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Accidents are a rich site of exploration for the actor–network theorist. Through accidents, hidden actors are brought into view, silent intermediaries become full-blown mediators, and black boxes are pried open. Based on fieldwork with electronic musicians in Soweto, South Africa, this paper asks how one might conceptualize actor–networks in a context where accidents and failures are ubiquitous, even expected aspects of musical activity. Because of the fragility of musical settings, my interlocutors de-emphasize the way that actors are constituted through relations (because these relations are constantly shifting and breaking apart) and instead emphasize the relative autonomy of individual components. Hence, if we are to develop a theory of musical mediation that lives up to the challenges posed by South African electronic music, it is necessary to supplement actor–network theory with a framework capable of accounting for both relationality and the non-relational perdurance of autonomous objects. This requires a careful meditation on ontology.

Keywords: Actor–Network Theory; Accident; Failure; Ontology; Soweto

In recent years, arguments regarding the nature of music and sound have begun to coalesce around a more or less stable set of terms. One interdisciplinary impulse falls under the rubric of what we might term modalities of the mobile: music, so the story goes, is a fluid medium that circulates effortlessly (Holmquist, 2005; Weinberg, 2003). The emphasis on effortless circulation points to a second preoccupation in much recent literature, namely, the prioritization of process and practice over things and texts, as, for example, in much recent work in performance studies and ethnomusicology (e.g. Small, 1998). A related term within this constellation is relationality: music and sound are said to be inherently relational and, therefore, particularly useful sites with which to think the social (e.g. Henriques, 2011). In addition to fluidity, mobility, relationality, and process, there are many associated terms beside

—vibration and resonance being two (Goodman, 2009). What all of these terms have in common is a sense of things being outside of themselves, a wager on an object's becoming or always already having been another. Another way of saying this is that —in recent critical discourse—music and sound are said to be fundamentally *co-constituted* (e.g. Stover, 2016); music and sound are made up of what lies between them, by what binds them, by their associations and linkages. From this perspective, music and sound *are* their mediations.

This paper is an inquiry into music and mediation in contemporary urban South Africa. The main question animating this paper is whether recent theorizing in music studies and adjacent disciplines can comprehensively account for the way that mediation (technological, formal, and otherwise) functions in South African electronic music. And my answer, to anticipate what follows, is that it cannot—or at least that in staging the encounter with South African electronic music, theory hits a cul-de-sac.

Part of my argument is that the tendencies regarding the nature of music and sound that I have briefly described are forms of *valuation*; they put a certain amount of trust —or even faith—in relations, associations, motion, and process.[1] In much of the work mentioned above (i.e. Weinberg, Small, Henriques, Goodman, and Stover), relations and motion are valorized as being truer to music's inherent tendencies—and truer even to the very nature of reality itself.[2] In actor–network theory (ANT), too, the idea seems to be that the more associations or relations that can be mustered the better (e.g. Latour, 1999). To speak of mobility and relationality, then, is to make ontological wagers about what and how music is. In this paper, I take the ontological seriously as a register with musical, social, and political stakes. Situating my argument within the so-called ontological turn in anthropology (Holbraad & Pedersen, 2014) as well as philosophical movements such as new materialism (Bryant, Srnicek, & Harman, 2011), I sketch the broad outlines of a theory capable of living up to the challenges posed by South African musical scenarios.

If the preoccupation with mobility and relationality belies a certain faith, then a useful way into this thorny topic may be to examine moments of accident and failure that put this faith to the test. I ask how one might conceptualize music and mediation in a context where breakdown and failure are far from anomalous. In South Africa, computers crash frequently, leading to information loss; power outages affect entire neighbourhoods, rendering studio consoles useless; gigs frequently proceed with at least one band member absent due to a car crash, crime, or illness. If, as a number of scholars have recently pointed out, in South Africa the accident has become normal (Morris, 2010; Nuttall & McGregor, 2007), then what becomes of the accident as an explanatory device? What might these strangely anticipated accidents tell us about music in South Africa and, more generally, about how and with what music is made up?

To put a finer point on my argument: I am not saying that all of the above authors— those very many who argue for mobility, practice, relationality, vibration, resonance, and co-constitution—are wrong. My point is merely to note how one-sided the argument has become, how undialectical. The current essay aims for a more balanced and

dialectical approach. Models for such an approach already exist, for example in the assemblage theory of Manuel DeLanda (2006), especially as it has been adopted in music studies by Georgina Born (2011) and by Ochoa and Botero (2009). In the work of these authors, there is a subtle balance between devices and actions, between objects and relations. DeLanda, Born, Ochoa, and Botero are attuned both to relations and non-relations. My aim here is to further develop the non-relational side of the argument, which to date has received less emphasis.

I proceed in five parts. First, I discuss practices of music making in my primary field site and offer some preliminary observations about technological accidents and failures. Second, I present possible interpretations of these techno-musical failures from three different angles—popular music studies, media studies, and ANT—and weigh their relative merits. In the third section, I delve more deeply into ANT approaches to technology use in Africa by presenting close readings of two seminal texts (Akrich, 1992; De Laet & Mol, 2000). In the subsequent sections, I turn back to my ethnographic examples and suggest a series of elaborations, revisions, and (partial) inversions of the ontological assumptions of ANT and related theoretical impulses.

Electronic Music in Soweto

To date, much of my research has been based on fieldwork in Soweto, South Africa's largest township and formerly a key site of the anti-apartheid struggle.[3] I spent a year living in Soweto between 2008 and 2009 and have made short research trips each year since. I am a white South African and was born in Johannesburg in 1981. South Africa remains a highly racialized country, and this has, of course, had a tremendous effect on my fieldwork, especially considering that the population of Soweto is entirely black. Nonetheless, thanks to the sheer generosity and openness of my interlocutors, I have learned a great deal about musical practices in Soweto over the past nine years. In particular, I have spent many hours and days playing with musicians in the 'deep' neighbourhoods of Soweto, particularly Moroka North and Chiawelo.[4]

In this paper I focus on non-professional musicking in Soweto, which typically takes place amongst groups of friends in designated rooms of private residences. A large percentage of young men and women in Soweto are unemployed or underemployed, making ends meet through odd jobs and support from family and friends. As the anthropologist Adam Ashforth (2005, p. 32) notes, in Soweto 'people survive because others feel obliged to share and support them as members of their families, as neighbours, and as friends'. In most cases, he observes, resources are distributed 'equitably and according to need' (Ashforth, 2005). Many unemployed people stay at home most of the day, assisting with housework[5] and otherwise participating in activities such as music making, reading, or watching television.

Musicking in Soweto is an informal and loosely structured activity that takes place alongside other activities such as drinking soda or beer, smoking cigarettes (or, less commonly, marijuana), and conversing intermittently about personal matters and

topics ranging from politics and technology to movies and sports. A typical weekday afternoon 'session' begins when several people from the neighbourhood (usually between four and eight) gather at one person's house. In addition to the sharing of drinks and tobacco, individuals exchange MP3s, digital documents, and films. They also perform music with and for each other by trading vocal-melodic phrases over steadily repeating electronic tracks known as *imizimba* ('bodies') in isiZulu.[6]

Sessions typically proceed as follows: one person presents an electronic track that he or she has produced on commercially available software (during the time of my research Sonar was particularly popular). These 'tracks' are usually between four and eight measures long and are looped repeatedly, providing a musical substrate over which individuals perform for one another. While the style of vocalization may vary considerably, individuals usually either sing or 'rap' in isiZulu, English, or an urban vernacular known as *tsotsitaal*. Although vocal passages are usually improvised, fragments of these improvisations may be taken up by others and turned into refrains.

The practice of multiple individuals improvising over the same electronic tracks is known locally as *ukukhopa* ('copying'), but the aim of this musical practice is less to create literal 'copies' than to produce ever-new creative versions. This process, in fact, closely resembles 'versioning' in Jamaican music (Veal, 2007) and also, more generally, the creative 'relays' that characterize much African diasporic music, in which 'live performance and music's commodified forms are understood to coexist in a creative symbiosis that fosters musical evolution' (Born, 2013, p. 146; see also Born, 2005).

Unlike electronic tracks—which are often repeated on multiple days and shared widely through digital storage devices—lyrics and vocal melodies are generally somewhat transient, lasting only for a single afternoon. Nonetheless, one exception to this general asymmetry may be found in the 'signature' hooks or phrases that certain individuals are known to deliver on almost any given day, irrespective of the electronic track that is being sounded. Because these hooks are usually only quasi-melodic, vocalists can easily adapt them to just about any substrate, regardless of mode (major or minor) or harmonic sequence. In other words, these hooks bear no determinate relationship to a particular electronic track. The more general point to notice is that despite the complex interactions between digitally generated substrates and heterogeneous vocal utterances, the various 'component parts' of musicking in Soweto maintain relative autonomy and may be rearranged and recombined in multiple ways.

Electronic tracks circulate widely in Soweto and are exchanged person-to-person through digital storage devices such as hard drives or memory sticks. Because few people in Soweto own external hard drives, musical information is more commonly transferred by removing and then lending out hard drives from desktop computers. Most people permanently remove the chassis from their desktops—thus exposing the hard drive and the computer's circuitry—to enable this process.

My interlocutors face two primary challenges. First, although individuals are obligated to lend out hard drives, these devices are not always returned in a timely fashion—and sometimes they are not returned at all. The second main challenge is breakage. Most desktops and laptops in Soweto are many years old and have gone

through several rounds of repairs. These computers crash often and hard and are affected, furthermore, by frequent power outages due to South Africa's ailing electricity infrastructure. Notably, unexpected power outages have direct effects on the sensorial qualities of digitally stored music: a sudden interruption in power supply may corrupt digital information and produce gaps or glitches in MP3s. These gaps and glitches are clearly audible and transform the sonic texture of electronic tracks.

Music in Soweto is thus marked by a number of difficulties including lost and stolen equipment, equipment breakdown, and infrastructure failure. Because of these difficulties, the 'system' itself is often unworkable and most of the time some failure or accident renders performance impossible. A hard drive is lent out (for an undetermined period of time), a computer monitor is stolen, a keyboard is broken, there is no electricity: for these, and many other reasons, musicking is often impossible or severely restricted.

For my interlocutors, musicking takes place in relation to a patchwork system of technical bricolage in which parts are absent, substituted, exchanged, scrambled, or mismatched. While I would not wish to make sweeping generalizations, and while I acknowledge certain similarities, it is clear that this context differs markedly from professional studio environments in South Africa (Meintjes, 2003), as well as amateur digital audio workstations that have developed into a somewhat stable 'globalized' form in a variety of urban locales ranging from New York and Amsterdam to Melbourne and Seoul. In most cases, these studio environments are characterized by three key interrelated features that are absent in Soweto: (1) a 'fetishism' of the invisible inner-workings of technologies, (2) a closed-system of connectivity attaching various component parts, and (3) particularly in set-ups in the global North, a relationship between consumers and manufacturers sustained through warrantees, system updates, and repairs.

On the first point, consider Louise Meintjes' analysis of technology in a professional South African recording studio. Meintjes illustrates the ways that particular technological devices are imbued with magical qualities because of the invisibility and unavailability of their processes. For example, when the voice of a black female vocalist named Joanna is captured on a recording console, a gap is inserted between her body and her voice, and now she can only recover her voice with the assistance of a male studio engineer (Meintjes, 2003, p. 100). The recorded voice, therefore, becomes a 'fetish', that is to say, a 'reif[ied] … object that can procure for those who have earned access to it the services of that force, or "spirit", lodged within it' (Meintjes, 2003, pp. 73–74). Georgina Born makes a similar observation about a completely different context: the electroacoustic studio environment at IRCAM in Paris. She reports, for instance, that the 'ordinary surface' of one machine (the 4X prototype) 'belied the intense interest stimulated by its inner workings'. This interest was only exacerbated by the developer's refusal to reveal 'the machine's secrets', and as Born notes, the 'preservation of secrecy encourage[d] a fetishism of the machine's mystery' (1995, p. 232).

On the second and third points above, note briefly that in more affluent contexts a consumer will seldom attempt to fix a malfunctioning computer herself. More

commonly, a closed and integrated system is established by the manufacturer, which effectively 'locks in' the consumer, forcing her to turn to the manufacturer whenever there is a problem. The best example of such a system, of course, is Apple, which steers its customers towards purchasing exclusively Apple products through its closed operating system. But this dependency is nothing new: Born (1995) examines a similar reliance on different corporations already in the early 1980s.

To anticipate what follows, I note briefly a distinction between two primary forms of mediation. On the one hand, there are forms of music making that prioritize robust associations and dense entanglement, for example in professional recording studios that rely on systems that integrate software and hardware into smooth circuits. On the other hand, the situation in Soweto is more precarious but also, because of this, more flexible. The aim of this paper is to comprehensively analyse the latter form of musical creativity, which encounters failure and accidents at every turn. With what theoretical and methodological tools might we then begin to interpret mediation in Soweto? In what follows, I consider three possibilities.

Three Ways of Interpreting Accidents: Popular Music Studies, ANT, Media Studies

1. *Popular Music Studies*

Popular music studies was probably the first discipline in the humanities to take technological failure seriously. From Robert Walser's (1993) analysis of overload and distortion in heavy metal to Tricia Rose's (1994) work on turntable scratching in hip-hop, scholars of popular music have illustrated the profound musical and affective dimensions of accidents, errors, failures, and misuse. In contrast to the situation in Soweto, the cases examined by popular music scholars concern fully functioning technology that is pushed beyond its limits by inventive users: distortion and scratching are intentional aesthetic choices.

Because the technological 'failure' typically examined in popular music studies is deliberate, scholars have tended to focus on questions of musical meaning rather than issues of technical infrastructure. *Musical* glitches or distortions are heard as metaphors for *cultural* characteristics such as madness (in Walser) and resistance (in Rose). Hermeneutic arguments of this nature are arguably hobbled by their inability to account for the multiple levels of mediation that link music and culture (for a critique, see DeNora, 1995; Tomlinson, 2007). And largely because of the reliance on a hermeneutic approach that encourages speculative claims about music's cultural meaning, popular music researchers have tended to interpret any kind of failure as a sign of resistance and subversion. But such an approach is inadequate for the analysis of electronic music in Soweto. There, technological failure is neither subversive nor resistant—nor it is an *intentional* act of technological sabotage, as is the case with distortion in heavy metal and DJ scratching in hip-hop, which are both deliberate social-aesthetic practices. Instead, in Soweto technological failure is a material and even

quotidian aspect of musical activity. Valorizing or romanticizing failure is also a dubious exercise, especially considering that most of the musicians I work with find failure extremely frustrating and are constantly seeking ways to overcome it.

2.   *Actor–Network Theory*

Although seldom commented upon, accidents have primarily *epistemological* value in ANT. For a wide range of scholars falling generally under the rubric of ANT, accidents and failures are seen as learning moments for the theorist her or himself. For example, Bruno Latour writes that 'accidents, breakdowns, and strikes' offer a particular opportunity for the actor–network theorist: 'all of a sudden, completely silent intermediaries become full blown mediators; even objects, which a minute before appeared fully automatic, autonomous, and devoid of human agents, are now made of crowds of frantically moving humans with heavy equipment' (2005, p. 81). Latour proclaims that it is therefore *fortunate* that the amount of '"risky" objects' increased in the late twentieth century. But for whom is this fortunate? What Latour means is that the proliferation of risky objects is fortunate for the *theorist*—even though such objects may be hazardous for people who encounter them on a daily basis. In any event, his point is that accidents are useful for the theorist 'because they provide occasions to hear, see, and feel what objects may be doing' when they are *not* broken (2005); and also, Latour might add, for the scientist who discovers something 'by accident'.

   Indeed, Latour and other ANTs valorize situations where relations between humans and non-human 'actors' form robust constellations that are maintained through careful labour. For the ANT, one does 'not gain access to reality by subtracting the layers of distorting perception added to the world, but only by *increasing* the number of mediators'.[7] As Latour (1999, 137) argues, it is 'as if *the more filters there were the clearer the gaze was*' (emphasis in original). On this view, every additional mediator paradoxically brings one *closer* to the thing under consideration. With each additional attachment, 'the more [a thing] exists' (Latour, 2005, 217). The reason that Latour often studies cases where things break down is only because smooth functioning systems (or 'black boxes') do not reveal anything about their functional mechanisms. Here again, accidents and failures are useful only insofar as they provide valuable information for the theorist.

3.   *Media Theory*

Unlike popular music scholars and actor–network theorists, media theorists have historically tended to focus on situations where technology works at its optimum. Only with the very recent interest in glitches, breakages, and quirks (Mathew & Smart, 2015; Parikka, 2012) are we able to recognize just how pioneering were the early studies of technological failure by authors such as and Schivelbusch (1986), Born (1995), and Virilio (1999).

Because of his interest in African infrastructures, Brian Larkin's work (2004, 2008) on technological failure is most relevant for the purposes of this paper. Arriving in Kano, Nigeria, to pursue fieldwork in the 1990s, Larkin quickly realized that several of media theory's central assumptions were flawed. In particular, he recognized that despite media theory's focus on situations where technology works at its optimum, 'the inability of technologies to perform the operations they were assigned must be subject to the same critical scrutiny as their achievements' (Larkin, 2004, p. 291). For Larkin's interlocutors, technological failures are neither subversive nor resistant. But they are also not merely anomalies in a system that requires repair. Instead, Larkin shows that accidents and failures have 'material and sensorial effects on both media and on their consumers' (2004, p. 310).[8] Taking a cue from Larkin, recent interventions by authors such as Rosalind Morris (2010) and Rebekah Lee (2012) have explored the generative, culture-making capacities of accidents and failures—such interventions, no doubt, are highly relevant for Soweto's MP3 glitches that generate tangible, audible effects.

Larkin's emphasis on the materiality of media also provides a useful way to avoid popular music studies' speculative linking of music with 'reified generalities' (DeLanda, 2006) like culture, society, or—even worse—context. As Benjamin Piekut (2014, p. 14) has noted—in a manner redolent of Kofi Agawu's (1993) earlier argument on the same topic—'context has come to stand in much recent scholarship for all the stuff which seems possibly relevant, but not *as* relevant as the other more important things that are at the center of the study'. Recent media theorists have, therefore, eschewed notions like context and have turned their focus to the material grounding of media (e.g. Parikka, 2012; cf. Larkin, 2013).

Without explicitly employing the approach in his own work, Larkin suggests that ANT 'has been extremely productive for recent anthropological research' (2013, p. 331). Although I cannot pursue a comprehensive comparison here, it seems that ANT differs from anthropologically inclined media theory in that it pays more attention to non-human actors (I say *more* attention, since media theory clearly also considers non-human actors). This difference is attributable, at least in part, to ANT's insistence on a coherent and explicitly articulated ontological grounding, while media theory tends to be more diverse and less rigid about its ontological assumptions.

To summarize: one pitfall of popular music studies is an insufficient account of the multiple layers of mediation between musical sound and culture. ANT oscillates between what accidents mean for the theorist and what they mean for the people theorized. Recent media studies go further, moving in a materialist direction. But none of these approaches tell us how things are put together in the first place. Instead, they tell us what *might* happen to a system that has already been put together. They begin, in other words, from the assumption of an already working system. Furthermore, none of these approaches to accidents is explicitly invested in ontological considerations. In the following section, I turn to empirical cases that seem almost to necessitate ontological reflection. It is no coincidence that these cases are located away from sites where theories about technology are usually developed.

Technology Transfer and the Case of Africa

In her seminal text, 'The De-scription of Technical Objects', Madeline Akrich aims to show the asymmetry, in all technologies, between the 'user' as she or he is envisaged by the designer, and actual users who in fact engage with and use the resulting object. Akrich elucidates this point with stunning clarity by examining cases where objects and their intended function are particularly poorly matched: her focus is on cases of 'technological transfer' from Europe to 'less-developed countries' (1992, p. 207). For example, the French-designed Photoelectric Lighting Kit was largely unusable in Africa for four reasons: (1) the wires linking various components were short and, therefore, not easily adaptable, which made the device ill-suited to large rooms, (2) the light bulbs were difficult to replace, (3) the kit relied on a non-standard plug not ordinarily available in Africa, and (4) the photoelectric panel was fixable only by a French repairman. As Akrich emphasizes, this particular set-up became effectively a means of social control: 'the kit represented a large set of technically delegated pre-scriptions addressed by the innovator to the user' (p. 211). And indeed, in the histori-cal context of colonial France, it is not surprising to read Akrich's conclusion that 'the users did not interest the manufacturers; they were only important to the extent that they made it possible to go to the ministry of overseas development and seek support for a product that did not yet have a market' (p. 220).

The same problematic is taken up in another important text: de Laet's and Mol's 'The Zimbabwe Bush Pump: Mechanics of a Fluid Technology' (2000). Like Akrich, de Laet and Mol are interested in the transferability of technical objects. But rather than focusing on technologies that are *not* easily transferred, de Laet and Mol investigate a particularly pliable instrument, the Zimbabwe Bush Pump 'B' type, for which they openly declare their '*love*' (p. 225, original emphasis). If 'Akrich's stories tell us [that] in the arena of technology transfer the lesson about fluidity still needs to be learned' (p. 256), de Laet and Mol imply that with the Zimbabwe Bush Pump this lesson has finally been learned. Unlike the stubborn Photoelectric Lighting Kit, the Zimbabwe Bush Pump is fluid and highly adaptable to the harsh environment of rural Zimbabwe. Broken parts may be easily extracted and replaced with new parts, while certain components may be altered or substituted depending on the situation (pp. 238–240).

De Laet and Mol summarize their research:

> We find that in travelling to intractable places, an object that isn't too rigorously bounded, that doesn't impose itself but tries to serve, that is adaptable, flexible and responsive—in short, a fluid object—may well prove to be stronger than one which is firm. (2000, p. 225)

The Bush Pump, they suggest, is deeply relational: it is 'not well-bounded but entangled, in terms of both its performance and its nature, in a variety of worlds' (p. 227). They emphasize the pump's fluid and 'widely drawn' boundaries (p. 235), the fact that the pump has changed considerably over time, and that one can never say for certain 'where this pump ends' (p. 237).

Adapting Akrich's work, De Laet and Mol ultimately argue that in the case of the pump '"being itself" means that it is continuous with a number of others' (2000, p. 231). They argue, in other words, that *the pump is what it relates to*: the pump is literally 'a *different thing* when it is sitting on the premises of V&W Engineering, than it is when pouring water in, say, Marondera' (2000, p. 252, my emphasis). In saying this, they propose a theory of actors that becomes the main thesis of Mol's celebrated *The Body Multiple* a few years later: 'To be is to be related' (2002, p. 54). This notion has since been elevated to something of an ontological axiom of ANT, with Latour (2005, p. 45) defining 'actor' through a famous quote from Rimbaud: 'Je est un autre' (I is another).

Objects and Relations

What would this theorization of actors look like in terms of South African electronic music? Like the Zimbabwe Bush Pump and its multiple uses in Zimbabwe, the various actors making up electronic music in South Africa constantly shift, forming an unstable constellation. Electronic tracks (or 'bodies' [*imizimba*]), hard drives, and MP3s travel through unpredictable routes and along the way they are borrowed or lost, they become corrupted or broken. Akrich, de Laet, and Mol would say that these various actors are fluid, entangled, and boundary-less enough that they are able to move (and they would add, perhaps, that this fluidity has its limits because at a certain threshold the components become stuck and break).

Akrich, de Laet, and Mol, therefore, accept the 'commonsense' position that flexible scenarios require flexible actors. Notions such as flexibility, fluidity, openness, and heterogeneity are used liberally in their accounts and are defined in contradistinction to rigidity, firmness, and boundedness. This leads ultimately to an ontological 'internalism' according to which relations are internal to and constitute actors (Bryant, 2011, p. 213). The pump, for example, is not ontologically equivalent with the physical apparatus of the pump itself: instead, the pump is precisely what it is attached or related to. We can never locate 'the pump' as such, but are instead required to examine the relations that constitute it.

Now, if mobility is a socially and economically desirable property of things in settings in Soweto, then we must seriously examine the claim that a thing is what it is with. My contention is that this common-sense argument conflates different kinds of openness and fluidity, resulting in an inadequate theorization. I contend that if an object is constituted by its relations, then this makes change *more difficult* (rather than less), since any change requires a shift in the multiple and interlocking system of mutually constituting relations. This leads to a somewhat surprising conclusion: if an object is to move, it would make more sense for that object not to be constituted by its relations, but, instead, to hold something of itself in reserve. Thus, against the ANT axiom that an actor *is precisely what it is not*, I would argue to the contrary that an actor *is exactly what it is*. This requires an ontology in which relations are external to self-constituting objects. The philosopher Graham Harman, whose work I have learned a great deal from, writes:

> Just as Latour teaches, there are countless actors of different sizes and types, constantly dueling and negotiating with each other. But objects are not defined by their relations: instead they are what enter into relations in the first place, and their allies can never fully mine their ores. In Heideggerian terms, objects enter relations but withdraw from them as well; objects are built of components, but exceed those components. Things exist not in relation, but in a strange sort of vacuum from which they only ever partly emerge into relation. (2009, p. 132)

Without necessarily taking on Harman's position wholesale, we are nonetheless in a position to question the conclusion that technical objects are different things when they are in different places, as de Laet and Mol would have us believe. After all, surely the fact that they can speak of the Zimbabwe Bush Pump at all suggests that something perdures through the various relational changes? When things are entangled they are interdependent, lacking autonomy, and reliant on an expanding web of potentially infinite other things. Deep relational entanglement thus results either in stasis (Harman [2005, p. 82] uses the metaphor of a 'house of mirrors' where everything is locked in place) or in a situation where one small change—for example, the replacement of a single screw in a single pump—sets off a ripple effect impacting an entire system. But both possible results contradict basic logic and practical observation. Objects *do* move and, furthermore, component parts are routinely substituted without causing any major structural change. This is especially the case in places where accidents and failure are common, such as in Soweto or rural Zimbabwe.

If an object is constituted by its relations, then when it breaks from those relations it becomes impotent or even disintegrates. This, after all, is precisely what happened with the Photoelectric Lighting Kit: the kit was so tightly constituted by its relations to French developers that it could not function at all when severed from those relations. Thus, the Photoelectric Lighting Kit, *not* the Zimbabwe Bush Pump, is an 'entangled' object. The problem with the Photoelectric Lighting Kit is that its relations are rigid or fixed—but this has nothing whatsoever to do with its boundaries being too narrowly drawn. On the contrary, the fact that the Photoelectric Lighting Kit does not have clear boundaries—the fact that its continued functioning depends on a sustained connection to French engineers—explains why it does not transfer easily. One might say, in fact, that the Photoelectric Lighting Kit's boundaries are not drawn narrowly enough. We are, therefore, left with a new axiom: *the more bounded an object is, the more easily it moves*. This inverts the core position of ANT.

If I learned anything in Soweto, it is precisely the extent to which an entity can move or shift relations and still remain what it is. For example, a hard drive is lent to a friend and filled with new MP3s and then lent, again, to someone else. The device's relations have changed, yes, but those relations are external to the device that harbours an excess beyond all relations. In spite of its movement and transmutation, the hard drive remains the very same device. And the same could be said of an electronic track—or 'body' (*umzimba*)—which serves as the basis for multiple *amakhopa* ('copies'). Electronic tracks maintain relative autonomy, existing through multiple 'copies' and

entering into musical assemblages only contingently. It is possible to conclude, then, that when a technical device (such as a hard drive or an electronic track or a pump) moves in a precarious environment this is possible only because its boundaries are tightly drawn and because one *can* say precisely where the device 'ends'.[9] It follows that critical rejections of anything like a stable object, along with the corollary valorizations of process and practice, stand in need of rethinking.

In Soweto, people go to great lengths to pry devices or component parts from their entanglements within technical systems. Devices are broken down, as much as possible, into autonomous component parts that can then be rearranged into new configurations. This differs quite radically from technology use in the global North, where corporations tend to lock consumers in by integrating hardware and software components. The best example of such a system, as I have already mentioned, is Apple, which steers its customers towards purchasing exclusively Apple products through its closed operating system.

One of my interlocutors in Soweto has long experimented with building his own computer system that is more amenable to township use. Called the Ramputer (a portmanteau of his English name, 'Ralph', and 'computer'), this device will not be constructed as a self-sufficient or organic unit like a laptop. Instead, the Ramputer will be comprised of easily detachable component parts: keyboard, screen, motherboard, power supply, multiple hard disks and solid-state drives. Because reliable Internet is a rare luxury in Soweto, Ramputers will exchange information by swapping detachable drives and through Bluetooth technology.

The case of Ralph brings another interesting point to light: in Soweto, there is a close association between knowledge of music and knowledge of technology. Individuals known as skilled music producers are also often known for their technological know-how. As I noted elsewhere, fixing computers, downloading files from BitTorrents, and producing electronic music are closely associated practices in Soweto (Steingo, 2016, p. 137).

Networks of music production and electronics repair are closely interwoven. And through my interaction with musicians in Soweto, I have come into frequent contact with electronics repairmen, who have given me additional insights into the dynamics of technological failure. The dilemmas faced by television repairmen in contemporary Soweto—individuals who are either close collaborators with musicians or else who are musicians themselves—will help further elucidate a particular approach to technical objects. In the days of cathode ray tube TVs, television repair was a viable source of income and there existed extended networks of repair shops and apprenticeships throughout the many neighbourhoods of the township. As one repairman told me, tube TVs could be fixed fairly easily with the right training and equipment because their parts and circuits are 'scattered' (*ukuhlakazekile*). A malfunctioning TV, in other words, was usually the result of a malfunctioning *part* that could be located because of the spatial and structural separation of components on the circuit board. This part could then be fixed or, more commonly, replaced.

The growing popularity of liquid-crystal display (LCD) TVs poses a serious problem, however, because their circuitry is 'compressed'. Although this repairman first used the English term 'compressed', he offered *faka endaweni yayo* as an adequate Zulu translation, which more literally means 'to bring together in one place'. In other words, what was once an assemblage composed of identifiable component parts has become an integrated system of internal relations. With everything 'together in one place', this repairman is unable to fix broken TVs and his livelihood is threatened (see Figure 1).

It is necessary to point out that when the repairman speaks of circuitry being compressed, and when musicians in Soweto creatively engage in technological bricolage, these people enact a particular *ontology*, a particular sense of what it means for things to exist in the world. Significantly, my interlocutors in Soweto seem to de-prioritize relations and associations, and to prioritize a flexible relation to component parts, which may be selectively substituted and withdrawn. From this vantage point, relationality and the desire for 'openness' are terms better applied to the Apple corporation than to the Zimbabwe Bush Pump or technology practices in Soweto.

The de-prioritization of relations is evident, too, in the way that Sowetans deal with musical material. To help me think through what kind of analytical framework would be most useful for music produced by my interlocutors, I turn briefly to the work of

Figure 1 Television repairman explaining the differences between 'Compressed' LCD circuits (the lower panel) and 'Scattered' tube circuits (the upper panel). Photo by the Author.

Manuel DeLanda, whose assemblage theory perhaps comes closest to what I am proposing in this essay. Mirroring my earlier distinction between 'externalism' and 'internalism', DeLanda develops a (Deleuzian) view of assemblages as constituted by 'relations of exteriority' rather than 'relations of interiority' (DeLanda, 2006; see also Born, 2011; DeLanda, 2011; Ochoa & Botero, 2009). Contrary to a model in which component parts function only in relation to other component parts, in assemblages parts are not fused together and may be detached and used in other assemblages. Thus, component parts maintain relative autonomy while simultaneously functioning within larger systems.

Assemblage theory is useful for understanding how South African electronic music is put together. Consider, for example, the song 'Amadlozi' (the ancestors), by the South African electronic music group Bongo Maffin from 1999.[10] Although a commercial recording, the song is stylistically very similar to the ones produced by the non-professional musicians I work with in Soweto. 'Amadlozi' consists of nine digitally produced layers that repeat in short, three-second, cycles. The song is constructed by activating or deactivating layers in various combinations without any change to the layers themselves.[11] Various combinatorial possibilities of these nine layers constitute the song, as illustrated in the following figure—an analysis of the first 30 seconds of the recording (Figure 2).[12]

In the analysis below each block represents one 'cycle' (or 'measure'), and one can clearly see the song's assemblage form. It is not difficult to see the way layers are added and removed, how they accumulate and dissipate. Zulu speakers sometimes use the term *ukuhlela*, which literally means 'organize', to describe the process of creatively assembling digital layers in different combinations. Only through good organization, my interlocutors insist, does one produce *iculo*—a song.

It is important to note that none of the layers are *essential* to the song. In South African electronic music, songs have potentially infinitely many versions, and each version is made up of a different combination of layers. In addition to the interaction of layers within each song, it is also crucial to note that any single layer may be detached and used in other songs as well. There are dozens if not hundreds of instances in the history of South African electronic music of bass lines, hooks, and drum tracks being used in as many as eight or even ten songs. South African electronic music, from this perspective, is constituted by assembling autonomous parts into larger musical structures: that is, it is constituted through a perpetual process of attachment and release.

I am not the first to notice the usefulness of assemblage theory in music studies. Of particular relevance is the work of Born (2011), who draws profitably on DeLanda by
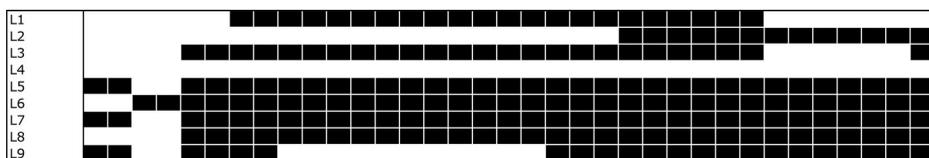

Figure 2 Layer analysis of the first thirty sections of 'Amadlozi' by Bongo Maffin.

suggesting that music's social mediation might be conceptualized as 'a heterogeneous unity composed of elements that have a certain autonomy while being brought into relation and fuelling emergence' (p. 385n2; see also Ochoa & Botero, 2009, pp. 166–167). But Born also notes important limitations of assemblage theory, particularly its rigid scalar modelling—which moves from systematically from small to large (2011, p. 386n2). Born thus takes inspiration from DeLanda but develops a model that allows for more flexibility of movement between scales.[13]

Along similar lines, it seems to me that DeLanda's model is somewhat totalizing. DeLanda essentially argues that his assemblage theory can account for (or explain) *everything*: from the smallest assemblages (such as molecules) to the largest (global economies, or—far larger still—galaxies). Rather than a single model that accounts for all things and relations in any place and at any time, my aim is to understand fundamentally different ways of being in the world.

Now, assemblage theory does in fact work well when it comes to South African electronic music. In Soweto, as I have mentioned, a technical object does not get plugged into a system of relations as much as it moves between multiple assemblages. *Accidents and failures break the assemblage but they do not break the object* (or actor). Accidents and failures simply release objects from assemblages, decomposing assemblages into component parts that can be retrieved and plugged into other systems.

But—and this is the important part—assemblage theory works less well for most Western cases. Although I have been mostly focusing on cases where objects have relative autonomy, there are certainly instances where relations exert ontological priority over objects. Colonial apparatuses and contemporary corporations (such as Apple) function through sustained solid relations. The same could also be said of most contemporary scientific enterprises, at least if we are to believe actor–network theorists like Latour. Indeed, Latour typically examines situations in which relations or associations are established and proliferated. This constitutes good construction in Latour's books—he even would go so far as to say that it constitutes reality itself. Recall the quote from earlier: 'The more *attachments* [an actor] has, the more it exists. And the more mediators there are the better' (Latour, 2005, pp. 217–218, original emphasis).[14] This claim makes perfect sense in certain contexts; it does not, however, apply very well to Soweto.

A prioritization of relations is evident, too, in the establishment of (Western) taste cultures in which individuals form clingy attachments to particular musicians, songs, and styles. Gomart and Hennion (1999) present an extreme case in their study of music lovers and drug addicts. In their view, the pleasure derived from listening to one's favourite music is akin to narcotic addiction—surely there is no better analogy for the desperate need to maintain particular attachments. As Gomart and Hennion insist, music lovers and drug addicts 'abandon' (p. 227) themselves to their objects such that the boundaries surrounding various actors become fuzzy. Like the Photoelectric Lighting Kit (which probably worked very well when hooked up as originally intended), Latour's scientific laboratories and Gomart's and Hennion's music lovers have rigid attachments that become brittle when put under pressure. Indeed, the actors hardly function at all outside of their relations.

Invoking assemblage theory does not help us here, since the systems just mentioned actually *are* constituted by relations of interiority (rather than relations of exteriority). In other words, the question is not whether ANT or assemblage theory are 'correct' or 'incorrect'; the issue is less a heterogeneity of *theories* than a heterogeneity of *ontologies* (or lived ways of being in the world). Again, my discussion regarding different approaches to technical systems does not stop at an empirical pluralism. Rather, I understand the ways that people intervene in the world as properly *ontology*, that is, as having real ontological weight.[15]

The core argument of this paper is not that objects are *never* constituted by their relations, nor that they are *always* so constituted. My argument is rather that sometimes objects are constituted by their relations, and sometimes they are not. This claim is what makes my account ontologically pluralistic, unlike many ANTs who claim to recognize plural ontologies but who, in effect, possess only an analytical ontology and not an ontology of the worlds that they study.[16]

Concluding Thoughts

In this paper, I have analysed music making in Soweto by focusing on technological accidents and failures. In Soweto, accidents are part of the everyday, quotidian music making process, and as such the musical context does not lend itself easily to dominant theorizations. One might say, following Lauren Berlant (2011, p. 227), that musicking in Soweto is 'constitutively broken'. Accidents are expected. Failure breaks things apart but also generates new structures and effects. This scenario differs from more integrated systems, such as professional studio environments (e.g. the one described by Meintjes, 2003), colonial apparatuses (e.g. the Photoelectric Lighting Kit), or major corporations (e.g. Apple). To borrow a phrase from Akrich (1992, p. 211), each of these integrated systems represents a 'large set of technically delegated prescriptions addressed by the innovator to the user'.

Part of the problem is that terms like 'accident' and 'failure' assume a normative horizon of functionality. They assume, to put things bluntly, that systems usually (normatively) work. But the very ubiquity of accidents and failures in Soweto compelled me to reassess the manner by which component parts are put together. I have, therefore, attempted to theorize how techno-musical set-ups in Soweto are assembled in the first place. This has led me, finally, to an *ontological* consideration of (1) what an actor or object is, and (2) how actors or objects relate to one another. One surprising conclusion of my investigation is a caution against the uncritical valorization of anything malleable or relational. I have argued, to the contrary, that flexible systems require somewhat stable component parts—parts that perdure through shifting relations.

This, to re-iterate, is not my own theory. It is rather a reflection on what I witnessed during fieldwork in Soweto. My experiences there did not match most of the theoretical models I had encountered. It would nonetheless be disingenuous to say that the model I have presented comes, in some naïve and unmediated way, directly from

my interlocutors. I have indeed supplemented my ethnographic observations with 'metropolitan' theory selectively along the way. Harman's work has been helpful in formulating my ideas; so too has the work of Manuel DeLanda.

A genuinely non-relational ontology remains difficult to grasp—and even more difficult to swallow—for many contemporary academics. Indeed, for many today the proposal of such an ontology is sheer madness. We are so accustomed to understanding things in context, that is to say, to understand a thing in relation to other things. We have also seen in this paper that for many contemporary scholars a thing *is what it is not*, since, as the maxim goes, to be is to be related. Or as Donna Haraway puts it, the world is 'relationality all the way down' (2014). Stated in general terms, the tendency is towards what Harman (2011) calls 'undermining', that is to say, towards conceptualizing an entity or thing as a façade for a reality that lies elsewhere (e.g. in an entity's relation to other entities). On this view, mediation—what lies between things—takes priority over things themselves.

These arguments are dubious for a number of reasons adumbrated in this paper. But such arguments become particularly problematic, and even pernicious, when they claim to account for everyone everywhere—when they claim to account for the entire world. Perhaps ironically, the uncritical affirmation of multiplicity, movement, and heterogeneity results in a suffocating homogeneity precisely because it leaves out autonomy and stasis. At the risk of simply advocating yet another totalizing theory, it seems to me that a general theory of musical mediation (if one were to exist) would have to account for heterogeneity *and* homogeneity—a kind of second-order heterogeneity, or a 'heterogeneity of heterogeneity'.

Assemblage theory has obvious advantages over emphatically relational theories, but it too falters when it tries to explain too much. My own fieldwork has propelled me to develop new ideas capable of accounting for objects, relations, and mobility in precarious situations. One surprising result of my investigation was that relatively stable and autonomous objects afford *more* (rather than less) flexibility and mobility. This runs counter to conventional wisdom.

The valorization of relationality also has the effect of depleting our political resources. As I have implied throughout this paper, strong relationality and the proliferation of associations has been the bread and butter of both colonial apparatuses and capitalist corporations. If this is so, then perhaps a non-relational ontology provides the outlines of a new politics: not of production but of refusal, not of circulation but of stasis, not of relationality but of withdrawal.

Such a politics is evident, I think, in contemporary Soweto, where musicians are constantly withdrawing their equipment from relational systems, such that they are invested in scattered rather than integrated technical systems. Perhaps we are at a historical conjuncture where our efforts as media scholars would be well spent by cataloguing moments when objects resist subjection. Perhaps it is time, as Fred Moten (2003) has suggested, to pay attention to objecting objects—those objects that object to process, relation, and exchange.[17]

Notes

[1] For a related argument, see Cimini and Moreno (2016).
[2] Indeed, for many recent scholars sound has an intimate relationship to reality insofar as both are understood to be inherently in motion. I consider this in more detail in my forthcoming project, *Soft Material: A Critique.*
[3] The history of Soweto is indissociable from economic concerns (Mbembe & Nuttall, 2008). It was originally created by the white apartheid state as a collection of contiguous areas to the south west of Johannesburg with the purpose of housing black workers (Bonner & Segal, 1998).
[4] These neighbourhoods are considered 'deep', first, because of their distance from Johannesburg and, second, because they are poorer than some parts of Soweto, such as Diepkloof Extension, which in recent years has become increasingly middle-class.
[5] White (1999) notes that housework is distributed fairly evenly between men and women.
[6] By 'electronic track' I refer to a digitally stored substrate consisting of looped synthesized drums and bass over which a variety of vocal or non-vocal layers may be added. These tracks closely resemble American house music.
[7] Harman (2009, p. 77). Note that this is not Harman's position; rather, he is clarifying Latour's position.
[8] Larkin examines the aesthetic forms generated by the imperfect reduplication of analog film. The films that he analyses are copied from tape to tape and, as is the case with any analog format, the content degrades with each copy. 'Constant copying erodes data storage', he writes, 'degrading image and sound, overwhelming the signal of media content with the noise produced by the means of reproduction' (2004, pp. 290–291). In this way, Nigeria's informal networks of copying and distribution produce 'a set of formal qualities that generate a particular sensorial experience' (2004, p. 291).
[9] Significantly, this does not mean that a technical device is a 'nominalist' object defined by its shape, appearance, or form, but rather that every device is ontologically precisely what it is—beyond function and capacity, but also beyond every phenomenological determination and 'physical' description.
[10] The song can be heard here: https://www.youtube.com/watch?v=QoP_wVJjg0w
[11] Here again, the musical processes in South Africa strongly resemble Jamaican music (Veal, 2007) and also, more generally, the creative practices that characterize much African diasporic music. On 'layers' in hip-hop production, see Rose (1994) and Krims (2000).
[12] Note that I have omitted the vocal layers, which are less consistent. For a more in-depth analysis of the song along similar lines, see Steingo (2016), especially chapter 6. The current article develops that earlier analysis.
[13] Born employs the metaphor of 'plane' as a way to examine music's complex social mediation. Born advocates a form of analysis that considers four planes in particular: (1) the production of music's own social relations (e.g. in music ensembles), (2) music's production of virtual or imagined communities, (3) music's relation to 'wider social identity formations' (e.g. class, race, gender), and (4) music's relation to institutions (Born, 2011, p. 378). For a related critique of scalar thinking in music, see Steingo (2016, pp. 138–140); after Ferguson (2006).
[14] As another example, consider Latour's attempt to rescue Whitehead's notion of 'society' by making it equivalent with his own concept of the 'collective'. Latour begins by paraphrasing Whitehead's argument that: (1) 'society' is really 'all the bundles of composite entities that *endure* in time and space', and (2) because of this, 'a society needs new associations in order to persist in its existence' (2005, p. 218, original emphasis). Latour concludes his thought with the following typical remark: 'And of course, such a labor requires the recruitment, mobilization, enrollment, and translation of many others—*possibly of the whole universe*' (2005, my emphasis).
[15] This is a thorny topic that cannot be adequately addressed here. I have found the recent debate between Eduardo Viveiros de Castro (2015) and David Graeber (2015) extremely useful as a

way to think through the issue of how to theorize ontology. Thanks to Thomas Crowley for bringing this debate to my attention.

[16]   I thank Georgina Born for this insight and for a useful way to articulate it. For a similar argument in relation to Gell's work, see Born (2013, p. 137).

[17]   Moten's context is in fact quite specific. He begins with the famous prosopopoeia that concludes the first chapter of Marx's *Capital*:

'If commodities could speak, they would say this: our use-value may interest men, but it does not belong to us as objects. What does belong to us as objects, however, is our value. Our own intercourse as commodities proves it. We relate to each other merely as exchange-values'. In his important reading of this passage, Moten invites us to think about those human commodities that not only speak, but scream: slaves. As he famously writes in the first sentence of *In the Break*: 'The history of blackness is testament to the fact that objects can and do resist'.

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Notes on Contributor

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