars, among others, have demonstrated that science and technology have been co-constructed and technology and society are mutually constituted (Harding, 2008, 2011; Mavhunga, 2014, 2017; Wajcman, 1991; Wasserman, 2018). In that regard, Harding (2011) asks "What roles had Western sciences and technologies played in colonial histories, and what role had colonialism played in the histories of Western sciences and technologies?" While a wealth of research has responded to these sets of questions, what we need to further research is how science and technology, especially in the form of communication technologies and infrastructures, have

informed and supported national liberation struggles and how national liberation struggles have influenced science and technology. The practical investment of national liberation movements in the project of anti-colonialism through science and technology and communication might be a more universal practice than we think. Only by digging further into this anticolonial tradition will people have access to a different set of materials and ideas to think about science and technology and communication. This can be done by bringing anticolonial perspectives to research in order to break the cycle of silence that reinforces these myths. Questioning the stories we have inherited about science and technology will allow us to think differently about them and bringing about a richer set of approaches to understand them. Undoing myths and shedding light on the silences by documenting these histories is a decolonial move that gives access to alternative narratives.

Beyond the Glow of the Freedom Fighter

The way I have told the story of the members of the ANC TC and those who built, updated and maintained the ECS makes them seen like heroes. In this dissertation, I certainly give them the credit they so richly deserve as freedom fighters. In the preceding five chapters, I have recognized the impressive work carried out at the science and technological levels by the South African national liberation movement and their allies over several decades. My work has documented the long history of technical practices in the revolutionary movement against the apartheid regime in South Africa. The revolution in South Africa is unfinished and the work continues at so many levels, especially in terms of inequality and access to basic rights, but also in terms of science and technology, infrastructure and communication. While there is a danger of romanticizing the revolutionary moment as I have written about it, I want to stress that there is another side to this story which I need to acknowledge in the contemporary moment. The work

of Jane Duncan (2018) in particular has revealed that it is precisely through their experiences with cutting-edge technology during the liberation struggle that the ANC has come to understand and appreciate the power of new technologies, particularly surveillance technology, and has been using it in the post-apartheid era to spy on its population, particularly the poor, workers and students. Further, a number of ANC leaders have become mired in corruption scandals leading to state capture and the looting of state coffers and institutions, bringing many of them to the brink of bankruptcy. In light of this, what questions would an investigation like mine ask in the current moment in South Africa if we are not going to simply celebrate the end of apartheid? The answer to this is not how infrastructure and technology have been implicated in what the South African state has done and how the elite have pillaged the country. Rather, we need to ask where the contemporary revolutionaries are, the new Mac Maharaj, Ronnie Press, Tim Jenkin, Janet Love and Totsie Memela, among many others. What are the organizations, collectives and movements doing on the ground in terms of constructing the basis for their communication and technological practices in resistance to current injustices? What are they building? How are they exposing and circumventing state surveillance practices? What are their priorities? While this is not the subject of my dissertation and my time in South Africa was spent delving into history rather than the contemporary period, I have nonetheless tried to be attentive to current overt resistance practices. The very brief examples I give below help to illuminate the concrete actions activists are taking to resist today.

South Africans have been busy creating investigative journalistic organizations to inquire and reveal corruption and malfeasance. AmaBhungane is such an investigative journalistic entity. It was created in 2010, a year after Jacob Zuma was elected president of South Africa, and in light of the Protection of State Information Bill, which aimed to weaken the rights of

journalists and whistle-blowers to access information. AmaBhungane aims to reveal and demand accountability of state intuitions and a just democracy by exposing political state corruption at a time of rising securitization in South Africa combined with high levels of protests. AmaBhungane was one of the three media organisations with *Daily Maverick,* and *News24* that extensively covered the state capture scandal through the #GuptaLeaks.[95] At the same time as AmaBhungane was created, and in response to the aforementioned Secrecy Bill, The Right2Know campaign emerged as an organization and movement centred on freedom of expression, access to information and communication rights, including a demand for affordable access to the Internet and telecommunications (Mottiar & Lodge, 2020). The Right2Know campaign has come up with manuals and pamphlets to be used by activists to protect themselves such as the Activist Guide to Protest and the Activist Guide to the Regulation of Interception of Communications Information Act.

In terms of alternative communication infrastructure, a solar-powered mesh network driven by the community was created in 2012 in the town of Mankosi in the Eastern Cape Province. Owned and operated by a rural cooperative, this grassroots mode of Internet connectivity enables community members to collectively influence their communication future. As Internet Service Providers (ISPs) had no interest in providing services to the remote town of Mankosi, which is not connected to the electricity grid, researchers from the University of the Western Cape helped start the Zenzeleni (meaning "do it yourself") Networks project. Zenzeleni allows residents to access less expensive voice, data, and phone battery charging stations. In

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[95] The Gupta family, through their friendship with President Jacob Zuma, looted South African state institutions. Two anonymous South Africans leaked emails called the #GuptaLeaks proved the relationship between the Guptas and President Zuma. The leaks implicated firms such as KPMG and McKinsey, and helped bring about the demise of the British PR firm Bell Pottinger, chronicled in the documentary *Influence*.

addition, residents were trained on how to use the Internet and taught technical skills on how to maintain their network. Zenzeleni is part of a global movement of mesh networks that allow communities to have more control over their communication infrastructures.

Tim Jenkin, too, has continued his work at the intersection of technology and social justice by developing the Cape Town Talent Exchange (CTTE) in 2003 the first exchange group now part of a larger Community Exchange System (CES). CES provides an online platform where goods and services are traded without using a national currency. CES is based on the principle that non-monetary exchange methods helps build community by connecting people and providing a local support network. All transactions are recorded in an online database that Jenkin developed. The CES has grown now to 1147 exchange points in 102 countries. In an interview, Jenkin explained that when developing the ECS, he believed that an economic system could be replaced by overthrowing a government (Bendell, 2017). He came to understand that even with the election of the ANC in 1994 they would not and could not change the economic system that prevailed globally. What needed to be done was to create an alternative economic system that did not rely on money and which co-existed with the dominant system (Bendell, 2017). For Jenkin, creating an autonomous, self-generated system that provides freedom from money with and through community is his new way of helping himself and others continue the liberation struggle and become free (Bendell, 2017). Jenkin's contribution to a legacy of communications resistance has been carried through in his current work and he is involving newer generations. The struggle, it seems, continues.

Appendix 1
Short Profiles of Some of the Protagonists

Ismail Ayob	Indian South African. One of Nelson Mandela's lawyers. He was asked by Mac Maharaj to bring secret messages to Mandela when he was in Victor Verster Prison in the late 1980s. He lives in South Africa.
Frans Boonekamp	White Dutch jack-of-all-trades whose girlfriend at the time was working for the Dutch Anti-Apartheid Movement (AABN). He was sent to South Africa in 1987, prior to the start of Operation Vula, to find out about the South African phone system. He lives in the Netherlands.
Conny Braam	White Dutch co-founder and president of the board of directors of the Dutch Anti-Apartheid Movement (AABN). She was asked by Mac Maharaj to be the Vula point-person in Amsterdam. She lives in the Netherlands.
Rob and Helen Douglas	White Canadian couple who were asked to set up a safe house in Johannesburg for Operation Vula. They were both members of the Communist Party of Canada. In the late 1990s, they relocated to South Africa. They live in Cape Town.
Bram Fisher	White Afrikaner South African lawyer who led Mandela's defense team at the 1963-1964 Rivonia Trial. He was the leader of the clandestine South African Communist Party (SACP). He was arrested for underground activities and died in prison in 1975.
Ruth First	White South African journalist (working for the *New Age* newspaper) and scholar arrested during the Treason Trial. She was the only woman in the MK High Command in the early 1960s and went into exile in London in 1964. She was killed by a parcel bomb in 1982 in Mozambique.

| Geraldine Fraser and Jabu Moleketi	Coloured and Black South African couple. They hosted and used the ECS equipment in Harare, Zimbabwe. They live in Johannesburg.
Barry Gilder	White South African who was an intelligence officer for the ANC in exile. His cover was working for the Canadian solidarity news service in Gaborone, Botswana. He exchanged coded messages with John Tshabalala (Comrade Movers). He lives in Johannesburg.
Denis Goldberg	White Jewish South African, member of the SACP, who was arrested during the 1963-1964 Rivonia Trial. He was released from prison in 1985. He died in 2020.
Susan Grabek	White Canadian woman who was asked to set up a safe house in Johannesburg for Operation Vula. She lives in Ontario.
Floris Guntenaar	White Dutch circus artist. Technological advisor to Conny Bram and found numerous technical instruments that were tested as part of Operation Vula. He lives in Amsterdam.
Barbara Heron	White Canadian woman. Former director of the CUSO office in Lusaka. Her house phone was used by Operation Vula operatives to send messages to London. She is an Associate Professor in the School of Social Work at York University in Toronto.
Percy John "Jack" Hodgson	White South African of British origin, member of the SACP. He fought in the British Army in the WW2 in the North African Campaign. Because of his knowledge of explosives gained during the war and in the mining industry, he was tasked to train the first MK soldiers for the sabotage campaign. He died in London in 1977.
Tim Jenkin	White South African who co-developed in the 1980s the encrypted communication system used during Operation Vula. Prior to Vula, he was sent as an underground operative to Cape Town to make

	leaflet-bombs. He was arrested, jailed and escaped by lock-picking his way out. He lives in Cape Town.
Joel Joffe	White Jewish South African. One of the lawyers who defended the Rivonia arrestees including Mandela, and later Maharaj. He came to fund Operation Vula. He died in 2017.
Ronnie Kasrils	White Jewish South African. He was a member of the SACP and a founding member of MK. He was part of the ANC TC and was infiltrated into South Africa as part of Operation Vula in 1990. He lives in Johannesburg.
Maria Kint	White Dutch woman. Set up a safe house in Johannesburg as part of Operation Vula. She lives in the Netherlands.
Stephen Lee	White South African who escaped prison in 1979 along with Tim Jenkin, who he had met at university, and Alex Moumbaris. He was arrested with Jenkin for leaflet bombing in Cape Town. He lives in South Africa.
Janet Love	White South African MK commander and SACP operative. She was infiltrated into South Africa in 1988. Inside the country, she was recruited by Mac Maharaj and became the main communication officer during Operation Vula. She lives in Johannesburg.
Mac Maharaj	Indian South African, Mac Maharaj became part of the second MK High Command after the arrest of the first MK High Command. Maharaj spent 12 years in prison on Robben Island together with Mandela before he was released in 1976. He became the Commander of Operation Vula. He lives in Durban.
Zarina Maharaj	Indian South African. She worked in London as a mathematician and Xeros system analyst before leaving to join the struggle in the Frontline States

	where she met Mac Maharaj. She advised Mac at the technological level and tested the ECS from Lusaka. She lives in Johannesburg.
Totsie Memela	Black South African woman. Thanks to her knowledge of Swaziland and her extended network of contacts, she helped Mac Maharaj and Siphewe Nyanda cross the border to South Africa as part of Operation Vula. She lives in Johannesburg.
Nelson Mandela	Black South African. Trained as a lawyer, he helped co-found the ANC Youth League. He was a co-founder of MK, arrested and charged at the 1963-1964 Rivonia trial. He spent 27 years in prison. He used the ECS when at Victor Verster Prison. He was the first Black president of South Africa. He died in 2013.
Claudia Manning	Coloured South African. She assisted Operation Vula with logistics and communication. She left South Africa to study in the UK before Vula was discovered. She lives in Johannesburg.
Alex Moumbaris	Egyptian by birth from White Greek parents. He was arrested and imprisoned with his partner Marie-José for their anti-apartheid activism in and out of South Africa. He escaped from prison with Jenkin and Lee. He lives in France.
Charles "Francis" Ndaba	Black South African. Arrested as part of Operation Vula and killed by the South African regime in 1990.
Siphywe Nyanda (aka Gebuza)	Black South African MK commander. Deputy Commander of Operation Vula overseeing the Durban area. Upon discovery of Vula, he was arrested and tortured. He lives in Johannesburg.
Aziz Pahad	Indian South African. From 1963 onwards he was in exile in London. He was elected to the ANC NEC in 1985. He was part of the ANC Technical Committee. He lives in Johannesburg.

Joe Pillay	Indian South African. After being released by the South African police following his abduction from the South African Police in the 1980s, he left for Canada with his Canadian partner, Barbara. He operated the ECS from TallCree, Alberta. He and his wife live in Edmonton.
Ivan Pillay	Indian South African. He was the coordinator of Operation Vula in Lusaka, Zambia. He lives in Johannesburg.
Estelle Press	White South African. Daughter of Ronnie Press. She did not know her father was part of the Technical Committee. She lives in Bristol.
Ronnie Press	White Jewish South African scientist. He was one of the 156 arrestees during the Treason Trial. He left South Africa for the UK in the mid-1960s. He was a key player in the ANC Technical Committee, co-developing the ECS among others. He died in Bristol in 2007.
Lucia Raadschelders	White Dutch anti-apartheid and women's rights activist. She worked for the AABN, before being asked to operate the ECS in Lusaka. She settled to Johannesburg in the 1990s. She died in November 2018.
Geert Reijs and Gonne Kruijer	White Dutch couple who set up a safe house in Swaziland during the Vula years. They live in the Netherlands.
Mbuso Shabalala	Black South African. Arrested as part of Operation Vula and killed by the South African regime in 1990.
Walter Sisulu	Black South African. As part of the leadership of the ANC, serving as Secretary General, he was incarcerated for 25 years on Robben Island as part of the 1963-1964 Rivonia Trial and released in

	1989. He died in 2003.
Joe Slovo	White Jewish South African. Leader and theorist of the SACP, MK Chief of Staff and elected to the ANC National Executive Committee (NEC) in 1985. He was one of the top figures of the leadership who knew about Operation Vula and the ECS. He died in 1995.
Oliver Tambo	Black South African. He served as President-in-exile of the African National Congress from 1967 to 1991. He was one of the top figures of the leadership who knew about Operation Vula and the ECS. He died in 1993.
John Tshabalala (Comrade Movers)	Black South African who designed a program to encrypt reports on computers. He was part of ANC intelligence based in the Green House in Lusaka. He lives in Johannesburg.
Susan Tshabalala	Black South African woman who left Soweto after the 1976 uprising. She was trained in Angola and sent to South Africa to work on the communication system in Durban. She was arrested when Vula was discovered in July 1990. She lives in Johannesburg.
Antoinette Voegelsang	White Dutch woman. KLM flight attendant who was recruited by Conny Braam to act as a mule during the Vula years. She smuggled necessary computer material into South Africa, among other things. She lives in the Netherlands.
Ineke Vos	White Dutch woman. She was recruited as part of Operation Vula and arrived in Zambia to help Raadschelders operate the communication system. Vos had been trained in computer programing in the Netherlands. She lives in the Netherlands.
Archie Whitehead	Coloured South African. He was trained by Ronnie Press to operate the ECS in Zambia. He lives in Namibia.

Appendix 2
Infographic
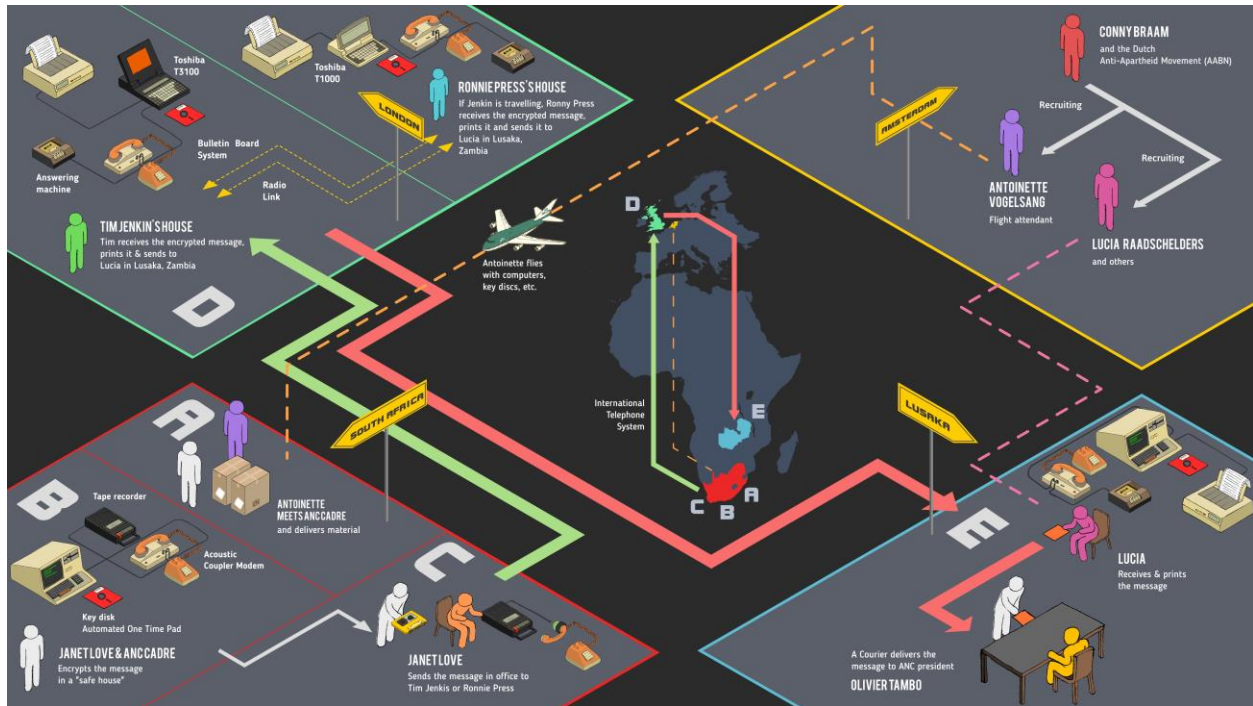
Infographic: Ariel Acevedo and Sophie Toupin. CC BY-NC-SA. Simplified infographic of how the encrypted communication system worked.

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