

**'The digital is everywhere':
Negotiating the aesthetics of digital mediation in Montreal's
electroacoustic and sound art scenes**

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St Catherine's College
University of Oxford

Thesis submitted for the degree of
Doctor of Philosophy in Music

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In this thesis I argue that the relationship between the increasing ubiquity of digital audio technologies and the transformation of aesthetic hierarchies in electroacoustic and sound art traditions is not deterministic, but negotiated by producers and policy-makers in specific historical and cultural contexts. Interviews, observations, and historical data were gathered during sixteen months of ethnographic fieldwork in the Canadian city of Montreal between 2011 and 2012. Research was conducted and analysed in collaboration with a transnational group of researchers on a programme of comparative research that tracked global changes to music and musical practice associated with digital technologies. The introduction presents Montreal as a rich ecology in which to track struggles for aesthetic authority, detailing its history as a key site of electroacoustic and sound art production, and its local positioning as a politically strategic 'hub' for the Canadian culture industry. Core chapters examine the specific role of digital mediation in the negotiation of electroacoustic and sound art aesthetics from multiple interlocking perspectives: the recursive relationship between technological affordances and theories of mediation; the mobilisation of digital technologies in the delineation of cultural, professional and generational territories; the political contestation of digital literacies and pedagogies; the articulation of the digital's opposition with analogue in the construction of instruments and recording formats; and the effects of the digital on the dynamics of genre and genre hierarchies. The concluding chapter offers a critique of the notion that digital mediation has shifted the balance between the normative and the generative dimensions of genrefication in the scenes in question, and closes by suggesting how a better understanding of this shift at an empirical level can inform an ongoing rethinking of the interaction between technology and aesthetics among scholars, policy makers, and musicians.

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Perhaps the most important perks of working on the MusDig project, however, was that it opened my work up to a vast network of researchers at a formative stage when feedback was always necessary. While I must take full responsibility for the degree to which my interpretations do justice to our conversations, I would like to share as much of the credit as I can. I am especially grateful for the essential advice I received from senior colleagues. During my fieldwork in Montreal I was hosted at the McGill University department of Art History and Communication Studies by Professor Will Straw, who shared helpful sources on language, media and music in Montreal. I was also welcomed at seminars, conferences and conversations with Jonathan Sterne and Eric Lewis. Back in Oxford, I received constructive feedback on form, method and style from Eric Clarke, Jonathan Cross and Jason Stanyek, the assessors of my work in progress before and after

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In my final two years of writing I also received helpful references, commentary, and corrections from peers, friends and interlocutors. For their invaluable help at this stage of the writing process I thank Alexandrine Boudreault-Fournier, Mark J. Butler, Aditi Deo, Kyle Devine, Byron Dueck, Adam Harper, Darsha Hewitt, Christabel Stirling, Alexander Wilson and Maria Witek. Consultants who I met during my fieldwork in Montreal from May 2011 to August 2012 contributed in the form of interviews, informal conversations, and collaboration both during fieldwork and after.

Although we are now scattered across two continents my family is always close to me, and I dedicate this thesis to them. I may be the furthest away of all, but I wouldn't be anywhere without my father Tim Valiquet, my mother Mary Defayette, or my brothers Chris Valiquet and Dan Valle. The newest member of my family is my partner Maria Witek, who inspires me every day with her patience, dedication, intelligence, and the passion she brings to her own research. I do all of my work in conversation with her.

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Note: References to the videography and discography are provided throughout the thesis to illustrate musical descriptions. Readers are invited to follow the URLs provided or search for online sources to listen to these examples.

Introduction

1.1 *'Where is the digital?'*

Where is the digital?

The digital is everywhere.

The digital is now found in every part of our lives. It has infiltrated our daily routine so subtly that we have forgotten its presence. It's an almost mystical phenomenon for some, a form of addiction for others.

In 2012 it is no longer possible to talk about artistic creation without involving the digital.¹

These words come from curatorial notes written by composer and curator Alain Thibault for the first edition of Montreal's Biennale d'art numérique (BIAN) in April 2012. The festival followed nearly twenty years of political and economic manoeuvring aimed at redefining the city's reputation in the wake of Quebec's second sovereignty referendum in 1995, and marked the arrival of the digital media producers at a somewhat uneasy plateau. Government support for new media practices and industrial partnerships was promising, local production was attracting the attention of international media, and local festivals and institutions showed unprecedented interest in cooperation and convergence.² BIAN also confirmed the dominance of the artists and promoters of Thibault's generation—musicians like Jean Piché, and visual artists like Jean Décarie and Bill Vorn—many of whom had rebelled against the modernist aesthetics of academic electroacoustic studios in the 1980s and 1990s. His statement's emphasis on 'the digital' appeals to common experience as if its

1 Alain Thibault, director's statement from the 2012 website of the Biennale d'art numérique. My translation from the French.

2 In general I use the term 'scene' advisedly not as a description of any particular kind of social collectivity among producers, but rather as a geo-spatial delineation (cf. Straw 2004; Hesmondhalgh 2005). I take up these social and spatial distinctions in more detail in chapter three.

agency in these transformations were a foregone conclusion. But its role in the redefinition of Montreal's artistic identity is neither uniform nor inevitable. The notion of digital 'ubiquity' which has become so commonplace in contemporary discussions of media and cultural dissemination, glosses over what in practice is an intensely differentiated set of histories, identities, technical repertoires and genres.³

Even if we take into account only the electroacousticians⁴ and sound artists in Thibault's audience, as I do here, we still find that they had multiple ways of locating the digital in creative practice. For those working in the city's high profile digital arts and virtual reality research institutions the digital pervaded almost all aspects of practice, embedded in expensive mobile devices, driving the rapid expansion of internet technologies and distributed computing, and sustaining progress in the scale and resolution of audiovisual presentations.⁵ Those in academic electroacoustic studios claimed to take a more 'catholic'⁶ approach to compositional technique, emphasising the continuity of practice and aesthetics in the face of constant technological change. In the city's various 'undergrounds', anti- and post-digital positions predominated, to such an extent that the digital could only be considered to be everywhere in its noticeable omission or exclusion.⁷ Each of these styles of digital ubiquity spoke to a different section of an evolving electroacoustic and sound art public at home. Moreover, each of these sites of negotiation privileged a slightly different set of transnational sounds, technologies and institutions. While they participated in wider narratives proclaiming digital mediation as a broadly transformative force, these shifting and stratified local negotiations also illustrate what Anna Tsing (2005) has called the 'frictions' that occur when global forces interact with practical, local engagements. Broad claims like Thibault's 'the digital is everywhere' are

3 With reference to the paradigm of 'ubiquitous computing' see Dourish 2001. On the implications of this paradigm for music consumption and perception see Kassabian 2013 and Quiñones et al, eds. 2013.

4 I have coined the term 'electroacoustician' as a shorthand to include both electroacoustic composers and performers.

5 For an extended genealogy of these practices see Salter 2010.

6 I borrow this characterisation from one of the first electroacoustic composers in Montreal, Istvan Anhalt (1984), who used it to express the comprehensive and pluralist approach that he saw as being characteristic of many Canadian composers.

7 I situate Montreal's undergrounds in greater detail in chapter four. For an extended attempt to theorise the underground as a sphere of transnational music circulation see Novak 2013, 64-91.

thus certainly ripe for relativisation. But what more can tracing such discordant articulations of the digital teach us about the new forms of mediation that seem to be transforming so many aspects of musical production? As Gabriella Coleman (2010, 489) has written, 'the fact that digital media culturally matters is undeniable but showing how, where, and why it matters is necessary to push against peculiarly narrow presumptions about the universality of digital experience'.

This thesis examines some of the new territories, epistemologies, ontologies and literacies mediated by digital technology in electroacoustic music and sound art, taking the scenes in Montreal as its test bed. Its focus is on the aesthetic ramifications of these different aspects of digital mediation, ranging from the immediate and personal to the historical and institutional. It takes the aesthetic as a category of cultural practice extending from the intimate affective experiences posited by philosophers like Dewey (1934), Langer (1957) and more recently Massumi (2002; 2011), to the complex plays of contextually- and culturally-specific rules analysed by Wittgenstein (2007), and the forms of negotiated, distributed labour described by sociologists like Becker (1982). The scope of the aesthetic as it is understood here includes not only the sonic, visual and tactile properties of works of music and sound art, but also styles of construction and experimentation, technical design, generic affiliation, and social organisation. Treating digital mediation as an aesthetic as well as a technological and social phenomenon raises questions of agency, value, politics, construction and genre which are dispersed throughout the ethnographic illustrations in later chapters. These discussions exercise and criticise a growing body of theoretical literature that often makes rather more general social and historical claims about the relationship between technological mediation and aesthetic diversification (see for example chapter two). They highlight new concerns about a complex of repertoires and practices that are currently rising in global importance, both inside and outside of academic contemporary music circles. Indeed many of these questions thus extend both to the object of my ethnography and to the professional context in which I wrote it. Although it is not the central topic of the thesis as a whole, I return from time to time to the complications that arise from this ambivalence.

By bringing together on-the-ground accounts of aesthetic negotiation, theories of epochal shift, and reflexive institutional critique in this way, I hope to contribute new answers to questions that bind these three branches of inquiry together. What factors condition the interrelation of the technological and the aesthetic in electroacoustic music and sound art? How and why are specific interrelations negotiated and maintained? Where is 'the digital' in the fields of electroacoustic music and sound art, and what difference does it make? Although my treatment of these issues addresses a specific genre complex in a specific place, the roots and significance of which I will return to in a moment, their repercussions can often be felt more broadly.

My interest in the digital as a pivot-point for these investigations is similarly multifaceted. On one hand it emerges organically from the practical and discursive patterns that characterise the genres I have chosen as my objects of inquiry. The expanding dissemination of digital technologies—in particular the advent of mobile computing, exponential increases in the speed and affordability of microprocessors and telecommunications systems, and the expansion of the software market since the late 1990s—is widely seen as having introduced a radical transformation of the temporal and spatial economy of electroacoustic music and sound art, especially in the sense of facilitating work by producers who don't belong to an academic or high-brow elite. Such a democratisation of the field's technological resources has been associated by scholars of electroacoustic music and sound art with an increase in the variety of popular and amateur expressions, all of which have in turn influenced the sound of the elite.⁸ As a practitioner in the field myself for many years prior to my doctoral studies, both in my native Canada and in Europe, I came to my project with a strong sense of the degree to which such narratives of digital diversification structure recent aesthetic debates.

On the other hand, my desire to distill a stronger sense of why the digital in particular gets invoked in these narratives responds to the professional and institutional environment in which I conducted my research. I worked as a doctoral student in a team of

⁸ For paradigmatic statements of this narrative see Emmerson (2007); Landy (2007). See also section 2.2 of chapter two in this thesis.

ethnographic researchers employed on a five-year programme of comparative research conceived by my supervisor, Georgina Born, and supported by major funding from the European Research Council. Presented with the task of investigating the 'far-reaching changes to music and musical practices afforded by digitisation and digital media', each researcher was charged with designing a case study that addressed the issue in a specific local context.⁹ My study took place alongside parallel sub-projects in Argentina, Cuba, India, Kenya, and the United Kingdom. To a certain extent the shared project normalised research to an overarching framework designed to facilitate a global optic. In a stronger sense, though, the arbitrary nature of some of the comparisons both highlighted the contingency of the local results and generated unexpected points of aesthetic, material and ideological convergence. If nothing else, listening to the seemingly esoteric and inaccessible sounds of Montreal's electroacoustic music and sound art in combination with anything from Kenyan gospel, Argentinian cumbia, North Indian tribal song, Cuban dubstep, and British free improvisation made it difficult to absorb my interlocutors' prolific theoretical pronouncements uncritically. It also helped me to see their crises and controversies in relation to political, economic and aesthetic currents which exceeded their practices, epistemologies and social imaginaries.

My close working connection to Born also shaped the scope of the theoretical framework I brought to my study. Born's early analysis of contemporary music and technology cultures at the Institut de Recherche et Coordination Acoustique/Musique (IRCAM) constitutes a foundational point of historical, anthropological and geopolitical comparison. Born's sociology of music deploys conceptual and critical questions informed by British cultural studies and French social theory to inform an analytical and empirical apparatus drawn primarily from cultural anthropology. She has played a pioneering role in introducing music scholars to the critical sociology of Pierre Bourdieu, the cultural anthropology of Alfred Gell, and in the long-overshadowed molecular sociology of Gabriel Tarde (Born 2010b; 2005a; 2012c). Her influence is felt widely in recent musicology and ethnomusicology, particularly among scholars of contemporary music concerned with

9 Unpublished research proposal by Georgina Born, 2010.

engaging the methods and insights generated by the study of Science, Technology and Society (STS) (cf. Prior 2008; Piekut 2011; Levitz 2012; Drott 2013; Piekut 2014). The project I shared with her was designed around the use and extension this more recent work on musical ontologies, genre theory and especially what she describes as music's 'social mediations' (Born 2012b).

My methodological conversation with Born's (1995) ethnographic work is shaped by a strategy of critical comparison and empirical revision. For my fieldwork in Montreal I conducted interviews and ethnographic observations in a variety of classroom, studio, and performance spaces over a principle period of sixteen months. I also worked with my ethnographic interlocutors to study new theoretical literature (see chapter two) and learn new techniques of instrument construction and improvisation (see chapter four). I was far from approaching these challenges as a complete outsider, however. My initial contacts there came mostly from the two periods during which I had lived in the city as a student and freelance musician: the first between 1996 and 2003, and the second between 2006 and 2008. Unlike Born's work at IRCAM, I divided my attention between multiple sites and institutions, several of which I introduce in of the course of my thesis. My interest was in the negotiation of aesthetic differences and the movement of musicians between them. Since I was interested in negotiation and transformation over time, and since Born's body of data from IRCAM was nearly thirty years old, my research also involved gathering archival and oral sources pertaining to the history of these sites and musicians. In fact, since there are relatively few secondary sources for musicologists to work with on Quebecois avant-garde movements and since the data I discovered proved particularly rich, my work in this area will be ongoing for some time.

My findings are thus not purely ethnomusicological, but rather rooted in a mixture of ethnographic fieldwork, historical inquiry and theoretical reflection. As outlined above, the theoretical questions I brought to these studies addressed concerns that stretched beyond my particular site. Again here, the scope of my critical comparison also overlaps significantly with Born's, often further inspired by my re-reading of her sources, and at times inflected by the thinking of the practitioners I studied among. For example, I address

ideas from STS via specific discussions of Madeleine Akrich's (1992) notion of technical 'de-description', Michel Callon's (1986) 'sociology of translation', and a more general borrowing from Latour's (1988) logic of 'irreduction'. I examine and apply ideas drawn from Born's interlocutors in ethnomusicology and sound studies, via scholars like Steven Feld, Louise Meintjes, David Novak, and Jonathan Sterne. I also cover a similar range of social and critical theory, considering the ideas of Bourdieu, Foucault, Adorno, and Williams, but refracting these ideas through the lens of more recent commentators like Michael Warner and Luc Boltanski. My work complements Born's by addressing more recent theoretical and historiographical assessments from within contemporary music studies, as well as by exploring synergies with the engineering, historical and aesthetic literatures I encountered among my ethnographic interlocutors during fieldwork, many of which, as I discuss in more detail in chapter two, overlapped with my own analytical apparatus. Like Born herself, I consider this kind of 'pragmatic' approach to theorisation to be essential to an ethnographic methodology that doesn't occlude the dissensus that can obtain in the field (cf. Born 1995; 2012c). Because my combinations are guided by my ethnographic practice, as well as my previous experience as an insider to electroacoustic and sound art practice, however, the particular readings I offer here are entirely my own. They respond to the specificities of my topic, and sometimes afford different interpretations from Born's when brought into conversation with different empirical material. I deploy her work liberally but critically, then, noting when my conclusions agree with her previous findings, and frequently allowing myself to explore interpretations more closely honed to the material at hand. Before elaborating further on that material by giving an historical overview of the electroacoustic and sound art scenes in Montreal, I want to pause to address the way this theoretical framework animates the central questions I listed earlier and affords new ways of looking at familiar problems.

Much of the existing literature on the relationship between the technological and aesthetic aspects of musical practice frames the inquiry in terms of the critical potential of cultural production in the face of industrialised reproduction. The controversy here echoes a conversation between Adorno and Benjamin in the decade leading up to the Second

World War, a corpus handed down to music scholars through the accounts of historians like Susan Buck-Morss (1977, 146-150) and theoretical discussions such as those of Richard Middleton (1990, 64-99). For better or worse, most commentators simplify the dialogue into a polarised debate. Benjamin, as the story goes, noticed that popular genres were quicker to adapt to technological innovations, and argued that this enhanced their critical and emancipatory potential. He proposed that a more technologically sophisticated audience would gradually dismantle the bourgeois cult of authentic and autonomous artworks (see Benjamin [1968] 2011a). For Adorno, however, high and low genres bore the 'stigmas of capitalism' equally and dialectically. He agreed with Benjamin that technical innovation and aesthetic progress in art music led towards a gradual 'liquidation' of its critical functions, but argued that these forces made popular music more vapid and inauthentic as well (Adorno 1973, 66-67; cf. Adorno [1938] 2002). Heirs to this conversation during the Cold War years took it to radical extremes, in some cases arguing that the tools of a technologically rationalised society were essentially alienating, and thus that the only possibility for resistance lay in a radical rejection of all dominant means of production (e.g. Marcuse 1964). For the most part, however, they agreed that new technologies would effectively erase old ways of thinking, acting, and organising social and political conduct (e.g. McLuhan [1964] 1997).

There have been many reconsiderations of Frankfurt School critical theory in the music disciplines and more widely since the 1980s. Most commentators have focused on its lack of empirical support, its projection of flawed or anachronistic social and aesthetic biases, or its tendency to generalize across cultures, genres, and historical periods.¹⁰ There has been relatively less reflection on the ways that the critical narrative handed down by the Frankfurt School characterises technological agency, or the centrality it accords to technological upheavals in the process of aesthetic and social change.¹¹ Although commentators disagree about who sits on which side and what kind of aesthetic prescriptions their stances might support, most affirm that Adorno and Benjamin saw

¹⁰ See among others Leppert and McClary 1987; Born 1987; Subotnik 1991; Born 1993; DeNora 2003.

¹¹ Ineed some of their assumptions about the political power of technological mediation and the overall historical trajectory of technological change remain current. Recent writers who persist in taking a more or less Adornian view of the effects of technology include Ashby 2010 and Katz 2011, for example.

technology as amounting to a force of 'means-ends' rationalisation which at best presented artists and musicians with a choice between progress and constraint (cf. Subotnik 1991, 35; Paddison 1993, 116-117; Witkin 2003, 64). Theorists like Jameson (1990) and Levin (1990) have sought to rehabilitate the understanding that the members of the early Frankfurt School thought it was possible to harness such 'forces of production' as ancillary to progress in artworks themselves. Born (1993, 231), on the other hand, argues that 'the technological/phenomenal cannot stand in for an aesthetic politics, let alone for a politics of cultural production'.

More recent commentators cast doubt upon the degree to which the Frankfurt School's theory of technology could be said to have any continuing relevance. Robert Hullot-Kentor (2006, 139-140) criticises what he sees as a naïve, 'Leninist productivism' in Benjamin's side of the conversation. Benjamin famously presents 'technical reproduction' through an account of its apparent effects in film and photography, but Hullot-Kentor many of these can be easily contradicted by gathering in evidence from other fields like literature or music, in which works might have 'auras' that aren't necessarily eroded by mediation. Since from his Leninist perspective, technology in socialist hands could only be a force for progress, Benjamin fails to offer any account of how something like 'aura' might be produced technically, instead blaming the persistence of 'aura' in film on residual social and economic factors outside of the production process. By considering it in the light of a contemporary post-Fordist music industry Adam Krims (2007) refutes Adorno's reduction of the capitalist culture industry to a force for the liquidation of subjectivity through standardisation. Krims argues that we risk a serious anachronism by bringing Adorno's critiques to bear upon a scaled-down, flexible and multi-centred music industry unlike anything he could have imagined in his historical situation (2007, 97). For Krims, viewing the aesthetic diversification of post-Fordist musical production through the lens of standardisation—which for Adorno and Benjamin was an eminently technological process—has led popular music scholars to overestimate the resistance it poses to forces that an observer in Germany before the Second World War would have understood as inherently capitalist. As Krims points out, then, Adorno's idea that capitalism must homogenise to

thrive speaks to a radically different set of historical conditions. Capitalism now depends upon 'mobility' and 'diversity'. It is no longer monolithic or uniformly hierarchical, but both aesthetically diversifying and economically segregating (Krimms 2007, 101-103).

Whether or not we can agree with Krimms' characterisation of post-Fordism as a coherent cultural and economic order—as for example David Hesmondhalgh (1996) argues that we should not—we are clearly on the right track when begin to question the long-term viability of such sweeping generalisations about what technology might mean for culture. For the purposes of the present argument, then, the best we can extract from the dialogue between Adorno and Benjamin is the notion that the technological domain mediates between the material base and cultural superstructure (see Paddison 1993, 126-128). As I explore further in chapter two, technology often needs to be understood as a point of intersection between aesthetic expression and material production, and is inseparable from either sphere. At the same time, we now have a sharper understanding of the political and aesthetic struggles which shaped the development of Western Art Music during the Cold War period.¹² Instead of solidifying this new range of empirical work into new competing orthodoxies about the relationship between technology and aesthetics, I believe the task is now to sustain the spirit of critical inquiry in a more pragmatic and reflective register.

I endeavour to do so by focusing my attention on the work of critique and negotiation itself. The generic and technological complex that I study is not a stable, closed system which undergoes transformation by external forces. I therefore attend to the mechanics and pragmatics of change in progress, distributed over a broad sample of musical actors, instruments and institutions, and extending across a long historical moment. As media historian Lisa Gitelman (2004) has argued, focusing on negotiations allows us to avoid the pitfalls of placing too much value on the novelty of media and their technological forms in moments of flux. 'Moments of media transition are periods in which the perceptual and semiotic patterns, the technological forms, social practices, economic structures, and legal constructions later defining a particular media within a dominant

¹² Here I would mention, among numerous recent interventions, Grant 2001; Beal 2003; Carroll 2003; Adlington 2009; Heile 2009; Piekut 2011; Drott 2011; Kutschke 2011; Adlington 2013.

media system remain unsettled and under negotiation', she writes. 'Indeed, negotiation makes a better point of historical comparison than media forms themselves [...].' (Gitelman 2004, 200) My topic is not 'media' as such, but mediation, a term which I explore in more detail in chapter two. Nevertheless I am similarly concerned with the social and political strategies that structure the ways people negotiate its aesthetic effects. My critical strategy is grounded in a constant holding together of descriptive and 'metacritical' encounters with my interlocutors' projects and interpretations.¹³ In this way, I want to show how the power of critical conflicts for normative authority regarding the digital is situated in a given time and place. I thus also affirm the possibility of other resolutions, suited to different contexts and purposes, or grounded in different comprehensions of events than those of the actors involved. Latour (1988, 163) points to this sort of approach in his systematic attention to the process of negotiation in the dissemination of scientific inventions, as does Born (2005a, 10–11) in her broader reflections on mediation as 'negotiation of difference' in the context of musical ontologies.

My central argument, then, is that digital mediation does not transform musical aesthetics uniformly and directly by having 'effects' on it, but because of the situated and pragmatic ways that musicians, listeners and policy-makers negotiate it. Because the sites of these negotiations are often discontinuous and dispersed, it is impossible to point to single moments of origin or impact in the process of digitalisation, just as it is impossible to essentialise the character of digital agency. In each chapter of my thesis, then, I provide a detailed examination of a different site or domain in which I found these negotiations to be most intense and salient during my fieldwork. I have selected five which I see as representative, if not necessarily exhaustive, of the diverse and sometimes paradoxical shapes that the aesthetic negotiation of digital mediation can take. Each forms the basis of a chapter. I explore the ways that engagements with the digital are influenced by theoretical production, historical and cultural territorialisations, aspects of subject-formation such as literacies and disciplines, ontologies of technological construction and

13 Cf. Born 2010b. See also the pragmatic responses to Bourdieuan sociology outlined in Rancière 2004, and Boltanski and Thévenot 2006. The notion of a 'metacritical' engagement (that is, with criticism as a social process) comes from Boltanski 2011. I discuss these matters in more detail in chapter three.

technical practice, and genres. I return to these intersecting sites of negotiation in a formal overview at the end of this chapter.

As I noted at the outset, my study focuses on a specific genre complex in a specific place. There are several reasons for this decision. On a superficial level, Montreal's electroacoustic and sound art scenes may seem to be relatively low profile compared with those in larger European cities like Berlin or Paris, or in pockets of institutionalised activity generated at large American universities. Nevertheless, Montreal represents itself as a hotbed of cutting-edge sonic arts activity (e.g. Dhomont 1996; Letarte and Schütze 2002; Bachand 2007; Beaucage 2008) and, as I describe at greater length in chapter three, is seen and treated as such by Canadian cultural intermediaries more broadly as well. It does not owe this reputation to a single dominant figure or institution, but rather to a tangled web of careers, collectivities and institutions shaped by an idiosyncratic political, economic and cultural heritage. Its electroacoustic and sound art scenes are indeed small, but my interlocutors mostly considered them more condensed and intense for the limitation in scale.

There are also cultural and historical reasons for focusing on Montreal. First, as a place where normal, singular and rational political and cultural relationships cannot be assumed, Montreal confounds common-sense notions of the aesthetic impact of digital ubiquity such as those used to market festivals like BIAN. Second, although Montreal has arguably been a key site in the global electroacoustic and sound art traditions for some time, this is the first historical or anthropological study to give sustained attention to its development and dynamics. Indeed, its historical development challenges some of the entrenched historical assumptions that have developed around the genre complex in question. Finally, the variety of spatial and temporal strata in play in Montreal affords detailed comparison of dominant developments with receptions and articulations that either aspire to or reject their legitimacy. All three of these reasons inform the structure of my thesis, but before I outline the form of the proceeding chapters, I'd like to spend a some time sketching the history of the location in which I have situated my examinations.

1.2 From Quiet Revolution to Creative City

I want to set aside issues of technological mediation for a moment to provide the outlines of a history of Montreal's electroacoustic and sound art scenes that links the people and institutions involved with major historical, economic and cultural changes in the city as a whole. Specifically, my aim in this section is to trace the shift from the nationalist liberalisation projects of the 1960s to contemporary neoliberal projects associated with the urban regeneration movement and the tourist industry. Doing so may suggest parallels with the links between musical practice and urban geography proposed by scholars like Adam Krims, in particular with his account of the effects of post-Fordism on urban musical practice and experience (see for example Krims 2007, xxii-xxix). While I do share Krims' concern with music as both spatializing and spatialized with respect to the urban environment and the process of urbanisation—which for Marxist commentators also constitute defining factors in the experience of modernity more broadly (see for example Williams 1975 or Hobsbawm 1994)—I do not extend that to a detailed examination of the roles of location and design on musical practice, or of the experience of particular types of visitors to particular types of cities. Although the city provides a test bed for my study, my primary focus is on the nexus of relationships between people, institutions and technologies that has accrued to notions of digitalisation. I make an effort to account for the role that spatialization plays in shaping the relationships in question, but in general I treat urban geography as only one among many factors involved. Fortunately, there are numerous studies that do already provide rich accounts of Montreal's peculiar urban geography and its traditions of cultural production (e.g. Probyn 1996; Allor 1997; Straw 2004). I refer to them in the course of my descriptions, and the reader can look to them for deeper examinations of the kinds of concerns that would interest scholars of urban geography. In general, however, my thesis highlights the constant renegotiation of aesthetic and cultural boundaries in relation to the real and imagined impacts of the digital. Although undoubtedly also shaped by urban geography, I argue that these renegotiations undermine strict analytical connections between identity, aesthetics and place.

The most obvious factor to explain Montreal's particularity as a site is its bilingual character, and its unique position as the largest francophone city on an otherwise predominantly anglophone continent. This positioning has been associated with the formation of a fragile and contested field of local identities (e.g. Simon 1994). More broadly, however, Canadian identity as a whole can be considered fragile and contested, even beyond the division between its anglophone and francophone settler populations. The federal system established by British colonial authorities over the course of the nineteenth and early twentieth century consolidated the growing resource extraction infrastructure, and generally satisfied the small population's desire for self-government, albeit at the expense of violating the substance and spirit of agreements with indigenous residents (cf. Dueck 2013, 24-27). At the same time, the previously separate provincial governments also retained significant powers over education, immigration, property and civil law. It may be physically situated on an island, then, but Montreal's cultural isolation is not unique in the Canadian context. National identity is highly regionalised, and political divisions at the federal level are heavily conditioned by local and provincial concerns.¹⁴ Although Canadian anglophone identity is often equated with difference from a dominant American monoculture on the basis of social democratic policy-making in the areas of culture and welfare, this distinction is also dubious. This aspect of Canadian identity is overdetermined by the effects of years of cultural and economic protectionism, motivated first by collusion with the British commonwealth, and more recently by lingering anxieties about the necessity of sustaining historical differences with the United States (Innis 1956; Taylor 1993). Government-sponsored monopolies designed to keep Canadian hands on the flow of capital, especially in the resource-extraction industry, have shaped the broader economy as well, most noticeably in the transportation and telecommunications sectors.¹⁵ At various levels then, isolation and fragmentation are the keynotes of Canadian cultural and economic experience (see for example Diamond 1994).

14 Although they ended up not being adopted, the recommendations of the most recent round of constitutional negotiations in 1992 highlighted even further devolution of authority over cultural policy to the provinces. Cf. Monahan 1993; Tierney 2008.

15 The high prices of domestic travel, internet and mobile phone services are topics of frequent complaint. See for example Taylor 2010.

Montreal is also far from unified. The city is shot through with contradictory cultural and aesthetic currents which in some cases have coexisted in relations of tension for decades. Its various francophone, anglophone and 'allophone' (minority) identities are impure and unstable (e.g. Straw 2008; Heller 2011). It is dubious, moreover, to imagine Montreal as a place cut off from the rest of Quebec or from Canada as a whole. Population fluctuations since the middle of the twentieth century have been driven in large part by waves of migration to and from other places.¹⁶ Almost invariably my interlocutors became associated with the city by situating their careers there and not by being born there. Their interests and professional engagements often stretched beyond the city, but their movements outside also extended well worn local circuits. Some traveled east to Sherbrooke, Trois Rivières, Québec, Rimouski, Sept Isles, Gaspé and Moncton. Others went primarily west to Ottawa, Toronto, Winnipeg, Saskatoon, Calgary and Vancouver. Their aesthetic allegiances were diverse, and I never found a one-to-one mapping between genre, territory and language as such. As I describe in chapter three, there is a sense in which the essential myth of Montreal's special status as a cultural city is a self-reinforcing part of its historical role as an economic hub, but it remains important to recognise that many of the boundaries that separate Montreal as a place of linguistic and cultural difference in relation to the rest of Canada are imaginary, imperfect, and porous.

The urban area including the suburbs of Montreal is home to nearly 4 million people, representing almost half the total population of Quebec (Statistics Canada 2014a; 2014b). In recent decades cultural and design workers have comprised a significant and growing portion of the city's workforce (Leslie and Rantisi 2006; Pilati and Tremblay 2007; Charrieras 2010). Artists and musicians in the city receive the vast majority of cultural funding in the province (Conseil des arts et des lettres du Québec 2013). More cultural institutions, universities and festivals are located there than anywhere else in the province, or indeed in most cities in the country. A large, if often ultimately ephemeral, student population comes to the city to attend its numerous higher education facilities: two anglophone universities (McGill and Concordia), two francophone universities (Université

¹⁶ Compare the centrality of migration to Montreal in discussions by Jacobs 1981; Germain and Rose 2000; Stahl 2001; Kenneally and Sloan 2010.

de Montréal and Université du Québec à Montréal, more commonly known as UQÀM), a public conservatory, and several specialised subsidiary degree-granting institutes (École Polytechnique, École des Hautes Études Commerciales, and various branches of the Institut National de Recherche Scientifique) (cf. Conférence des recteurs et des principaux des universités du Québec 2006).

Until the 1950s the city prospered as a banking, shipping and transportation hub. Its entertainment and nightclub industry flourished as an alternative to 'dry' jazz venues in the nearby northeastern United States during alcohol prohibition, and it maintained a reputation for indulging the hedonism of tourists well into the Disco era of the 1970s (Straw 2004; 2008). As migration from the rural parts of Quebec rose in the 1960s, however, cultural tensions began to mount. At the same time, the decline in rail transportation and the expansion of water routes beyond the city helped shift Canada's business centre from Montreal to Toronto (Innis 1956; Jacobs 1981). Population and economic growth stagnated for decades as new nationalisms rose on both sides of the linguistic divide to struggle for power over the city's political allegiances (Létourneau 2006). Two referenda on the separation of Quebec from Canada held in 1980 and 1995 triggered further exoduses of anglophones and immigrants. By the late 1990s, the city had gained a reputation for bohemianism, a bleak and deteriorating urban landscape, and a proliferation of avant-garde expressions in music, dance, theatre, literature and film (Stahl 2001; Marshall 2001).

By this time the city's cultural calendar revolved around an annual festival season concentrated between May and July, after the last snowfall, but before the most hot and humid part of the summer.¹⁷ A flagship jazz festival operated by the powerful promotion company Équipe Spectra sustained the city's traditional orientation towards the tourist market. Festival offerings began to expand in the 1990s, an increasing number of them featuring a 'new media' theme. The rebranding of the city as technological centre was fostered in part by a government push to attract multimedia investment following the

¹⁷ My historical account over the rest of this section is supported by interviews and conversations with field consultants, as well as by scholarly and journalistic sources where indicated.

success of start-ups like Softimage, a motion graphics software company which made significant profits and was sold to the American video and audio editing corporation Avid after winning multiple awards for visual effects on the film *Titanic* in 1997. New festivals that emerged during this period included the penultimate edition of New Music America in 1990, the sixth edition of the International Symposium on Electronic Art (ISEA) in 1995, the Montreal International Festival of New Cinema and New Media (FNMM) in 1997, and finally in 1999, the annual digital art and music festivals Elektra and MUTEK (cf. Brooks et al 1991; Knight 1996; Letarte and Schütze 2002; Bachand 2009). By the early 2000s, just before the collapse of the 'dot-com bubble',¹⁸ the federal government allocated major funding to two new interuniversity initiatives which expanded the art and technology theme that had become the city's economic keynote into the research sector: the Centre for Interdisciplinary Research in Music Media and Technology (CIRMMT), housed at McGill University, and the Hexagram Consortium, initially an arm's length body designed to coordinate research funding between Concordia University and UQÀM. These festivals and institutions survived the turbulent decade that followed to become defining pillars of Montreal's musical and cultural identity. They all have strong connections to the electroacoustic and sound art traditions.

The story of these parallel art music traditions—difficult to disentangle on either aesthetic or genealogical grounds, if sometimes deeply divided ideologically and socially¹⁹—weaves in a diverse collection of genres, individuals and institutions. In my thesis I describe them together because of their mutual articulation as modern countermovements to the longer traditions of Western Art Music, and because of their constitutive engagement with digital production technologies. Electroacoustic music and sound art are also linked in practice in Montreal, often sharing institutions, venues, social patterns, and political imaginaries. My interest is thus not in separating the two a priori, as previous critics have done, but into examining the specific points where they converge and diverge.

18 The 'dot-com bubble' was a period of rapid speculation around Internet services and websites in the late 1990s which ended with the collapse of the NASDAQ exchange in 2000 and 2001. Cf. Stieglitz 2004.

19 For recent accounts of the shared aesthetic heritage and mutually-reinforcing boundaries of electroacoustic music and sound art see Demers 2010; Rogers 2013. I revisit the problem of their differentiation in chapter six.

Before presenting an overview of the various sites of negotiation I will explore in later chapters, I want to rewind the historical tape and give a more detailed account of the various peripheral developments that conditioned the situation I encountered in fieldwork. Policy, style and infrastructure in this domain have been closely connected since the 1950s, when both electroacoustic music and sound art first began to coalesce in a flurry of postwar avant-gardism fostered by rapid reconstruction efforts involving state broadcasters, universities, intelligence agencies and NGOs.²⁰ A wave of institutional developments affecting the production of art music occurred in Montreal around the same time. Canada's first arts council was established in 1957 following guidelines set out in the 1951 Massey-Levesque Report which was prepared by the Royal Commission on the National Development of the Arts, Letters and Sciences. The report's central recommendations dealt with shoring up Canadian cultural sovereignty, especially against perceived threats from the United States, and encouraging development in what was perceived as a parochial and 'anaemic' arts sector (cf. Monahan 1993; Berland 2000). Alongside subsidy and award programs, it also outlined national policies for archiving, research, education, broadcasting, and compliance with the newly established policies of the United Nations Educational, Scientific and Cultural Organisation, or UNESCO (Saint-Pierre 2003). The first recognised experiments with electroacoustic technology by Canadian composers and artists took place in this context of renewed institutional support. Prominent examples include Norman McLaren and Maurice Blackburn's abstract etched soundtrack for the National Film Board (NFB) short *Blinkity Blank* (1954) and Hugh Lecaine's National Research Council (NRC) sponsored tape and synthesiser inventions, which he used to produce short compositions like *Dripsody* (1955).²¹ The first university-based work in electroacoustic music in Montreal came from a Hungarian émigré named Istvan Anhalt, hired to teach theory and composition at McGill in 1949. Anhalt reportedly discovered electroacoustic music for himself when he heard Stockhausen's 1956 composition *Gesang der Jünglinge* on a Canadian Broadcasting Corporation (CBC) program. Between 1958 and 1961 he paid visits to the studios of the Groupe de Recherches

20 Cf. Beal 2003; Carroll 2003; Valiquet 2012.

21 For a detailed account of the arrival of electroacoustic music production in Canada see Guérin 1992b.

Musicales in Paris, Westdeutscher Rundfunk in Cologne, Columbia University in New York, and Bell Labs in New Jersey. In 1959 he gave what is said to have been the first concert of tape music in Canada, offering Montreal audiences a program that included his own work alongside that of Lecaine and Stockhausen. In 1964 he opened a studio at McGill using equipment on loan from the NRC (Stublely 2008, 43-44).

Another early importer of electroacoustic music and sound art in Montreal was the francophone composer Pierre Mercure, who spent time at the GRM in Paris during a sojourn in France between 1957 and 1958 (Richer 2006). In 1961 with collaborators Serge Garant and Maryvonne Kendergi, Mercure organised the five-day *Semaine internationale de la musique actuelle* ('International week of today's music'), attracting an impressive list of invited composers from around Europe and North America for the first time. The most recognisable among the names on the bill included Milton Babbitt, John Cage, György Ligeti, Richard Maxfield, Luigi Nono, Yoko Ono, Pierre Schaeffer, Karlheinz Stockhausen, David Tudor, Edgar Varèse, and Christian Wolff (Rivest 1998). The following year Mercure returned to Europe, visiting Paris, Darmstadt and Dartington, and presenting his work at the Fluxus festival in Wiesbaden. His work took place in parallel with early efforts to develop Montreal's profile as an international cultural centre. The Quebec government's efforts to 'nationalise' industries thus went hand in hand with establishing what Erin Hurley (2011) refers to as 'paradiplomatic' associations overseas.²² The first of these was the *Délégation générale du Québec* in Paris in 1961, organised in direct dialogue with French culture minister André Malraux. The similarly motivated Quebec House opened in London in 1963. Influences from UNESCO and Malraux lent Quebecois cultural policy a profoundly humanist orientation during this period, stressing notions of cultural 'rights' that resonated strongly with the decolonisation narratives circulating among leftists in the province (Saint-Pierre 2003, 15-16; cf. Mills 2010). Popular narratives characterise the 1960s as a '*Révolution tranquille*' or Quiet Revolution, a time of national rebirth and awakening after long suppression of francophone self-actualization by a conservative nationalist Catholic clerical orthodoxy and a largely anglo-Canadian business elite. The

22 On this development see also Handler 1988, 81-108.

period saw the growth of political aspirations among a rapidly urbanising population experiencing unprecedented economic empowerment. Politicians downplayed problematic notions of ethnic particularity and revolutionary struggle, however, to construct a broader program of modernisation that led to sharp drops in church attendance, widespread educational reform, and the Keynesian nationalisation of energy and financial infrastructure (Létourneau 2006, 75–93; Mills 2010). Government investment in harnessing technological progress for the public good became a central component of nation-building strategy, just as crucial to the accumulation of international recognition as Quebec's pursuit of political recognition abroad (Taylor 1993, 51; Hurley 2011, 20–21). Provincial cultural policy intensified with the rise of nationalist sentiment at this time, but also clearly aimed at attracting outside recognition and luring expert immigrants (cf. Helmer 2009).

These efforts reached a symbolic peak in the massive urban redevelopment projects the city undertook as it prepared to host the World's Fair in the summer of 1967. Expo 67, as the event was branded, was designed as a display of Canadian identity in the year of the country's centenary. Situated at the peak of migration to Montreal from rural Quebec, it also became emblematic of what urban studies scholars Kenneally and Sloan (2010, 8) have called the 'modern and secular coming-to-consciousness of the Quebecois'. Traces of the Quiet Revolution are also etched deep into the face of Montreal's urban landscape. Over the course of twenty years, the city's core sprouted an arts complex modelled on Lincoln Centre, imposing modernist skyscrapers, an ostentatious network of concrete traffic interchanges, an artificial island to host its world's fair, a colourful underground transit system, and two plate-glass university complexes (Illien 1999; Germain and Rose 2000). The subject these renewals address is one who has left behind the rural and religious aesthetic in search of a technically-enhanced future: a global citizen with 'universal' aspirations (Kenneally and Sloan 2010, 8–10).

By the 1970s and 80s the radicalisms of this early modernisation period became more divisive and ultimately proved untenable. The far left-wing of the Quebecois nationalist movement was both deflated and newly enraged by the federal government's

response to the so-called October Crisis of 1970, a wave of violence and kidnappings by the Front de la Libération du Québec repressed by the federal government of the time through the invocation of martial law. The crisis contributed to a push from the centre of the political spectrum to normalise the efforts of the nationalist movement and focus attention on legislative action.

The period after the Quiet Revolution also saw a proliferation of institutional adoptions for electroacousticians in Montreal. Argentinian composer Alcides Lanza arrived at McGill in 1971 to become director of the studio set up seven years earlier by Anhalt. Lanza had spent many of the preceding years in New York studying at the Columbia-Princeton Studio but disavowed the serialist leanings of its directors. He took the McGill studio in a performance and multimedia direction, mounting a large-scale theatrical production of Maurizio Kagel's *ludwigvan...* in 1976, for example, and developing a strong framework for live electronics (Lanza 1979; 1980).²³ British immigrant Kevin Austin, student and studio assistant to both Lanza and Anhalt before him at McGill, was hired to teach electroacoustic courses at what would later become Concordia University in 1970 (see chapter three). His early work further extended the inspirations of his teachers, especially in the area of live performance, and he later went on to lead a drive to establish a national electroacoustic composers' society. In the francophone music departments, early efforts were fronted by a pair of composers who had visited the GRM during studies in Paris between 1968 and 1971. One was Micheline Coulombe Saint-Marcoux, who went on to found a studio for electroacoustic music at the Montreal Conservatoire, marking her return in 1972 with an event entitled *Carrefour électroacoustique*, featuring European guests like Luc Ferrari (Lefebvre 1991; 2009). The other was Marcelle Deschênes, who spent the 1970s working primarily at Université Laval in Quebec City, before being hired to establish an electroacoustic studio at Université de Montréal in 1980 (Levebre 2009; Ricard 2009; Keillor 2006, 265). Her students in Quebec included Alain Thibault and Jean Piché, both of whom followed her to Montreal. Deschênes, Thibault and Piché engaged heavily in the dance music and performance art scenes of the time and fed their dark and

²³ For a discussion of Kagel's composition in relation to the German political context of the time see Kutschke (2011).

eclectic aesthetics back into the electroacoustic world. The students of Lanza, Austin, Coulombe and Deschênes became leading representatives of the distinctly pluralist aesthetic that continues to hold sway in the academic studios. A more purist strain of electroacoustic composition emerged only much later under the influence of French transplant Francis Dhomont, a prominent disciple of the French 'acousmatic' tradition who arrived in Montreal in the late 1970s and was hired as a *chargé de cours* (teaching assistant) at Deschênes' studio in 1983.²⁴

Recognition of the Montreal studios' particular brand of pluralism came only much later to cultural policy, and at a cost. The first referendum on Quebecois sovereignty in 1980 initiated a fifteen year period of intense constitutional negotiation in Canada. Following the close loss of the 1980 referendum by the independence movement, prime minister Pierre Elliot Trudeau reinvoked what he saw as a personal mission to renew Canadian federalism (cf. Létourneau 2006). In 1982 Trudeau led efforts to repatriate the Canadian constitution from Britain. The new constitution received royal assent without the signature of the Quebec premier René Levesque, who refused to sign in part because it made several articles of Quebec law unconstitutional. The 1982 constitution also inscribed support for 'multiculturalism' into the charter of rights, but did not delineate the jurisdiction for protecting or defining it (Saint-Pierre 2003, 92). Disagreements over these aspects of the charter meant that Quebecois cultural policy became increasingly entangled in the negotiation and redistribution of federal and provincial constitutional responsibilities.

These negotiations came to a head by the end of the 1980s. By this point, alienation from the rest of Canada and North America had begun to have serious economic impacts on the Quebec economy, particularly its mining and hydroelectric industries. The province had persistent problems with unemployment, in part due to the collapse of the industrial base and the movement of the financial sector to Ontario. The next round of constitutional negotiations came in 1987 at a government conference centre in Meech Lake, Quebec.

24 Dhomont's interviews on this point claim a more defining position (Dhomont and Mountain 2006, 15), including a widely mythologised (if unsupported) autobiographical narrative in which he invented electroacoustic music independently of Pierre Schaeffer. According to first-hand reports I gathered from Deschênes and her students from that time, his role in the foundation of the studio and the design of the curriculum has been significantly overstated. On the acousmatic tradition more broadly see Bayle 1992.

Here Trudeau and Liberal premier Robert Bourassa negotiated an accord which would bring Quebec into the Canadian constitution on the condition of special economic provisions and recognition of Quebec as a 'distinct society' within Canada (Saint-Pierre 2003, 94-95). The accord failed when three of the other provincial premiers refused to sign over the perceived favouritism. The failure of the Meech Lake accord engendered renewed interest in Quebecois independence in the early 1990s. A second referendum on Quebec sovereignty was narrowly avoided in 1992 by the announcement of new constitutional meetings in Charlottetown, Prince Edward Island. Here Quebec was represented by Liberals Jean Lesage, Daniel Johnson and Robert Bourassa, whose interventions gave the province increased autonomy in immigration and international relations. The accord would have given further powers over cultural policy to the provinces, but it failed after a national referendum later that year. As of 2014 the Canadian constitution has still not been signed by Quebec.²⁵

Despite their failure federally, the 1992 constitutional meetings did have a significant impact on Quebec's provincial policy framework. The most significant implications for cultural policy came out of broader efforts to 'repatriate' governing powers to Quebec as a concession for remaining within the federal system. The task of repatriating cultural policy was handled by a council group led by Roland Arpin, ex-vice minister of Cultural affairs and Director General of the Quebec Museum of Civilisation (cf. Arpin 2002; Lacroix 1991). Lobby groups representing unions and managers in the culture and tourism industry also played an important role in shaping the new policies. Most prominent of these was La Coalition du monde des arts et de la culture (1986-1992) who, according to a 1987 newspaper report in *La Presse*, represented a disenchantment with the left-wing policies of the traditional nationalist movement (Saint-Pierre 2003, 158). These lobby groups voiced support for a shift away from the classic Quebecois nationalist left which was aided by Liberal party courtship that promised to address artists' identity concerns within the existing federal framework. The federal and provincial Liberal party's response to nationalism was always paradoxical in this sense. Trudeau's followers realised that

25 For a detailed analysis of the lengthy constitutional debates in Canada see Russell 2004.

sovereigntist feeling could be tempered by promoting a system which claimed that federalism was better at protecting Quebec's cultural essence than independence. In effect, they continued to stoke nationalist sentiment in the service of federalism (cf. Létourneau 2006). To this day the mainstream political debate in Quebec is structured not as a struggle between nationalism and federalism, but as an oscillation between federalist and separatist versions of a common nationalist narrative.

The period of constitutional negotiation in the 1980s and 1990s saw a variety of new articulations of transnational genres at the periphery of the electroacoustic scene. These genres would go on to play a significant role in shaping the local electroacoustic and sound art imaginaries of the 1990s and 2000s. The first, known in Quebec as *musique actuelle* (literally 'current music') mutated from the province's thriving progressive and psychedelic rock scene of the 1960s and 1970s.²⁶ Bands in this era had ranged from highly experimental combinations of Zappa-esque parody, free jazz, folk revivalism and conceptual theatre (such as L'Infonie and Conventum) to more mainstream acts inspired by the sounds of British groups like Yes and Genesis (such as Harmonium, Octobre or Slôche). Both sides of the spectrum were characterised by proud, if at times also critical, embrace of Quebecois language and heritage, and staunch rejection of academic convention.²⁷ Some eventually pushed towards the established contemporary music domains, like L'Infonie co-founder Walter Boudreau, who became the director of the Société de Musique Contemporaine du Québec (SMCQ) in 1988.²⁸ Others maintained a more 'underground' ethos, releasing records independently and playing mainly to an audience of artists and students. This strand established connections first with the European 'Rock In Opposition' scene—according to one journalist the Quebecois musicians were sought out by Fred Frith and Chris Cutler after they stumbled upon a Conventum record in a shop in Belgium—and later with New York-based 'downtown' composers like John Zorn

26 Unless otherwise noted, the terms I use to name genres within and beyond the electroacoustic and sound art scenes are not my own, but those of my ethnographic interlocutors. I capitalise genre names when used as nouns but not when they are used as adjectives. I revisit issues of genre and genrefication at length in chapter six.

27 For an account of the anti-establishment genealogy of *musique actuelle* see Stévance 2011 and 2012. For an example of the sound see, in the discography, Conventum 1977.

28 In the discography, see *l'Infonie* 1969.

(Jones 1995). By the end of the 1980s, *musique actuelle* had become a stable presence in Quebecois art music institutions. An annual festival devoted to it opened in the rural town of Victoriaville in 1984 and still attracts a range of international musicians with similar inclinations, with regular visitors including Zorn, Frith and Cutler, but also Keiji Haino, Merzbow, Evan Parker, Meredith Monk and Zeena Parkins (see Bélanger 2007). Benefitting from the advocacy of electroacoustic composer Jean Piché, the genre was first recognised as an official category of 'non-commercial' art music by the Canada Council, and later celebrated as the centrepiece of the New Music America festival in 1990 (Brooks et al 1991).

Another peripheral genre complex I want to touch upon in my account of Montreal's electroacoustic and sound art scenes developed on the margins of the city's high-profile disco scene in the late 1970s. The work of producers like Gino Soccio, Pat Deserio and Lime (Denis and Denyse Lepage) gave the city a reputation for machinic, synthesizer-driven tracks closer to the European dance music of Giorgio Moroder than the more soulful sounds of Philadelphia and New York.²⁹ In the 1980s the Montreal sound developed in a darker new wave direction that appealed to musicians in the electroacoustic scene, characterised by Deserio-produced records for Rational Youth (a synth-pop quartet featuring sculptor Bill Vorn) and Monty Cantsin (alter-ego of performance artist Istvan Kantor), then a close collaborator of Marcelle Deschênes and Alain Thibault. Producers of this time cultivated an image mixing a variety of nuclear-era anxieties with indexes of exclusion from the dominant anglophone culture of North America. This complex expression of alienation is typified by the iron curtain exoticism of Rational Youth's 1983 hit 'Dancing on the Berlin Wall' and Cantsin's 'Blood and Gold', both Deserio-produced.³⁰ Over the course of the ensuing decades the close contact between the city's post-disco electronic dance music (EDM) and electroacoustic producers continued. The city's decaying industrial and nightclub infrastructure supported a vibrant underground party scene until the middle of the 1990s, propelled in part by DJs from the city's gay clubs like

29 For a discussion relating the 'european' connotations of this music to local culture see Straw 2008. For an example of Soccio and Deserio's work see, in the discography, Soccio 1979.

30 From the discography, compare Deschênes 2006, Thibault 1990, Rational Youth 1983 and Cantsin 1983.

Robert Ouimet, who had survived the mutation from italo disco to techno and house (Ben Saâdoune et al 1997). The influence of academic studio regulars like Thibault was partly responsible for the institutional stability afforded by the festivalisation of Montreal EDM in the late 1990s, first at FCMM, and then at Elektra and MUTEK.³¹

The period of institutionalisation that began in the 1990s was shaped by ongoing developments in cultural policy and constitutional reform. The recommendations of the Arpin Report in the wake of the 1992 Charlottetown negotiations called for three 'axes' of application which cut across the multiple notions of culture at play in Quebec: affirmation of cultural identity, support for producers, and access to cultural life (cf. Arpin 2002; Saint-Pierre 2003). The creation of a provincial arts council was not among the 113 items in the report, but arose from the efforts of the Liberal government to solve to the problem of maintaining the independence of artists from 'bureaucratic contingency' while also 'rationalising' the administration of the report's other goals (Saint-Pierre 2003, 72-73). The Conseil des Arts et des Lettres du Québec (CALQ) was thus established by law in 1993, and instituted later that year by the Parti Québécois following a provincial election. It began issuing grants in the 1994-1995 season, with an initial budget set at \$38 million (Conseil des arts et des lettres du Québec 1995). Around three quarters of funding went to artists and organisations in Montreal, an imbalance justified partly by population and partly by the substantial tourist attraction represented by the festivals. Although it was neither the first nor the largest provincial arts council to be established to parallel the federal council, CALQ's efforts to distinguish and foster particularly Quebecois forms of production made it unique. Unlike other provincial councils, CALQ was seen primarily as an agent for the protection of sectors associated with linguistic and cultural identity, for example. It set up funding for craft, folklore, and a widely recognised circus industry, as well as special programs to support a treasured francophone theatre and film heritage.

The issue of sovereignty was brought to a referendum again in 1995, this time narrowly missing a bid for independence with a final result of 49.5% for and 50.5% against (cf. Russell 2004). Again Montreal's economy was hit hard. The drop in housing prices

31 I describe Thibault's interventions at greater length in chapter three.

stimulated a new influx of students and artists, and a new experimental music scene coalesced around an immigrant neighbourhood known as Mile End. The city garnered a reputation for style that hinged upon a combination of exaggerated working-class toughness and sarcastic kitsch, defined in part by independent publications like Vice Magazine, which originated in Montreal as an alternative tabloid before moving its offices to New York City and rising to fame as an advertising-driven encyclopedia of 'hipsterdom'.³² The diminishing rave scene left behind a small but intensive degree of engagement by international labels like Ninja Tune, who moved their North American operations to Montreal in 1997. Canada's largest and last specialised distributor of twelve-inch dance music singles, Nice Music, opened its doors in Montreal in 1997 as well.³³ The city's cachet converged most prominently, however, around a mix of instrumental rock, electronica and improvisation known as post rock. Local bands like Fly Pan Am and Godspeed You Black Emperor! [sic], along with labels like Alien8 and Constellation, proved adept at straddling the linguistic divide and persistent at the business aspects of scene building.³⁴ Where previous art musicians in Montreal had been forced to choose between struggling in the underground and warming up to the academic avant-garde, the post rock generation struck a path down the middle, establishing venues and festivals such as the political-themed Suoni Per Il Popolo that embraced *musique actuelle*, the experimental end of the dance music scene, indie rock, noise, electroacoustic music and sound art, alongside other forms of activist-oriented theatre, dance and visual art. As I discuss further in Chapters 3 and 6, exponents of Montreal's post rock generation have often overlapped with the electroacoustic and sound art traditions. New festivals in the early 2000s like Pop Montreal attracted a much broader audience to the city and helped set off the wave of attention that propelled bands like Arcade Fire—several members of which had also studied electroacoustic music with Kevin Austin at Concordia—to global prominence.

32 Vice has since acquired a small empire of youth-oriented media outlets. See for example Wilkinson 2008 and Sweney 2012.

33 Nice, Ninja Tune, Alien8, and a number of other genre-specific labels and distributors were founded by former employees of the collapsed generalist independent distribution company Cargo. Some of its employees are interviewed in Stahl 2001.

34 In the discography see Godspeed You Black Emperor! 1997.

The business successes of the post rock scene and the festivalised EDM scene have been mirrored by the rise of neoliberal discourses in Quebec cultural policy. The once left-leaning Parti Québécois remained in power after the second referendum. CALQ programs remained stable and cultural funding continued to grow steadily until the Liberals returned to power in 2003. That year the council announced a new strategic plan to stimulate career development, institutional consolidation, international visibility, and administrative rationalisation. Budgets remained stable between 2003 and 2005, when a new 'financial diversification' program was announced under the title Placements Culture (Culture Investments) which would encourage corporate and private patronage of the arts. The program awards matching funds to non-profit arts institutions that receive private and corporate donations (Conseil des arts et des lettres du Québec 2005). Since then, Placements Culture has absorbed a large part of the budget increases to the CALQ, usually around 5-10% per year. In 2010-2011 the CALQ's budget totalled \$87.6 million, \$9.2 million of which was allotted to matching private donations (Conseil des arts et des lettres du Québec 2011a). A similar trend can be charted at the federal level. Between 1996 and 2006, music organizations surveyed by a committee working for the federal arts council noted that the biggest revenue increase in this sector came from private sector sponsorship, enough to increase the number of public performances by 15% even while attendance dropped by 22% (Hill 2008). In Montreal, however, privatisation went hand in hand with new efforts to embrace and incorporate digital technologies. I observed these policies in negotiation during fieldwork in 2011, a process I describe further in chapter three. One of the things that is remarkable about them is the degree to which the CALQ justifies their commitment to Quebec's new 'knowledge economy' in terms that transform traditionally nationalist cultural and linguistic feelings of 'survival' into a typically neoliberal set of regional values that should flow unimpeded into the global economy (cf. Harvey 2004; Krims 2007). The council's annual report for 2011 illustrates such an elision:

Artists are researchers and adventurers, smugglers of dreams and breakers of boundaries, thinkers and hard workers. In their world of perpetual motion, major mutations are in progress since the arrival of the digital age that they have already

largely integrated and which inspire, permeate and overturn traditional styles of creation, production and diffusion. The place of Quebecois culture in the digital universe is a strategic challenge for its evolution and its survival. (Conseil des arts et des lettres du Québec 2012, 6)

Two business leaders have been central in articulating the growth of Montreal's software and multimedia industries to the government's neoliberal vision. The first is Daniel Langlois, founder of the software company Softimage. Langlois made millions selling his company to Avid, which he then invested in institutions to support the convergence of art and technology. These included the cinema complex Excentris, the MUTEK festival (initially with partners from the Société des Arts Technologiques and the Association pour la Création et la Recherche Électroacoustique du Québec), and the Fondation Daniel Langlois, which housed a media archive and hosted artist residencies. Following Langlois' success, all three levels of government seized the opportunity to subsidize the expansion of the local technology sector. Large companies like the French video game maker Ubisoft were given major long term tax relief and grant incentives to set up development campuses in Montreal. Policy makers saw technology sector growth as an opportunity to recover finally from the stagnation of the constitutional crisis, and the declines of the 1980s and 1990s when the city had almost gone bankrupt paying for its modernist excesses. The multimedia technology boom of the late 1990s seemed to offer municipal authorities a way out of debt. Concordia and McGill's successful bids for 'technology transfer' funding, allowing the universities to establish Hexagram and CIRMMT, respectively, took place against this background of renewal. Major redevelopment projects like the Quartier des Spectacles ('Entertainment Neighbourhood') began in the later part of the decade, and gentrification efforts continued to intensify during my fieldwork (McKim 2012; Rose et al 2013).

The second key intermediary is Simon Brault, former director of the National Theatre School, and current director and CEO of the Canada Council (Doyon 2014). Several strata of activity have contributed to the rise of the 'public private partnership' model of cultural funding in Montreal, but many can be traced back to the interventions of

an organisation Brault helped to found in 2002 known as Culture Montréal. The organisation has its roots in a supper club known as the Forum d'action des milieux culturels du Grand Montréal ('Action Forum for the Greater Montreal Cultural Milieu') assembled by wealthy patrons and culture intermediaries in the late 1990s to negotiate the role of cultural institutions in urban regeneration (Prud'homme et al 2011). Under Brault's leadership, Culture Montréal has had a major impact on municipal arts policy. Several of its members have either been elected to political office or sit on the boards of local festivals and venues. Its 2002 founding policy document *Culture Montréal: pour un rassemblement des milieux culturels* ('Culture Montreal: For a Gathering of the Cultural Milieu') lays the groundwork for a shift in arts policy towards economic stimulus (Quintas 2001). Efforts such as these have been instrumental in fostering a convergence between the politicised notion of culture which has structured traditional nationalist policy making and more recent discourses of 'creativity' drawn from the work of American economist Richard Florida (2005). Advocating a reorientation of economic policy to encourage the gentrification of urban cores by bohemians and cultural professionals, Brault's corrective paradoxically reinforces older narratives of Quebecois cultural sovereignty at the same time as it brings the city in line with global trends.

In his 2009 book *Le facteur C: l'avenir passe par la culture*, (The C Factor: The future lies in culture) he imagines Montreal as both *ville créative* ('creative city') and *métropole culturelle* ('cultural metropolis'), citing its '450,000' workers in the 'creative economy' and its high percentage employed in the *noyau super créatif* ('super creative core').³⁵ He explicitly links this back to Quebec's history, its linguistic diversity, its population density, and its geographical situation. He describes how Quebec's cultural policy combines the postwar arts council model with Malraux's ideas of cultural rights and democratisation through the establishment of 'modern cathedrals' such as the Maisons de la culture (Brault 2009, 66). At the same time he also describes being inspired by the urban branding movements of the 1990s and Richard Florida's notion of a 'cultural dynamism' index as a measure of economic prosperity. He describes his efforts in Montreal as a hybrid

35 Brault 2009, 83. For a further expression of this paradigm as a factor in attracting artists to the city see Pilati and Tremblay 2007.

of these influences, privileging continued public support for national identity, but emphasising economic diversity and decentralisation (Brault 2009, 70). City policy documents like the 2005 report *Montréal Métropole Culturelle* (Montreal, Cultural Metropolis) clearly betray Brault's influence, emphasising democratisation, prosperity, and urban renewal (Ville de Montréal 2005).

I return to the matter of neoliberal urbanisation policy and sustain my analysis of the notion of cultural specificity in Quebec in chapter three. To put it briefly here, local engagement with the notion of the 'creative economy' represents an effort to resolve neoliberalism with Quebec's humanist nationalism. The paradoxes this throws up are definitive for Quebec cultural policy. Like nationalist discourses, 'creative economy' policies find support on both the right and the left of the political spectrum. Programs encouraging small and medium size businesses and public private partnerships, for example, are embraced by the right as providing economic stimulus, and by the left as ways of building urban solidarity and supporting artistic expression.

While the creative economy movement has been most strongly associated with large-scale gentrification projects like the Quartier des Spectacles, however, the convergence of business and culture has also generated a new wave of underground venues forced to fly under the radar of city authorities and operate without licensing. Many of the new venues and labels associated with electronic art and dance musics in the past decade have existed for several years without official recognition. Nevertheless, they currently dominate the city's musical life outside of the universities and festivals. Few, with the notable exception of the gallery and performance space Eastern Bloc, which I revisit in chapter six, have taken steps to apply for government funding or municipal licensing. Some, like La Brique and La Plante, have specialised in sound art, noise, and electroacoustic improvisation (EAI). Others, like Silver Door and Tarot, have catered more to an after-hours club audience. The underground scene these spaces support simmers with activity to the extent that it often boils over into local and international media. The independent label Arbutus Records, to take one recent example, grew out of its point of origin in a loft called Lab Synthèse to gain global attention for its brand of retro-styled

synth pop in 2011 and 2012 (M. Coleman 2010). Artists such as Grimes (Claire Boucher) and Chris D'Eon crossed over from the eclectic after-hours scene to become icons of an ironic millennial fascination with the idiosyncrasies of 80s and 90s new age and internet aesthetics (Kerr 2011).³⁶ While increased media attention often leads to closer attention by police, spaces like Lab Synthèse can survive for months or years without being taken down permanently. Festivals keep them at arms length through legal waivers, but nevertheless book them for parties and concerts on a regular basis and list them in programmes as if they were legal. According to some of my interlocutors, these spaces have even been known negotiate lucrative sponsorships with beer and sound equipment companies, whose sales representatives are enlisted to keep a close eye on where listeners' money is being spent. I read them as part of the neoliberal context because their thriving seems to indicate a kind of effective deregulation of cultural venues and promoters in Montreal. In a place known for high taxation and highly centralised institutions, they operate tax- and license-free.

As I've highlighted here, then, electroacoustic music and sound art are part of a genre complex that plays a central role in the politics and socio-economic dynamics of the city. Cultural policy orientations have involved, influenced, and sometimes been shaped directly by the work of musicians. Art music expressions are implicated in economic, political and technological development, for better or worse. Any discourse of digitalisation, then, must be understood in the context of this ongoing succession of attempts, by both artists and policy makers, to isolate and articulate the distinctness and vitality of local production.

1.3 Overview

In what follows I explore concrete ways that the politics and aesthetics of electroacoustic music and sound art have been reconfigured in relation to the digital in Montreal in recent years. To reiterate my main argument, I believe that these ongoing

³⁶ In the discography see D'Eon 2012 and Grimes 2012.

negotiations are not attempts to deal with something already fixed in its effect on musical practice, but constitute the substance of digital mediation's agency. Recent theorists of electroacoustic music and sound art like Labelle (2006), Kim-Cohen (2009) and Demers (2010) have insisted that their meanings and oppositions might be deduced from their sonic and conceptual properties alone, but I argue with the sociological tradition handed down by Becker (1982), Wolff (1984), Bourdieu (1992), Frith (1996) and Born (2010) that an empirical perspective on the social life of art and music making provides an essential grounding for criticism and semiotics. In each chapter, then, I take a different point of entry into the digitalisation process, exposing the sometimes conflicting resolutions which occur at different levels of detail, time scales, and with respect to different objects and materials.

I begin in chapter two with a review of the ways musicologists and media theorists have theorised the intersection between technology and aesthetic innovation in music. This chapter also establishes a pragmatic theoretical and methodological framework for the entire study, bringing perspectives from the literature into conversation with moments from my ethnographic fieldwork, and examining the consonances and dissonances produced by theorising side by side with interlocutors equally invested in the work of academic knowledge production. I use a number of extended illustrations to show the agency that theorisations about technology can have for the way digital mediation in music is made and understood. In one, I show how evolutionary assumptions about technological modernisation have shaped the historiographies of phonography and electroacoustic music, conditioning both interpretations of the past and projections for the future. In another, I compare theorisations from STS with the poststructuralist metaphysics circulating among the academic musicians I studied in Montreal to show the delicate balance which must be struck between insider and outsider perspectives. I conclude by bringing these threads together under the general rubric of musical mediation theory, highlighting the possible technical and theoretical uses of this concept, but also relating my approach to the Peircean interpretation of Louise Meintjes (2003) and to Born's (2012) critical heuristic for analysing social assemblages and their material ramifications.³⁷ From the perspective of

³⁷ Marcus and Saka (2006, 101) define assemblage as 'a sort of anti-structural concept that permits the researcher to speak of emergence, heterogeneity, the decentered and the ephemeral in nonetheless

my overarching argument, my attention here is on negotiation at the level of theory, both 'emic' and 'etic'.³⁸

In my third chapter I delve further into my ethnographic material, this time highlighting the ways electroacousticians and sound artists in Montreal used digitalisation to articulate historical, social and aesthetic ruptures between local genres and scenes. Using a framework of field theory expanded from the work of Bourdieu (1993), I trace multiple acts of territorialisation (Deleuze and Guattari 2004) through the politics of linguistic and geographical distinction, technological and economic modernisation, cultural and generational recognition, gender, technical literacy, and performance practice. Here I also give close descriptions of the work of many of the individual musicians and artists I worked with in the field, following the paths their works cut through Montreal's new digital territories. Beginning with the planning of a new program for digital art by the main provincial funding body, the CALQ, I trace the contribution of key negotiator Emmanuel Madan back to his work with interdisciplinary sound art duo [The USER]³⁹ and his roots in electroacoustic composition, showing how his movement through these territories has informed what are now canonical works in Montreal's digital art tradition. From here I move deeper into the electroacoustic tradition, exploring the subjective and social territorialisations of a group of composers who have been central organisers and spokespeople for the local, national and transnational scenes. I begin with Kevin Austin and Jean-François Denis, co-founders of the Canadian Electroacoustic Community (CEC), and then highlight Jean Piché, director of electroacoustic composition and digital music at Université de Montréal. I pause with Piché to discuss the importance of his ambiguous public persona, straddling the boundary between the maverick side of electroacoustic music and the more traditional side of the new digital art sector. Zooming back out from these territorialised subjectivities and institutions, I end with a vignette illustrating the way that this kind of boundary work between genres and scenes also played out in concrete, 'microsocial' interactions like public performances (Born 2010a, 230). I offer an account of

ordered social life.'

38 For a discussion of these terms in relation to musical semiotics see Nattiez 1990b, 61.

39 Note that the stylised orthography is considered integral to the duo's name.

a concert organised by Piché's former student Freida Abtan, whose work aimed at a similar resolution of the conflict over diversity and innovation in the digitalising electroacoustic scene. I show how attempts to bring together opposing approaches in a spirit of pluralism paradoxically re-inscribed long-standing territorial boundaries between them. Again, here my lens is on the role of the digital in negotiations of the limits of fields, professions and generations.

Chapter four addresses the role of digital mediation in reconfigurations of musical literacy and discipline, both inside and outside the classroom. Specifically, it shows how the negotiation of digital literacies is preconditioned by genre-specific ideologies, and by the prevailing politics and economics of institutions. Inspired in part by the work of Michael Warner (2002) and Byron Dueck (2013) I coin the term 'counterdisciplines' to highlight the degree to which the process of learning to make electroacoustic music and sound art is consistently constructed as an act of resistance to dominant principles of musical discipline and tradition, but also helps to constitute just such a body of conventional literacies and aesthetic tropes. Counterdisciplines help electroacousticians and sound artists to recognise each other as 'counterpublics' (Fraser 1990; Warner 2002). I also evaluate the degree to which electroacoustic and sound art counterdisciplines are entangled in the ideological transformations brought about by neoliberalism, such as the centrality of responsabilisation and self-production (see Foucault 2008; Gershon 2011), post-Fordist models of flexible labour and distributed production (Hesmondhalgh 1996; Commaroff and Commaroff 2000; Krims 2007), and the neutralisation of social and aesthetic critique (Boltanski and Chiapello 2005). My musical objects in this chapter pertain to the recent proliferation of improvised idioms in electroacoustic and sound art practice. These new sub-genres seek to remedy the perceived inhumanity of computer and electronic technologies by privileging spontaneous, collective, and moreover live engagements with software and hardware. Holding on to the notion of counterdiscipline, I examine the embodied performance of opposition in electroacoustic literacies in a variety of contexts: against the politics of free jazz in the scene that obtained around a sound art concert series known as 24 Gauche; against the concerns of the academic electroacoustic

tradition in the reform of undergraduate electroacoustic studies at Concordia University and the work of the laptop ensemble 'CLOrk'; and against traditional ideals of creative agency in my participant observation of the underground EAI scene, and in the self-consciously anti-virtuosic performances of the sound artist Darsha Hewitt. My narrative in this chapter also visits local political developments such as the student tuition crisis which catapulted Montreal briefly to global notoriety as a site of dissent in 2012.

In chapter five I zoom in further, interrogating the aesthetics of the technological objects of electroacoustic music and sound art, attending to the ways musicians imbue their formats, instruments, and infrastructures with meaning and agency in the processes of assembly and disassembly. I look in detail at negotiations of difference between analogue and digital, showing how this apparently unambiguous distinction can play out differently depending on the goals and generic allegiances of the musicians and technicians involved. By focusing on different processes of negotiation here I seek to complicate the binary oppositions sometimes suggested by scholars with respect to the digital as a whole. Extrapolating from the historical and social conceptions of the musical object proposed by Gracyk (1996), Bohlman (1999) and Born (2005), I propose a similar attunement to the multiple and pragmatic ways that musicians construct what I call 'technical ontologies' that project and regulate the topologies of their circuits, interfaces, media and machines. I illustrate this chapter by visiting various expressions of the recent upsurge in artisanal media and hardware hacking in electroacoustic and sound art practice. Each example focuses on a different level of technological detail. First, I describe styles of programming and the materialisation of data in a series of software and hardware courses at the feminist artist-run centre Studio XX, following the hybrid ways that signals are conceived as alternately analogue and digital as they move back and forth between graphical interface, patch, microcontroller chip, and sensor element. Second, I turn to the conceptual and theatrical work of experimental trio K.A.N.T.N.A.G.A.N.O., exploring their use of complex digital assemblages as distancing devices in performance, as artificial agencies in the creative process, and as mediators of an ironic stance on the technological repertoire of academic electroacousticians. Finally, I examine the technological practices of musicians

associated with the noise label Fluorescent Friends, showing how highly fetishized recording formats are not so much purist negations of digital immateriality as they are hybrid mediators of an aesthetic economy built on notions of spontaneity, craft production and surrealist distortion.

My sixth and final chapter draws together threads from across the study in order to highlight the interaction between negotiations of the digital and notions of genre. While it has long been commonplace to describe the overall generic diversification of electroacoustic and sound art practice since the 1990s as an effect of digitalisation at a global level,⁴⁰ here I focus on the issues that both complicate and enrich that perspective. I begin by revisiting the materiality of digital technologies, examining how different qualities and affordances can slow down or speed up genrefication, with a focus on the processes of personalisation and disembedding I discussed in Chapters four and five. I proceed by summarising the role of cultural institutions in genrefication, focusing both on the implementation of distinctions between genres of electroacoustic music and sound art at various policy levels, and the complicated ways these distinctions shape the careers and subjectivities of individual practitioners. I then turn these observations back upon the recent literature on genre theory in music, surveying the recent turn from a normative to a rhetorical understanding of how genre mediates musical production and consumption (cf. Drott 2013). I argue that a holistic account, attuned to the intersecting agencies of technologies and institutions, must retain both aspects of the genrefication process. Such a balanced model of genre is better at explaining the musical transformations that have occurred around digitalisation than any notion of the technology in itself. In closing, I offer a brief postscript to my fieldwork, showing how the complex of aesthetic negotiations around the digital continues to change, with genres and careers both converging and dissolving, sometimes stabilising, sometimes progressing, and often cycling through apparently stagnant debates. The proposals and speculations which I offer in my postscript are cautiously optimistic, and point towards more flexible approaches in the theorisation and institutionalisation of cultural policy and musical discipline.

40 For example in Waters 2000 or Emmerson 2001.

Although I provide detailed accounts of works and practices illustrative of larger trends, and I take pains to chart the global associations mediated by local genre distinctions, I situate my accounts in a cultural and historical moment with features that may not translate easily to other places and times. I do not attempt to extrapolate a normative theory of what makes electroacoustic music and sound art what they are or should be, nor do I posit an essential connection between Montreal as a place and the peculiar ecology of styles I found there. Likewise, my criticisms are not grounded in prescriptions about the ways these genres should or could develop. I believe that useful critical engagements must be grounded in an understanding of how my ethnographic interlocutors deal with different amounts of conflict between the prescriptive and performative enunciations of the aesthetics and ethics they subscribe to in everyday practice, in their institutions, and over longer historical periods (cf. Boltanski 2011, 30). The critical gaps I encountered in fieldwork suggested that frameworks to distinguish electroacoustic music and sound art from one another are unstable and negotiable, as are those to distinguish a digital era from a pre-digital one. In practice these domains blur into one another in unpredictable but important ways, in spite of the fact that a number of scholars are still taking pains to separate them.⁴¹ I believe that the constitution of this space of negotiation is the best test bed for investigating the uses that categories like electroacoustic music, sound art, and 'the digital' afford. This is the reason that my interest is primarily in accounting for the pervasive and ongoing work of negotiation and not in privileging a particular perspective on the way that my object of study should have played out over the course of my fieldwork.

My examples and illustrations show that digital audio technologies were never far from either the objects of my study or my techniques of enquiry. The task of maintaining an analytical and reflexive awareness of ubiquitous digitalisation thus requires a situated and pragmatic understanding of the digital which is analogous to my approach to aesthetics. There need be no transhistorical answers to questions of digital technologies' agency or materiality: no common origin, natural outcome or overarching teleology that

⁴¹ For arguments in favour of various permutations of the latter periodisation see for example Danielsen 2010 and Holt 2010.

regulates the ways electroacousticians and sound artists negotiate their aesthetic mediations. Instead, technologies and ideas about technologies take the form of what Latour (1988, 163) has named 'entelechies', assemblages of objects and subjects animated by the activity of negotiation or the pursuit of purpose. Historian of technology Wiebe Bijker (1987) has expressed a similar principle in his account of the 'angular momentum' of the bicycle. The ways inventions work, argues Bijker, are not intrinsic properties of the artefacts, nor are they simply 'in the eye of the beholder'. Rather, the ways technologies work and affect our lives is an achievement that always requires the work of a larger network of agents and institutions over time (Bijker 1987, 14-15).

By reasserting that temporality must be understood as a constitutive element of techno-aesthetic practice, I again echo the recent work of Born who argues for a sharper awareness of the multiple temporalities that 'mediate and imbue' the aesthetic (2010b, 198; cf. Born 2012c, 242). From this perspective, the impact of digital mediation on the aesthetics of electroacoustic music and sound art is not a monolithic, causal operation that can be abstracted from the kind of concrete instances of negotiation that I treat in the discussion to follow. Studying these moments gives us critical access to the ways practitioners experience and absorb technological transformations in their work, and how the accumulation of their critical engagements with technology changes musical aesthetics over time.

Modes of composition: Theorising the aesthetics of technological mediation

2.1 'Welcome to our setup!'

In the Autumn of 2011 I spent several months working among students and instructors while I observed the ways that digital technologies were being brought into teaching in the undergraduate electroacoustics course at Concordia University in Montreal. After a couple of months attending classes I was looking to develop more of a participant's perspective on creative practice, so I answered an open call to join the course's only large ensemble, a laptop orchestra which had been formed for the first time the previous year as part of a 'live electroacoustics' course. Outside the course, membership in the ensemble was basically ad hoc. No restrictions were placed on experience or prior knowledge. The only requirements for participation were technical: a laptop, an external sound interface, and cables to connect to the classroom sound system were the only indispensable resources. Training was to be provided during the group's rehearsal time. I wrote to the instructor asking to be involved, and was welcomed with open arms but reminded to 'gear up', so I went to a local shop and picked out a sound interface I'd seen recommended on the internal email list. The sales clerk, a student himself, recognised me from his sound engineering class and gave me a discount, complementing me on my choice.

We spent our first day of rehearsal plugging and unplugging equipment, installing software, loading sample libraries, establishing audio and video stream contact, and troubleshooting network connections. Each musician ran multiple softwares in parallel. To start us off, the instructor circulated a software he'd found on the internet called Soundplant which allowed individual samples to be assigned to each of the laptop's keys. Multiple instances of the program could be run at once, and we were to switch between them at his signal. Some of the players had prepared sequences, recordings, or textures using Live or Logic. Others had designed synthesis processes to play with Max or Pure Data as well, and in most cases these could all be run in parallel, although some had difficulties due to the

incompatibility of their operating systems or malfunctions in their external hardware. From what I could see, most also spent rehearsal time using their laptops to chat on Facebook, answer email, and surf advertisements for gear. For my part, I did all of this in addition to taking ethnographic notes using a journaling program I'd recently started using at a colleague's recommendation. As the concert was also to be networked with ensembles in two remote locations—McMaster University in Ontario and the University of Calgary in Alberta—and recorded into a shared, multi-channel Digital Audio Workstation (DAW), a further computer system needed to be set up to operate parallel chat, video streaming, audio routing, and recording software. Getting the machines to 'talk to each other' took time, and a few hours into the session, the instructor apologised for 'not really having much of a rehearsal'.

'Friday is going to be very improvisational', he explained. 'The important thing is to be able to stop quickly'. About an hour before closing down for the day he had us play back some of the sounds we'd prepared and demonstrated his conducting system. The system allowed him to indicate rudimentary dynamic changes, select players to perform solos or form subgroups, and call up prepared material from a sample library he'd distributed to the students on a portable memory stick. After many plodding decrescendos it became clear to me that ensemble members could only achieve dynamic variation he called for using the physical volume knobs of their sound interfaces or MIDI controllers, as our laptop screens were now teeming with swarms of software too unruly to be commanded in a single gesture.⁴² The instructor seemed used to this. Nothing was harder than stopping a laptop orchestra, he told us.

The next day we were asked to arrive a few hours before the concert to resume the apparently endless process of setting up our gear. Organisers and technicians had worked for several hours before the session to launch the systems. The computers connecting the laptop orchestra with its remote improvisation partners served as a platform for multiple networked audio, visual and textual communication softwares running in parallel at each of

⁴² MIDI stands for Musical Instrument Digital Interface, a communication protocol adopted in the mid-1980s which I discuss further in chapter five. For an account of its origins see Théberge 1997.

the interconnected institutions. Among these were a high-bandwidth audio engine known as 'Jacktrip' which needed to stream and synchronize 48 channels of high resolution audio, multiple webcam video streams set up to host multiple flavours of software and hardware, a chat interface for conductor-to-conductor communication, and a handful of composition-specific 'score' interfaces distributing textual or graphical performance instructions. For perhaps the first and only time in my fieldwork I had the sense that I must be at what could be described as a 'cutting-edge', if only because of the sheer accumulation of tentative and unpredictable mediations in play. As each new component was imbricated into the system, a new malfunction would emerge somewhere else. Foregoing the planned rehearsal and training time, troubleshooting continued until fifteen minutes after the scheduled beginning of the concert when, with network connections failing yet again, the instructor announced that we might as well go ahead locally whether the system was working or not. We silenced our software and he addressed the scattered audience with a hint of ironic apology: 'Welcome to our setup! Tonight you'll hear more setup than performing...'

The first time I presented my laptop orchestra observations to an audience of colleagues I also illustrated them with a video recording taken from one of the performances I attended. One audience member commented that the music sounded as if it could have been made with a single computer. Why, he asked, was there such a palpable disconnection between the level of technological engagement and the musical result? What other justifications could there be for assembling so many devices?

Indeed, time spent planning, assembling and modifying instruments seems to have become a central element of electroacoustic practice. Tinkering and reconfiguration practices now permeate every level of musical activity. In the broader field, entire courses and conferences are often delineated purely by technological domain.⁴³ In my conversations with students and staff I found that people generally assessed this aspect of the process positively. Construction and troubleshooting often became an occupation that spilled over into their free time. It was not uncommon for students to enjoy staying up late

43 I am thinking of such gatherings as International Computer Music Conference, New Interfaces for Musical Expression, or Linux Audio Conference.

into the night building a new patch or looking for solutions to nagging bugs. So why should the instructor have felt the need to apologise, even ironically, for the lack of 'performance' in such an obviously 'setup' focused event? Allowing more space for instrumental configuration in the electroacoustic aesthetic might focus theoretical attention instead upon where the dividing lines are drawn between performance, preparation and concept in musical practice. It also opens up new questions about the instruments involved. Were the components of the laptop orchestra constituted as fixed objects, or did they change during the setup and performance process? Should laptops be thought of as single instruments or complexes? And what do we stand to gain by complicating our understanding of their constitution and operation in this way?

This last set of questions brings me to another line of inquiry for this chapter, one that has implications for thinking about digital mediation in music making more broadly. If digital ubiquity and interoperability have already become common sense, has the ethnographic observer arrived too late to find out what individual technologies add or subtract from musical culture? In her work on ubiquitous listening, Anahid Kassabian (2013) argues that a study of listening in which music is omnipresent must depart from the direct relationship between source and receiver. She unpacks ubiquitous listening into multiple modes of 'simultaneous' and 'secondary' attention (Kassabian 2013, 18-19). In a similar way, this thesis explores a situation in which digital mediations are said to permeate nearly every aspect of musical practice. If 'the digital is everywhere', as 2012 BIAN tagline would have it, then how can we isolate its agency from the composites and aggregations it inhabits? What are those composites and how do they work?

In this chapter, I review theoretical and methodological literature from across the music disciplines in search of different ways to understanding the aesthetic agency of digital mediation in musical practice. Naming the chapter 'modes of composition' indexes the fact that this is a matter of following several lines of inquiry into how things are literally put together: technologies, musics, histories, and theories in the scenes I studied; theories and methodologies that I brought to my fieldwork; and critical reflections and conversations I had both during and after fieldwork. At the core of this review is the

position I staked more succinctly in my introduction, that digital mediation is not a monolithic force, but dispersed, dynamic and asynchronous. Technological objects are not isolated units, but are brought together as composites, framed by aesthetic, theoretical and historical preconceptions, to mediate the relationship between people, ideas, institutions and music at a given place and time. I am primarily concerned with the ways these composite mediations are recursively conditioned by knowledge *about* technology. The goal of this chapter, then, is to track the feedback loops that occur between two overlapping levels of mediation: technological objects (machines, software, and instruments), and technical knowledges (epistemologies, aesthetics and historiographies).⁴⁴

I draw connections between emic theories and a variety of musicological, ethnomusicological and sociological epistemologies of technological mediation in music. I specify the ways my study is both informed by, and in critical dialogue with all them. In the first half of the chapter I explore first the historiographies of phonography and electroacoustic music, and second the recent intersection of organology with STS. Through these discussions I try to address some of the anxieties often expressed around the relationships between technological change and socio-musical progress, and between technological agency and human ability. In the latter sections I discuss the occurrence of a feedback loop between theory and ethnography in fieldwork, and suggest ways that it points to a more contingent and relational understanding of technological mediation. I conclude by linking my arguments with contemporary theories of social mediation in music. Here, I seek a middle ground between semiotic and empirical approaches, extrapolating their potential as a combined basis for the study of composite and recursive technical and technological mediations, and pointing forward to the ways they inform the subsequent chapters of my thesis. My overall goal is to demonstrate the degree to which the effects of technological mediation are perspectival. Perception of technology's aesthetic agency are shaped by theories of technology.

44 In general I use the adjective 'technical' to refer to techniques, skills, as well as the purposive discourses and knowledges people develop about them. I use the adjective 'technological' to refer to tools, instruments and systems which constitute applications of those techniques. Unfortunately a distinction is made only rather inconsistently between these terms in the theoretical literature. Cf. Dreyfus 1995; Dumouchel 1995; Stiegler 1998.

2.2 Schizophonia, glitch, and the problem of technological agency

To date much of the theoretical and historical literature on technological mediation in music has focused on isolating and enumerating the effects of recording methods or 'phonography'. In one sense the topic illustrates the problem of mediation particularly well. Modern musicians and listeners have used recording technologies to debate and reinvent both practice and perception in ways that would have been unthinkable to previous generations. In his work on the way the phonograph was taken up in the practice of late-nineteenth century German musicologists, for example, Alexander Rehding (2005) has examined the anxieties new technologies generated with respect to the accuracy of transcription and the universality of the work concept. Phonography has thus long presented scholars with fertile material from which to try to develop theories about how and why music and technologies change, and how these trajectories of transformation relate to each other. There are risks, however. It is possible to overemphasise the degree to which phonography can be considered representative of the relationship between music and technology at a more general level. It is also possible to assume too simple a relationship between music technologies and the progress of human knowledge over time.

This is particularly the case when it comes to the degree to which the phonographic literature tends to rest upon implicating recording technologies in the broader process of modernisation. Commentators such as Michael Chanan (1995) and Mark Katz (2011), for example, have characterised the qualitative transformations caused by recording technology as a major upheaval in the production, reception, and political economy of music. Both highlight the ways that phonographic mediation distances listeners from the musical practices of the past, whether by transforming experience and expression, or by challenging traditional notions of private ownership and authenticity. Taking a more measured approach, Jonathan Sterne (2003, 216) describes the transformation as a 'sedimentation' of economic and epistemological modernity into technological artefacts. Adopting a broadly Foucauldian mode of analysis, he opens the historical window onto a

dispersed and discontinuous field of conceptual and practical modifications.⁴⁵ His concern is with a complex interrelation of early recording technologies, the science of hearing, and embodied techniques for listening, and his account is situated historically, but his overarching narrative still centres on notions of modernisation.

The keynote of modernisation in these narratives recalls Canadian composer R. Murray Schafer's (1977) claim that recording technologies effect a condition which he dubbed 'schizophonia' by breaking essential connections between listeners and sound sources.⁴⁶ As Sterne (2003, 20) notes, of course, the literal interpretation of Schafer's idea is pure fallacy, since sound is almost by definition a form of perception at a distance—Schafer's normative sociological assumptions aside, sound is never physically immediate, but requires time to travel across spaces filled with fluid or gas. Here I am more interested in schizophonia's conceptual implications. Phonography, for Schafer, destroys previously stable traditions which he associates with cultural authenticity, communal music-making and spatio-temporal situatedness. In a similar vein, many more recent scholars have based their arguments on the notion that technical mediation inevitably alienates listeners and musicians from the past. Media theorists Bolter and Grusin (2000) have argued that newly invented media inevitably reframe, and thus dialectically 'remediate', older media such that the forms of experience associated with them are progressively transformed. Philip Auslander (1999) makes a similar argument about the technical mediation of live performance, arguing that representational technologies redefine performance to the point where a separation between the two is no longer imaginable. For Auslander 'liveness' itself has become a technological effect. Gradually then, the effects of schizophrenic modernity seem to extend to every aspect of aesthetics and practice, slowly cutting off humanity's ties with the past and with each other. In many ways, these treatments hark back to long-standing critiques of modernity. While not necessarily drawing the same ethical conclusions, they adopt similar terms to Horkheimer and Adorno ([1944] 1988), who

45 For detailed accounts of this style of historiography see Foucault [1972] 2002; cf. Dreyfus and Rabinow 1982.

46 See also Feld (1994), who argues for a reading of Schafer's notion of *schizophonia* with Benjamin's ([1968] 2011a) account of the loss of *aura* and Attali's (1985) account of the alienating effects engendered by the historical dominance of *repetition*. Cf. Benjamin [1968] 2011a; Attali 1985.

decried the progress of technoscientific rationalisation as a form of 'conceptual domination', the symptoms of which included the disenchantment of art, the negation of individual subjectivity, and the rise of blunt scientific utility over authentic spirituality.

As critics of Adorno's writing on music have frequently point out, however, modernisation narratives become particularly problematic when deployed to normalise aesthetic assertions.⁴⁷ A similar assumption can often be found in the critical literature on phonography. Michael Chanan, for example, takes a largely pessimistic view of the musical transformations engendered by phonography, especially as they pertain to what he perceives as the decline of popular culture. Focusing again on the schizophonic break with the past, he writes, 'the domain of recorded sound has become a kind of continuous present, in which, as old recordings are recycled, memory can be confounded. The condition can also be heard in the cacophony and confusion of contemporary music of all genres bombarding us from all sides, an increasing portion of which is recycled.' (Chanan 1995, 22) In his popular 1987 book *The Recording Angel*, critic Evan Eisenberg identifies a similar suspension of history, but inscribes it in a more optimistic register, reenacting the modernist narrative of the composer as 'prophet' of technological progress. 'By [the time Edgar Varèse's composition for orchestra and tape *Déserts* was premiered in 1954] Otto Luening and Vladimir Ussachevsky in New York and Karlheinz Stockhausen in Cologne had produced several experiments in electronic music; but these were experiments. Varèse, by contrast, had been making electronic music in his head for half a century; the moment the tools were in his hands he knew what to do with them.' (Eisenberg 1987, 110) A few pages later he insightfully notes Varèse's enthusiasm for the idea of reconstructing the instruments of baroque composers such as Monteverdi and Lully. Ironically the historically informed performance tradition which flourished in the twentieth century actually lies closer to Eisenberg's own phonographic historiography than to his imaginary Varèse. The period performance movement of the time understood the inaccessible regions of music history to be hidden only because later musicians had forgotten the instruments and

⁴⁷ See, among many examples, Leppert and McClary 1987; Born 1993; Subotnik 1993; DeNora 2003. See Paddison (1993, 136-140) for an account of the Adornean understanding of aesthetic modernisation in the guise of Weberian rationalisation. For Adorno, advanced artwork shared in instrumental rationality of the external world but also opposed it in its 'lack of purpose'.

techniques that made them possible. In a similar way then, students of the European Baroque tradition imagined seventeenth century composers as 'prophets' of practices only possible because of contemporary techniques of scholarship, documentation and instrument building (Taruskin 1995). The assumption underlying both narratives—the stultifying frozen moment of accumulated memories, and the prophetic projection of a more advanced future—is that science and technology should ultimately help us progress rationally according to our present concerns.

This optimistic narrative of technological modernisation is strongly articulated in the historiography of academic electroacoustic and computer music as well. Until now, major historical surveys in the field have been written almost exclusively by its own composers, educators and critics. As Joel Chadabe (1997) has written, these self-elected historians seek to preserve a 'tradition of innovation' which they see as working 'against the grain of a conservative musical establishment' but destined eventually to be 'incorporated into the mainstream'. One of the main assumptions underlying this effort is that music and technology necessarily co-evolve towards more advanced and sophisticated forms (cf. Appleton and Kasdan 1970; Roads 1996). There is an acute concern with excluding musics not seen to be 'idiomatic' to electroacoustic technologies. Thom Holmes (2002), for example, defines the domain of his history as 'music that exists *because of the use of electronics* rather than music that simply uses electronics'.⁴⁸ Alongside this concern is a long standing modernist conviction that these technologies will inevitably afford more and more direct channels of communication between composer and listener, thus eliminating the need for performers and intermediaries, whether human or non-human (cf. Boulez 1986). Many authors cast a McLuhan-esque distinction between electroacoustic music as an essentially 'oral' form of expression, and the antiquated disciplines of 'notated', 'literate' or, to use Trevor Wishart's terminology, 'lattice-based' traditions.⁴⁹ The narrative of evolution towards more perfect forms of expression can serve social and political purposes

48 Holmes 2002, 2 [emphasis in original]; a classic example of this argument can also be found in Stockhausen (1961).

49 Cf. Wishart 1996; McLuhan 1997; Landy 2007. Rabinovitz and Geil (2004, 3) point out that prognostications like McLuhan's can be self-fulfilling as 'they make popular the vision of society that they claim will result from new technological interventions'.

as well. Born (1997), for example, finds situations in which composers deploy orality ideologically to regulate the distribution of institutional technical knowledge, sustaining hierarchical power relationships at the same time as they sustain liberal notions of openness and freedom.

Informed in part by the reconsiderations of the Western Art Music canon that spread across musicology more widely in the 1990s (e.g. Bergeron and Bohlman 1992; Kassabian 1997), theorists in the electroacoustic tradition embarked upon a reconfiguration of the historiography of the field in the early part of the following decade, downplaying modernist tropes of formal autonomy, progress and authenticity while also extending greater legitimacy to popular genres (e.g. Chadabe 2000; Waters 2000; Emmerson 2001). At the same time, academic composers maintained their historical authority by explaining the expansion as a trickle-down effect, claiming that mainstream musicians simply re-appropriate techniques pioneered in the avant-garde.⁵⁰ This narrative of diversification also found purchase in music criticism, among writers such as Kodwo Eshun and David Toop, in magazines like *The Wire*, and in popularising surveys of twentieth-century music like Alec Ross's widely read 2007 book *The Rest is Noise*.⁵¹ As Fabian Holt (2007, 126-127) has argued, however, the vibrant and cosmopolitan pluralities promulgated by critical organs like *The Wire* often stand for very narrow social and aesthetic spaces in practice. We can illustrate the contradiction by turning briefly to the canonisation of an EDM genre known as 'glitch' that occurred in conjunction with electroacoustic music's diversifying historiographical turn.

The arrival of glitch in academic circles is difficult to date precisely, but its role in the rethinking of the electroacoustic canon began around the turn of the millennium. Glitch made headlines in a lengthy feature article by Rob Young for *The Wire* in 2000. Glitch producer Carsten Nicolai was awarded the top prize that year in the freshly created 'digital music' category at the Austrian festival Ars Electronica.⁵² Kim Cascone's essay 'The

50 See for example, Gayou 2007; Collins 2009.

51 For definitive examples of this style of criticism see Toop 1995; Eshun 1998; Shapiro 2000; Prendergast 2000; Cox and Warner 2004; Ross 2007.

52 Young 2002. Ars Electronica replaced the category of 'computer music' with 'digital music' in 1999, causing significant outcry among academic composers. See for more detail Eshun 1999; Copeland 1999.

Aesthetics of Failure' in the Winter 2000 issue of *Computer Music Journal* described glitch as a style in which 'the technique of exposing the minutiae of DSP errors and artifacts [sic] for their own sonic value has helped further blur the boundaries of what is to be considered music' (Cascone 2000, 17). A full issue on the new 'electronica' movement published in the British electroacoustic journal *Organised Sound* in 2002, on the other hand, presented glitch to academic composers as an enticing and innovative crossover from the 'commercial world' (Myatt 2002). The incorporation was facilitated by the fact that the genre's *sine qua non* was a matter of unquantized timbral manipulations rather than any particular rhythms, melodic, harmonic, or forms.⁵³ Many of the prototypical glitch tracks do in fact share a noticeable predilection for interrupted or irregular metrical patterns, but for critics, timbre was typically the most interesting register of detail. A paradigmatic glitch track like 'Aero Deck' from Oval's 1994 album *Systemisch* builds up a phase-shifting rhythmic gestalt without necessarily establishing a regular pulse or idiomatic dance metre.⁵⁴ As critic Torben Sangild wrote of the music of Alva Noto (pseudonym of German producer Carsten Nicolai) in 2004, glitch 'has the groove of dance music without any hint of melody and with a beat only audible in a quiet room, even when the volume is turned up high' (Sangild 2004, 266).

Critical writing about glitch highlighted the same kind of technologically catalysed evolution that electroacousticians imagined would lead to the gradual convergence of 'intelligent' musicians around a transcendent synthesis of intelligent genres.⁵⁵ The genre's close association with the production of critical theory and philosophy seemed to bear this out. Mille Plateaux label-owner Achim Szepanski (2002), for instance, positioned his business from the start as a philosophical project, adopting the style and catchphrases of Gilles Deleuze, and writing in *Organised Sound* of engaging the 'field of possibilities of the digital' to effect a negative critique of 'internal ramifications and program hierarchies'. The moment of glitch's incorporation also generated widespread agreement about the genre's

53 Vanhanen (2001), for example, suggests that in Glitch 'sound has escaped the overcoding symbolic order of music...'

54 In the discography see Oval 1994.

55 Citing music critic Alec Ross, Leigh Landy, in somewhat grandiose fashion, has referred to this teleological ideal as the 'final "great fusion": intelligent pop artists and extroverted composers speaking more or less the same language' (Landy 2009, 518).

avant-garde origins. Glitch seemed to originate as a kind of ahistorical, pseudo-biological 'mutation' within electroacoustic chronology. A 'natural selection' of 'errors and imperfections', wrote Sangild, had brought about music's inevitable next 'evolutionary step' (Sangild 2004, 269). Rob Young's feature in *The Wire*, for example, cited Pierre Schaeffer and the Italian Futurists as laying the foundations of this kind of rupture.⁵⁶ Canadian composer Phil Thomson (2004) situated the glitch and .microsound [sic] genres of the late 1990s and early 2000s at the end of a series of innovations originating with Stockhausen and flowing through progressive stages of modernist computer music research.⁵⁷ This narrative has persisted in more recent accounts as well. 'Musicians on the fringes of dance music soon enough looked backward to discover the great history of experimental electronic music', wrote British composer and programmer Nick Collins in 2009, 'and automatically merged to become part of that progression (even had they not looked, they could not have helped the latter).' (Collins 2009, 339)

What I hope to have foregrounded by pausing with this example is the way that reformers of the electroacoustic canon have maintained a narrative of technological and aesthetic progress in which modernist essentialisms continued to hold sway. Thomson, for example, read the unambiguously house-derived manifestations on Mille Plateaux's *Clicks 'n' Cuts* compilations as evidence of glitch's gradual 'commercialisation' rather than as authentic manifestations of its aesthetic (Thomson 2004, 214). Composer and theorist Simon Emmerson, while heartily supporting engagement with EDM at the turn of the millennium as an emblem of postmodern plurality and aesthetic synthesis, also expressed suspicion of its 'free-market' commercialisation. 'Historically resonant' art music, he insisted, stood to lose its natural vitality as long as the 'possibilities of an emerging dominant monoculture' are allowed to proceed unchecked (Emmerson 2000, 15-17). His explicit solution was to dis-embed modernist values of detachment and specialisation from their historical context, and inject them back into postmodern discourse. Defending these

56 Young 2002. Although differently inflected, Caleb Kelly's (2009) more recent account inserts glitch into a similar lineage of high art engagements with repurposed recording media.

57 .microsound is a genre associated with an internet mailing list and website of the same name, both of which exist to this day, oriented around the production of minimalist computer music. The website was named for Curtis Roads' (2001) book on stochastic and granular synthesis techniques.

qualities, he claimed, had become the essential aesthetic vocation of all electroacousticians insofar as they represented an aesthetic 'minority' called upon to 'enrich and counterbalance' the encroachment of rhythmic and hedonistic tendencies (Emmerson 2000, 19). The mix of praise and dismissal in these readings belies a broader compulsion to trace the roots of EDM to the avant-garde, and teach popular music producers respect for what makes art music serious and different.⁵⁸ Deliberately or not, many of the typically white male musicians who make and listen to electroacoustic music have seen fit to attribute more agency to technology than to their counterparts in black and gay nightclub subcultures.⁵⁹ As Taylor (2001, 67) writes, 'going back to the European avant-garde is more compelling than a more historically accurate [narrative] that traces their music to African Americans and gays. As such, these latter groups are almost wholly exscripted as techno is championed as an intellectual music to be listened to, not danced to.'

What I would like to highlight in the phonographic and electroacoustic narratives is not so much their recourse to modernist narratives of authenticity and alientation, as their failure to analyse the relationships they assume between historical change and technological agency. Most historians and theorists of music's technological mediation are careful to confine the scope of their arguments to 'influences' or 'affordances' in an effort to distance themselves from the charge of technological determinism. Recent musicologists such as Ashby (2010) and Katz (2011), for example, see fit to wash their hands of a determinist viewpoint early in their analysis by focusing on the importance of 'users', or by highlighting the 'irrationality' of technology's impacts. As Langdon Winner (1977) has argued, however, a generalized avoidance of determinism may also be interpreted as symptomatic of technology's role in human life as a form of 'externalized labour'. According to a strong anti-determinist perspective, technologies must always be kept 'under control' lest they upset the master-slave relationship and take agency away from humans. For Winner, however, the political problems posed by technological determination

58 See Taylor (2001) for a more detailed discussion of this point. Popular music scholars like Fikentscher (2000) and McLeod (2001) have also suggested that disco's absence from EDM genealogies may be attributed to efforts to suppress its close association with gay nightclubs.

59 Several authors have pointed out how often interpretations of certain vernacular styles in the literature of Western Art Music slide into tropes foregrounding 'embodiment' over intelligence and technoscientific sophistication. Cf. Lewis 1996; Monson 1996; Born and Hesmondhalgh 2000; Meintjes 2003.

are not solved by privileging human agency in design and use, but by examining situated technological action at a finer grain. Human agency, argues Winner, necessarily transcends the boundary between human and machine.⁶⁰

In order to discard modernist anxieties about technological agency we must move beyond preconceived historical frameworks in order to decompose and retrace the construction of agencies and causalities empirically. Philosophical accounts of technological action, totalising though they may be, often take the deconstruction of causality as a basic condition of analysis. In his 'Question Concerning Technology', for example, Martin Heidegger ([1954] 1977) unpacks the Aristotelian account of instrumentality into multiple modes of causality in order to move past a common-sense understanding of tools as mere means to be mastered in the service of rational ends. Later commentators have sustained the Heideggerian critique in part by figuring instrumentality as only one of the many factors determining the political and social agency of technological systems.⁶¹

Contemporary theorists of musical invention have also turned increasingly to the problem of agency as a way beyond modernist historiographical impasses. Born (2005a), for instance, places agency at the centre of an account of musical ontology and creativity. On one hand, she is primarily concerned with the social agency of musicians, intermediaries, traditions, identities and institutions. On the other, she draws upon Alfred Gell's anthropological theory of the agency of objects, in which 'the objects that result from creative agency condense or embody social relations [...] by spinning forms of connectedness across time and space' (2005a, 16; cf. Gell 1998). In her recent work Born has developed a theory of musical objects as bundles of social relations dispersed over time and space into larger assemblages linking identity and genre. In the semiotic terms Born borrows from Gell, musical objects may be thought of as 'indexes of agency' as they accrue uses and interpretations over time (cf. Gell 1992).

Other strands of recent music studies have also tried to pick apart the networks of

60 For a similar critique of the a priori separation of human and machine see Haraway 1991.

61 See for example Feenberg and Hannay 1995 or Stiegler 1998.

human and non-human agency that Born theorises. Steven Feld, for example, has argued that we might think of relationships between musical objects as engendered processually through a 'schismogenetic' process of 'cumulative interaction and reaction' (2004, 265). He relates this process to an escalation of schizophonia, moving beyond Schafer's concern with technological alienation. Others, such as Frederick Moehn (2005, 49-50), have suggested that it may be possible to transpose this interest in 'escalating cycles of distorting mutuality' from the relationship between human musicians and intermediaries, which is Feld's primary object, to relationships between human and non-human music-makers. Moehn has pointed towards the local particularities that the processual dynamics of schismogenesis can exhibit, suggesting that sometimes these go beyond division of music-making into the traditional categories of mediated and unmediated. Ben Piekut and Jason Stanyek (2010) also aim towards a finer grained analysis of agency. 'We take it as axiomatic', they write, 'that agency is always distributed and never coterminous with a single body; it is not something that a person collects and, in a moment of purposeful clarity, unleashes.' (Piekut and Stanyek 2010, 16) At base, they propose an account of human and non-human agency that complicates the predominance of presence and immediacy, loosening the constriction of causality to the 'here and now' and breaking down personhood into a network of 'translations, diffractions and deferrals'. Their theory of 'deadness' can be summarised as an analytical framework addressing the action of missing or absented agents.⁶² They zoom in to examine the agency of isolation booths, leakages, edits, mixes, splices, and punch-ins: all different ways of disarticulating human agencies and saving them to be deployed later or elsewhere.

In a more recent article summarising the methodological insights to be drawn from Actor Network Theory (ANT)—an approach I address other aspects of later in this chapter—Piekut (2014, 196) argues in favour of moving away from a narrower 'proprietary' model, in which agency is possessed only by those with 'intentions', and thus capable of ethical and moral judgment.⁶³ Piekut's alternative is to reverse the imputation and describe

62 As they write, 'not only living human workers, but also the ostensibly "dead" labor of technology and discipline, and even the "dead labor" of the human dead—contains within it the seeds of unpredictable futures that can and do retrace worlds.' (Piekut and Stanyek 2010, 18–19)

63 As an aside, this is precisely the kind of agency that Katherine Hayles (1999, 3-4) has argued is eroded

agency as the observable 'effect' of 'an action or an event'. 'If something makes a difference', he goes on, 'then it is an actor.' (Piekut 2014, 196) Treating agency as epiphenomenal in this sense makes its presence or absence in a situation a matter of empirical inquiry rather than theoretical speculation. Such an agnosticism famously allows the observer to describe objects, collectives, ideas, or even musical works as agents.⁶⁴ It does not preclude analysis, however. For example, we still see that agents can have, or be imputed to have motivations or goals—ranging for example from the 'virtual agents' which can appear to operate as driving forces in musical structures (Cone 1974) to the political projects guiding the work of the countercultural collectives of the 1960s like *Musica Elettronica Viva* (Beal 2009). In Piekut's terms, we might assert that there can thus be both 'strong' (critical, transformational) and 'weak' (effective, event-engendered) forms of agency in any situation, but that neither is essential, and one should not be presumed to be preferable to the other. Taking a semiotic perspective, linguistic anthropologist Paul Kockelman has pointed out that it is possible to divide agency further by examining what kinds of purposes or objects (as opposed to subjects) are in question in a given situation. Agency can thus be either 'residential' when it involves determining the terms of expression or action, or 'representational' when it involves determining the references and conclusions that can be made from a situation after the fact (Kockelman 2007, 375-376).

Such a multi-dimensional analysis of agency makes it difficult to attribute shifts in aesthetics or consciousness to technological change in such broad strokes as the narratives I outlined at the beginning of this section. Moreover, I would argue that the expectations of alienation and pluralisation engendered by modernisation narratives can actually have a normalising agency of their own, by limiting the number of imaginable answers to the questions of when, how, and why specific technologies have changed or been changed by musical practice. These expectations also stand in the way of deeper questioning about whose practices can be said to keep pace with technological change and whose fall behind. As Amanda Weidman has put it: 'rather than narrate the takeover of a "traditional" practice

by posthumanist thought and media, not to mention that which Adorno thought was at risk of falling victim to scientific rationality (see for example Horkheimer and Adorno [1944] 1988, 29). Hence the anxieties of many commentators on the ANT tendency to attribute agency to the 'non-human'.

64 For the other side of this debate compare Taruskin (2014), for example.

by "modern" technologies', it is also possible to 'show how ideas about authenticity, tradition, and modernity were—and continue to be—shaped in the very encounter with such technologies.' (Weidman 2003, 454) It is this impossibility of determining agencies outside of or prior to the encounter with digital technology that shapes my perspective throughout the thesis. Questions remain, however, with respect to the constitution and meanings of technological agents, and with respect to the implications of treating them so agnostically.

2.3 The ethics of inscription in organology

Organology matured alongside early attempts in German comparative musicology to establish rational systems of musical classification and evolution, but has changed remarkably over the past century with the development of historical and ethnomusicological thinking as a whole. The discipline has long since moved beyond its early taxonomical obsessions. Taking ethnomusicology as an example, researchers since Alan Merriam (1969) have frequently included detailed organological accounts of the process of instrument construction, and its immediate interrelation with other aspects of social practice and organisation. Later contributors such as Margaret Kartomi (1990) have brought organology's traditionally regulative, rationalising Western taxonomies into conversation with ethnographic accounts of classifications systems that reflect the concerns of non-Western musical and philosophical systems. Such approaches foreground the plurality and context-specificity of technical conceptions, classifications, and technical knowledges.

In the 1990s popular music scholars also set out to turn organology's attention to the ways musical instruments are embedded in social, cultural, and economic practices. One of the first accounts to set the stage for these critical interventions was Paul Théberge's 1997 book on the relationship between technological innovation in the musical instrument industry and the consumption practices of musicians, *Any Sound You Can Imagine*. He emphasised the degree to which digital instruments blurred the boundary between

production and consumption, bringing his work into direct dialogue with the electroacoustic theory of his time. He also raised a number of issues which he saw as absent from organological scholarship, listing among other things its lack of awareness of the aesthetic distinctions associated with genre and subculture, its largely hagiographical orientation towards the inspired agency of canonical composers, its lack of interest in popular music, and in particular its blindness to economic processes (Théberge 1997, 6).

Popular music studies saw a number of attempts to take up the issue of instruments' embedding in cultural and aesthetic formations around the same time as Théberge's intervention. Focusing in particular on the technologies of rock music, scholars such as Leslie Gay (1990), Steve Waksman (2003), and Robert Walser (1993) drew renewed attention to the ways that the mastery and management of instruments can become entangled in generic associations and identity constructions, becoming both objects of tradition and sites of social distinction (Waksman 2003, 256). Gay and Lysloff's (2003) widely read collection *Music and Technoculture* cemented a concern with music's technological mediation that linked the popular music studies approach with those of anthropologists and scholars of communication. More recently, ethnomusicologists have extended this interest in the aesthetic and subcultural associations of musical instruments, borrowing from the work of Arjun Appadurai on globalisation to trace the shifting courses of their 'social lives' (Dawe 2012, 196-197; cf. Bates 2012). Drawing as well upon Nicholas Thomas' (1991) explorations of the contestation and reinterpretation of artefacts by anthropologists and conservators, recent ethnographic interventions in organology have shown how instruments can be 'recontextualised' or even 'reauthored' as they shift between practice and analysis, as well as between global and local registers of power and representation. Paul D. Greene highlights the inequalities that can accrue as these shifts in register play out. 'As Western sound technologies are drawn into music making around the world', he writes, 'their hard-wirings begin to structure local musical practices in certain ways, imposing their own musical logics onto the societies that adopt them. Hard-wirings constitute a (sometimes subsonic) vehicle of control in the world's musical praxis [...].'⁶⁵

65 Greene 2005, 6. Louise Meintjes' work on South African studio practices makes this more literal. She observes that 'the multinationals are wired into the studio system. They name their indelible presence –

Although Greene is quick to add that a certain amount of technical 'refunctioning' is always possible in principle, there has until now been relatively little reflection among music scholars about the precise ways in which knowledge can become implanted into instruments in the way that his notion of 'hard-wiring' suggests. More recently explorations have begun which address the invention and construction of musical instruments from a perspective informed by historical and sociological accounts of the entanglement of non-human actors in the production of knowledge in the natural and social sciences. The focus from this perspective is on plurality, in terms of the ways cultural and political intentions are implicated in design, in terms of the sources of the intentions thus inscribed, and in terms of the musical and scientific disciplines in which decisions are situated (Tresch and Dolan 2013). Bijsterveld (2010), for example, echoes Th  berge's criticism of organological models grounded in presumptions of compositional genius and logical evolution. Instead she advocates a heightened concern with the ways that site, purpose and style of construction can condition different materialisations of theoretical knowledge. Taking two examples from the restoration of baroque organs, she aims to demonstrate how 'the material claims in both projects depended on different styles of knowledge generation [...] which explain particular differences in the ultimate reconstructions.' (Bijsterveld 2010, 116) In one of her case studies, builders worked from the sound of a specific historical source instrument, hoping to match particular aesthetic uses which had been made of flaws in the original construction. In the other, an interdisciplinary team of builders attempted to reconstruct an example of a stylistically similar collection of organs using computer models. The team concluded that only a new organ with three different wind systems embedded inside it would be equipped to reproduce the entire range of possible sounds.

The 'hard-wiring' of knowledge in music technology may thus have different motivations and take a variety of spatiotemporal shapes. David Novak (2013) suggests a similar kind of dispersion at play in the process of innovation with respect to the technologies and aesthetics of Japanese. In particular, his genealogical account of the genre's instrumentarium illustrates the uncanny rediscoveries that can occur as sounds,

Lexicon, Roland, Yamaha, Korg, Technics, Amcron – on the faces of their products.' (Meintjes 2003, 86-87)

objects and techniques circulate transnationally via a restricted market in recorded and print media. When Japanese experimental musicians began hailing Canadian artists' collective Nihilist Spasm Band as forgotten innovators, for example, the band members found themselves literally out of place and time, forced to catch up with the ghostly wanderings of their 'dead' inventions decades later (Novak 2013, 125-129). Novak's vignette thus illustrates a similar kind of historical 'distension' to that theorised by Piekut and Stanyek (2010, 18) in their examination of mediated agency in posthumous duets. As Novak puts it in the context of a discussion of the genealogy of cassette feedback later in his book, 'incidental, unsynchronised moments of sonic discovery do not add up to a linear history of technical invention or produce a singular model of stylistic development. They cycle back into distinct creative projects and separated moments of innovation. The process of feedback delay was discovered by mistake, over and over again.' (Novak 2013, 155)

Novak's characterisation also hints at a kind of recursive inscription, in which agency accrues to a particular inventor by the cyclical action of technology in the context of a particular generic, cultural and historical milieu. Moreover, then, the task of understanding the ways cultural and political assumptions are encoded in technologies demands a scope of inquiry encompassing not only multiple modes of inscription, but also multiple sources of agency. Jonathan Sterne adopts such a scope when he argues for his exploration of the 'mediatic dimension' of technical genealogies. His proposal for a 'format theory' is designed to reorient the history of media to the ways that objects, systems and standards fit together and cross-reference each other: the CD with the cassette and with sampling standards, the LP with the 78 and with film sound, or the MP3 first with ISDN (Integrated Digital Services Network) and other early internet technologies, and subsequently with portable audio players (Sterne 2012, 7-17). Technological designs are not pure expressions of clearly distinguishable authorial intention, Sterne reminds us. They presume a complex system of interconnected parts and principles.

Taken together, then, the methodological innovations of these ethnomusicologists, popular music and sound studies scholars have generated a range of alternative viewpoints on the evolution of musical instruments. As the experience with the laptop orchestra I

described at the outset of this chapter suggests, however, the foregrounding of mobility, malleability, interoperability and continuous transformation in digital software and hardware poses new questions about the constitution and change of musical instruments. These questions can complicate efforts to identify them as unified objects, trace the dynamics and aesthetics of their transformation, or read their inscription in webs of technical discourse.

While it may sharpen a new critical lens to examine their constitution, however, it is less clear whether studying instruments as cultural systems in action also resolves organology's ethical questions. One central concern for organologists in this regard has been the challenge of picking apart the roles of users' intentions, inventors' intentions, and the many ways, perhaps unintended, that technical mechanisms operate in creative practice. Untangling this web of more or less flexible and contingent tendencies into a two-way struggle between creative resistance and technocratic imposition, as for instance Greene seems to want to do in the passage I cited earlier in this section, presumes the answers to several questions about the site, conditioning, and value of aesthetic agency. Moreover, as Langdon Winner has argued, the oscillation of philosophical debates between negative and positive accounts of technological impact belies a fundamental defect in any attempt to draw a hard and fast division between human freedom and artificial control (Winner 1977, 91-93). By presuming to take a side in the argument over whether technology *should* have an impact on creativity, we evade theorising the intimate and varying ways that instrumentalists already do negotiate human and technological presence, absence, automation and surrogation.

For the purposes of ethnographic and historical study, the relationship between human and technological agency in creative practice is less an ethical problem to be solved once and for all than a matter of situated and historically contingent aesthetic convention. At some times a specific generic discourse leaves the relationship open to negotiation, while at others musicians might consider it an irrefutable matter of personal intuition. But while Théberge (1997, 17-18), for instance, claims that aesthetic notions like 'musical need' creep into discourse about technology as a kind of false consciousness generated by

rationalisation, it is certainly problematic to reduce the negotiated and the intuitive to a kind of 'residual' force chasing the tail of progress (cf. Williams 1973; Acland 2007). Indeed, regardless of the way it is articulated by musicians, the way the agency of music technologies is framed as an aesthetic 'need' can have profound ethical implications for the way musical practices are valued in particular situations. The debated connection between perceptible human gesture and musical richness which Born (1995) discovered at IRCAM in the 1980s, and which continues to be contested in the theories of contemporary electroacousticians such as Emmerson (2007), for example, would be difficult to apply to a situation like that of the laptop orchestra which I discuss at greater length in chapter four. There may be those who would see this gap as an indictment of the laptop orchestra as an idiom. By recognising that such a hierarchical distribution of practices along a scale from 'easy' to 'difficult' is culturally and generically specific, and pluralising our account of how creative agency can be situated, however, we can resist the prevailing ethical bias that favours instruments and modes of engagement which engender greater and greater virtuosity while dismissing those that seem trivial or mechanical.

2.4 Translating and 'transducing' theory

Clearly, a flexible account of technological agency in musical practice must attend both to the varying ways that the ethical and aesthetic meanings of instruments are transformed as they are propagated from one place and time to another, and to the ways that they can be enlisted in the conversion of knowledge between different discursive systems. In what remains of this chapter I will explore some elements of a theoretical and methodological framework that claims to afford closer attention to these issues, linking its proposals to concrete examples of theorisation from my ethnographic fieldwork.

The territory I want to cover overlaps with a nascent turn among music scholars to the work of Bruno Latour and the school of European sociologists associated with ANT, especially with respect to the agency of technical objects in music-making (see Prior 2008; Piekut 2014). ANT encapsulated a set of principles for the sociology of technoscience that

figured innovation and organisation as the work of heterogeneous social networks with no a priori difference between the roles of people and things within these networks.⁶⁶ The term seems to drift in and out of fashion, due in part to persistent criticism of its rhetorical amorality, its perceived inability to account for disconnection and difference, and its apparent privileging of 'alibis' for human decision-making (Taruskin 2014, 292; cf. Born 2005a; Strathern 1996). While stepping back from a full-fledged revival of ANT, I'd like to engage pragmatically with some of its terms and bring them into conversation with a selection of its critics in order to address my main concern in this chapter: that there is a generative feedback relationship between technological mediation and technical knowledge production.

I'd like to illustrate the way ANT analyses work by borrowing an example from Born's analysis of software production at IRCAM. While Born is very clear about her differences with Latour and his disciples, here I am simply interested in developing a critical picture of what the latter might say about her ethnographic data. Specifically, I'm thinking of her account of technology as materialising knowledge production through a kind of 'symbiosis between scientific analysis and the development of sophisticated software' (Born 1997, 144). Her emphasis on the technological mediation of scientific discourses and the 'scientific status of software' suggests a number of correspondences with the ANT approach. In the case in question, software serves as both codification of empirical procedures and incarnation of a modernist aesthetic imaginary. Born's illustration of the composition software Cmusic demonstrates the range of knowledges she sees it as mobilising. 'To use the patch languages and other computer music software for even the simplest exercise requires knowledge of several domains. [...] These enter directly into the description of the sound desired, or into the manipulation of parameters which produce or control sounds.' (Born 1997, 150-151) Sterne has recently pointed to the nexus of relationships between Born's computer music composers and the broader audio engineering sector of the time, highlighting the way that software and hardware production depended upon models that encapsulated knowledge of psychoacoustics, signal processing, and

66 For further discussion see Law and Callon 1992; Latour 2005; Law 2010.

previous industry standards (Sterne 2012, 115-116).

ANT proposes a range of concepts which highlight the social and rhetorical work that goes into structuring, sustaining and transforming the knowledge these technologies embody. Michel Callon (1986) first proposed the special concept of 'translation', for example, to account for the contingent and processual structuring of power relations in the application of scientific research to the development of French fishery conservation strategies. Identifying different 'moments' in the process, Callon analyses the ways that new roles are assigned to human and non-human actors, and decisions are made about who speaks in the name of whom. Since, as Callon reminds us, successful translation is never fully assured or finished, conversions from scallop larvae to sheets of diagrams and numbers, or from groups of fishermen, scientists and specialists to a few spokespeople sitting in a closed room, are always at risk of breakdown. 'Displacing' knowledge to express it in other terms is an arbitrary and precarious activity (cf. Callon 1986). Madeleine Akrich (1992) seeks to express a similar kind of displacement in her notion of de-scription [sic], this time referring to the way knowledge inscribed in technical objects is modified as it is unpacked by new users in new cultural and technical contexts. Because the 'scripts' assigned to technical objects delegate a number of aesthetic and social choices, and because these delegated choices are always taken by different people, in changing situations, technologies can either change practices without anyone being fully informed how these choices will play out, or reinforce existing styles of activity.

Born's account goes on to highlight 'the instability of software as a medium', the 're-translation' of programs from one system to another as software and hardware went through their asynchronous obsolescence cycles, and the complex oral conventions through which these features of software production were enacted and preserved (Born 1997, 153-154). She thus seeks to 'disturb any assumption of the scientificity of advanced software research.' 'Oral and social mediation are', she asserts, 'essential to the circulation of programming knowledge.' (Born 1997, 166) Put in ANT terms, the software instruments of IRCAM in the 1980s required the kind of ongoing oral, textual and social work which Callon called 'translation' in order to materialise or 'de-script' the knowledge claims of

modernist discourse and scientific analysis. Born's software and hardware objects slip through multiple stages of meaning, constantly changing values for their users and thus often evading their grasp as tools. Proponents of ANT have made similar observations about the act of translation. 'If there are exchanges', writes Latour for example, 'these are always unequal and cost a fortune both to establish and to maintain.' (1988, 162)

We come up against the limits of ANT's conceptual repertoire when we try to use it to explain situations in which the translation of social and technical relations proceeds in a less linear fashion. The notoriously messy world of ethnography can present situations in which roles and concepts are misapprehended or contested. Multiple scripts and descriptions might seem to either blur together or compete for recognition and viability at the same time. The ethnographic encounter offers up many situations which illustrate this well. Steven Feld and Aaron Fox (1994) have argued that the way knowledge about music is communicated both in rationalised theories and in other narrative and metaphorical idioms should be an important part of our comparative matrix for understanding the social structuring of musical meaning. Similarly Born (2010b, 198) suggests that an 'oscillation' between inductive and deductive phases of ethnography is both necessary to evince critical interpretations of the 'new insights given by fieldwork' and a 'subtle tool for the amendment of theory' on the part of the ethnographer. But what complexities can arise when the epistemologies of ethnographer and ethnographed intersect and interact from the start? During fieldwork in Montreal I experienced just such a blur.

As I outlined briefly in chapter one, I came to my project in the context of a larger program of comparative multi-site ethnography. My choice of material was partly determined by the intended international scope of the overarching project, and partly informed by my past experience. My site and objects of study struck a balance between contrast and comparability with those of my colleagues. We discussed our methods and exchanged observations constantly, tracing flows of ideas between our projects, noting patterns of articulation, and identifying objects and actors who moved between them. My background before the project included studies in contemporary music, media art and the history of electroacoustic music. After earning a performance degree in Montreal I had

worked as a self-taught technician and sound artist before turning my attention back upon the field as a scholar. Fieldwork brought me back into contact with musicians still working in the milieu I'd left behind. Although distanced from their professional and aesthetic concerns, I could still relate directly to their disciplinary experiences and conceptual repertoires. My initial contacts when I arrived in the spring of 2011, for example, were mostly friends who I had met years earlier. My perspective, although never completely shared with my interlocutors, was thus always coloured by memories of my past experience as one of their peers.

I found the theoretical ecosystem I stepped into as an ethnographer in Montreal to be different from those I experienced studying electroacoustic music in the Netherlands or the United Kingdom. Debates were geographically and linguistically specific, but also conditioned by a different mix of historically sedimented institutional and disciplinary divisions. Because many of my interlocutors were academics or former academics, technical and philosophical discourses similar to my own became an important part of my ethnographic object. In turn, the theorisations I encountered in exchanges with them sometimes re-inflected the repertoire I'd accumulated from my own disciplinary, geographical and professional perspective. The artists I met among junior faculty and postgraduate students in fashionable interdisciplinary programs at Concordia and UQÀM tended towards poststructuralism, in some cases flavoured by heavy doses of Deleuze, Whitehead, Stiegler and Simondon. My contacts in these programs exchanged drafts of their writing with me.⁶⁷ They also introduced me to newly published work by local theorists whose work they were in dialogue with.⁶⁸ With my contacts at McGill, where I was hosted as a visiting student in the department of Art History and Communication Studies during my fieldwork year, I attended seminars and reading groups where I encountered other ideas that bled into my fieldwork. This was especially true of the explorations of interdisciplinarity and improvisation being then being debated at the

67 I had an early draft of this paper read by media artist Alexander Wilson, for example, and he also gave me a paper of his to comment upon. I discuss Wilson's musical work further in chapter five. The paper he contributed to me has since been published as Wilson 2014. I also discussed early drafts of my work with Concordia electroacoustics professor Eldad Tsabary, whose teaching I discuss in Chapters three and five. Cf. Tsabary 2012; 2014.

68 Two examples published during my fieldwork period are Massumi 2011 and Migone 2012.

McGill node of the recently established ICASP network. As I describe further in chapter four, notions like 'comprovisation' and theories about the dynamics of social movements flowed seamlessly between my hosts at McGill and my ethnographic interlocutors at Concordia. Musicians elsewhere in the scene, many of whom had come through similar programs at McGill, spoke to me of their engagements with gender studies and psychoanalysis, their discoveries of performance and conceptual aesthetics, and their re-imaginings of historical theoretical movements like Fluxus. I watched and participated as political and theoretical convictions were ignited by the tensions around the intensifying student movement in 2012, and by wider national and international transformations filtered through online media. I saw barriers erected and dissolved between proponents of different theoretical schools, between francophone and anglophone academic cultures, and between musical subcultures and genres. Adding to the richness of this complication was that fact that these musicians and theorists were often trying to theorise the same phenomena that I sought to address by observing their work and comparing it with the ethnographies of my colleagues. Although it was crucial for me to maintain an outsider's perspective on how interlocutors' theorisations articulated with their practices, engaging with them also helped me add to my own theoretical toolkit. The crosstalk this produced can be illustrated by zooming in one example in particular and showing again how it could be applied beyond my fieldwork. Specifically, I'd like to point to the correspondence between some of the theoretical concepts that I encountered in the field and the ANT concepts I introduced above.

There is significant overlap between ANT's sociology of technoscience and the philosophy of the late French philosopher Gilbert Simondon, whose work I encountered through interactions with musicians Alexander Wilson and Alexandre St-Onge. The keynote of Simondon's work is the process of 'ontogenesis', applied broadly to social, psychological and technical systems (cf. Simondon 1958; Combes 2013). Like Latour and his disciples, Simondon emphasises a composite and systematic approach to the study of social and technical organisation. During my fieldwork, however, the bulk of his writing had not yet been translated into English, so informed reception of his theory in the

disciplinary environment I came from was still recent, and limited to a handful of specialists. In Montreal, however, the prevalence of bilingualism afforded access to a much wider range of scholars. Encountering Simondon ethnographically, as it were, helped me to sharpen my perspective on the ideas I brought to the field from ANT. By way of example I want to look briefly at some points of comparison between the ANT concept of translation and the Simondonian concept of 'transduction'.

As I outlined above, Callon's 'sociology of translation' offers a useful framework for attending to the ways in which objects and actors are brought together for the purposeful displacement of knowledge and power structures. The intuitive and non-discursive operations often central to the transformation of musical instruments, however, can sometimes lead to dynamic re-imaginings of pre-conceived purposes. To illustrate this I draw upon my colleague Alexandrine Boudreault-Fournier's unpublished account of the circulation of software tools for the production of dubstep music in Cuba, which she shared with me during meetings and presented at workshops and conferences in the year following my fieldwork. With few connections to the internet at the time of Boudreault-Fournier's fieldwork, Cuban producers relied upon face to face networks and portable physical media to exchange new both music and software. During her stay there in 2012, dubstep was a hot new genre in the country. She began to hear stories about how local hip-hop producers had not known how to emulate the sounds until they received the software presets they saw as enabling them to make it. Files containing music by the American dubstep artist Skrillex had begun to circulate shortly before the tools supposed to be necessary for producing music in the genre.⁶⁹ This sparked demand and pre-conditioned producers' expectations about how the software should sound in operation. The sequence of events casts doubt on the producers' assertion that the software by itself gave them the power to make the aesthetic leap to the new genre. We can safely speculate that, had the tools arrived before the music, there would be far less chance that they could have intuited an inherent aesthetic connection to this particular kind of dubstep sound. The producers needed already operating set of aesthetic expectations to catalyse the 'correct' use of the

69 For an example of this artist's signature sound see, in the discography, Skrillex 2010.

new technological mechanisms.

Boiling down the particular temporal and affective properties of this inscription process to a 'translation' between orders of knowledge might not be sufficient. It was not that the software needed to be inscribed with the particular agencies experienced by the Cuban producers. The sonic and epistemological environment in which the software was to be inserted and interpreted needed to change as well. Simondon's (1958) notion of 'transduction' gives us a closer fit with the kind of aesthetic differentiation that Boudreau-Fournier's hip-hop producers and dubstep presets underwent over the course of their transformative travels.⁷⁰ Borrowed from the language of thermodynamics, transduction describes an 'operation whereby a domain undergoes information', and through which an 'activity propagates from point to point' within it (Combes 2013, 6). He uses the term 'information' in this case to describe a process which is not the transmission of inherently meaningful encoded forms, given in advance, from one place to another, but an inventive activity in which a whole ensemble of preexisting elements produces a newly meaningful form according to its present orientation. Anthropologist Stefan Helmreich (2007) has drawn a helpful analogy between Simondonian transduction and Sterne's (2003) account of the physical process of passing sound from one medium to another that was mobilised and re-imagined in the development of early audio technologies (Helmreich 2007, 622). According to Simondon's (1989) model, successive phases of transduction can also be thought of as the mechanism by which a machine, idea, person or collective is newly individuated each time it passes between two social, psychological, technical or biological domains. Returning to the Cuban example, then, we might say that dubstep aesthetics were constituted in producers' relations with the software even if they had not been 'inscribed' in software in advance. The software mediated a historically specific encounter between transnational musical influences, local aesthetic expectations and local patterns of exchange. Rather than a translation of an existing set of objects from another context, the reception of dubstep presets in Cuba could thus be thought of as a transduction between two aesthetic environments. The new assemblage of subjects, sounds and software

70 For further discussion of Simondon's theory of transduction see Mackenzie 2002 and Combes 2013.

propagated across a new, pre-existing milieu like a virus carried by a single cell.

In a similar way, many of the examples I've outlined in this chapter can be described as instances of transduction. No technology is imbued with meaning in action without a historically and aesthetically specific milieu to shape the way it is brought together with other technologies, theories or practices. The theory recalls the ecological account of perceptual activity, in which the perspective of the subject in relation to a given environment defines the 'affordances' of instruments and other objects (Hutchby 2001; cf. Gibson 1979). The inherent properties of a musical instrument go only part of the way to explaining why it affords the things it does in a relatively predictable way. Attending to instruments' transductions from one setting to another moves the combinatorial dynamics of their agency to the centre of theoretical reflection about the technologies of music.

Complicating matters further, my account of the theory of transduction here may be thought of as a kind of transduction as well. The conceptual seed I jotted down in a fieldwork notebook was gathered from an environment in which it addressed a different interdisciplinary configuration, articulated a conversation with authors in a different language, and responded primarily to the purposes of artists and technicians struggling to theorise their own inventions in progress. By planting it here I have brought it into a dialogue between musicologists, anthropologists and historians over technological agency, accented its associations with ANT, and tentatively applied it to a range of case studies which could almost certainly not have been predicted by those in its previous milieu who proposed it to me. By transducing it, however, I cannot help but engage now with a different set of affordances and pitfalls.

By lingering with the theoretical and technical thinking of my interlocutors throughout my thesis I hope to shed new critical light on the context in which they apply their terms. Other examples of such overlapping theoretical investment abound in the ethnographic literature on music. In her study of IRCAM, for instance, Born notes Pierre Boulez's long and productive engagement with Michel Foucault, also one of her key theoretical reference points. While she chooses not to elaborate on the exchange between

the two men, she does work through the 'ironies' that arise in reshaping Foucault's social and political theory to her own project (Born 1995, 344). More recently, Frederick Moehn (2012, 167-203) has offered an account of a sustained theoretical conversation with composer and singer Paulinho Moska, in which the two exchange terms in a shared Deleuzian register. Moehn borrows terminology from Moska throughout his ethnography, and the act of turning it back on his ethnographic subjects brings out the gaps and idiosyncrasies that arise in conceiving of their work in a philosophical register.

As anthropologist Michael Fischer has written, one challenge of theorisation in ethnographic writing is to avoid placing the 'situated authority' of ethnographic subjects below the 'nonsituated authority' of philosophical commentators.⁷¹ For Born, however, an awareness of producers' theoretical explanations must also be tempered by an effort to 'hold their discourse up against both the cultural object and a complex rendering of aesthetics, genre, social and temporal mediation, and ontology' in order to achieve an understanding 'informed by the actors' judgements', but 'not reducible to them' (Born 2010b, 198). My main goal in exploring my interlocutors' theorisations, then, is not to adopt them uncritically but to situate them and refract them through the lens of an examination of the broader social and historical situations in which they mediate the technological transformation of musical practices. A Simondonian concept like 'transduction' fits into to a long-standing history of Deleuzian poststructuralism that addresses francophone cultural production in the Americas from both inside and outside.⁷² Finding a path through this web of indigenous influences isn't a question of privileging an arbitrary analytical literature, but of noting how theoretical expressions are both addressed to and embedded in their particular circumstances. As Edward Said (1984, 237) once wrote, tracing the difference between the various avatars of a particular idea or thinker doesn't require one to relax into limitless intertextuality, but rather to rigorously follow and describe the 'particular voyage' of a 'travelling theory'.

As I hope to have shown by comparing the concepts of translation and transduction,

71 See Fischer's response to Biehl and Locke 2010, 337-338.

72 See, among numerous examples, Glissant 1980; Deleuze 1989; Marshall 2001; Stivale 2003; Marshall 2009.

transformations in knowledge and perspective play an intrinsic role in the way instruments and musicians are inscribed with changing affordances. Nevertheless, the role of the aesthetic and ethical framing of technologies by theory is often underestimated in theories of mediation. In concluding I want to provide a sketch of for a definition of mediation that puts these negotiations in the foreground.

2.5 Mediating mediation

Richard Middleton (1990, 90) has written that 'technology and musical technique, content and meaning, generally develop together, dialectically. Each makes demands on the others, but at every stage there is an area "left over" from the constraints of the immediate relationship, pointing to "pre-historical" residues or to unforeseen possibilities.' The dialectical model Middleton presents here restricts the possibilities of difference and invention to a zone of excess, hived off from the operation of a material infrastructure to which it affords either progressive resistance or conservative reaction. In essence it follows the Adornean notion that only relatively autonomous art can mount a critical opposition to the prevailing forces and relations of production (Paddison 1993, 124-126). What I hope to have shown in this chapter is that there are other ways to look at this relationship. There only needs to be a zone of excess if we first theorise a separation between technology and aesthetics. The theoretical dialectic of technology and musical technique in Middleton's model provides a framework for registering change and assigning agency in musical practice that perpetuates a certain understanding of what technology and aesthetics should be and do. Not presuming this framework allows us to see how the distinction between the domains can be differently inflected and transformed by intersecting systems of knowledge, culture, and ethics.

The notion of mediation has been used by contemporary sociologists of music as a way of talking specifically about how and where such transformation happen. Mediation has been defined crudely as the act of transmitting something through (electronic or other) media, or the effect of media practices and institutions on processes of communication

(Couldry 2008). As Jonathan Sterne writes, however, the sociological definition of mediation can also be more precise than the common sense meaning. 'Mediation is not necessarily intercession, filtering, or representation', he asserts. 'Another sense of mediation describes a form of nonlinear, relational causality, a movement from one set of relations to another.' (Sterne 2012, 9) Born (2005a, 11-15) has offered a critical examination of the roots of this definition in Adorno's method of 'immanent critique', highlighting the ways that musical forms can 'sublimate' social and historical relations and forces of production.⁷³ Mediation in this sense retains the sense of dialectical intervention between disparate domains (Paddison 1993, 138-141). To identify a process or object as a mediation is to say that it 'triangulates' a relationship between external processes (cf. Witkin 2003, 177-178).

There are alternatives to this dialectical definition, however. Louise Meintjes (2003), for example, gives the concept of mediation a semiotic inflection informed by the logical category of thirdness devised by C. S. Peirce.⁷⁴ As she writes, '[m]ediation is explicitly named in semiotic theory as fundamental to the process of meaning production: the sign mediates between its object and its interpretant.' (Meintjes 2003, 259) This notion of mediation emphasises the instability and multiplicity of musical relations and representations, suggesting that the nonlinearity noted by Sterne could also be understood as the effect of accumulated chains of mediation across space and time. Although Meintjes' focus is on objects rather than practices, her definition opens the effects of mediation up to differences in cultural and historical perspective. She continues:

Mediation embeds layers and layers of experience in the expressive commodity form and it opens up multiple possibilities for interpretation of those embedded experiences. Mediation operates in different arenas ... the micro and the macro. It is in the convergence of these forms of mediation that social difference is produced and variously made powerful. (Meintjes 2003, 261)

There is significant disagreement about how to define the mediation in the domain

⁷³ See also Paddison 1993, 150-158.

⁷⁴ See Peirce [1903] 1998; cf. Turino 1999, 231-232.

of musical practice. In her work on *Music in Everyday Life* (2000), for example, Tia DeNora focuses mainly on the way music mediates local social action and affect. She uses the concept to explain the way music can seem to both contain certain meanings and to transmit shared feelings among listeners. Antoine Hennion (2012) describes how studying music's mediation—which in his definition corresponds to the ways music is 'materialised'—affords to the observer a 'mobile' and 'distributed' perspective on the meaning of musical objects and thus expands musicological interest beyond the composer-work dyad while maintaining awareness of their agency in the construction process. Mediation, for Hennion, gives the observer a perspective on local changes in interpretation over time.

At risk of oversimplifying, we might summarize by saying that DeNora's definition focuses on what mediation means to the creative or perceiving subject, while Hennion's emphasises what mediation means for the observer of what Adorno would call the musical material—that is, the sedimentation of musical knowledge or know-how. In an often cited article from 2005, Born expresses dissatisfaction with the scope of these approaches. In particular, she argues for orienting the concept of mediation more towards the wider political and institutional forces that structure power relations in musical practices. 'A fundamental theoretical question arising from these approaches', she asserts, 'it how to move beyond the tendency, derived from interactionist sociology, to take the observable micro-social patterns of musical experience and behaviour as the privileged locus for an analysis of musical meaning, and as amounting to the entire socio-musical reality.' (Born 2005a, 14) The semiotic understanding of mediation, she has argued more recently, should be elaborated through empirical inquiry into a full blown 'critical phenomenology' (Born 2013a, 24-31). She expands music's mediated 'socialities' into four categories or 'planes': the 'intimate microsocialities' of performance and listening practice; 'musically imagined communities' of listeners identifying by genre, subculture or public; 'wider social identity formations' such as class, race, and gender; and 'institutional forms' which condition music's production and exchange. All four 'planes' must be taken into account, Born claims, if a holistic account is to be taken of the dynamic workings of the musical

assemblage (Born 2012b, 266-267).

It is of course arguable that what Born's 'planar' framework contributes is little more than a mnemonic for the different kinds of social meaning that can be observed in music and musical practice, rather than theory of mediation as such, and thus that it is merely a description of what good cultural musicology should already do. As Nick Prior has observed, mediation 'serves Born best in getting at how objects afford a continual relay of translation of distinct processes and effects' (Prior 2011, 133). What distinguishes Born's model is the heightened attention it encourages to the fact that the musical assemblage is always potentially mediating a vastly expanded set of social meanings and agencies.

I've bracketed out this wider set of mediations for the moment and concentrated the more specific case of technology and aesthetics in order to show how in any given situation what is mediated is partly a product of what people imagine mediation to be. Linguistic anthropologists have observed a similar effect in the ways technologies mediate discourse. People develop culturally and historically specific ideas about how media shape discourse, and what kind of utterances are appropriate to them. In turn these ideas—what Illana Gershon has called 'media ideologies' (2010)—shape the ways people use, experience, and construct media. I've focused on aesthetic and technological assemblages to highlight the way such ideas bear upon not only the objects and effects of mediation, but also its agents. My point in lingering with narratives of modernisation, with ANT, and with Simondonian transduction has been to demonstrate that each offers a partial perspective on what kinds of mediation can occur, and thus each bears comparison with local concepts and beliefs. Mediation is useful as a concept only insofar as it affords a plurality of interpretations over time and space.

In the next chapter I take a similar approach to the work of social and historical differentiation. Here I describe a fractal territoriality being dramatised and negotiated at multiple scales, showing how technological objects and epistemologies mediate the differentiation of subjects, institutions, performances, histories and genres. In the subsequent chapters I bring the same approach first to the politics of performance and

pedagogy, and then to the constitution of devices and setups themselves. In my conclusion I draw out its implications for thinking about the ways the digital interacts with notions of genre.

Digital territories: Negotiating cultural, historical and technological limits

3.1 Mutations, fields, territories

In the autumn of 2011, the board of directors of the CALQ published new recommendations to reform the funding of digital production practices in the arts. For producers and intermediaries in the more technically savvy wings of the city's high profile cultural industry—people the CALQ addressed both as the lobbying force behind the reforms, and their main clientele for funding—the recommendations were already long overdue. Using words such as 'mutation', 'sustainable development' and 'evolution', the report connected the then majority Liberal party's business-friendly policy orientation with a narrative that figured cultural transformation as an inevitable, even ecological responsibility.

In many domains today, among them that of culture, traditional mechanisms of recognition and notions of professionalism and excellence are in mutation, thereby redefining the role of organizations and support infrastructures.

The channels of production in the culture industry are changing, artistic practices evolving, access to the Internet at very high speeds becoming strategic, and users transforming themselves into content producers. The sum of these observations calls for a revision of public policies and government structures in the cultural sector.

In the end, integrating the principles of sustainable development in the framework of every government policy or strategy reflects the importance of insuring that present choices don't prevent future generations from responding to their own needs. The demographic situation in Quebec and the context of the rationalisation of state resources calls for an optimisation, even a redefinition of current processes and mechanisms. Digital technologies will quite possibly permit Quebecois society

to realize this shift. In order that the generations of the future will be able to succeed at evolving in this context, many actions must be taken right now.⁷⁵

The report references notions of culture and modernisation rooted in long-standing Quebecois historical and social imaginaries. It is deeply invested in the future of the province's largest city, Montreal. On one level, the city's reputation as a cultural crucible is generated by sheer geopolitical contrast with the rest of North America. It indexes a subversive sense of Europeanness by surviving as the sole metropolis of a francophone 'archipelago' scattered across an overwhelmingly anglophone continent, the dominant culture of which rose to global dominance over the course of the twentieth century (Louder and Waddell 2007; Marshall 2009). Its preconceived otherness also feeds back into the material construction of cultural life in the form of public funding and economic development initiatives designed to preserve the city's unique status. As I outlined in my introduction, the collapse of the city's port and industrial base during the nationalist awakening of the 1960s and 1970s laid the groundwork for a turn to the multimedia industry as a new driver for economic growth in the late 1990s, and later a wave of post-Fordist gentrification policies (cf. Germain and Rose 2000; Pilati and Tremblay 2007). Real and imaginary have thus worked together to establish Montreal as a city of businesses and institutions celebrating cultural experimentation and innovation, and to sustain it as a vibrant microcosm of the ways culture and technology have become entangled in the North American imagination.

In spite of the generalising language adopted by policy makers, the diverse electroacoustic, sound art, media art and experimental improvisation scenes which the CALQ recognised as taking part in the digital transformation define themselves largely in contrast with each other. By framing them as a single ecosystem in mutation, the report smooths over a number of frictions generated both in the professional consultation meetings where the policy was negotiated, and among the artists and collectives whose changing practices were seen as motivating their assembly. If those in Montreal's cultural

⁷⁵ Perron and Gauthier 2011. For immediate reception of the CALQ report in question see also Deglise 2011. All translations from francophone sources in this chapter are my own.

sector did have a growing sense that institutional and aesthetic changes were afoot, they could hardly agree on what they were.

In this chapter I want to take this specific debate over 'Quebecois culture in the digital universe' as a point of entry into a more detailed examination of the work of opposition in the scenes and practices where its negotiation and articulation occurred. The range of sound artists and electroacousticians seen as implicated in the CALQ report mapped onto a stable set of aesthetic conflicts with deep roots in Montreal's high art institutions. Their social and aesthetic conflicts have been definitive in the generation of international attention around Montreal's electroacoustic music and sound art scenes, but don't necessarily map in a linear way to the hierarchies that have defined other places and periods. Montreal is a place where art musicians are increasingly structuring their social and aesthetic divisions around notions of the digital. The territorial specificities in play correlate with the idiosyncratic range of genres the city harbours.

In the last decades of the twentieth century, Montreal grew into both a global centre for research and education in electroacoustic and computer music, and a North American hub in the transnational media art circuit. On the electroacoustic side, the city has become known as one of the homes of a genre known as 'acousmatic music', characterised by a meticulous compositional practice emphasising modified recorded sound and immersive listening practices involving highly specialised diffusion techniques (Dhomont 1996). Concentrated in university studios, the scene has also developed strong links to psychoacoustic, sound engineering, and digital instrument research. Although it has had connections to the electroacoustic scene since the early 1980s, Montreal's so-called 'digital art' scene has grown substantially at the points of transition between this academic context, the experimental theatre and dance scenes, and the multimedia industry. It brings together academically trained artists, musicians in a network of Artist-Run Centres (ARCs), and clubs linked to the city's long established EDM scene. By the end of the 1990s the digital art scene had developed institutions and festivals of its own, modelled on international art and technology organisations like Transmediale, Ars Electronica and ISEA.

As a glance back at the first chapter will indicate, neither digital art nor electroacoustic music existed in isolation. A number of local genres intersect them, sometimes connecting and other times filling gaps between them. The hybrid of free jazz, Cagean experimentalism, prog rock, and downtown eclecticism known as *musique actuelle* emerged in the early 1980s and now counts a cross-section of both digital artists and academic electroacousticians among its representatives. The post rock scene established around the band Godspeed You Black Emperor! in the late 1990s, on the other hand, now encompasses a range of noise, drone and experimental expressions that continue to attract students of electroacoustic music and digital art looking for an escape from the canonical discourses of universities and museums.⁷⁶ Both of these local aggregations play a vital role in conditioning the larger genre complex that makes the opposition between Montreal's electroacoustic and digital art scenes so unique.

Electroacoustic and digital art institutions in Montreal stake blurred, sometimes overlapping, but always competing claims to technological innovation, and the power associated with it. My goal in this chapter is to examine claims by producers from different parts of this conflict, highlighting the variety of ways that digitalisation in Montreal has interacted with the performance of cultural, generational and territorial difference. In particular, I'm interested in the intersection of social, historical and aesthetic transformations. Where the 2011 CALQ report referred to 'users transforming themselves into content producers' and 'notions of professionalism and excellence [...] in mutation', it depicted a world in which the social and technical boundaries restricting access to artistic production were collapsing. Within the cultural sector it addressed, there were those who would agree that the field had indeed become a kind of flat, postmodern utopia: a place where anything goes, and where social hierarchies are subverted. But the very notion that digital forms differ substantially from those involving other media suggests that certain kinds of aesthetic cohesion and division are still discernible. Indeed, digitalisation policies like those of the CALQ don't simply recognise the work of categorisation; they also perform it. At a general level, this chapter looks at how they do that, and for whom.

⁷⁶ I explore such escapes further in Chapters four and five.

Other observers have put forward accounts of the social lives of cultural producers in the Internet age that figure their creative and critical relationships as a delicate balance between individual choice and a field of cooperative competition. Christopher Kelty's concept of the 'recursive public', for example, describes a kind of social group who 'imagine in common the technical and legal configuration of the very medium that makes it possible for them to associate with each other' (Kelty 2005, 187). Members of Kelty's recursive public of open source software programmers perform their belonging not only discursively, but also materially, each building and repairing a part of the Internet's infrastructure. Ethnomusicologist David Novak has extended Kelty's notion in a way that suggests it could be applied to almost any group that takes an active role in the infrastructure of its own discursive activity. 'A recursive public', writes Novak, 'remediates the construction of knowledge toward its own formation' (Novak 2011, 626). The public for underground experimental recordings, for example, is not assembled from above but constituted by the circulatory practices of what he calls 'experimental listeners'.

It is easy to imagine how such models of open and voluntary social cohesion might provide precisely the kind of democratised framework that would account for the widely reported post-modernisation of electroacoustic practices supposed to have followed the popularisation of the Internet in the mid-1990s.⁷⁷ Digital technologies have clearly transformed academic electroacoustic music's 'musically imagined community', to borrow a formulation from Georgina Born.⁷⁸ But discourses of openness do not fully explain the changing position of electroacoustic music within the institutional ecosystem that supports the Western Art Music canon: they also enact new limits. Although postmodernist thinking has brought with it new critiques of artistic autonomy and authority, from an institutional and social point of view the practices of both electroacousticians and digital artists in Montreal continue to operate under the assumption of well-defined professional roles, and a degree of isolation from commercial competition.⁷⁹ The persistence of these limits and

77 See among others Ostertag 1996; Cascone 2000; Waters 2000.

78 For various discussions of this concept compare Born 1993, 237; Born and Hesmondhalgh 2000, 35; Born 2012b, cf. Anderson [1983] 1991.

79 Narratives of democratisation and openness resonate with postmodernist projects on the fragmentation of grand narratives and textual unities. Cf. Lyotard 1984; Jameson 1991; Kramer 1996. Coincidentally, Lyotard's (1980) analysis was originally written as a report for the Quebec Council of Universities.

oppositions demands critical attention to mechanisms of public-making that go beyond the involuted work of recursion. As I will argue, narratives of liberalisation in electroacoustic music and digital art have co-developed through musicians' efforts to structure relationships, not just among their immediate peers, but between genres and generations.⁸⁰

There is much to suggest that the artists and institutions I explore here continue to operate according to the logic of what Pierre Bourdieu once called 'autonomous fields' of cultural production. Bourdieu's classic example is the nineteenth century French literary avant-garde, in which 'producers-for-producers' competed for access to a market in symbolic capital divested of commercial necessity (Bourdieu 1993, 125). His portrayal relates the concept to modernist notions of aesthetic autonomy familiar to historians and theorists of art music. The concept of musical autonomy has been used variously, by Adorno (1973) to characterise the teleological 'liquidation' point of the Romantic tradition, and by scholars ranging from Langer (1957) to Clarke (2005) to describe the sense of abstract, organic movement that seems to pervade certain kinds of 'absolute' instrumental music. Bourdieu uses the notion of autonomy in a more limited and technical way, however, distinguishing between the self-sufficient exchange of purely symbolic capital in the high art market, and the 'heteronomous' exchange of 'mixed capital' which dominates the commercial market. Heteronomous capital requires support in a useful activity or function. Autonomous capital and the field structured around it are constituted for Bourdieu by what he calls the 'magical operation' of economic reversal, which 'consecrates [...] preexisting social difference' by allowing symbolic capital to function independently and arbitrarily (Bourdieu 1998, 22).

In the particular situation of electroacoustic music and sound art in Montreal, this symbolic autonomy is partly shaped by residual notions of modernist aesthetic autonomy like those put forward by Adorno. The majority of public arts funding in Canada is awarded on the basis of an independent peer review process designed to avoid political influence. These rules were instituted in the 1950s as part of a strategy to advance the

80 I return to the internal mechanisms of public-making and their entanglement with digitalisation and liberalisation in chapter four, and to the matter of differentiation between genres in chapter six.

collective career interests of Canadian artists within the context of what Jody Berland has called 'mimetic' nationalism, a way of bringing Canadians into being 'through the process of seeing and knowing themselves' (Berland 2000, 17). Associations between modernist aesthetic politics and technological progress also have deep roots in the electroacoustic and digital art fields at a transnational level, as Born's work on the computer music research institute IRCAM illustrates, for example (Born 1995, 97). My concern in this chapter, however, is with the concrete strategic activities that can sustain the autonomy of a field's Bourdieuan 'symbolic economy' even where producers have learned to resist or demur from recognizably modernist thinking. I argue that the operations which make aesthetic autonomy possible, the ways that divisions and allegiances are performed so as to protect the status of certain cultural practices over others, are not inherently modernist in orientation, but afford a degree of negotiability in the 'exchange rates' of symbolic goods. Informed by some of Bourdieu's more recent critics, I treat these operations as sustained in the performance of specific limits in time and space, not pre-determined by an enduring structural hierarchy so much as acted out repeatedly in dynamic patterns of imitation and opposition.⁸¹

In the ethnographic and historical accounts that follow I probe the ways that artists and intermediaries in Montreal mobilise both technologies and discourses of technological change to differentiate digital art from other traditions of electroacoustic and sound art production. Taking another cue from Born (1995), I attend here to what Bourdieu refers to as the 'rationalising' operations that sustain cultural practice. Critics of Bourdieu have focused the way he elides historical and cultural differences in social struggles by assuming the general formal stability of the field's dynamic stasis.⁸² As Edward LiPuma (1993) has argued, however, we must always consider the historical and cultural specificity of the social frameworks that symbolic capital reproduces. Transhistorical accounts of reproduction as a mechanism must be backed up by detailed examinations of the different legitimations and dispositions which occur in practice (LiPuma 1993, 27). I argue then for

81 See for example Calhoun 1993; Boltanski and Thévenot 2006; Pelletier 2009; Boltanski 2011; Born 2010b.

82 See LiPuma 1993, 33; Born 2010b; Prior 2011.

a reading of rationalisation that discards the underlying generative logic in favour of something closer to what Boltanski and Thévenot (2006) call the 'operations of qualification' which people use to support the work of opposition and agreement in political life. From a technical perspective, Bourdieu's notion of rationalisation denotes only the work people do to consecrate the boundaries of cultural territories and secure the exchange value of cultural goods.⁸³ Tracing such practices helps us to observe how particular motivations and meanings are achieved instead of presuming that the outcomes of reproduction are formally determined in advance.

My analysis in this chapter highlights territorialisation, which I understand as a kind of rationalisation that doesn't reproduce a fixed structure, but generates temporally and spatially specific limits and distinctions.⁸⁴ These can include the kind of concretely territorialising actions which play upon the relationship between musicians' identities, nationalities and spatial imaginations, but they don't stop there.⁸⁵ Autonomous and heteronomous territories can be constituted historiographically, through the ways musicians and intermediaries maintain authority over a practice or medium with particular styles of narration or by setting up precursors in positions of historical primacy and agency.⁸⁶ As I will elaborate upon further in subsequent chapters as well, they can also be constituted technologically. Several authors have pointed out that an orthodox reading of Bourdieu leaves questions of technological practice largely unanswered.⁸⁷ By looking at the use of technological objects and technical work as territorialising resources I want to show how they can mediate power and identity in similar ways to aesthetic objects.

83 See also Bourdieu 1998, 22. This is in contrast with the more widely used account of rationalisation developed by Max Weber (1958); cf. Paddison 1993.

84 My use of the terms territory and territorialisation is inspired by Deleuze's 'deterritorialisation', a concept which is not strictly spatial, but implies any action or movement generating structured boundaries in an otherwise unstructured milieu. I deliberately avoid Deleuze's distinction between deterritorialisation and reterritorialisation, which is often misused to imply a Manichean distinction between chaotic process and predictable structure (cf. Massumi 1992). Other recent scholars also adopt a less technical account of territories and territorialisations. Christopher Atton, for example, simply relates the production of territories in free improvisation performance practice to Goffman's concept of 'framing' (Atton 2012).

85 These kinds of territory constitute a central point of reference for historians of Canadian music like Elaine Keillor (2006, 295-320), who highlight mythological notions of landscape and northernness. On the ideological and phenomenological implications of such notions see also Daniel Grimley's (2006; 2011) accounts of 'landscape' in nordic music.

86 Cf. Thomas 1989. In the particular context of cultural politics in Quebec see also Handler 1988, 16-19.

87 For more detailed critiques of Bourdieu's neglect of technology see Sterne 2003 and Prior 2008.

Technological objects may be thought of as territorialised by musicians through different styles of what Akrieh (1992) calls 'de-description'. As I noted in chapter two, de-descriptions are the adjustments that happen when real agents take over where the designer of an object's imagined agents leave off. Where those real agents are situated has a significant effect on how their tools and systems are territorialised.

My account will alternate between the registers of scene, career and performance to explore the ways both electroacousticians and digital artists in Montreal figure digital technologies and digital practices as harbingers of change and opposition. Sometimes these patterns of spatial and temporal distinction challenge preconceived boundaries between serious and popular music, for instance, or between music and visual art. My illustrations show the negotiation of digital territories in sometimes paradoxical action, from the construction of origins, to projections of possible futures.

3.2 Defining culture

My fieldwork in Montreal began in 2011 on the day of a highly anticipated federal election—the third in Canada in five years. Its results were significant for two reasons. First, the country's economic core in Ontario experienced a widespread shift of previously Liberal voters to the Conservative party, consolidating the first Tory majority in twenty years after a long string of ineffectual minority governments. Second, a wave of support in Quebec shifted to the left-leaning New Democratic Party (NDP), leading to the defeat of all but three members of the Bloc Québécois, a sovereigntist protest party which had held nearly every federal seat in the province since 1993. Analysis in the press dubbed this Canada's first 'social media election', citing the influence of the *vague orange* (orange wave, after the colour of the NDP logo) campaigns which ignited Quebecois Facebook and Twitter traffic in the weeks prior to the vote. Divergent narratives emerged almost immediately to explain this shocking change in the fortune of a party which had never held more than one seat in the province since it first posted candidates in 1962. In the anglo-Canadian press the swing was reported as signalling a drop in support for political

separation and a new era of harmonious federal cooperation. In the francophone Quebecois press, however, the dominant narrative boiled down to renewed isolation from the rest of the country. Holding seventy-five (slightly more than a quarter) of the seats in the House of Commons, Quebec's population had thrown its considerable federal influence overwhelmingly behind a left-wing political platform which the rest of the country seemed not to share. Complaints began to emerge from nationalist quarters that the NDP had defrauded Quebecois voters in some way to lure them away from their 'natural' bases of support in the independence movement. In one high-profile case, a rural riding north of Montreal drew a combination of ridicule and indignation after inadvertently electing a *pôteau* or dummy candidate. Their new NDP member of parliament lived in Ontario, had never visited the region, and did not speak French.

A campaign advertisement for the Bloc Québécois which lingered on the walls of the underground metro system in the weeks following my arrival depicted a track of stage lamps suspended above a vacant proscenium framing the curt slogan '*Parlons culture*' – somewhere between the English 'we speak culture' and the more imperative 'let's talk culture'. Like the Bloc's main campaign slogan, '*Parlons QC*', these posters capitalised on the strong connection between language and place which characterises dominant constructions of Quebecois identity. Here, however, the word 'culture' also indexed a further connection between identity and the arts. As I pointed out in the introduction to this thesis, this connection has served both nationalist and counter-nationalist purposes in Quebec's political history.⁸⁸ Political scholar Diane Saint-Pierre (2003) situates the roots of this double meaning in the 'humanist' (*anthropologique*) thinking that drove Cold War efforts to establish 'cultural rights'. Influential definitions circulating among policy makers during the emergence of the liberal nationalist movement in the 1960s were diverse, but most tended to emphasise sovereign control over cultural 'resources' and provision for cultural 'needs'.⁸⁹ Nationalist sociologist Fernand Dumont (1993) has divided the notion into 'first' and 'second' cultures. Dumont's 'first culture' is the common-sense body of

88 On the ambiguity between these uses see for example Handler 1988, 102-110.

89 Saint-Pierre (2003) cites UNESCO interventions, André Malraux's *Maison de la Culture* program in France, and the decolonisation movements of the West Indies and Algeria as particularly influential. On the last point see also Mills 2010.

practices, meanings, ideals and models, similar to Bourdieu's 'habitus' (1977). First culture can be understood as that which is always already present for individuals depending on where they were born. As anthropologist Richard Handler (1988) points out, Quebecois nationalism places a high premium on its 'ownership' of a culture in this sense. As anthropologist Richard Handler (1988) points out, the Quebecois nationalism places a high premium on its 'ownership' of a culture in this sense. It is also this notion of culture that the Quebecois refer to when they speak of immigrant populations in the province as the *communautés culturelles* (cultural communities) which they host as minorities (Handler 1988: 158). Dumont's 'second culture' is the acquired, ideological and historical consciousness that comes about through cultivation and education.

These shifting definitions and representations show that culture is not just what Gary Tomlinson (1984) once called the 'web' from which musical production in Quebec arises. Debates around what culture *is* in Quebec are central to the problematisation of production. Quebec's aspirational status as a nation has been deeply invested in both the first culture associated with language and place, and the second culture expressed by the artistic pursuits of the Quebecois. In the past this relationship has operated mimetically. 'Since the political realm cannot offer its own proofs of the nation's reality', writes literary scholar Erin Hurley, 'the fictions of cultural production frequently bear the burden of proving *le fait national*' (Hurley 2011, 22). But genre, language and identity-bending spectacles such as those of Cirque du Soleil, Robert Lepage, and Carbone 14 have become increasingly emblematic of national creativity as well. All adopt a kind of cosmopolitan ambivalence towards markers of origin. These icons' penchant for abstract spectacle now plays into a popular essentialism opposing the 'gestural' and 'emotional' focus of francophone performance to the 'textual' and 'rational' focus of anglophone productions (Hurley 2011, 14–15).

In practice, however, performances of Quebecois identity, whether first or second, are often difficult to divide along essentialised ethnic lines. This complication is particularly salient in Montreal. The patterns of inter-linguistic translation which characterize everyday life in the city coalesce into a range of multi-lingual identities,

expressions addressed to publics used to straddling gaps between discursive registers (Liebersohn 1970; Simon 1994; Probyn 1996). Disguised or misread markers of identity render the city's linguistic and cultural character notoriously difficult for outsiders to decipher. Its disparate reputations as a centre for acousmatic music, italo disco, prog rock and intermedia theatre have all at times been connected by critics to such complications of identity.⁹⁰ In many ways, the complexity of cultural mixture in Montreal is what makes culture stand out as an issue.

Culture stands out as an issue for Montreal in the rest of Canada as well. The junior New Music programme officer for the federal arts funding agency, the Canada Council, once gave me an informal estimate that roughly a third of his programme's recipients were based in Montreal. He had just been hired at the time of our meeting, succeeding Aimé Dontigny, a prominent Montreal-based experimental musician who'd been promoted to director of the entire music section. Although highly aware of the degree to which Montreal dominated contemporary music in Canada, the officer was at a loss to explain. Nevertheless, its reputation as a city where culture is a kind of local specialty transcends its geographical and linguistic boundaries. The independent rock scene, for example, is now widely mythologized as a kind of perfect storm generated by the migration of anglophone students from other parts of the continent (Stahl 2001). Many were attracted to Montreal universities in the 1990s by low tuition rates, cheap property values due to the slow recovery of the real estate market following the second sovereignty referendum, and strict tenant protection laws instituted during the Quiet Revolution.⁹¹ Visual representations associated with the recent indie rock and post rock scenes paint a conspicuously displaced picture of Quebecois pride. Arguably the most popular and enduring band to emerge from the post-referendum scene is Arcade Fire, a group which draws most of its members from outside the city, and releases its records with an American independent label. They promoted their 2012 tour with a t-shirt featuring a stylized map of the province and the English-language warning 'Don't mess with Quebec', riffing on a popular slogan for Texan

90 See among other examples Dhomont 1996; Straw 2004; Straw 2008; Hurley 2011.

91 Tuition rates for students from outside Quebec are higher than those for residents, but residency can be established by staying in the province for one year without full-time study.

pride. The scene's annual point of convergence is a festival established in the late 1990s known as Pop Montreal. A variation on the 'buy local' poster hung on the lamp-posts on busy St-Laurent Boulevard during the past few editions of the festival encouraged shoppers to weigh the value of goods '*made icitte vs. made ailleurs*'. The expression defies translation because it combines two languages. It thus thwarts the notorious laws which restrict the linguistic content of all signage to French, and succinctly encapsulates a salient local linguistic idiosyncrasy. This kind of ironic, punning play with national symbolism, as Alexandrine Boudreault-Fournier has noted in her work on Montreal's hip-hop beat-making scene, also characterises emerging 'post-national' identities among francophone and immigrant youth (Boudreault-Fournier and Blais 2014; Heller 2011).

As we shall see another major catalyst for the construction of Montreal as a site of cultural innovation is the narrative of the Quiet Revolution. This period remains central to Montreal's reputation as a site of cultural dominance, and a symbol of technological advance in Canada. Present-day cultural sentiment has been deeply affected by its weaving together of modernising technological projects and humanist notions of ethnic and linguistic specificity. It symbolises the paradoxical notion that while first culture in Quebec can be rooted in an apparently closed idea of collective heritage, second culture can continue to push for growth and progress.

3.3 Defining digital art

Professional consultation meetings to negotiate revisions to the CALQ's digital art proposals took place against this background of cultural solidarity and optimism in June 2011. Early in the month a two day forum was announced to address the digital arts at the Musée d'Art Contemporain de Montréal (MACM). It was the second of three, each oriented towards a different artistic sector. The council invited prominent intermediaries in the province's media art scene along with previous and current grant holders. Although smaller talks addressing the music program had been held separately some weeks earlier, sound artists, musicians and musical intermediaries made up a considerable part of the

digital art guest list as well. A few days in advance, delegates received documents describing the agenda and setting out a point form outline of the final report. The council sought proposals to enhance the viability of the field through support for five items: creation, production, diffusion, 'promotion/marketing', and advanced training (Conseil des arts et des lettres du Québec 2011b). Delegates concerns gravitated repeatedly, however, towards the proposed closing task which seemed to frame the entire discussion: that of defining and identifying the sector as such. Small pockets of dissent sometimes boiled over during breaks into discussions about promoting free software and hardware, keeping funding accessible to women and minorities, or the exclusion of anglophone participants and presenters. When sessions reopened, however, conversations consistently returned to the practicalities of infrastructural support, self-definition and international recognition.

The opening presentation by the committee of CALQ officers featured what they described as a schematic timeline of the sector, outlining its genealogical shape. It began with a computer animation festival, *Images du Futur* (Images of the Future), curated by Hervé Fischer and Ginette Major every summer from 1986 to 1996. It continued with dates for the establishment of local media art institutions, beginning with the web-focused multimedia centre Agence TOPO in 1993, followed by the research-oriented SAT and the feminist Studio XX in 1996, Perte de Signal and the Fondation Daniel Langlois in 1997, and ending at the turn of the millenium with the first MUTEK and Elektra festivals, the inter-university art and engineering consortium Hexagram, and the public sound installation *Silophone* built by local duo [The USER].⁹² These moments, the committee argued, had made Montreal a 'hub for the digital arts', on its way to becoming 'a little Berlin'. New programs needed to sustain this progress by engendering new aesthetic mixtures and 'multidisciplinarity'.⁹³ Associating Montreal with Berlin referenced not only the German city's post-reunification success as a hotbed of film, performance and EDM

92 The committee left out some darker, but perhaps more galvanizing, events in the scene's genealogy such as the aborted *Quebec – New York* exhibition of 2001, organised to celebrate a trade deal between the two governments. A delegation of high profile artists associated with digital art such as videographer and SAT president Luc Courchesne and theatre director Robert Lepage were set to launch new works in the lobby of the World Trade Centre on the morning of 11 September 2001. Courchesne has become notorious on the Internet more for his hand-held video of a plane striking one of the towers that morning than for his art work. See Corbeil 2011.

93 For a discussion of the distinctions between inter-, multi-, and transdisciplinarity see Barry et al 2008.

production, but also specific partnerships with Berlin-based festivals like Transmediale.

Other speakers located the identity of the sector in a more philosophical register, but still emphasised historical cohesion. A talk by local author and theatre director Daniel Canty called for a view of the ways the contemporary scene related to the history of media art as a succession of technologically engendered ruptures. Canty highlighted Expo 67, focusing on the Buckminster Fuller design for the American pavilion later renamed as the Biosphère, an architectural icon of the occasion and one of the few original installations left standing at the old fair grounds. At the time of the meetings the SAT was in the process of constructing a similarly dome-shaped projection space on the roof of its headquarters a few blocks away, set to open with a centenary tribute to Marshall McLuhan a few months later. Why not emphasise the continuity of these experiments, Canty suggested, by adopting a term like 'electric arts'? Viewed in this light, the changes engendered by digital media were simply the most recent in a long series of ruptures forming a 'rhizomatic' genealogical network.⁹⁴

There was little agreement, however, when it came to defining the field in aesthetic or technological terms. Whenever the floor was opened to commentary, delegates raised and then quickly cast aside any attempts to ground a definition in tenuous concepts like 'digital material' or 'code', or cybernetic concepts like 'feedback'. Eric Mattson, a prominent sound art curator known for his work showcasing local artists at the annual MUTEK festival, stood many times to express his doubt that the council could ever distinguish a clearly digital quality or style. Where, he asked, would this leave musicians and sound artists working with analogue or mechanical technologies? What of more conceptual practices that hinged on language or writing?

For the founding director of the Elektra festival, Alain Thibault, the cohesion of the sector was simply an effect of mutual recognition which had obtained among its key players. What was at stake, he suggested, was not a stable tradition or group of institutions, but the maturation of a 'digital culture' fully integrated with the 'perpetual evolution' of

⁹⁴ The Deleuzian metaphor of the rhizome, signalling a kind of reticulation between moments which are otherwise socially or historically disconnected, has long been a popular one with Montreal's media art critics. See for example Letarte and Schütze 2002, Charron 2008, or Bachand 2009.

media technology. As Lauren Rabinovitz and Abraham Geil have argued, definitions focused on 'digital culture' can either designate a particular subculture with specifically digital preoccupations, or deploy 'the digital' as a 'master sign' of the transformations that characterise late modernity, an index of speed, interchangeability, and mutability (Rabinovitz and Geil 2004, 4-5). Thibault's diagnosis echoed sovereigntist tropes in which modernisation is figured as a passage from childhood to adulthood, the growth of a 'self-actualizing, independent political and social body'.⁹⁵ At the same time, his notion of a maturing digital culture could also be understood as a gesture towards his personal break with his roots in academic electroacoustic music.⁹⁶ He had studied composition in the early 1980s at Université de Montréal under the close guidance of the studio's founder Marcelle Deschênes. After becoming director of the electroacoustic concert society ACREQ in 1993, he had gradually cut the organisation's ties with the electroacoustic mainstream. As sole curator, he then personalized the ACREQ aesthetic and focused its activities into the Elektra festival in 1999. In a rare statement written for the francophone contemporary music journal *Circuits* in 2002, he articulated the rupture publicly. His vision of an emergent and evolving digital culture represented a counterpoint to academic insularity, a tuning-in to changing demands generated outside of the canon. Specifically, he called for renewed openness to the technical and stylistic transformations associated with popular genres of electronic music, especially what he saw as their far richer engagement with the domains of rhythm and physical sensation.

In spite of Thibault's efforts, most audio artists and composers I spoke with at the time expressed frustration that the Elektra festival had fallen out of touch with contemporary aesthetics and become more concerned with establishing international ties than with supporting the local scene. For some, the high-intensity, abstract audiovisual spectacles which had become the festival's mainstay—typified by immersive work like Austrian artist Kurt Hentschlager's 2006 fog, strobe light and subwoofer show *Feed*, which visited the festival four times between 2007 and 2011—smacked of high-brow pretension.

95 See for discussion Hurley 2011 and Lamoureux 2001, both citing Dumont 1993.

96 Although not cited explicitly at the meeting, Thibault's contribution recalled earlier published statements about the evolution of electroacoustic music in Thibault 2002.

As one promoter put it to me, although it sometimes included techno producers, Elektra was 'for the head, not for the feet'. Many saw the festival's aesthetic as insular and anachronistic, straining to catch up with ten-year-old standards set by bigger European festivals. The aesthetic seemed to imply that the really important artwork had always happened elsewhere. It also reinforced both the modernisation narrative and the drive for economic innovation at the heart of the CALQ reform process. Fostering overseas success and disseminating Quebecois culture in the 'digital universe' suggested that 'growing up' required 'opening up' to the outside world.⁹⁷

Growing up into a digital universe also signalled another kind of transformation for institutions like ACREQ and CALQ. Many of those involved in the consultation process represented long established models of cultural access and production in Montreal. Education and research fell both to universities and ARCs, the system of non-profit organisations which originated in the 1970s and quickly spread across Canada to improve access to technical resources and provide an alternative to the curatorial and social practices of the country's dominant museums and commercial galleries.⁹⁸ Dissemination and valorisation fell mainly to public museums and to the swarm of annual festivals which dominated the city's tourist industry each summer. At the same time, the wording of the CALQ report called upon all of these players to re-imagine their operations along the lines of the 'creative cities' strategy advocated by local culture pundit Simon Brault. Changing tools of production, the council suggested, had implications beyond the creative process; they also engendered increasing institutional 'decompartmentalisation'. In an age of 'autoproduction' and 'autodiffusion', institutions became specialised 'poles of reference' for research and experimentation. Inter-institutional partnerships needed to be struck to consolidate markets, facilitate 'transfers of expertise', and negotiate industry partnerships to secure access to specialised infrastructure like the new high powered fibre optic lines

97 For a discussion of metaphors of maturation in Quebecois nationalism see Handler 1988, 140-158.

98 Early centres often took the form of print shops or video production studios, but their focus gradually widened to include other aspects of advocacy, curation and distribution. For detailed discussions of the structures, politics and publications of Canadian ARCs see Tayler 2007; Conlin 2008. The connection of ARCs with education and employment strategies is confirmed by Will Straw (2004, 419), who notes in passing the historical anchoring of the model in the federal government's 'Local Initiatives Project' which sought foster youth employment in the 1970s.

planned by the provincial hydroelectric corporation Hydro Québec. At the same time, institutions required government oversight in order to stimulate public interest and become involved in local economic development.

The recently completed Quartier des Spectacles development, which had transformed Montreal's former red light district into a permanent multimedia festival space, provided a perfect example (McKim 2012). Its benefits to the tourism industry afforded a link between local styles of neoliberalism and cultural nationalism. Discourses of 'creativity' in recent urban planning in Montreal drew upon both sides of this intersection. On one hand, they affirmed government strategies which refocused arts funding on added value in the tourist sector, and corporate arts patronage. On the other, they played into a desire to distinguish the city as a site of intensified cultural production. As Montreal-based urban studies scholars like Damaris Rose have asserted, the implementation of neoliberal gentrification policies such as those espoused by Culture Montréal and the CALQ does not imply blind complicity with these ideologies among local actors. In Montreal as elsewhere, these transnational policy trends often align with 'home-grown' myths about regaining a lost or potential vitality or diversity (cf. Rose et al 2013). For composers and media artists involved in the CALQ consultations, the complex of historical, territorial and economic guidelines was thus not only an imposition of neoliberal policy. It also translated into concrete identifications and engagements.

3.4 Fixing the medium

One of the most vocal delegates at the CALQ digital art consultations was Emmanuel Madan, a Montreal-based composer, and member of a sound art collective that identified itself with the stylised name [The USER]. The duo first came to attention in 1999, when the first iteration of their *Symphony for Dot Matrix Printers* project earned them an honourable mention for the Ars Electronica Prize in Austria (Leopoldseder and Schöpf 1999, 183).⁹⁹ Madan, trained in electroacoustic composition, and his collaborator

⁹⁹ In the discography see [The USER] 1998.

Thomas McIntosh, trained as an architect, have gone on to develop a series of projects which straddle the boundaries between music and installation. Madan's contributions to the forum highlighted the costs and logistics associated with circulating work on the international market. The delicacy, complexity and sheer scale of their projects, he argued, necessitated a system of management more like theatre or dance production. It was this model of production—closer to Montreal's established tradition of experimental intermedia companies like Gilles Maheu's Carbone 14 and Edouard Lock's La La La Human Steps than to the academic electroacoustic studios—that defined the duo as a pseudonymous collective rather than as traditional collaborating authors.

I met with Madan at [The USER]'s studio some time after the digital art report was published. He and McIntosh worked with a rotating cast of technical assistants and student interns in a one-story brick building in an industrial section of a neighbourhood known as Mile End. The area had been increasingly popular with design and technology start-ups since the late 90s, when the French company Ubisoft opened a large-scale video game development campus there with the help of government initiatives to fund the early dot-com era multimedia industry (Germain and Rose 2000). Since then rents had increased drastically, and a wave of trendy boutiques and restaurants had opened to cater to the growing bilingual middle class and heavy tourist traffic in what was once a working-class immigrant enclave and is still home to a large Hasidic community.

The studio was reminiscent of a small industrial design or architecture firm. Large frosted glass front windows flooded the interior with light while hiding its contents from passersby. The locked street-level door opened onto a remodelled mechanic's shop accented with stainless steel, concrete, glass, and blonde wood. Exhibition catalogues and architectural monographs lined floor-to-ceiling bookshelves. Just past the front office was a glass-enclosed sound studio, its isolated interior cluttered with computers, paperwork, and electronic circuits boards in various states of disassembly. 'As it turns out, it's rare that I do audio work here.' Madan explained to me. 'So it looks more like an electronics shop than a sound studio.'

Beyond this lay an open room lined with desks where the duo and their assistants worked on what Madan referred to as 'mid-stream' projects. Their contents pointed to the reasons why the standard sound studio arrangement had gone unused. On one sat a row of metronomes with their faces stripped off to reveal blinking microcontrollers embedded inside, each connected to a network hub. At an adjacent desk a recent McGill graduate named Nick sat in front of a PC scrolling through the C program running on the metronomes to confirm the accuracy of the timing data they emitted. He pointed to his desktop to show me the Max-MSP program uploading the software to the chips and the Pure Data program that ran in parallel, analysing and graphing the data. The modularity of the project's software layer was typical of [The USER]'s pragmatic approach to development. Here several software paradigms were combined.¹⁰⁰ While describing himself as committed to technical accessibility, Madan had chosen not to support preferential measures for free software or hardware at the CALQ forum. Some projects, he explained to me, could be done better with free software, but extending the principle to all projects risked overriding his aesthetic decisions and increasing the time he spent on technical development.

The back of the studio opened onto a large storage area with tools and raw materials stacked to the ceiling. 'This building here is 2000 square feet, and we also have 1000 square feet of storage', he explained, adding, 'we also have stuff stored in Europe.' The physical space [The USER] required may have been a material necessity for the purposes of construction and storage, but it was also partly an effect of marketing strategy. 'Increasingly we're working on a multiple basis', said Madan. 'It's interesting in terms of sales. You can sell a copy and you still have another. It also makes sense logistically. The prime market for what we do is Europe, but that can be complicated if there were a show in North America.'

The penchant for multiples also played a role in their aesthetic. Most of the collective's installation and stage works featured quasi-orchestral arrays of obsolete mass-produced objects. The sense of decaying modernity was offset by an element of

¹⁰⁰ For further discussion of the implications of modularity in software design see chapter five.

memorialisation. Their project, *Coincidence Engine*, for instance, was conceived as part of an homage to Ligeti's 1962 conceptual work *Poème symphonique*. The series of three installations, the last of which was being premiered later that year in Paris at a showcase curated by Alain Thibault entitled Québec Numérique, featured choruses of time keeping devices modified to shift in and out of phase with each other in an organised rhythmic fashion. While the first two used plastic Ikea clocks, the third was being constructed at great effort and expense using handmade mechanical metronomes. These were being sourced from what Madan told me was the last company in Germany that made them, brought to Montreal as parts, and then reassembled so as to be embedded with networked micro-controllers. In an earlier project, the *Silophone*, Madan and McIntosh transformed a disused industrial grain silo in Montreal's harbour by installing audio hardware that allowed its cavernous interior to be 'played' remotely by transmitting sound over telephone and internet connections. This project has since been established, with provincial and municipal funding, as a permanent monument to the city's ageing industrial megastructures. Digital technology is not so much thematised as masked by [The USER]'s obsession with the afterlife of the 'residual' paraphernalia of mass production (Acland 2007).

When I spoke with Madan in studio, he theorised the style in terms reminiscent of what late 90s critics saw as a turn towards the materiality of the digital medium, a turn long associated with Glitch (cf. Young 2002, 47). 'We're sort of interested in what is non-reproducible in a mass-produced object,' Madan told me. 'And that is apparent in the metronomes and printers. They're mass-produced objects but they seem to have this real personality to them. They're not interchangeable in the same way.' [The USER] developed their interest in the irreproducible element or 'grain' of mass-produced objects at a fortunate time. In 1999, when they were recognised at Ars Electronica, the name for the music prize category had just been changed from 'computer music' to 'digital musics'. Writing in that year's festival catalogue, jury chairperson Kodwo Eshun celebrated this as a response to both the democratisation of digital studio technologies, and the failure of academic electroacoustic aesthetics to react with the appropriate 'iconoclasm' (Eshun 1999, 162–

163). Elektra director Alain Thibault adopted a similar position in the wake of this shift. 'Electroacoustics was born out of repurposing, and from a specific use of audio technologies,' he wrote. 'These technologies are in constant evolution, modifying and fashioning our lives. If it wants to conserve a status as an art that is not frozen (*figé*), electroacoustic music must call into question its modes of representation and explore more radical and stimulating forms of diffusion, in relation with contemporary digital culture.' (Thibault 2002, 53) Similar to the electroacoustic theorists I discussed in chapter two, critics like Eshun and Thibault saw the contemporaneous glitch movement, canonised in part by the remodelling of Ars Electronica, as responding to technological democratisation in a way that was both more politically engaged, and more engaging to listen to. The combination of 'banal office technology' and 'densely textured, rhythmically-driven music' in the *Symphony for Dot Matrix Printers* struck exactly the right chord for the time.

In spite of being recognised as a musician, however, Madan expressed surprise at being an object of interest for a musicologist when I first approached him. Although he could still conceive of his work with [The USER] as musical in a formal way—describing the Csound scores used to program the *Symphony* as 'compositions', for instance—like Alain Thibault he saw his trajectory as excluded from the cloistered discourse of academic electroacoustic music. But his misgivings with respect to categorization also betrayed a desire to maintain a position in a different sector. There was also a close fit between [The USER]'s practice and the production models envisioned in the newly negotiated paradigm proposed by the CALQ. One of the committee's 'items for action' identified changing divisions of labour and institutional forms. Liberalised categories like 'creative collective', 'artist-entrepreneur' and 'artist-technician' dissolved older concepts of authorship and profession. Where older artist-run centres emphasised public access and early career development, [The USER] had developed a branded model of collective production oriented towards a more restricted professional market. Instead of receiving support for independent creative work, as in the traditional artist-run model, here students and early-career artists worked as interns and assistants. [The USER]'s design studio business plan fit well with the CALQ's proposed transformations, as did their skepticism towards

disciplinary 'silos'.

Some of Madan's classmates from the Université de Montréal composition course—the installation and instrument builder Jean-François Laporte, for instance—had gone on to do similarly interdisciplinary work but continued to be thought of as composers. Madan saw this not as an aesthetic difference, but the effect of a kind of 'clientelism' operating in the policies of the federal and provincial arts councils. Madan and McIntosh chose early in their career to apply for provincial government support not through the music section, but through the council's 'multidisciplinary' program. Since they had stuck with this stream over several projects, the music section no longer recognised Madan as eligible. 'What they're doing,' he asserted, 'Is they're defining the discipline according to a set of practitioners regardless of what they happen to be doing'. By addressing a group of artists according to a predefined medium or discipline, and delegating accreditation to the artists collected in the group formed by the definition, the councils effectively helped to police the categories as territories. Although artists and musicians sometimes worked across these boundaries, their dependence on the funding scheme made the definitions difficult to dispute. Madan gave me an example of how he continued to negotiate this complication.

I recently submitted a project in collaboration with someone who works in theatre, and we submitted the project in the digital arts section, and the agent called me up and said: 'Your collaborator is not admissible. He's not part of our clientele. He could submit in theatre.' But obviously he's not going to submit this in theatre because it's not a theatre work, it was a sound installation, like an audio art installation. So I had to say that I was submitting the project solo and he was a principle collaborator, but it wasn't actually a collaboration.

To reiterate, CALQ's style of sectorial division was designed to recognize a medium's social existence without intervening in its aesthetic or technical development. Scratching the surface, however, we find that the naming of a medium was in itself a territorialisation. Artists had to negotiate policy limitations to form common understandings about their adherence to a set of materials and genealogical reference

points. Those migrating from one scene to another articulated their decision as a shift in their way of de-scripting (Akrich 1992) technologies: in this case from a concern with sound technologies as tools of representation, to a concern with their mechanisms and modes of operation. Madan, for example, described his transition as only a slight shift in his understanding of the acousmatic notion of the 'fixed medium' (Bayle 1993), an interest, he told me, 'in other ways that a musical event could be completely captured that did not involve audio recording'. But in what ways did Madan's digital art differ from the electroacousticians he understood as his forebears?

3.5 'Robust but invisible'

It is impossible to disentangle Montreal's reputation as a centre for the production of electroacoustic music from the histories of its four main academic studios.¹⁰¹ All have undergone significant changes in relation to digitalisation policies over the past decade. I chose early in my fieldwork to focus on the academic studio where attachment to the Western Art Music canon and its traditional institutional pedagogies would be the lowest, and thus where the stakes in aesthetic and technological transformation would be the highest. The electroacoustics programme at Concordia University is relatively minor in comparison with more prestigious courses at the Conservatoire, Université de Montréal, and McGill. It is paradoxically both the newest and the oldest in the city. An undergraduate major became available at Concordia only in 2005, but the courses at its core were offered in the early 1970s, prior to the foundation of the university and before comparable courses were established by any of its more prestigious rivals. Concordia was founded in 1974 through the forced amalgamation of the YMCA-administered adult education institution Sir George Williams University with the anglophone Catholic seminary Loyola College. The union came in the wake of sweeping secularization and democratisation reforms initiated by a Quiet Revolution public commission on the Quebec education system

¹⁰¹ Descriptions in this section are drawn from ethnographic interviews and primary sources, but include elaborations from the patchwork of existing publications on Montreal's electroacoustic tradition. See Lanza 1980; Guérin 1993; Dhomont 1996; Mountain 2001; Dhomont and Mountain 2006; Beaucage 2008; Stuble 2008; Ricard 2009; Lefebvre 2009.

(Lenoir 2005). The YMCA's focus on applied and adult education persists, and the university continues to be cultivate an image both more pragmatic and more dynamic than its ostentatious neighbours.

Concordia's music department falls under the authority of the Faculty of Fine Arts. Students in the department can study for undergraduate degrees in the areas of classical performance, jazz performance, composition or electroacoustics. The department offers no specialised graduate degrees, emphasising pedagogy over research.¹⁰² Since the mid 1980s it has built its profile mainly by coordinating a national association of electroacoustic composers with its own open-access journal and a growing archive of recordings. It also maintains an international mailing list for electroacoustic composers and organises an annual competition. In 2001 the university received major federal and provincial research funding—including one of the first grants awarded outside of the engineering disciplines from a body known as the Canadian Foundation for Innovation (CFI)—for a large-scale art and engineering research consortium known as Hexagram. For nearly a decade the consortium operated as a partnership between Concordia and the francophone UQÀM to foster interdisciplinary collaborations involving media artists, academic researchers and the local multimedia industry.¹⁰³ In 2008 the centralised structure was dissolved, and each university gained full control of its share of the partnership, but the mandate maintained fundamentally the same focus. The new funding scheme led to the provision of new studios, laboratories, and sound design courses across the Faculty of Fine Arts. As many Hexagram researchers maintained strong ties with ACREQ and the Elektra festival, the university reforms also drew them closer to the digital art sector.

The electroacoustic 'area', as it is known at Concordia, was initially resistant to the changes, which seemed to undermine the authority of its long-established instructors, and only began to converge when a former Hexagram administrator was hired as interim music chair, shortly before my fieldwork began. Prominent among the instructors sceptical of the change was the course's founder Kevin Austin, who began teaching on Concordia's then

¹⁰² I elaborate on the implications of this emphasis in chapter four.

¹⁰³ For a discussion of this earlier model see Fourmentaux 2007.

small offering of music courses in 1970 while still studying as an undergraduate at McGill. Austin was instrumental in the Concordia studio's genesis and development, but his professional reputation was changing as a result of his intransigence in the face of institutional change, and what colleagues saw as his increasing eccentricity. He remained generally popular with students, and saw their success as proof of the value of his time-honoured approach to teaching. He proudly took part credit for the work of alumni, several of whom, like the indie pop band Arcade Fire, had gone on to international success. He traced his own pedigree back to the local and international avant-garde. Austin had trained at the McGill studio with its founder, Hungarian-born composer Istvan Anhalt, and with National Research Council-based inventor Hugh Lecaine, whose idiosyncratic oscillator banks, variable speed tape machine, and sequencer-like SSSG (Serial Sound Structure Generator) were central to the McGill studio's early instrumentation. When Columbia-trained Argentinian composer Alcides Lanza took over direction of the studio in 1971, Austin remained as de facto technical assistant for several years, being by far the most familiar with the Lecaine equipment of anyone in the music department. He arrived at Concordia in 1970 with no teaching experience. Designing the electroacoustic courses afforded him a space in which to elaborate upon and systematize the approaches he'd learned as a student. Working primarily with untrained musicians in a department without a composition course, he set assignments informed less by traditional music theory than by the cybernetics and phonetics research which had inspired the first wave of European electroacousticians.¹⁰⁴ His account of how audio technology should be taught preserved the naturalism of the Cold War avant-garde, conflating synthesis technique with the unmediated physiology of hearing (cf. Piekut 2012). He often framed his innovations as creative insights waiting for technology and audiences to catch up.

By the time Austin had settled into a permanent position at Concordia in the early 1980s, the handful of courses he offered there were already marginalised in comparison with the new undergraduate program in electroacoustic composition at Université de

¹⁰⁴ Karlheinz Stockhausen's close relationship with Werner Meyer-Eppler, and Pierre Schaeffer's with Abraham Moles, refracted a broader cultural interest in cybernetics in the post-war period. See Grant 2001; Schaeffer [1952] 2012; Stockhausen 1964.

Montréal and the comparable studio courses offered at McGill and the Conservatoire, not to mention similar programs which had sprung up at universities across the country.¹⁰⁵ Having limited opportunities to expand his projects in Montreal, Austin channelled his efforts into the establishment of remote connections. 'The idea of having some kind of national network [came to me] in 1982 or 83', he told me. He began his email list after the university awarded him a small technology grant to buy modems for the departments small collection of Apple IIs. 'This was the beginning of the technology that was going to allow the evolution that I had been waiting for twelve years previously.' In 1986 he floated the idea of a national electroacoustic society to a national conference at the Music Gallery in Toronto entitled 'The Wired Society'. After a handful of favourable responses he began a collaboration later that year with his former student and fellow Concordia instructor Jean-François Denis to form the Canadian Electroacoustic Community, or CEC. In many ways, the CEC was to operate as a new professional composers' society, but for Austin its name articulated a crucial epistemological distinction.

The word 'music' doesn't appear on the CEC website. It was designed to look at the nature of the technology that understands human communication and largely communication theory in information theory terms. You have a source, a channel, and a receiver, and this can be broken down into multiple sources, channels, and receivers. [...] And the electroacoustics is part of this chain that connects the ideas of this person to the cognition of this person and it's not... the idea is to make this part of the chain robust but invisible.¹⁰⁶

The full undergraduate electroacoustics course that finally received administrative approval in 2005 introduced students to audio signal transmission in a way instructors saw as similarly neutral on an aesthetic level. But this neutrality masked a bias towards characteristically electroacoustic ways of understanding musical and technical practice, reinforcing and in a sense expanding the genre's traditional territory. A course on 'Aural

105 By the end of the 70s studios were set up at many of the arts undergraduate faculties in the country. Among the most prominent were Queen's University and the University of Toronto in Ontario, and Simon Fraser University in British Columbia. See Guérin 1992b.

106 Compare the published account in Austin 1996.

skills' took the place of musicianship, 'MIDIstration' replaced music theory, and music history took on its own technological inflection in a new course entitled 'From Edison to iPod.' The process of rationalising the electroacoustic imaginary proved particularly tricky in the historical domain. When I arrived, the course was being taught by a limited-term instructor (now Assistant Professor) named Eldad Tsabary, a young Israeli-born composer then in the final years of his PhD in music education at Boston University. During a conversation following my first tour of the department, Tsabary showed me a chronological list of repertoire he'd prepared for the course. He had found it difficult to decide upon listening material for the final lessons. Following the technological periodisation as closely as possible, his syllabus began with the earliest examples of recorded sound, and proceeded by profiling each of the canonical electroacoustic studios of the 1950s and 60s, but it seemed to trail off after covering a few composers of local importance in the mid 1980s. Ironically, the last selections were composed more than a decade before the iPod was invented. It was difficult to know which composers were important anymore, he complained. It was also difficult to choose examples from the teeming archive of popular music without considering them in electroacoustic terms. The previous semester, for example, he had included the 1970 Pink Floyd instrumental 'Alan's Psychedelic Breakfast' from the album *Atom Heart Mother*, marking it as 'an early example of *musique concrète* in pop'.¹⁰⁷ Tokenisation efforts such as this placed non-academic music in the context of a territorialising narrative in which electroacousticians set the agenda for technological development.¹⁰⁸ Whenever wider repertoires were addressed instructors framed the inclusion as a demonstration that electroacoustic theories and methods could be universally applicable.

Austin extended the historiographical and technological dominance of electroacoustic pioneers into the twenty-first century by arguing that their influence had now simply become too complex and too fragmented to perceive. The expanding inclusiveness of the field could also be explained as an effect of technological

107 In the discography see Pink Floyd 1970.

108 For a discussion of the broader implications of the pluralist perspective and a critique of popular tokenism see also Clarke 2007.

democratisation. During the intermission of a concert organized to celebrate the twenty-fifth anniversary of the CEC in November 2011, for example, he gave an impromptu speech to students and guests describing the growth of the organization, physically miming its development as if narrating the construction of a model city. Electroacoustics, he explained, had never been an exclusive 'club'. It was a 'community', inclusive even of people who didn't see themselves as members, regardless of genre or style. 'We speak for everybody who uses loudspeakers to make sound,' he declared proudly. Electroacoustic pioneers had been responsible for the initial 'vertical' growth. Once this strong central pillar had been established, he argued, the community had begun to grow horizontally to encompass new things like 'live electroacoustics' and 'turntablism'. Gradually, Austin suggested, the horizontal would overwhelm the vertical. 'The kid with an iPad who's 8 years old now will have 10 years of experience when she enters the program,' Austin speculated. 'I don't want to have to teach that kid!', he added with a grin. His speech neatly encapsulated the ethos that informed the broader curriculum. Efforts to expose the historical roots of musical innovation shored up the authority of electroacousticians against the genres and technologies which they now saw as upsetting their institutional dominance.

Similar historical and technological territorialisations stretched beyond Concordia as well. In the weeks following my semester at Concordia I met with Austin's former student, and CEC co-founder, Jean-François Denis. In the late 1980s Denis had left an academic career to found the label empreintes DIGITALEs, the name of which is a bilingual play on the words embedding the English 'digital' in the French expression meaning 'fingerprint'. Denis and his collaborator Claude Schryer founded the label on a commitment to issue high quality digital recordings, originally on CD and later on multichannel audio DVD, in a solo album format profiling individual composers, rather than the traditional recital format that normally structured classical recordings. While still operating from a residential apartment in the city's eastern Plateau district, the label has gone on to gain a global reputation as the definitive arbiter of the acousmatic sound.¹⁰⁹

¹⁰⁹ The label's distribution arm Diffusion iMédia (now electrocd.com) has grown beyond the acousmatic genre since 1995 to cover the international business of most of Quebec's experimental and improvisation-oriented labels. Its website is hosted by the SAT.

Given the label's self-consciously digital branding, I wondered if Denis could think of anyone for whom digital technologies had opened up new aesthetic paths. He paused before tentatively suggesting that this could perhaps be said of local composers Jean Piché and Christian Calon. Both had incorporated video and live performance into their practices while remaining close to the acousmatic tradition. But the tools a composer encounters in the studio should not really affect the ways she chooses to manipulate sound, he insisted. For him the distinction between analogue and digital was entirely beside the point: one intends a certain sonic result and attempts to realise it with whatever is at hand. When I pointed to the favouring of analogue technologies among experimental improvisers, and the new CALQ programs favouring specifically 'digital' artists, he quickly corrected me. These people might be instrumentalists, sculptors, theatre directors, but electroacoustic music was essentially non-instrumental and non-mediated: a music directly 'made of sounds'.¹¹⁰

What had changed for Denis was the social structure of the field. During our interview he took a scrap of paper from his desk, sketching out an improvised map as he narrated the transformation. I asked whether he could connect his observation to changes in technology, and after a moment of protest, he tentatively wove in what he saw as the key instruments and techniques. He drew a timeline from the late 1970s to the mid 2000s. Along this axis he depicted the different institutions and festivals fanning out from the city's first electroacoustic concert society, ACREQ, in 1978. Like Austin, he connected the CEC with early internet, email and bulletin board technologies, but he added home studio technologies such as the Yamaha DX7, the MIDI protocol, and the Apple computer. Around 1990, he drew a cluster of events coincident with the foundation of his own label. He described the most important as the touring annual festival of 'downtown' composers known as New Music America, which was brought to Montreal for its final edition in 1990, and co-curated by Jean Piché. The festival created a 'new dynamic in Montreal', he claimed, laying groundwork for future festivals by consolidating a scene around a variety of contemporary styles, encompassing the whole gamut of '*la musique fuckée*'.¹¹¹ Next to

110 On the notion of sonic immediacy in acousmatic aesthetics more broadly see Bayle 1992 and Kane 2007.

111 This expression suggests not music that has a problem, but any kind of bizarre or abnormal music. The

the 1990 cluster he indicated the Akai S1000 sampler and the Alesis ADAT digital tape system as key technologies. The next key moment for Denis was the 1995 ISEA (Inter-Society for Electronic Arts) conference, organisers of which had gone on to found the SAT.¹¹² Here his map split off into three distinct branches named by the each of the major local electronic music and sound art festivals: MUTEK, Elektra and AKOUSMA. Each of the three festivals' organisers had had a hand in the Montreal edition of ISEA, but their aesthetic differences set them apart. MUTEK's director Alain Mongeau preferred Techno (which Denis connected with a separate line to Disco, marking it off as absolutely Other), Alain Thibault sought a kind of audiovisual hybrid inspired by Industrial music, and Robert Normandeau's AKOUSMA (originally entitled Rien à voir – a play on words meaning both 'nothing to see' and 'nothing to do with' or 'unrelated') had stayed close to the electroacoustic tradition.¹¹³ Towards the end Denis inscribed the iPod, broadband internet and Napster as key technological factors, all associated with the eventual upheaval of the recording industry. Here again, the situation again became too complex and too fresh to follow.

In these narratives of electroacoustic expansion by Austin and Denis, a crucial aesthetic paradox arises in the friction between recognition of the widening economy of production and distribution which is supposed to revolutionize creative practice and the ideal that its result should remain a transparent image of human sonic intention. Kevin Austin's insistence, for example, in keeping demusicalised chains of technical and human communication 'robust but invisible' seems like an intuitive response to this dilemma. But his account of 'horizontal' aesthetic plurality branching off from a 'vertical' line of pioneering mavericks rationalises electroacoustic aesthetic authority by presuming the mediating effects of the march of technological progress. I noticed that active electroacousticicians appeared to resolve this paradox with a structure of feeling (Williams 1977) that coated the irony of the genre's apparent decline in self-deprecating humour. At

word *fucké* is not negative or vulgar in Quebecois French.

112 For a contemporary review of the festival see Knight 1996.

113 The ironic fact that the directors of MUTEK and Elektra had the same given name did not go unnoticed by my interlocutors. I sometimes heard them referred to as '*Alain blanc*' (Mongeau) and '*Alain noir*' (Thibault). The expression referenced both their sartorial and musical preferences.

the CEC's 25th anniversary concert, for example, current president Jef Chippewa sported a t-shirt emblazoned with the tongue-in-cheek slogan 'Sex, Drugs, and Academic Electroacoustic Music'. He'd picked it up at a computer music conference in Mexico City the previous summer. He displayed it to me with a grin while we chatted with a recent graduate of the Concordia degree program. Although critical of the electroacoustic aesthetic, and busy pursuing an interdisciplinary Master's degree across the street at Hexagram, the student admitted to having the same shirt.

In an interview with me a few weeks later where he described the CEC's struggle for recognition by the main professional society for Canadian composers thirty years previously, Austin compared the bitterness of the marginalised 'electroacoustic community' to that of the ancient Greek tragic figure of Electra. For Austin, Electra represented the electroacoustician's desperation at being denied access to positions of authority in the art music world. Betrayed and banished by her own mother, Electra recognises herself as the rightful heir to the throne but is incapable of taking revenge without thereby bringing misfortune and shame upon herself. It struck me as ironic that Austin chose the same tragic reference that Thibault had used to name his festival. In a sense, by seeking to inherit the prestige of the classical tradition (their metaphorical 'mother') by destroying or surpassing it, both the digital artist and the electroacoustician were condemned in an analogous way to Electra. For Austin and his electroacousticians, however, such metaphors of defiance and exile permeated the work of territorialisation more deeply. The downplaying of differences between electroacoustic music and other genres could be read as either a kind of imperialism or a deep expression of regret at having given up the means by which empire could be obtained.¹¹⁴

114 My gloss of the story of Electra comes from Euripides 1963. There is a further irony to the use of the metaphor by Austin and Thibault in the fact that the character of Electra has a long history of use in efforts by men to enframe the expression of female sexuality in shame and taboo. Women's expressions are indeed limited, if not deliberately excluded from electroacoustic and digital art scenes, both in Montreal and elsewhere. Nevertheless, I refrain from sustaining the metaphor any further so as not to distort the scope of the intended meaning in the ethnographic context where I discovered it. For a reading of the Electra character which touches on its psychosexual implications in the context of late nineteenth century opera see Kramer 1993. For a classic critique of its use in psychoanalytic tropes, see Beauvoir [1949] 2011, 50-62.

3.6 *'Tainted blood'*

The fact that they harbour anxieties like these does not necessarily suggest that electroacousticians are a dying breed, however. A closer look at the work of one of the city's most recognised electroacoustic pioneers demonstrates the amount of purchase which was still possible for electroacousticians in the newly delineated domain of digital art. Université de Montréal professor Jean Piché occupies a kind of aesthetic middle ground, shared by the two aesthetics. For electroacousticians he figures prominently as an educator, software developer, and composer of mixed-media works for various combinations of live and computer generated sound and video. In the digital art scene he garners extra attention for his exploration of high-resolution animation technologies, and his resistance to the acousmatic focus on purely sonic forms of expression. His role as a composition professor with a distinguished pedigree in computer music research sustains his authority in electroacoustic music. At the same time, however, he is one of the few academic composers to have maintained connections to the maverick digital art society ACREQ. His position makes sense from both the electroacoustic and digital art perspectives, and thus confounds any simple mapping of genre to subculture. His story illustrates that the territorial distinctions which define Montreal's electroacoustic and digital art aesthetics can also occur at the scale of the individual career.

Born in the town of Trois Rivières, half way along the Saint Lawrence River between Montreal and Quebec City, Piché was first exposed to electroacoustic music with Nil Parant and Marcelle Deschênes as a student of communication at Université Laval in the early 1970s. He then left to study with Barry Truax and Murray Schafer, both prominent theorists of the Acoustic Ecology movement, at Simon Fraser University (SFU) in Vancouver.¹¹⁵ It was there that he began using a computer to program his compositions. After short periods at Stanford University in California and the Institute of Sonology in Utrecht, Piché made his home in Vancouver for several years, starting a family there and finding work producing commercial music and jingles at Mushroom Studios, a popular

¹¹⁵ On acoustic ecology as a research paradigm in composition see Schaefer 1993 and Truax 2001. The terms of acoustic ecology have recently seen wide application in the study of music and sound more broadly as well, as in Samuels et al 2010.

recording site among west-coast rock bands. At Mushroom in the early 1980s he left behind the mainframe programming of the academic studios and became one of the first Canadian musicians to privately buy a Fairlight CMI, the early piano-roll style sampling and sequencing system popularized by Peter Gabriel and Kate Bush in the United Kingdom. Piché's former colleagues Marcelle Deschênes and Alain Thibault adopted the same system around the same time at Université de Montréal. Using it helped to set them off from the broader acousmatic scene as mavericks and iconoclasts. In the mid 1980s Piché moved to Ottawa where he worked for a few years as a programme officer for the music section of the Canada Council. One of his central contributions there was the introduction of a new category of funding for *musique actuelle*. The move opened up channels of support to improvisers and crossover jazz and rock composers previously unrecognised by the council's peer review committees. In 1988 he was hired on as professor of electroacoustic composition at Université de Montréal, joining Marcelle Deschênes as the second full-time faculty member in the program.

In 1990 he took on the mantle of artistic director for the final edition of a touring festival known as New Music America. The project, subtitled Montréal Musiques Actuelles, brought together Canadian and Quebecois composers and improvisers with prominent American 'downtown' musicians such as Lamonte Young and Alvin Curran, feminist pioneers like Joan La Barbara and Hildegard Westerkamp, and rock crossover artists like Rhys Chatham, Einstürzende Neubauten, and Brian Eno (Brooks et al 1991). In a review published a few months after the festival, Piché echoed the festival's American producers in describing his curatorial approach as a celebration of pluralism (Brooks 1992). Recognizing that the 'most important American aesthetic currents' of the day were situated outside academic traditions, he wanted 'to make co-exist, under the lights of the same stage, every type of musical expression demonstrating a willingness to push back the limits of the language of its choice.' (Piché 1990, 138) With a deep sense of indignation he denounced the 'snobbism' of the 'partisans of hard discipline' among the city's critics and university professors. 'One of my little satisfactions of the festival', he wrote, 'was a comment from a sympathetic regular of the "punk" bar Foufounes Électriques. For him

musique actuelle was even more messed up [*sauté*] than industrial rock!' (Piché 1990, 139)

The festival's confrontation with academic conservatism found broad support in Montreal's electroacoustic and sound art scenes. Kathy Kennedy, experimental vocalist and later founder of the feminist ARC Studio XX, declared that 'Montréal's community could never again succumb to academic complacency after the shrieking of choirs and church bells in the streets, the kumungo pluckings through deafening silence at Foufounes Électriques'. A more provocative response came from critic George Dupuis, who described Piché's festival as 'less an affront to the FIMAV [the long running Festival de Musique Actuelle de Victoriaville, which shared in the postmodernist aesthetic] than to the historically staid Montréal scene (which, in recent years, seems to have run out of the blood tainted by Boulezian influences'.¹¹⁶ The image of 'tainted blood' was extremely loaded for the time. In 1991 Canada was still reeling from a massive scandal in which thousands of haemophiliac patients had been given unscreened transfusions of blood infected with Hepatitis C and Human Immunodeficiency Virus (HIV) and which escalated into an inquiry dissolving the Canadian Red Cross Society in 1993 (Picard 1995). These comments show how strongly polarised the claims of modernists and postmodernists had become at this pivotal period.¹¹⁷

For Piché and his supporters, the academic electroacoustic tradition had been flagging, if not completely flat, for a long time. Interestingly, although this was an opinion he shared with self-styled exiles from the academic electroacoustic scene like Thibault and Madan, it wasn't grounds for excommunication from his comfortable post in the university. Recall that even a quite orthodox acousmatic intermediary like Jean-François Denis had celebrated Piché's compositional and promotional efforts as being vital to Montreal's electroacoustic tradition. During the period I conducted fieldwork at Concordia, he was proudly welcomed by faculty to present recent video work and give a short lecture. He also continued to connect his work with acousmatic theory, extending its concepts to his idiosyncratic approach to video making. In a 2004 interview about his audiovisual

¹¹⁶ Both Kennedy's and Dupuis' reviews appear as part of Brooks et al 1991.

¹¹⁷ For enunciation of dissenting viewpoints on the politics pluralism from the same period see Nattiez 1990a; Olivier 1991.

composition *Sieves* he connected his approach with Michel Chion's theory of cinematic synchresis.¹¹⁸ 'I compose with the images that same way I do with the sound material,' he explained, 'In the sense that I will distort and process them with varying degrees of recognizability. The complexity of the image is associated with the complexity of the sound.' (Steenhuisen 2009, 262)

The years Piché had spent in the rock scene drawing inspiration from a mix of American minimalism and favourite British Prog bands like Hawkwind and King Crimson were also audible. Consonant drones and repetitive percussion patterns, often generated by manipulating recordings of instrumental performers, continue to betray his debt to these styles. I was at first taken by surprise, however, when one day in early 2012 a musician I had met through the underground noise scene, and who had dropped out of the Concordia electroacoustic program as an undergraduate for what he described as 'aesthetic reasons', stopped me during a conversation to show me that he had installed Piché's 1980 composition *Rouge* as the ringtone for his smart phone. In sociological terms, the appropriation of Piché's maverick electroacoustic music outside of academic art music circles could be explained as a performance of allegiance with his stand against the snobbery of uptown formalism, perhaps even an expression of aspiration towards his success as a maverick. As Bernard Gendron (2002, 18-19) has noted, the 'secondary aesthetic practices' of musicians, their styles of consumption and fashion, play an important role in the posturing that has framed production across art and popular music throughout the twentieth century. But the way this particular appropriation played out complicates this logic.

Rouge was rediscovered by Montreal's noise and experimental rock scene in early 2011, when the album on which it first appeared—a 1982 LP entitled *Heliograms* documenting Piché's early computer compositions realised at Stanford and SFU—was uploaded to an anonymous avant-garde MP3 blog known as Continuo.¹¹⁹ Soon afterwards

118 Chion was a student of Pierre Schaeffer and has become an important theorist of the acousmatic aesthetic. See for example Chion 2010.

119 In the discography see Piché 2012. Continuo was established in 2007. In 2009, after gaining enough notoriety as a source for rare vinyl and cassette uploads to garner high-profile comments from British music critic Simon Reynolds and *The Wire*, it formed a hosting partnership with the American sound and

local experimental rock musician Roger Tellier-Craig approached Piché about rereleasing the LP on vinyl. Tellier-Craig began his career as a guitarist and synthesist with prominent post rock bands such as Fly Pan Am and Godspeed You Black Emperor!, but by 2012 his work was at the forefront of a local revival of italo disco and new age psychedelia. From his perspective, Piché's prog and minimalism-inspired juvenilia sounded prophetic. Piché welcomed the renewed interest in his early work, but regarded the choice of format as misguided. The idea that analogue was warmer or more natural was a kind of marketing myth, he told me. The fact was that it had lower bandwidth, and when he listened he struggled to hear the signal through the noise. Instead of simply welcoming the new pressing of the LP, then, Piché responded with a parallel re-appropriation. He began by extracting two sections from the 1982 collection, *Rouge* and *Ange*, remastered the audio in a high definition digital format, joined the two compositions together with a seamless fade, and set about designing new video tracks to accompany the new arrangement, assembling HD footage from a trip to India in Adobe After Effects and processing it to abstraction. He preferred the higher resolution and precision he could achieve using a computer.

The new realisation of *Rouge* and *Ange* premiered at the next Elektra festival in early May 2012. I sat in on technical rehearsals over the preceding week to get a closer idea of the way Piché wanted his work to look and sound. The festival takes place each year at the Usine C complex, a monumental converted industrial building in the eastern part of downtown Montreal normally used for francophone theatre. Usine C was permanent home to Carbone 14 until its dissolution in 2005. The multi-purpose complex now contains offices and rehearsal space for Marie Brassard's theatre company Infrarouge, along with office space for a variety of other Montreal arts organisations, among them ACREQ.¹²⁰ Its main performance room is a modular black box: seating, staging and lighting can be reconfigured to afford a wide variety of audience and performer placements. During Elektra the room's seating is normally removed to allow access to a

video art archive Ubuweb. Much of the content remains online, but new posting ceased in November 2012. See also Continuo 2011.

¹²⁰ Brassard is known especially for her work as an actress with director Robert Lepage. ACREQ director Alain Thibault's connection with Carbone 14 goes back to a series of collaborations in the 1980s and 90s, including the 1990 Heiner Müller setting *Rivage à l'abandon* (Rolland 1990).

maximum of open floor space. For the 2012 edition, however, technicians left in the theatre seating, thus precluding the usual bar and dance-floor arrangements. It was more expensive to rent the room with the seating removed, the head technician told me, and this year the budget had been tighter. They had been forced to eliminate the bar, video projections were smaller, and a stereo public address system replaced the usual eight channel setup, which consisted of seven surround speakers and one subwoofer.

Frustrations plagued the rehearsals I attended. Regardless of the fact that it was a piece for fixed media—to use the acousmatic term—the preparation of *Rouge* and *Ange* took several hours. Each time technicians ran the video, new glitches would show up in the rendering. After testing several versions of the file, they updated the operating system, switched back and forth from memory sticks to external hard drives, and replaced the computer's graphics card three times; all without success. Clearly Piché's struggle to achieve the precision of reproduction he was after did not stop in the studio. Indeed it was partly this aspiration towards technical precision that allowed Piché to bridge the gap between the electroacoustic scene and the new digital art aesthetic. He vehemently challenged electroacoustic aesthetics, but not its organology.

ACREQ's development coordinator Nathalie Bachand later contradicted the head technician's account of the festival's technical contingencies, insisting to me that the cinematic arrangement had been an aesthetic decision. For Piché, adapted to the classically modelled concert conventions of the electroacoustic tradition, it was also perfectly acceptable, if not preferable. Among other things, he told me in a later interview, it afforded higher concentration for the audience. From an ethnographic point of view, however, a combination of both the technical and the aesthetic interpretations made more sense, especially considering the radically expanded context in which that year's festival took place. Concurrent with the CALQ's digital arts initiative the previous summer, ACREQ had already been at work on augmenting its usual weekend-long festival into a projected biennale of digital art (the aforementioned BIAN). The expanded series of events launched in 2012 lasted several weeks and decentralised curation across more than twenty-five media art and visual art venues. Over the preceding years, director Thibault had

charged Bachand with generating interest and assent across the field through a process she referred to as a kind of 'infection'.¹²¹ She became intimately involved in other institutions' planning and development, at times even taking a seat on their boards of directors. As much as it distributed curation, then, Elektra's expansion also generated unprecedented convergence. BIAN's first edition attracted high-profile contributions by stalwarts of the Elektra festival's abstract, monochrome, hyper-machinic aesthetic such as Robert Lepage, Ryoji Ikeda, and Carsten Nicolai. With so many events taking place in prominent museums downtown and smaller galleries across the city, then, the centrality of the Elektra weekend could be reduced, and its scope could justifiably be narrowed to a cinematic format that was coincidentally also more in tune with Piché's preferences.

3.7 '*Coalescence*'

Clearly then, the differentiation of digital art from the electroacoustic tradition did not prevent their coexistence, or the emergence of blurs and overlaps between them. To further upset the stability and uniformity of digital art's self-styled countermovement, I now take a final journey across the city, jumping back in time to an event just after the CALQ consultations that offers a final, microcosmic glimpse into its shifting set of territorialisations. My guide through this event was the composer and visual artist Freida Abtan, a former student of both Kevin Austin and Jean Piché, and a vocal advocate for the same kind of expanded, pluralistic idea of electroacoustic production that her teachers espoused in their work. Abtan performed the ideal of electroacoustic hybridity in her deeply personal aesthetic mixing EDM, industrial and acousmatic influences, in a career path cutting across the disciplines of computer science, music and the visual arts, and in her generous engagements as a teacher and intermediary. Even Abtan's feminism expressed the field's characteristic liberal pluralism. While many of the women in Montreal's electroacoustic and sound art scenes chose to create separate spaces outside the scene's overwhelmingly straight male mainstream, Abtan struggled to appropriate and pluralise

¹²¹ Compare Georgina Born's recent (2012c) reassessment of the work of Gabriel Tarde, in which she employs similar concepts from an analytical perspective. Also compare Richard Handler's (1988, 152-153) analysis of the 'infectious' growth of Quebecois *patrimoine* (heritage).

conventionally gendered spaces and positions of authority. During my fieldwork in Montreal we crossed paths many times. She taught computer programming classes for visual artists at Concordia University, worked as a programmer for Hexagram researchers, volunteered as an organiser at that year's International Computer Music Conference over the summer, completed production on her thesis project for a doctorate in computer music and multimedia from Brown University in Rhode Island, and organised an informal monthly concert series.

In the concert series, Abtan told me, she sought to set up the kind of space she imagined the electroacoustic scene could become under more equal conditions. Over the course of a year the concerts brought together a diverse series of friends and professional acquaintances, often connected more by their instrumental choices than by their aesthetic or professional allegiances. The venue for these meetings afforded nothing like the finely engineered sound and detached reception of a space like Usine C. Nestled in the ground floor of a residential building in Mile End, the space known as Cagibi—a colloquial term suggesting a small storage room or closet—expressed a cultivated intimacy, appealing directly to the neighbourhood's growing population of students and 'creatives'. Relative to other venues in the city, Cagibi lived up to its name. It entailed two ground floor shop front rooms, stuffed apparently at random with vintage furniture and wistful artwork. Noise from a busy adjacent intersection leaked through large windows lined with dusty house plants. The owners had recently been given a warning from city inspectors that their alcohol license only permitted them to serve drinks with food, so audience members were forced to choose between buying small vegan dishes and not drinking at all. Although committed to opening up a free space for aesthetic mixing, Abtan had chosen a space with social and musical connotations that some of her guests found difficult to adapt to.

On my first visit to the concert series at Cagibi I arrived well after the performers had finished their sound checks. I'd brought recording equipment, assuming it would be simple enough to plug in to the main mixing desk and leave my device running for the length of the show. The job of documentation turned out to be more complicated. Abtan was busy taking admission at the door to the crowded back room, so she directed me to

introduce myself to the musicians and find out how they were set up. The first act was to be an improvised duo by sound artists Emilie Mouchous and Andrea-Jane Cornell, both drop-outs of Kevin Austin's electroacoustics program at Concordia with strong connections to noise and *musique actuelle*. Cornell worked as music director at the McGill student radio station, and Mouchous had gone on to an administrative job at a conceptually-oriented ARC called Troisième Impérial. The two women had arranged their equipment on and under the torn upholstery of a wide sofa against the back wall of the café, far from the stage. Mouchous had brought a bulky black synthesiser, a semi-modular Korg MS-10 with a handful patch cables poking out of its iconic face-plate, one of which she had wired into a square of fabric quilted with conductive thread that modulated control voltages as she folded and stretched it in her hands.¹²² Cornell's setup included an amplified wooden frame with pieces of yarn stretched across it, a handful of guitar effect pedals, and an ageing white laptop running a sampling program. The duo had patched their instruments into a small silver mixing board hidden under the sofa with output patched to a single monitor speaker on the floor by the players' feet.¹²³

The remaining performers for the evening had assembled their gear on tables at the front of the stage. Four new silver laptops faced the audience with glowing backlit logos. Each computer was neatly patched to a blinking MIDI controller and high resolution sound card. Immediately it occurred to me that this could simply be a technical mediation of the performers' gender imbalance. The role that musical instruments can play in expressions of gendered authority has been a focus of feminist ethnographers for decades.¹²⁴ I overheard the women joking about needing a new laptop. Like Mouchous and Cornell, however, each of the male acts had also elected to play through a separate mixer and sound system. The duo scheduled to play second was comprised of Hexagram director Chris Salter and a visiting collaborator from Holland who went by the stylized stage name TeZ. Salter and TeZ had brought a sound system with them from the university downtown: four speakers arranged on stands surrounding the audience. The last group was a self-proclaimed IDM

122 Mouchous has documented her instrument in the online journal of Studio XX. See Mouchous 2012.

123 For an example of work by this duo see, in the discography, Mouchous and Cornell 2011.

124 Cf. Born 1995; Green 1997; Doubleday 2008; Sonevtsky 2008. I explore this connection further in chapter five

(Intelligent Dance Music) duo made up of two friends of Abtan's playing under the band name Foil.¹²⁵ They had patched their gear into the house sound system, a beat-up Mackie mixing desk and a pair of speakers suspended from the ceiling used mostly for rock and folk gigs. Regardless of the motivation, the unusual proliferation of speakers and mixers meant that there was no single point of access to the audio signal. With few extra cables and no obvious spot to set up a microphone stand, I sat down at a table near the centre of the room and decided to record what I could from there.

A larger than normal audience poured into the small back room of the café. As the seats filled up I recognised prominent sound artists and electroacousticians, a handful of Salter's colleagues from Hexagram, a few high profile digital art intermediaries, and a small contingent of regulars from the underground noise scene. True to Abtan's goal of setting up a meeting point for contrasting genres, these were publics not accustomed to mixing socially or sharing tastes. As listeners sat chatting and waiting for the first performance, however, the fusion she'd hoped for began to fracture. There was a flurry of whispered conversation between Abtan and the musicians as she weaved her way through the chairs and tables negotiating last minute changes. Finally she stood at the stage and welcomed the audience, apologising for the delay and noting a change to the program. Salter and TeZ had invited a number of guests who weren't able to stay, so they'd asked to play first so they could leave before the other performances. Otherwise the program would proceed as planned. Regardless of their intentions, both musicians and audience had been actively engaged in territorialising Abtan's utopian aesthetic space, first through technical, and then through temporal detachments. Her disappointment was palpable.

Salter and TeZ dramatised their difference in several dimensions. Their equipment afforded a display of complex spatialisation and synthesis techniques more appropriate to a hermetically sealed black box space than to the noisy bohemian environment of Cagibi. The sound palette of their half hour performance was subdued, textural and abstract. Samples suggested the machine worlds of glitch and minimal techno. Twittering,

¹²⁵ For a discussion of the origins of the 'intelligent' genres in EDM see Reynolds (1999, 180-205). For an example of Foil's work see, in the discography, Foil 2012.

scratching loops spun seamlessly around the four-speaker sound system in accumulating layers, sometimes coalescing into rhythmic patterns with the help of thumping suboscillator beats before fading away. If somewhat monotonous, the set was also highly polished, beginning barely audibly and ending abruptly after a building to long, full spectrum drone.

After the applause Salter and TeZ took down their equipment, including their speakers, and left the space, bringing their audience with them. They seemed to have no interest in what would happen next. Indeed, Mouchous and Cornell enacted what sounded like a deliberate countermovement to the first. Their setup was heterogeneous, tending towards the tactile and performative. They played from what they told me were their 'scores' for the evening—triangular pieces of pink paper drawn upon by Billy Mavreas, the comic book artist who owned the art and antique shop next door. Their half hour improvisation proceeded through a series of jagged timbral tableaux, beginning with Cornell scraping a pair of ceramic saucers together accompanied by delicate whining and squelching noises played by Mouchous on her MS-10. The synthesizer part developed into a long textural solo, first over a quiet loop recorded from Cornell's plucked strings, and later over a field recording of frogs and crickets gathering around an unseen lake. The duo drew to a close over a long low frequency drone pulsating under a layer of surreal backwards scraping noises from the computer.

Again, a round of applause was followed by an unmistakable exodus. Only a few people stayed to take in the performance by Foil. As if in a final gesture of territorial dominance, the duo set the volume on the café's sound system as loud as possible and burned through a set of hard-edged dance music reminiscent of late 1990s Autechre or Aphex Twin. They posed and rocked behind their laptops with the driving electronic beats, pausing intermittently between songs to load new sets into their sequencers. Repelled either by the volume or the style—it was difficult to tell for certain—the audience shrank further as they played.

Abtan's holistic aspiration to bring together what she saw as three harmonious

strands of a plural electroacoustic universe is difficult to account for from a straightforward Bourdieuan perspective. The classic reproductive frameworks of Bourdieu's study *Distinction* (1984) leave little room for such productive meetings of high and low, except insofar as such transgression might benefit musicians seeking to appropriate symbolic authority from those above them in the hierarchy. Indeed, Bourdieu expressed doubt that occupants of conflicting positions in the field of cultural production could ever authentically meet, save in the dark corners of what he once dismissively referred to as 'bad places', where members of dominant classes could pretend to throw off the trappings of their privilege in anonymous moments of hedonistic abandon (Bourdieu 1998, 10). Without considering their specificity and their pragmatic fit to a particular aesthetic, meetings of radically different expressions such as those at Cagibi might have seemed to Bourdieu simply as arbitrary instances of competition among entrepreneurs seeking manage their positions in a field of cultural production structured by the flow of capital. This reduction has been criticised for reinforcing the unequal distribution of power it purports to unmask and defusing performative subversions of the prevailing order (cf. Rancière 2004; Pelletier 2009). As several music scholars have argued, one of the main challenges for Bourdieu's sociological framework is acknowledging the aesthetic validities of art forms that don't conform to the structures of the autonomous field.¹²⁶

Solving this problem means considering the stakes of situations like the one I've narrated here. Musicians would receive no reward for displays of authority in Abtan's artificially flat space, only a chance to make the best they could of a less than ideal performance situation. This is why, for example, the gendered seating arrangement did not necessarily indicate systematic exclusion.¹²⁷ Mouchous and Cornell were used to performing in the lofts and living-rooms that normally hosted the local noise and EAI scenes, and chose to position themselves as authentically and as honestly as they could. They performed their aspirations using the conditions at their disposal. Salter and TeZ did their best to construct the kind of refined social and acoustic space they'd grown

¹²⁶ See among other examples Frith 1996 and Born 2010b.

¹²⁷ A contrasting interpretation might highlight the way that these musicians performed gendered expectations of the division between public stage and intimate sofa, for example (cf. Massey 1994).

accustomed to in cutting edge design laboratories and university studios. Their early departure reflected not so much a dismissal as an honest inability to adapt to a different kind of territory. Foil simply revelled in the chance to play as loudly as possible in spite of the lack of listeners.

These territorialisations were not abstract forces brought to bear upon concrete musical phenomena. They were immanent qualities and tendencies that defined the musical event as a whole. Thus Abtan's attempt at 'coalescence' was fractured here not through the agency of a hidden hierarchy, but as an effect of a constitutive dissensus among incompatible attempts to negotiate the situation's social, technological and aesthetic constraints. As a microcosm of electroacoustic liberalism, it also reinstated the genre's defining conflicts.

In short, the circumscription of digital aesthetics in Montreal by policy-makers at CALQ, as well as by festivals such as BIAN, mapped onto a complex, multi-generational conversation about the way technological changes should be framed. It also, however, cleared space for aesthetic possibilities that no one of these scenes could have generated on its own. At the level of institutions and funding bodies, the emergence of digital art may have been associated with a decline of the aesthetic and technological authority of a flagging electroacoustic tradition. But the logic of technological influence which constituted this narrative was strangely recursive. Many of the modes of historicisation, social imagination, and genre formation which CALQ reforms framed as being caused by changing technological 'channels of production' were the same ones that defined genre-specific engagements with these technologies' affordances. Inscribing the latest transformation of their technological repertoire into already existing modes of identification and negotiation helped electroacousticians and digital artists stabilise their differences in relation to one another. Part of what I hope to have achieved in this chapter, then, is to have re-situated the collapse of aesthetic boundaries that reformers saw as a result of digitalisation as a complex performance of differentiation enlisting digitalisation as a tool. The changes that the CALQ framed as being brought about by digital technologies were the same as those which musicians and intermediaries were deploying to

territorialise their practices already.

Far from bringing with it a uniform set of aesthetic or social effects, digitalisation afforded actions and interpretations specific to the Montreal scene. If it seemed at times to herald new ways of accessing power, musicians, educators and policy-makers made sure it did so without radically transforming the existing boundaries of social space. In effect, just as digitalisation in Montreal played a similar role in both neoliberal cultural policy and nationalist identity politics, it also mediated similar ambitions for both the tradition-oriented world of electroacousticians and the forward-projected innovations of digital artists.

Counterdisciplines: The politics of improvisation in electroacoustics and EAI

4.1 Introduction

In this chapter I shift from the negotiation of digital aesthetics at cultural, historical, and spatial levels to the status and stylisation of digital practices in the reform of musical disciplines and literacies. My focus is on the contested role of improvisation in the scenes I studied. I describe how improvisational practices were associated with contrasting and sometimes paradoxical feelings of resistance both in academic and non-academic settings. Seeking to combine insights from public sphere theory and practice theory, I propose the concept of 'counterdiscipline' to designate new ways of learning to perform which are defined primarily in opposition to the norms of an imagined dominant other. I expand upon this theorisation in section 4.3. The interspersed ethnographic illustrations set up a comparison between two recently established generic reference points in Montreal's electroacoustic and sound art scene, both of which highlight improvisation: an academic ensemble idiom known as the laptop orchestra or *LOrk*, and a largely non-academic solo or small ensemble practice known as electroacoustic improvisation or EAI.¹²⁸

4.2 'Keith Rowe Serves Imperialism'

I met the Basque musician Aitor Izagirre in an improvisation reading group at McGill University in the Autumn of 2011. He was a doctoral student at a university in northern Spain working on a thesis about the ontology of improvised experimental music. He had come to Montreal to visit the ICASP research group, established as a federally-sponsored inter-university partnership in 2008. Although based at McGill, his performance practice cut across two overlapping scenes in the city. ICASP's intensive outreach efforts with community organisations, partnerships with venues like Casa del Popolo, and close

¹²⁸ Although their names overlap I'd like to make clear that, when I encountered it in Montreal EAI was not considered to be derivative of the academic electroacoustic tradition, but a sub-genre of noise and sound art. I use the acronym throughout to sustain the distinction.

collaborations with international figures like guitarist Fred Frith and double bassist Joëlle Léandre, afforded him opportunities to play in the context of free jazz and *musique actuelle*.¹²⁹ Through his roommates and friends he came into contact with the city's noise and sound art circuits.

At the time of my fieldwork the latter were buzzing with a new genre called EAI. Its practice was characterised by quiet, abstract textures made with electronics and amplified objects. EAI was mostly performed on complex, personalised hardware assemblages instead of or in addition to laptops. Izagirre's colleagues in ICASP at the time were mainly interested in idioms that articulated struggles for social justice and freedom of expression.¹³⁰ In EAI, however, musicians preferred to address conceptual and formal issues, often deliberately avoiding the social and subjective mediations valued by ICASP scholars. Although not overtly racialised—there were very few non-white musicians at any of the concerts I attended during my fieldwork—the contrast could be mapped onto the genealogies of 'afrological' and 'eurological' approaches to improvisation elaborated by George Lewis (1996). One side aimed at pluralising and deconstructing musical disciplines; the other at establishing a more authentic and authoritative basis for them.

In a set at the end of October at a monthly sound art event called 24 Gauche, the two scenes intersected. As I was told by co-founder Patrice Coulombe, a graduate of the electroacoustic studio at Université de Montréal, and freelance instructor of programming workshops which I describe in chapter five, the gallery showcase was conceived as gathering place for sound artists who lived in the gradually gentrifying neighbourhood, many of them with young families. Programming sampled from the work of young sound artists as well as more established composers. Events attracted a cross section of local

129 Although they profess different genres in other places, Frith and Léandre are key international figures for *musique actuelle* when they play in Quebec (Jones 1995).

130 A co-authored volume outlining the project's political goals by Daniel Fischlin, Ajay Heble and George Lipsitz links improvisation's potential to the generation of conceptual novelty and interpersonal immediacy. 'In its most fully realized forms', they write, 'Improvisation is the creation and development of new, unexpected, and productive cocreative relations among people.' (Fischlin et al 2013, vii) Moreover, they suggest, improvisation's potential is not fully realized unless musicians insert the practice into a deeper engagement with human rights and social justice. Mis-recognition of the natural connection between improvisation and emancipatory politics, they claim, is a bi-product of the detached cultural relativism produced in an increasingly 'siloed' academic culture. (Fischlin et al, xxi)

intermediaries and students. Seeing their role as primarily social—hoping to bring together friends for an early evening drink—the organisers of 24 Gauche kept their programming eclectic and their scheduling accessible. The strategy was not unlike that of Freida Abtan which I described in chapter three.

24 Gauche was named after a commercial flight path directly overhead which made the deep rumble of landing aircraft a keynote of the local soundscape. Artists were thus invited to work with the soundscape of the neighbourhood in their performances. That night Izagirre improvised a short duo in collaboration with his host from the McGill ICASP group, Eric Lewis, an active promoter and performer of free jazz. The two musicians positioned themselves at opposite ends of the room. Each hovered over a table of electronics surrounded by a small audience of musicians, critics, and curators. Izagirre elicited abstract buzzes and squeaks from a mixer and a small collection of household objects amplified with contact microphones. Lewis blew a series of soft, tentative notes through an amplified trumpet patched into a signal processing and looping application running on his laptop.

Afterwards I spoke about the performance with players and audience members. Izagirre's roommate, an experimental musician and visual artist named Alain Lefebvre who later became an important interlocutor for me as well, described the duo's cross-genre performance as 'tense'. No one seemed quite satisfied with the encounter, and there were several explanations as to why. Lewis told me he had just finished a series of gigs with a large band and wasn't prepared for the stylized sparseness his collaborator preferred. Izagirre had asked him to play more quietly during the rehearsal because, as Lewis saw it, his setup was simply too loud. Both agreed, however, that the ideal improvisation should be free from aesthetic preconceptions, like the experience of approaching an unfamiliar instrument for the first time. Nevertheless, their styles had clashed. Lewis played with energetic tonal and textural variations, while Izagirre focused on maintaining a static dynamic with little sense of gesture or continuity.

A few nights later Izagirre invited me for an interview at his flat. We sat down to

tea, listened to music, and talked about influences and approaches. Lefebvre traced his influences from John Cage and the American experimentalists associated with the ONCE group, such as Robert Ashley, Gordon Mumma, Alvin Lucier and Pauline Oliveros. Izagirre pointed to what he saw as the most interesting contemporary heirs to this tradition: the New York label Erstwhile and the German Wandelweiser group.¹³¹ Lefebvre remembered a DVD he'd burned for a friend filled with his favourites from both generations and offered it to me to copy. As my computer downloaded the four gigabytes of MP3s, he began scrolling through the music collected on my hard drive, clicking songs at random to see if there was anything he wanted to copy in return. During a transfer from my previous computer two years earlier, I'd accidentally stripped away many of the track titles in my collection and never taken the time to reorganise them. He started clicking through them at random and soon stumbled across a composition I had made myself several years earlier. The conversation turned to my own work. Embarrassed as I was to share things I hadn't listened to in years, for my interlocutors it immediately placed us in the same creative arena. Soon they were proposing new collaborations and asking when I'd be performing myself.

Like most people I met in the EAI scene, both Izagirre and Lefebvre had had their earliest experiences as performers in teenaged Punk bands. This seemed to inform their attitude towards my participation. Izagirre had played bass, but described himself as tone-deaf. The music all sounded the same to him, and that was why he was so impressed when he first heard noise. Anyone can do this, he had thought. There were no audible hierarchies. In principle his sounds would be just as good as anyone else's. As he became more involved he realized that this wasn't entirely true. Experimental music had its 'popes', he told me. Well known figures gradually become just as infallible as Bach or Beethoven. Musicians could buy indulgences for their work by referring to or emulating these canonised figures. But why celebrate a canon if all anyone did was make noises, he asked, especially if these noises were supposed to be free and without hierarchy? More importantly, why did it make sense for one style of experimental sound-making to have a

¹³¹ On the latter see Melia and Saunders 2011.

home in the university, and another in a squat?

When I returned to my apartment later that night I went online to look up a recent artist's statement which Izagirre recommended to me as articulating a similar concern with canonisation. It came from a 2007 CDR by French experimental guitarist Michel Henritzi, released on a label owned by the Basque conceptual artist Mattin in an edition of 240 to generally positive reviews.¹³² Complaining that free improvisation had begun to form conservative and commodified traditions of performance practice and style, Henritzi sought to recapture the genre's lost spontaneity. To assemble his album he recorded strictly timed solo improvisations and then paired them with timed solos by other musicians. By removing the freedom of the musicians to collaborate spontaneously and respond to each other, he sought to test whether recording might actually be anathema to the freedom of free improvisation. If there was no longer any audible difference between a recorded improvisation and a composition, he asserted, it had become necessary to reconsider the political difference between the two forms.

The project's provocative title—*Keith Rowe Serves Imperialism*—suggested that the once challenging performers associated with the invention of free improvisation had become politically polluted. Rehashing the political extremism once articulated by Cornelius Cardew (1974) against his teacher Karlheinz Stockhausen, Henritzi ironically casts a famous former Cardew collaborator in role of the imperious modernist master.¹³³ The commodification of recordings, Henritzi argued, had transformed free improvisation's ideally fleeting and spontaneous expressions into increasingly impotent and stagnant conventions. In this sense the pioneering generation who had first brought improvised practices to the attention of the art music establishment had lost their credibility as revolutionaries. By targeting the 'liveness' of free improvisation as creative and political

¹³² In the discography see Henritzi 2007.

¹³³ Cardew and Rowe were bandmates in the early British free improvisation ensemble AMM. Cardew's original essay takes the form of a Maoist denunciation of the post-war avant-garde via analytical remarks on Stockhausen's 'mobile' percussion piece *Refrain* (1959). Among other things Cardew identifies Stockhausen as part of a 'tiny clique [in which] genius is still cultivated, especially when some composer ... appears eager to propagate an ideological line—such as mysticism or anarchism or reformism—that is in so far friendly to imperialism that it opposes socialism and the ideas that would contribute to the organisation of the working class for the overthrow of imperialism.' (Cardew 1974, 53) On politics and AMM more broadly see also Bailey 1992 and Prevost 1995.

practice, however, he ironically sought to retake a position established by his ageing opponents.¹³⁴ Derek Bailey's (1992, ix) survey of improvised practices makes a similar affirmation of ephemerality, arguing early on that 'any attempt to describe improvisation must be, in some respects, a misrepresentation, for there is something central to the spirit of voluntary improvisation which is opposed to the aims and contradicts the idea of documentation.'

Despite their ironies, the questions that followed from the confrontational statement resonated strongly with those Izagirre wanted to raise about his relationship to ICASP. Did the increasing institutional legitimacy of improvisation represent the end of the struggle against hegemonic forms of musical discipline such as those observed by Kingsbury (1988) or Born (1995)? Was improvisation's technological and intellectual development a form of maturation, or a softening of its early potential for social and political resistance?

4.3 Talking politics in Cage year

In Montreal EAI found itself in the midst of a shift in institutionalised music literacies and pedagogies. The rising importance of improvisation in academic electroacoustic practices specifically exemplified a turn to non-notational and autodidactic forms of music making seen as destabilising traditional modes of knowledge and discipline in the university (Taruskin 2009a, 509-511; cf. Bailey 1992; Nyman [1974] 1999). This shift was encapsulated by the celebrations of the Cage centenary that bubbled across the Euro-American art music world in 2012. Music once rejected as radically out of sync with the proprietary norms of the concert hall became a momentary staple in classical music programming. Cage was re-canonised as the prophet of a democratised, post-Internet generation of listeners and experimenters. Eschewing conventions like form-content distinctions and metrical quantizations, a turn to improvisation and indeterminacy seemed a way to discard modernist elitisms and essentialisms, replacing them with a more Liberal and consensual way of setting art music apart from the norms of the popular and classical

¹³⁴ Here I use the term 'liveness' in a purely figurative sense. For a more orthodox reading, arguing that the live as a category is constructed by mediatisation, see Auslander 1999.

worlds.

In EAI and similar new genres, the desire to present an ethical alternative to dominant musical norms plays a crucial role in structuring an imagined renewal in production and listening. George Lewis (2013, 4), for example, has remarked upon recent gestures towards a broader notion of improvisation as a 'ubiquitous practice of everyday life, fundamental to the existence and survival of every human formation'. Others have called into question the categorical relationship between improvised and composed practices that has been set up by musicologists and musicians (Nettl 1974). There are now multiple claims to the interpretation of improvised practices which note their unique and potentially transformative mediations of musical agency, sociality and ontology (Born 2012a). As Laudan Nooshin (2003) writes, however, setting up improvisation as the 'other' of composition can also mediate profound power differentials and essentialised notions of alterity. Inserting improvisation into educational canons can thus represent both a relaxation of repressions *and* an attempt to strengthen the basis for prevailing political and canonical doxa.

I argue that exploring these contradictory desires and interventions can show how electroacousticians engage in what Michael Warner (2002, 114) has called 'poetic world making' to construct themselves as 'counterpublics' (cf. Fraser 1990). A discipline is both a kind of public, made up of peers who share common interests and practices but may still be 'partial strangers' to each other, and a kind of practice undertaken either to perform one's own membership in that public, or to organise and structure the performances of aspiring members.¹³⁵ In his discussion of the ways that practice and politics of the public intellectual are conditioned by existing forms and venues, Warner suggests that disciplinary practice can be thought of as central to acts of public-making that hinge upon personal identification. 'Every sentence is populated with the voices of others, living and dead, and is carried to whatever destination it has not by the force of intention or address but by the channels laid down in discourse', Warner writes. 'These requirements often have a politics

¹³⁵ For extended critique of the former sense of discipline see Foucault 1988; for the latter see also the discussion of *dressage* ('grooming') in Lefebvre 2004.

of their own, and it may well be that their limitations are not to be easily overcome by strong will, broad mind, earnest heart, or ironic reflection.' (Warner 2002, 128) A discipline operates as a public in Warner's sense both by organising the circulation of utterances and by demanding attention to those utterances among a dispersed group of indeterminate participants. It also denotes signs and rituals that operate outside the enunciative sphere as preconditions for participation, structuring learning and creative practice.

I coin the term 'counterdiscipline' in this chapter to denote a discipline defined by reversal and opposition. It suggests a counterpublic shaped by the practice and awareness of discipline.¹³⁶ Although participation in a counterdiscipline does not preclude participation in other musical publics (Born 2013a, 30-31), it might influence outside engagements by generating frictions with them. Describing discipline as a positive element in the constitution of counterpublics rubs against the grain of standard accounts of Euro-American art music. Scholars of these traditions like Henry Kingsbury (1988), Katherine Bergeron (1992), Anahid Kassabian (1997) and Fred Everett Maus (2004) have mounted a critique of discipline as a form of repression, equating the idea of disciplined practice with the imposition of dominant ideals on otherwise unrestrained expressions of social dissension and subjectivity. Ethnomusicologists in other situations have foregrounded musical discipline's generative aspects, focusing on its use as a powerful 'technology of the self' (Foucault 1988). Charles Hirschkind (2001), for example, has explored how 'modern' technical mediations become inseparable from 'traditional' inculcation techniques. Similarly Rebecca Bryant (2001, 606) has described how self-discipline can engender participation and identification with a modern public. She presents this as a contrast with Western anxieties about discipline. 'In [...] parts of the world where hierarchies have not been hidden', she writes, 'where education has been exclusive and valued as such, and where traditions have been embodied in persons, creating educated persons has always been an integral part of imagining the community and its continuity.'

In my fieldwork, improvisational counterdisciplines cut across institutional

¹³⁶ While the concept is often used in the context of marginalised or subaltern publics, it does not necessarily imply that the members of a counterpublic must be linked together by political oppression as such (cf. Warner 2002, 120; Dueck 2013, 10-11).

boundaries. One site where I found them in operation was the undergraduate electroacoustics program at Concordia University, where I worked with students involved in the early stages of forming a new ensemble informed by free improvisation practices and modelled upon the new academic idiom of the laptop orchestra (Trueman 2007). Another was the non-academic network of sound artists who surrounded Aitor Izagirre and Alain Lefebvre. Like Heinritzi's problematisation of the improvisation-composition binary, and his hijacking of Cardew's essay on Stockhausen, these musicians seemed to turn anti-modernist polemic against the very musicians who first invented and deployed it. They decried banalisations in an effort to reaffirm the practical domain of the avant-garde against broader liberalisation efforts.

There is a growing body of literature bringing critical attention to the politics that informed Cagean and other anti-authoritarian experimentalisms in the 1960s and 1970s.¹³⁷ In light of this scholarly reassessment, it is also pertinent to understand the reevaluations these historical figures are undergoing in the present. In many ways these new genealogical imaginaries repeat older canonisation efforts, figuring dominant musicians as immune to questions of power and material struggle. One strategy to remedy this kind of depoliticisation is the rhetoric of demystification developed by Susan McClary in her 1987 chapter 'The Blasphemy Talking Politics in Bach Year'. McClary broke new ground for musicology by developing an Adornean account of the work of Bach which drew back the curtain of divine intervention and superhuman talent to reveal a practical synthesis of politically-charged stylistic and instrumental resources. The strategy is a rough fit with improvisational counterdisciplines, however. New improvisational counterdisciplines such as EAI and the laptop orchestra, do not propose naïvely to 'transcend the conditions of time, place, career and personality' as McClary once complained that Bach scholars did (McClary 1987, 19). Indeed, talking politics in Cage year is no blasphemy at all. Proponents of such practices, as Heinritzi articulates and my interlocutors in Montreal confirm, engage in inherently political projects. By reading their statements as acts sustaining electroacoustic and sound art counterpublics, I want to show how discourses

¹³⁷ For recent accounts of the politics of the broader experimental movement see Beal 2003; Adlington, ed. 2009; Piekut 2011; Drott 2011; Adlington, ed. 2013; Kutschke and Norton, eds. 2013.

such as these can be shared across genres and generations, regardless of any theoretical contradictions. They help to reaffirm the social imaginaries of electroacousticians and sound artists in the face of the declining legitimacy of aesthetic modernism.¹³⁸ Furthermore, these performances of opposition to an imagined 'mainstream', commodified other are not purely discursive.¹³⁹ They also require a level of counterdisciplinary commitment to embodied practices of learning, reception and production.

My analysis in this chapter touches upon several situations in which improvised idioms are figured as oppositional in this way. My goal is not to privilege one over another, but to explore how all have been framed, in uneven and contested ways, by the coincidence of improvisation's institutionalisation with the rise of neoliberal policy-making in Montreal's education and cultural sectors. As I have discussed in Chapters one and three, the repercussions of neoliberalisation could be felt across Montreal's electroacoustic music and sound art scenes at the time of my fieldwork. This is not necessarily to say that dominant neoliberal values are constitutive of what Eric Drott has called the 'generic ideologies' of electroacoustic improvisers. As Drott has written, ideology accrues to genre through the musical mediation of political expression. The norms and practices that govern genre modulate the meaning of musical action, and therefore also its political potential.¹⁴⁰ In contrast, these new counterdisciplinary practices can be understood as cohering to dominant neoliberal ideologies through relations of opposition and articulation. British cultural theorists such as Terry Eagleton (1976, 54) have interpreted the relationship between dominant and subjective ideologies as one in which ideological formations 'so reflect the experiential relations of individual subjects to their social conditions as to guarantee those misperceptions of the 'real' which contribute to the reproduction of the dominant social relations.' (Eagleton 1976, 54) Addressing the potential for political action

138 On the notion of the social imaginary in the broader contexts of nationalism and moral philosophy see Taylor 2004.

139 The notion of the 'mainstream' parallels the long-standing tendency of popular music subcultures to define themselves in opposition to a dominant monoculture (cf. Hebdige 1979; Thornton 1995). Although the term went out of fashion for a time because it often points to a nebulous and contested set of imagined others, recent commentators like Huber (2013) have argued for retaining its concrete implications. In musical terms, the other it designates more often than not for electroacoustic counterpublics is the 'common practice' of Western Art Music.

140 Cf. Drott 2011, 16. I return to notions of genre and genrefication in chapter six.

within such a system, Eagleton asserts that when such a formation becomes 'hegemonic' it can be considered as a heterogeneous composite of authorial and aesthetic ideologies which might in practice conflict and compete amongst each other.¹⁴¹ A hegemonic formation such as neoliberalism can thus be thought of as a dynamic discursive and disciplinary ecosystem rather than a monolithic repressive force. It becomes like the soil in which counterpractices and counterdisciplines are cultivated.

Growing out of this interest in neoliberal forms of power, I am interested in the entanglement of certain improvisational idioms, at times by virtue of their perceived social and epistemological potential, with certain kinds of political subjectivation. My focus is on the ways that processes of inculcation and ways of acquiring literacies can be deployed as oppositional techniques in the making of electroacoustic and sound art counterpublics. As anthropologists of musical training such as Hirschkind (2001) and Bryant (2001; 2005) have shown, phenomenology and autoethnography are the necessary corollaries of such a concern with the development of practical skill. Because disciplinary knowledge is often tacit and embodied rather than discursively worked out and expressed, criticism and theorisation should be enriched by self-reflexive awareness in these domains (cf. Bourdieu 1977). Indeed, this approach, exemplified by classic accounts such as David Sudnow's (1993) analysis of his learning process of a jazz pianist, and Paul Berliner's (1994) long-term account of the literacies and tacit knowledges of jazz musicians more broadly, has become an essential element in the musicological toolkit for the study of non-notated musics.¹⁴² A self-reflexive approach becomes even more important in the case of LOrk or EAI practices, where, in contrast with the Deleuzian and Simondonian interlocutors I introduced in chapter two, the privileging of highly personalised, atheoretical, or even anti-theoretical expressions can sometimes predominate. It also makes sense given the relationship that I want to evaluate here between social imaginaries and neoliberal ideology, in which self-interest has been identified as essential to participation (Gershon

141 Compare a more pessimistic definition from Theodore Gracyk's discussion of liberal hegemony in rock: 'Hegemony is present when the ideology of a dominant group seeps down to subordinate groups so that they accept and internalize it, displacing discourse representing their own interests.' (Gracyk 1996, 208) I understand concept of hegemony as being ambivalent enough to encompass both Gracyk's and Eagleton's interpretations.

142 See also Horning 2004 on the role of tacit knowledge in the work of sound engineers.

2011). By presenting autoethnographic reports alongside observations of my interlocutors I hope to both expose my own implication in this relationship and give some insight how a sense of individual franchise can develop in conversation with other members of a counterpublic.

4.4 Troubleshooting CLOrk

If for much of the late twentieth century improvised music making was still largely excluded from pedagogical canons in Montreal, a significant change of attitudes has taken place over roughly the past decade.¹⁴³ Some of the widest reassessments have taken place in the disciplines associated with contemporary electroacoustic music. The undergraduate program at Concordia University is no exception. Mobilising improvised practices has helped Concordia's electroacousticians transform modernist values such as autonomy and authenticity into a celebration of technological innovation, freedom of expression and aesthetic diversity. As I will describe, these efforts are articulated to prevailing ethical and theoretical discourses about laptop performance, managed in such a way as to exclude outside practices, and also tailored to respond to specific institutional pressures on the department. Counterdisciplinary efforts to reconstruct academic electroacoustic music as a marginalised tradition were condensed in a new idiom known as the LOrk.

Laptops have been controversial objects among academic electroacousticians. Students enter their undergraduate studies already fairly well-versed in the use of computers and virtual studios for recording, editing and synthesis. Students enter their undergraduate studies already fairly well-versed in the use of computers and virtual studios for recording, editing and synthesis. Almost every undergraduate lecture I attended during fieldwork was delivered to a classroom full of students half-engrossed in gear advertisements, games and Facebook chats. For faculty members, the laptop presented even more challenges. Students who had learnt among friends or online were seen as

¹⁴³ I have anonymised several of the quotations in this section in this section in order to protect the discretion of interlocutors who were critical of their university's administration. By agreement with university administrators I have also agreed to accord blanket anonymity to the students I interviewed.

needing a kind of retraining to use their machines according to accepted standards, and thereby attain a higher level of fluency and expertise.

In the wider academic electroacoustic world, the emergence of laptop computers at the end of the 1990s had also been received as an affront to more visually and socially engaging models of musical performance (cf. Emmerson 2007). As the director of CLOrk (Concordia Laptop Orchestra), Eldad Tsabary, put it to a newspaper interviewer towards the end of my fieldwork, the question was one of making the operation of a laptop convincingly performative: 'How do you make the audience feel like you're doing something when you're simply behind a laptop?' (La Leggia 2012). When this concern was first voiced by electroacousticians in the early 2000s, it was often associated as well with the emergence of autodidactic 'bedroom composers' averse to traditional authority. Critics complained that, especially in electronic dance music genres, laptop computers reduced the engagement of performers with their audiences, drawing their attention into a screen interface that isolated them from their surroundings and abstracted their actions from recognisable musical gestures. At the same time, they celebrated the potential that smaller and cheaper computing devices might 'democratise' what had long been a predominantly academic domain of creative experimentation (cf. Eshun 1999; Emmerson 2001).

The invention of the LOrk condensed these hopes and controversies into a concrete strategy for renewal. In 2005, a group of software and hardware developers in the computer music program at Princeton University established PLOrk (Princeton Laptop Orchestra). They received large-scale funding from the MacArthur Foundation in 2008 to document the new idiom and disseminate it as a pedagogical model. As co-inventor Dan Trueman (2007) wrote in his first article on the project, the PLOrk model addressed four ways that the musical use of portable computers had undermined universal musical values. First, it broke the natural connection between music and bodily spectacle. Using a laptop could never be sufficiently expressive to be emotionally engaging to audiences with a taste for physical 'virtuosity'.¹⁴⁴ Second, it was far easier to master and more efficient to operate.

¹⁴⁴ Trueman 2007, 175. On this point see also discussions of the laptopists' 'lack of gesture' in Prior 2008 and Montano 2010.

Since little of what audiences might recognise as effort was required, the new equipment broke the standard channels for gaining expertise and literacy.¹⁴⁵ Third, it had no 'tradition' or 'performance practice' to adhere to. And fourth, it fostered no inherent sense of 'community' among musicians. Laptop users had been deprived of the 'magical' aspects of playing together in large groups and contributing to a coherent whole (Trueman 2007, 178). The essence of PLOrk was thus the idea that salvaging and revitalising elements of existing performance models could help laptop experimenters to remedy the confusion brought about by their new techniques. By reappropriating the orchestral idiom, for example, electroacoustic and computer music researchers could draw upon its aesthetic and social affordances, especially its capacity to order individual actions and spectacularise collective coordination (cf. Adorno 1976). A series of commercial start-ups and extensions of the project to other mobile computing technologies ensued (see Gopinath 2013, 101-126).

Paradoxically, however, the PLOrk project also pushed aside much of what made the laptop distinct as a material object, as well as its particular genealogy as a hybrid of business and entertainment devices. These were contingencies to be managed or overcome, not essential to its potential as an instrument. LOrk discourse thus constructed the laptop as something that ran against dominant values. Management of its contingencies mediated a sense of responding to cutting-edge technological change. The laptop thus became an important component in the construction of electroacoustic counterdiscipline.

Management of students also played an important role in this transition from a modernist to a counterdisciplinary musical imaginary, enrolling students' sense of individual creativity and technical responsibility. In emails leading up to the first rehearsal I attended, Tsabary encouraged aspiring members to bring their own sounds and software setups to the rehearsal. 'The beauty of CLOrk,' the message explained, 'depends on an effective mixing of ideas and sounds.' Individually prepared material needed to be tested

¹⁴⁵ This point has its roots in a broader movement to correct the 'disembodiment' of human computer interaction. See Dourish 2001 and Suchman 2007. For a contrasting viewpoint from the specific domain of computer-based sound engineering showing that these systems may indeed afford different kinds of embodied interaction see Bates 2009.

before it could be added to the mix, however. In order to facilitate this, the email encouraged students to model their contributions upon 'categories of sounds and textures' that had already been tried out in previous iterations of the ensemble. The participants I interviewed reported spending very little time preparing material on their own, but this was no obstacle. At the first rehearsal Tsabary circulated a set of sounds and software libraries that he had designed in advance.

After extensive troubleshooting of the sound and networking systems, CLOrk spent the bulk of its rehearsal time on the first day becoming familiar with the assigned software. The first, called Soundplant, mapped the laptop's keystrokes to a bank of sound files. Once sounds were assigned to the keys, the user could also set basic parameters for each individual sound such as start and end points, playback speed, and volume level. Tsabary had also prepared a set of Soundplant 'keymap' files, each of which he had loaded with pre-chosen sounds categorized according to timbre. The second was a patch written in the Pure Data programming environment allowing students to control the timbre and pitch range of simple oscillator sweeps. Although some students modified the Pure Data patch or played their own sequencers or software synthesizers, they were expected to be able to produce the assigned sound textures on demand. In this context, improvisation amounted to an ability to manage assigned material 'on the fly'.

Some short compositions were designed that used this material in a predetermined way, but the bulk of CLOrk's performance practice revolved around lengthy group improvisations. This was considered essential because it re-admitted embodied expression and social interaction into the creative process, and thus increased the immediacy and interpersonal communication afforded by laptop performance. It was also more efficient than composition. Plans could be decided upon, communicated to inexperienced players, and tested with a minimum of rehearsal time, leaving more time for technical troubleshooting. There seemed to be little difference in practice between performing compositions or improvisations, however. Both were communicated by Tsabary *in situ* using a system of gestural indications known as 'Sound Painting', designed for large instrumental ensembles (cf. Thompson 2006). Tsabary had adopted the category of

'comprovisation' to describe what he did with the group. A new faculty member hired as a Hexagram double professor in Music and Theatre coined the term to denote music that was individually authored, but collaboratively worked out. Performances were often scored graphically or textually, sometimes in formats visible only to the conductor, and other times projected on a screen visible to the audience. In a negative sense, however, comprovisation and improvised Sound Painting also limited musicians' ability to prepare for instructions and thus enforced their adherence to centralised decision making.

Students' ability to make independent creative decisions was also limited by the level of multitasking involved. Unlike conventional musical instruments, which are expected to operate in singular and relatively immediate ways, their laptops were more like windows onto a virtual space in which multiple instruments or playback devices might be operating simultaneously, with or without intervention (cf. Manovich 2001, 78-91). Calling up different categories of sounds on cue was not possible without multiple softwares running at the same time. The main challenge for performers, then, was to make sure they could control their machines in accordance with the conductor's indications. Managing and restraining software processes drew attention away from the intended social benefits. The visual engagement it took to manage screen-based controls slowed interpersonal responses. The telematic multi-site concerts that were CLOrk's mainstay during my fieldwork intensified this difficulty. For one first-year student I spoke with, the difficulty came from reconciling screen-based mediation with ensemble playing.

It's not like when you jam and you look at each other, right? You kind of go into your own world, like if you're scared or if you're curious or if you're really lost in your head. You try not to overplay in that kind of stuff and all those things start to descend on you. But in the end, like, when I'm having my best jams is when I'm looking you right in the eye and when we're really connecting. But with the laptop orchestra that's really difficult to do.

As Nick Prior (2008, 912) has written, the laptop's design 'mediates mobility' – its screen and keyboard isolate the efforts and attentions of a single user from whatever

situation she happens to find herself working in. The problem of movement and the separation of work from play have become mainstays of the critical and ethnographic literature on laptop performance (cf. Montano 2010). In the context of a conducted performance like that of a LOrk, players' attention to a leader becomes an issue as well. Thus another CLOrk player I spoke had chosen to restrict her playing to the prepared material so as to be able to follow the conducting.

People are looking at their screen or keyboard or audio interface or whatever, so you have to really pay attention to see if he is moving around. Because I was doing such simple stuff I was able to watch him pretty closely. But I can see how you might not realize something is supposed to be changing.

The fact that students found their agency to be thwarted by the technical and disciplinary conditions of the laptop orchestra did not preclude their enjoyment of it. The students I interviewed were unanimous in wanting to continue with CLOrk as they progressed in their studies. The closest I heard to criticism of the ensemble was when a student described it to me as 'dorky, but cute'. Accessibility and informality had been a matter of principle since CLOrk was formed in 2011. In the summer and autumn semesters membership was casual and unrestricted. Students seemed to shift in and out of the ensemble from one rehearsal to the next. Although the performances and rehearsals I observed took place within a period of only two weeks, each involved a different group of musicians, several of them in the first year of undergraduate study. Email announcements seeking participants for performances reminded players that neither experience nor preparation was necessary. The only explicit prerequisite was access to the technology.

Nevertheless, the ubiquity of unspoken checks on musical comportment complicated this narrative of creative innocence. The construction of an electroacoustic counterdiscipline extended beyond the LOrk. The tactical keynote for Concordia undergraduates' initiation into electroacoustic practice was what department founder Kevin Austin referred to as 'cocooning'. Students were added to course email lists upon acceptance to the university so that they could ask questions and start to make connections

as much as two months before the beginning of their first class. 'We have a really high bar and a very narrow window of opportunity for a student to get into the program', one professor claimed, 'but once they are here we do everything we can for them.' This meant extending the social space of the classroom into other aspects of students' lives, keeping them engaged in their studies wherever their laptops and smartphones could go. Effectively, faculty members sought to weave students into a collectivity modelled along the lines of what Etienne Wenger (1998) has called a 'community of practice'. Maximising 'legitimate peripheral participation'—that is, setting up situations in which students would learn from each others' example—made it more likely that new players would be able to 'read between the lines' when necessary in an ensemble or assignment (Wenger 1998, 11).

It was rare for students to enter the program completely untrained, however. My observations aligned with faculty estimates that around half had previously learned to read traditional notation. Through direct contact I also learned that the majority had significant practical and professional experience. Some new students who I spoke with had taken extra time to become familiar with electroacoustic style through internet and library searches before applying. Several had gone so far as to consult with faculty members on what specific types of software and hardware to use. Although none of these types of experience were listed among the admission requirements, it seemed to be common knowledge among the students that their musical aptitude would be tested via the portfolio they submitted with their application. Faculty, however, saw it as one of their central responsibilities to reveal the preconceptions and misinterpretations in prior musical literacies. One long-term instructor drew the contrast quite sharply:

Well I mean they have certain technical skills. I know of one student, in her first year here, who has, I think she has a diploma from one of the private audio engineering schools and she, she's gone straight into the third year recording class, for example. Buts it's an interesting sort of contrast because you come in, like, way ahead technically and then, not necessarily in terms of the theory or the ear training. Those skills are very uneven in their standards.

Few people who I met at Concordia would admit to being scholars or fans of electroacoustic music as a genre, whether as listeners or composers. If they did so, as I describe in chapter three, they took the position ironically or self-effacingly. When it came to electroacoustics as a form of discipline, however, most embraced the distinction enthusiastically as a way of transcending aesthetic and social divisions. As Austin had put it, this reconfiguration of the electroacoustic imaginary gave them a way of 'speaking for' the rapidly expanding field of genres they saw as their epigones. I found that most students weren't altogether averse to this way of seeing things. In the words of a first-semester student I interviewed:

It's not an art program. You don't come in and start making art. It's not a music program, you don't come in and start making music and recording bands. It doesn't teach you anything about software, if that's what you're looking for to learn. So you have to come in with all these things and sort of a desire to explore sound generally and broadly. You develop a deep understanding of sound.

Another older student gave me a contrasting account of the approach, however, equating what he saw as the sterility of electroacoustic studies with the conditions of a laboratory. 'The problem with it in an institutional environment', he told me, 'Is that, I guess, it's something that already exists outside and people are already doing it, and learning by doing it, and somehow in order to justify its own existence the institution has to create its own special forms.' The feeling for most students was that they didn't need to be at university to learn the skills they were learning, per se. The dilemma was summed up in an internet meme that circulated on Concordia student Facebook groups around that time. The image was based on a screen capture of a character from the animated television comedy *Futurama*, looking off-camera with his brow furrowed in suspicion. The caption read: 'Not sure if learning from world class professors ... or teaching myself everything online before exams.' Again, however, the power of electroacoustic counterdiscipline was also enhanced by showing its superiority to outside skills. In the words of one part-time instructor, students needed a conceptual 'grid' to help them escape the metrical 'grid' faculty saw as imposed by their tools:

What's going to come out [of] someone's laptop is going to depend on what's in there, and also if they've got outboard gear at home, and if they are really coming from a much more traditional studio perspective, or a virtual studio perspective. All of these things have influence on the work but, in principle certainly my understanding is [that] creative work is creative work. [...] If you've got a grid to think by, then it creates a sort of priority list as opposed to taking out a manual that's hundreds of pages long, and going through things one by one, you go for the heart of the matter. [...] And certainly for many many years we've proven here that it really doesn't matter, that even someone working in something as restrictive as Ableton, for example, can learn how to go off of, say, the rhythmic metric grid, and create stuff that's compatible with the EA aesthetic.

As I have described, CLOrk was tightly woven into a web of practices that sustained notions of technological mastery and aesthetic exclusion derived from modernist traditions. Nevertheless, efforts to liberalise electroacoustic teaching during my fieldwork were also intertwined with efforts to align electroacoustics with university-wide strategies aimed at building Concordia's reputation as an international art and technology centre. Electroacoustics was constructed as a counterdiscipline in this context as well. Recent initiatives such as the Hexagram Consortium had attracted funding from public and private partners which was funnelled into a network of semi-independent research labs. Hexagram attracted a fresh crop of foreign researchers to Concordia, and grew to be recognised as one of the cornerstones of the university's international profile. As an interlocutor involved in the administration of the consortium put it, the goal of the original consortium was to open the door to commercial patent and technology transfer opportunities involving local media and technology companies like Moment Factory, Ubisoft and Cirque du Soleil. 'When Hexagram was starting', he told me, 'the goal was not researchers inside the university working in the university. [...] Many of these projects could be in one way or another [achieved] through different possibilities in industry.'¹⁴⁶ Over the ensuing decade, however, the emphasis on industrial partnerships had waned, interuniversity partnerships folded, and

146 For corroboration of my interlocutor's account see the analysis in Fourmentaux 2007.

the funding became re-concentrated inside the university.

As I wrote in chapter three, staff in the music department initially fought to keep the discipline of electroacoustics distinct from the new interdisciplinary audio and acoustics research at Hexagram. Only one faculty member from the music department had been involved in the initial proposals and planning in 2000 and 2001, and in her words, her contribution had been 'mainly as an administrator'. For decades electroacoustics facilities had been located at the suburban Loyola campus, several kilometres from the building housing the Hexagram laboratories in downtown Montreal. The distance had afforded faculty and students an ideal level of isolation, not just aesthetically and socially, but also in terms of production spaces and resources. The department held concerts in a separate facility designed by electroacoustics experts, kept specialized gear separate from the interdisciplinary resource pools set up by Hexagram, isolated themselves as much as possible from administrative oversight, and tried to avoid direct confrontations with other departments. By the time of my fieldwork, however, the music department had slowly and belatedly begun to align itself with the ascendent regime. New courses were introduced to the undergraduate curriculum with the goals of encouraging participation by non-electroacoustic students and giving core students transferrable skills. Newly equipped classroom and studio facilities were built directly across the street from the main Hexagram offices, replacing older spaces at the aging suburban campus. Long-term faculty members were ambivalent about the shift. One described his feelings at length:

It's been a double-edged sword in many many ways. I think there are certainly more pros, for all of the things, than there are cons. The cons, though, always sort of stick their heads out. You know the squeaky wheels always get the notoriety. But yeah, we're closer to the rest of the Faculty of Fine Arts for all kinds of things. It was terrible, we felt not only ostracised, but also left out of activities because we were out there at Loyola. It was, you know, a three hour escapade to try and come from there, downtown, and back. And if you have classes throughout the week, you're really bound to that. [...] So coming down here was that, it's really good. The flexibility of being out there as well. We had really good purse strings because we

were by ourselves. Now that we are down here, and the sort of other side of the sword, is that we are now part of the CDA, the Centre for Digital Arts, and although our students aren't required yet to pay the fee, all the studio stuff is now taken on by them. They wanted a little bit of the responsibility, and I realise they want more and more to be able to do what they're there to do. I had been doing all that. When a piece of new gear came in, I would install it, I'd check it, I'd make sure it was working. Something came back from repair I'd put it back in place, with a technician we had. We had a student assistant, and we'd make sure it would work. Well now we're downtown. We're now working on at least a six month [wait] on almost anything we want to have done, because we have so many more lines of communication that have been built up around us coming downtown. We can't do things. Unfortunately, it means that when you're left out of the loop, and you don't take into consideration that you need to be in the loop, and they do something, and you realise that they gaffered it [sic] ... that they messed it up.

As my interlocutor's statement points out, some of these changes led to redundancies ('we have so many more lines of communication that have been built up around us') when considered alongside the offerings at Hexagram's design and intermedia labs. Nevertheless, electroacoustics faculty argued persistently for recognition of the genealogical and disciplinary distinctions which set them apart from their colleagues in other departments. When events were held 'across the street' in Hexagram's design labs, I noticed more than once that more conservative figures seemed to be voicing their continued opposition by their absence. Older faculty members characterised the increasing focus at Concordia on 'industry-oriented' initiatives such as Hexagram as the latest step in a long-term rationalisation process driven by the education ministry. They expressed suspicion about the safety of their traditions in a context of intensified collaboration and commercialisation.

Indeed, in an effort to 'reduce redundancy' between the training and research activities at the province's music departments, the inter-university administrative council had come to an official agreement as early as 1997 solidifying the degree and research

distribution between the universities, and dividing resources accordingly (Conférence des recteurs et des principaux des universités du Québec 1997). According to the structure agreed at that time, existing graduate programmes in composition and musicology would continue to be supported only at research universities founded upon existing conservatory-style structures. Primarily professional and undergraduate institutions such as Concordia, on the other hand, were excluded from traditional disciplinary structures and encouraged to develop programmes geared towards 'transgressing genres'. This made it effectively impossible for the department to aspire towards developing anything like the rigorous traditional composition curricula at McGill or Université de Montréal, which older faculty held in high regard.

In an institutional sense, then, the turn to improvisation confirmed long-standing worries about being a 'minor' department in relation to the local academic field. Concordia has the largest undergraduate population in Montreal but consistently holds a lower academic ranking and more limited international profile than its research-oriented neighbours (Conférence des recteurs et des principaux des universités du Québec 2006). Its marketing campaigns emphasise dynamism, innovation and 'approachability' (Zack 2006). For most faculty members I spoke with, the reform of the discipline represented the kind of aesthetic and technological risks and speculations that only a low-profile, maverick department could afford to take. As Tsabary described it, experimenting with the teaching and practice of electroacoustics at Concordia resonated with a natural responsibility to work against the 'safety' of the broader institutional framework. 'I think it's because we're so flexible and we don't stick to what we see around us', he told me. 'Because we're in a university, and it's kind of a safe place in itself, it's our job to try [things] out, and not stick to the safe.'

In summary, the introduction of improvisation into electroacoustics played into both sides of a controversial transition. CLOrk was less an opening to outside aesthetic and technological innovations than a managed interiorisation of difference generated by internal fragmentation. Presenting laptop improvisation as an unresolvable lacuna dramatised the broader anxieties of the electroacoustic tradition at the same time as it

paradoxically intensified the department's claims to authority in the face of encroaching institutional reform.¹⁴⁷ Far from being a straightforward matter of technological or institutional necessity, then, measures like the laptop orchestra helped to mobilise previously modernist feelings and practices into a counterdiscipline. They did so on two levels at the same time: strengthening the tradition in the face of institutional liberalisations, and inoculating it against being overcome by the increasingly sophisticated inventions that it saw itself as having to absorb from both its imagined commercial others.

4.5 '*Politics, short-circuited*'

I return now, by way of contrast, to the genre complex with which I opened the chapter. The non-academic network of sound artists who surrounded Aitor Izagirre in Montreal were mostly graduates of or drop-outs from electroacoustic degree programs. Dissatisfied with the traditions and conventions of electroacoustic music, they constructed their work as a counterdiscipline to it. As an alternative, they modelled their practices on the sounds they heard emanating from transnational noise and sound art scenes linking far-flung reference points like Brooklyn, Berlin and Osaka. Ethnographers of the latter city focusing on the genre known as *onkyō* have emphasised the ways that listeners adopt strictly disciplined attitudes of silence and stillness (see Plourde 2008, 284-291). In Montreal, however, listeners were also for the most part producers. Their concepts of literacy and expertise as producers hinged more on adopting appropriate personal styles of expression than on enforced complicity through abstract doctrine or conventional *habitus* (Bourdieu 1977). In this section my focus is on the reversal these styles enacted of traditional electroacoustic expectations about performance, politics and agency.

Technological equipment was central to the aesthetics of underground noise, sound art and EAI in Montreal. All the performers I met held a strong sense of responsibility for their own technical knowledge and expressed this through the process of selecting and assembling a personal setup. It seemed to go without saying that one could learn the

¹⁴⁷ In this regard such reforms might be analysed along similar lines as the state responses to anomie and emergency examined by Giorgio Agamben in (2005, 31-39).

necessary skills to operate and connect these devices without instruction. They relied heavily on what Lisa Gitelman (2004, 208) calls 'paraliteracies' to help them do this: embodied habits developed to perform the standardised operations inscribed in technological appliances. 'Look: all the knobs are labeled with numbers and functions', one performer told me when I asked how he'd learned to use his gear. 'It's nothing like a violin. You can see where the notes are. It's designed to be easy to use.'

The performance practice of sound artist Darsha Hewitt strikingly dramatises the way that the construction of such 'paraliterate' assemblages could invoke a sense of counterdiscipline. I saw her perform in late spring of 2012 as part of an open studio event organised by the robotics artist Peter Flemming. Standing at a wooden table held up by saw horses and flanked by a small public address system borrowed for the occasion, Hewitt introduced herself casually and then began sifting through a prepared selection of analogue components, miniature loudspeakers, and nine volt batteries. She asked for an audience member to time her with a stopwatch, explaining that she hoped to use the gear on the table to assemble twenty square wave oscillators in twenty minutes. Once the clock had been set she began wiring up the first breadboard with an old CMOS 555 timer microchip, a pair of resistors and a capacitor.¹⁴⁸ The frequency of each new circuit depended on the combination of components she'd selected at random. At first she worked in silence, but as each completed oscillator added its ticking or buzzing voice to the mix, the intensity built. She chatted with the audience as she worked, cracking jokes about her mistakes. As each successfully built circuit began to oscillate, whatever pulse had begun to coalesce was destroyed. The rhythm became more and more disorganised, and as the last minutes ticked away it seemed to fuse into a dissonant cloud of electronic static. She cheered herself on with the pride of an amateur athlete, and was just short of finishing the task when her time ran out.

Formally, the performance derived from strategies for the electronics workshops

148 The 555 timer integrated circuit was developed in 1971 by the semiconductor manufacturer Signetics in California. It was used in delay, clock and oscillation applications in a wide range of devices including spacecraft, early personal computers and toys. It is increasingly popular with the hobbyist market. Cf. Camenzind and Ward 2004; Lécuyer 2006.

she taught at the local feminist ARC, Studio XX. At one such workshop a year earlier she had organised a kind of closing recital for her students involving a similarly structured race. Participants had five minutes to finish a single oscillator circuit, sonified not with speakers, but by attaching a found electronic object of their choice. She had no musical training, and most of her work was installation based, so performance did not come naturally. When called upon to perform herself, she simply chose to stage the act of assembly. Doing so became the conceptual seed that transformed the performance into a critical comment on the conventions of improvisation. It gave the performance a kind of built-in obsolescence. Each time she attempted it, it would become easier to do, until eventually she would have to either add to the challenge or abandon the strategy entirely. It deliberately reversed dominant values of virtuosity and aesthetic sophistication. At the same time it committed her to a kind of reflexive competition.

The politics of Hewitt's intervention are difficult to pin down. In some ways it recalled the work of the anonymous sound art collective 'Women With Kitchen Appliances' (WWKA), with whom she had played in the past. WWKA sought to highlight the gendering of electronic music shows by performing in masks with excruciatingly amplified food processing devices instead of instruments. Indeed the transnational hacking scene largely maintained the predominantly male gendering of older technical and engineering cultures, and in Montreal Hewitt sometimes took part in a small but persistent movement to position hardware building as a feminist intervention in itself by undermining its association with the expertise of elite musicians and engineers.¹⁴⁹ In '20 Oscillators in 20 Minutes', however, the feminist subtext was subdued. In an email conversation we had in the months after the performance, she spoke of an interest in ways of working that afforded 'stepping out of your perceived gender.' She went on: '[T]his is how I normally go about things too—I seem to be mainly reminded of my femaleness by others who still seem to find my gender out of the ordinary within this field.' Other musicians in the underground EAI scene chose similarly ambiguous political stances. Many of these would have been difficult to take in the university contexts like ICASP. Performances and programs

¹⁴⁹ For further discussion of this movement see Harlanova 2012. In comparison see also the discussions of emerging 'cyberfeminisms' in Minahan and Cox 2007.

thematized drug culture, sexual transgression, religious subversion, and various kinds of ironic kitsch. Concerts took place at anarchist housing collectives, parking lots, or industrial stairwells. Nevertheless the scene's social and aesthetic forms seemed to eschew radical politics.

The scene's responses to wider political struggles illustrated this paradox. Again here there was a salient sense of counterdiscipline in relation to imagined academic norms. The widely reported student strikes that dominated news and disrupted daily life in Quebec over the course of the spring of 2012 provide an interesting case in point. The crisis followed a strike declaration by the majority of the province's student governments in response to a government proposal to eliminate a two-decade-long tuition freeze. The atmosphere in university classrooms and in the streets became intensely politicized. Left-leaning university faculty declared public support for the student movement. They announced political actions during conferences, and rushed to publish polemics supporting affordable education and free dissent (e.g. Sterne and Davis 2012). In the months following the movement's peak at the end of May 2012 entire scholarly journal issues were filled with politicized writing (cf. Manning 2012; Massumi et al 2012). As Brian Massumi (2012) wrote in a widely reprinted denunciation of police repression, academics had a duty to 'emulate the inefficiency' of their striking students and 'short-circuit' the government's efforts to defuse the situation.

Although most student musicians I worked with also positioned themselves on the left, even supporters of the strike were reluctant to integrate its politics into their sonic work. At the most extreme phase of the crisis, dozens of small local protests arose spontaneously at the same time each night for two weeks. A Facebook campaign by an anarchist student group set off a wave of sonic protests called *tintamarres* (literally, 'cacophonies') in which residents filled the streets beating pots and pans in a strict rhythmic pattern. The widely reported overflow of anti-government sentiment coincided with the busiest time of the year for electroacoustic music and sound art—BIAN was in full swing and MUTEK began at the end of May. That month's edition of 24 Gauche opened with a brief gesture of support as the organisers led the audience and musicians out to the street to

join the nightly protest. My video of the event shows most of the audience members tapping rhythmically, entrained to the larger demonstration. One group of noise performers, however, is crouched behind a mailbox with a set of cymbals and metal objects, deliberately trying to throw off the rhythm and smirking at the crowd around them. Some I spoke with cracked jokes about the embarrassing resemblance between the *tintamarre* and a hippie 'drum circle'. They saw attempts by academic musicians to capitalise on social and political movements at best as corny, at worst as cynical and opportunistic. None of the invited performances later in the evening strayed into politics at all. As a negation of authority, however, this attitude also had its politics. It reenacted an avant-garde non-conformity, an attempt to embody resistance by refusing cooperative modes of communication and cooperation (cf. Adorno [1949] 2007; Bürger 2009).

This ambiguity extended into my experiment with practice as well. Here the tension between participation, technological mediation, and individualism became the pivot point for a further sense of counterdiscipline. From the first time I brought my ethnographic investigation to one of the city's underground noise and sound art venues, my interest in performing and participating was a key factor in negotiating access and maintaining long-term contact. Questions about my own activities as a musician and my potential as a collaborator were rarely absent from the gatekeeping process. Audiences at the frequent gallery shows and small festivals that percolated in the background of the city's large-scale festivals and cultural institutions were more often than not made up entirely of musicians and intermediaries. The underground was as much a field of what Bourdieu (1993) called 'producers-for-producers' as the academic field. Much of the trust and stability that held it together derived from the mutual pressure felt by musicians to act as the audience for each other's work. Critical talk among regulars often elided genre complexes with cliques of frequent co-performers. It was rare to attend an event concert that didn't mix EAI with noise, drone, conceptual art, video art and industrial music, but with a handful of exceptions this seemed to be more a function of who was invited or available to play than of any deliberate curatorial decision.

I came to perform in the EAI scene for the first time after I was invited by sound

artist Erin Sexton to join a small group of musicians at a jam session in a basement studio at 24 Gauche co-founder Magali Babin's house.¹⁵⁰ Each guest had to bring their own gear, so I decided to assemble a small set of portable electronics and cables that I had around the house. For a few nights in the week prior to the session I experimented with different configurations of a small mixing board and a pair of digital delay units—a Boss DD-3 and a Lexicon LXP-1—which I had used conventionally in the past as effects, but tried to reconfigure based on the systems I'd observed in my fieldwork. I patched them together so that the mixer's outputs ran through the delay pedals in parallel and then fed back into its inputs. By slowly altering the filter and delay settings I could elicit a limited range of abstract, indeterminate textures, from barely audible crackling to slowly changing multi-layered drones. At certain settings, I discovered that the patterns would begin to mutate unpredictably without any further manipulation on my part, apparently modulated by accumulated noise in the unstable circuit. This seemed to me to fit the ideals of what I'd heard in my visits to EAI concerts in lofts and squats. Convinced I had roughly approximated the style of setup I'd seen my hosts use in our previous encounters, I brought the gear with me to the sessions.

In his history of the Association for the Advancement of Creative Musicians, George Lewis writes of how the 'ad hoc, informal education system of jazz' was brought into conversation with theoretical compositional systems such as those of Schillinger and Cowell as it was gradually collectivised and institutionalised (Lewis 2008a, 60, 55-61). Before these rearticulations, a black experimental scene survived on a combination of public education, home schooling, jam sessions and autodidacticism, none of which extended necessarily into analytical theory, collective organisation or professional skills. 'Moreover', writes Lewis, 'competition-based models of music-making tended to relegate collectivity and solidarity among musicians to the background at a time when more collaborative notions of the relationship of community to individuality were being pursued in many segments of the African American community.' (Lewis 2008a, 61) While not necessarily 'competitive' or marginalised in the same way as early experimental jazz jam

¹⁵⁰ For a recent discussion of Sexton's work see Radford 2014. For an example of Sexton's work see, in the discography, Sexton 2011.

sessions, Sexton's gathering was similarly muted in its social and theoretical implications. Guests spoke little about their intentions before playing for an hour and a half over beer. The mood was relaxed. The texture was rough, but often sparse. Repeating, automated patterns emerged and dissolved successively. Each player took long intervals to listen before intervening with a new sound.

After a few undirected improvisations like this, Alain Lefebvre approached me to propose a collaboration.¹⁵¹ He had shared his collection of experimental recordings with me following my meeting with him and his roommate, so I already had a certain sense of his genealogy and aesthetics. Lefebvre had begun experimenting with sound during his studies in visual art at Concordia several years earlier. After his studies, he began a series of collaborations with dancers and video artists, quickly building a reputation for the delicacy and musicality of his improvisations and compositions. He fell in with EAI performers through connections in the conceptual art and noise scenes, gravitating towards its abstract, inscrutable aesthetic. Having no musical training, he aspired to be recognised as an autodidact working independently of institutional influences. At the same time, he devoured literature on Fluxus and the Cagean experimental movement, listened widely to historical recordings on archive sites like Ubuweb, and kept abreast of new currents in the contemporary avant-garde.¹⁵² He thus deliberately modeled his career on the figures Howard Becker (1982) describes as 'mavericks'. Becker's sociology of art production positions mavericks (using examples like Charles Ives, Conlon Nancarrow, and Harry Partch) as self-motivated innovators whose work is 'so difficult to assimilate that the art world refuses the challenge' (1982, 244), and thus widely neglected or rejected during their careers. Becker has less to say about the fact that the value of the maverick's independence requires exactly the kind of institutionalised public attention that composers like Ives claimed so vehemently to eschew (see also Wilson 2004).

Lefebvre suggested that we begin by exchanging recorded solo improvisations over

151 For an example of Lefebvre's work see, in the discography, Lefebvre 2012.

152 In our meetings we often discussed Lefebvre's reading, which at the time included Adlington 2009, Lussac 2010 and the recent anthology of the influential experimentalist journal *Source: Music of the Avant-garde*, edited by Larry Austin, Douglas Kahn and Nilendra Gurusinghe (2011).

a web-based file sharing site and get familiar with the range of sounds we had to work with. A month later I sent him a pair of sound files I'd made with my feedback system. Each consisted of around an hour of continuous drone patterns which shifted smoothly from low frequencies to richer harmonic textures. After meeting with me two weeks later to discuss it he sent it back heavily altered. He'd extracted portions he thought were promising from each of the files, and then overdubbed himself accompanying the recordings using his own setup. The resulting tracks were tighter, between two and five minutes each. He'd added a delicate metallic background made with bits of metal and contact microphones, and abrupt rhythmic shifts using radios and cassette players. The long droning patterns I had contributed were transformed by his intervention into fully idiomatic EAI. We decided that, at the very least, I had to generate variation at smaller time scale. The way to do so was to expand the range of my setup.

In the ensuing months I accumulated modifications to my feedback system by collaborating further with Lefebvre and by filtering in ideas from other parts of my ethnographic work. Each successive workshop or performance I attended yielded new ideas for configuring and intervening in the system I'd begun for the jam session in January. By July I had expanded the system with an old Radio Shack piezo microphone to input ambient noise, and an electromagnetic pick up to input the sound of wireless interference from my mobile phone. Lefebvre and I recorded a short duo with the new setup and agreed that we now had a promising range of textures to present in a concert later in the summer. We booked a performance space and invited other EAI performers to join the program. As I made final preparations in the week before the performance, however, both my delay units broke down and stopped working. I considered withdrawing from the collaboration altogether, but decided to attempt to work with what I had. Several weeks earlier I'd attended a workshop with the American designer and noise performer Peter Edwards at the artist-run centre *Perte de Signal*.¹⁵³ The instrument he'd taught us to build in the workshop, a small three-oscillator circuit he called the *Novadrone*, included an experimental 'breadboard' section where random electronic components could be inserted

¹⁵³ For the guidelines of the *Perte de Signal* workshop series I participated in see Dupuis 2011. On the history and mandate of the centre see Charron 2008.

into the circuit to modify the signal flow. Inspired by his invention, I opened the delay boxes and began connecting spare Light Emitting Diodes (LEDs) to the pins of the digital integrated circuits at random. Instead of feedback, the delay units began emitting complex patterns of electromagnetic interference. The sounds didn't come through their audio outputs. They were picked up by a small AM radio I had been using as a separate sound source. Although nothing like what I had intended, the unplanned intervention, drawing upon ideas and influences gathered from multiple players and teachers, transformed an unremarkable feedback system into a convincing and original technical invention. After I had performed with it, audience members complemented me not on the sound, but on my setup's idiosyncrasy.

My experiential encounter with the process of learning to play EAI demonstrated the blur between technological consumption and creative subjectivation which the process of personalisation can generate (cf. Théberge 1997; Butler 2006). Furthermore, performances like Hewitt's or my duo with Lefebvre downplayed the kinds of expression seen as essential to improvisation in contexts like the LOrk or ICASP. Indeed they occurred in a context that downplayed or parodied political action. In a certain sense, however, performers of EAI privileged a similar kind of political subjectivity to their academic counterparts. The individualisation process took centre stage, mediated by an embrace of technological agency and assertions of difference in relation to an imagined dominant norm. Aside from a certain anti-academicism and perhaps a tacit post-humanism, however, the sense of liberal subjecthood prevailed. There was little attempt to use improvisation to effect wider social change or question subjectivation on a deeper level.

4.6 Neoliberal mediations

By way of conclusion, I want to emphasise the ambiguity that obtains between electroacoustic counterdisciplines and aspirations for institutional renewal. My fieldwork was pervaded by the effects of neoliberal policy-making in Montreal's education and cultural sectors. Neoliberal government is concerned with establishing what Foucault

(2008) calls a 'space of freedom' in order to maintain a paradoxical conjunction of discipline and individualism. The exercise of freedom by individual subjects implies consent to any decision made in order to secure it and therefore sustains adherence to the state framework. John and Jean Comaroff (2000, 305) have identified neoliberal capitalism with a 'domestication' of market forces, breaking down solidarities associated with class or nation in favour of lifestyle choice, personal speculation, and post-Fordist flexibility. As I have described in previous chapters, the repercussions of this shift could be felt across the city. Since the late 1990s intermediaries, producers and audiences had adapted to widespread changes in cultural policy, refiguring music and sound making as key elements of the city's 'creative economy', and remodelling government support for the arts on strategies for economic stimulus and technological innovation (cf. Pilati and Tremblay 2007; McKim 2012). In the educational domain this meant declines in the value of purely aesthetic pursuits in favour of research and development with wider social, economic or technical utilities, transformative aesthetic effects, or increased accountability (cf. Barry et al 2008).

As I have described, my interlocutors both inside and outside of universities drew upon a wide range of mentoring, listening and performing practices to contextualise their practices, technologies and aesthetics in contrast to this formation. At the same time, they also adhered to long-standing ideas of the connection between improvisation and the struggle for liberation from traditional authority structures. Benjamin Piekut (2011), for example, traces a complex pattern of slippages between liberalism, anarchism and experimentalism in the work of the mid 1960s New York avant-garde. One example he highlights is John Cage's amplified orchestral work *Atlas Eclipticalis* (1961-1962). The work is significant here both as an aesthetic precursor of EAI and as one of the earliest pieces of experimental music ever presented in Montreal, having been composed for Pierre Mercure's ground-breaking *Semaine internationale de la musique actuelle*.¹⁵⁴ While most accounts of Cage's work and philosophy leave his self-styled anarchism unquestioned, Piekut points out how deeply his belief in a universal abstract space-time, as well as his

¹⁵⁴ This festival's unique mix of electroacoustic and conceptual work from both the European and American avant-gardes was foundational for the Montreal scene and is described in more detail in Rivest 1998.

cultivation of autonomy, choice, reason, fairness and small government can be thought of as permeated by liberal values. As Piekut writes, Cage's work '[hews] closely to the mainstream of political thinking', framing governance as a concern best addressed by technocratic management, removed from the contested sphere of ideological conflict in a space of 'apolitical problem-solving' and 'tolerance' (Piekut 2011, 23-24). An example closer to contemporary EAI can be found in Novak's (2013) recent account of harsh noise practices in Japan. Describing the spontaneous and often literally explosive improvisations of the reclusive duo Incapacitants, Novak likens the space generated in their performance to a 'temporary autonomous zone', drawing upon American anarchist thinker Hakim Bey's theories of how political resistance emerges (Novak 2013, 26). Novak's account places the physical and psychological challenges faced by the bodies of both listeners and musicians at the centre of the genre's claims to transcend political boundaries and aesthetic conventions. For both the Incapacitants and Cage, the political potential of improvised actions can be understood as depending upon the capacity of individual musicians to transgress both subjective sovereignty and social hierarchy.

Counterdisciplines like those of electroacousticians and sound artists are almost always articulated in terms of feelings of resistance, whether or not members share lived experiences of violence or repression (Warner 2002, 120). As Byron Dueck (2013, 10-11) reminds us, a counterpublic is different from a normal public only in that it 'understands itself to stand in a problematized relationship' to wider norms of aesthetics and ethics. At the same time, since they intersect many different 'planes' of social mediation at once, to use Born's (2012b) theoretical terminology, counterdisciplinary practices will always weave a complex web of political allegiances and allusions. Indeed, in the cases I have described here, the politics and ethics mediated in the improvised event, the subcultural and other identity associations brought forward by the musicians, and the role the music plays in institutional territories have been quite different, if not mutually contradictory. Because these practices effectively responsabilise the performer, and personalise the politics and aesthetics of music making, and because they favour an aesthetics built upon expressions of novelty and competition, they are also inherently ambivalent.

In a sense this interpretation undermines the narratives of spontaneity, social equality and liveness which many improvisers value so highly. Individuality and freedom also work as abstract concepts validated and supported by dominant political and institutional processes. Ideals of freedom and self-sufficiency such as those that permeate the practices I have described are thus disembedded, and at least partially displaced, from any roots in earlier radicalisms. Some recent cultural critics read this kind of disembedding as a form of acquiescence. Marxist geographer David Harvey (2005), for example, has linked neoliberalism to the late twentieth century push to limit external governance and establish 'open markets' through deregulation and privatization. As Harvey argues, the emphasis on notions of freedom in neoliberal discourse sets up a situation in which 'any political movement that holds individual freedoms to be sacrosanct is vulnerable to incorporation into the neoliberal fold' (Harvey 2005, 41). A similar point has been made by French sociologists Luc Boltanski and Eve Chiapello (2005), who observe that capitalism is often forced to become more persuasive in order to justify the continued expansion of its scope, and thus has absorbed contradictory discourses of freedom. 'Faced with a demand for justification,' they write, 'capitalism mobilizes "already-existing" things whose legitimacy is guaranteed.' The same practices of critique can thus be engaged on both sides of the political argument (Boltanski and Chiapello 2005, 20).

The displacement and disembedding of resistant practices might also be thought of as a key characteristic of the social institutions of liberal modernity more broadly. Modern social projects create, in the words of Anthony Giddens, 'a double-layered, or ambivalent, experience rather than simply a loss of community'. He goes on: 'What happens is not simply that localised influences drain away into the more impersonalised relations of abstract systems. Instead, the very tissue of spatial experience alters.' (Giddens 1990, 140) In the contexts I have described, the meanings of improvisational practices are engendered by what Giddens describes as the 'mediation' between disembedding and reembedding. In this sense they do not necessarily stand for the political potential of improvisation as a whole. Since, as Born points out, music mediates a complex sociality connecting the micropolitics of performance, imagined identities and communities, stratified social

relations, and competing institutional forms (see Born 2012b; 2013a, 32), the fact that improvisers cooperate with neoliberal institutions at one level does not necessarily imply that their work is completely defused or depoliticised at others. Questions like Izagirre's, reform projects like the LOrk, subversions of virtuosity like Hewitt's, and technologised self-management practices like those I learned with Lefebvre can thus represent inventive solutions to local problems while also reinscribing the existing social and political boundaries of wider disciplines, identities, or scenes.

Technical ontologies:

Locating the digital and the analogue in technological practice

5.1 Multiple ontologies

Whether or not users take full advantage of their potential, many audio technologies are designed with interoperability and modification in mind. Musicians working with electronics rarely limit their practices to a single type of instrument or recording format. Some genres and idioms even require musicians to construct instruments themselves. In these cases audio technologies may operate less as mediators of aesthetic intention than as components of the aesthetic object itself, whether in the ways they are framed and used individually, or in the ways they are assembled with other devices. Any potential mediating effects materialise in a construction process guided by prior aesthetic decisions.

Such practices complicate any attempt to ascribe aesthetic effects to fixed instrumental causes. Dwelling upon the differentiation between analogue and digital domains illustrates this well. The critical and theoretical literature on music technology tends to structure the distinction between analogue and digital audio technologies as an absolute binary. According to the now common-sense account, digital instruments favour recombination and immateriality. Those with 'high level' interfaces offer presets, gridded timelines, and graphic interfaces associated with commercial efficiency and replicability. Those with 'low level' interfaces that enable reconfiguration denote mastery and sophistication. In contrast, analogue instruments are supposed to favour continuity and materiality. Their interfaces are said to afford a richer level of physicality and embodiment which denotes warmth, nostalgia, and exclusivity. But the aesthetic implications of digital and analogue technologies must not necessarily be structured around the transparency of their operation as mediators or containers. This is especially the case when they are enmeshed in a set of practices in which their propensity for deconstruction and interoperation is central, and in which both their functions and their meanings are

contested.

While other commentators have described how instrumental identities can become indexes of genre (Waksman 2003; Dawe 2012), I want to shift attention here to situations in which such stylistic and technical distinctions are co-produced in practice. In doing so I aim to establish some of the historical and perspectival aspects of genre formation that I return to in chapter six. I also set aside the stylistic implications of individual instruments and recording formats to consider ways of differentiating technologies in terms of composite configurations and systems in various states of flux. Taking a further cue from STS, I want to highlight the ways that the production and mobilisation of heterogeneous technical 'materialities' can serve both semiotic and strategic purposes, helping musicians consolidate social operations and relations (Law and Mol 1995; cf. Born 2011). At the same time, the meanings and effects of technological objects are not essential to them. The roles and relations imagined by designers constitute gaps in the 'script', delegating the production of meaning to unknown agents (Akrich 1992). The aesthetic distinctions between analogue and digital technologies are similarly negotiated and unstable.

Some of the projects I touch upon in this chapter can be read within the context of a broader turn towards a 'do-it-yourself' or DIY ethos in electronic music.¹⁵⁵ The movement in Montreal which I aim to examine in this chapter coalesced as part of a broad reaction against the rise of laptop performance in the early 2000s. For some it consolidated around a rediscovery of the live electronic techniques of 1960s performers like David Tudor, Gordon Mumma, and Hugh Davies. For others turning away from mass-produced instruments constituted an embrace of naïve and authentic creativity inspired by postwar conceptual artists like Joseph Beuys or the Fluxus movement. Beyond Montreal, practice-led theorists such as Richards (2013) have extended this project to a reevaluation of the musical work concept and its associated performance and composition conventions. Many of these circuit builders also describe their work as enacting a Benjaminian politics of popular appropriation and subversion of dominant technologies. At the same time,

¹⁵⁵ For characteristic expressions of this tendency see Ghazala 2004 and Collins 2006.

however, music industry investment in the DIY movement has become commonplace, with successful companies often working directly to support and encourage DIY involvement in product development.¹⁵⁶ While the software industry's interest in fostering a sense of agency and belonging among users is nothing new, its persistent role does partly undermine the DIY movement's discourse of resistance to capitalist hegemony.¹⁵⁷

My point here, however, is not to weigh in on a particular debate over their political agency and authenticity, but to find out how such discussions relate to the ways musicians construct and deploy what I will refer to as technical ontologies. By this I mean the often implicit and embodied ways musicians understand the nature of technological objects and the ways they should be either divided or grouped together. The notion that there should be more than one way that technical ontology can be understood entails a presumption of ontological diversity and historicity which derives from long-standing discussions about the power and evolution of musical work concepts. My translation of the notion of ontology into the technical domain highlights what Lydia Goehr, writing about the dominant musical work concept in the European classical tradition, calls its 'regulative' and 'projective' aspects. 'The force of regulative concepts', she writes, 'Is one of guidance through *phronesis* and example, rather than dictation by explicit or formalized rules abstracted from practice.' (Goehr [1992] 2007, 103) In a similar way, my illustrations in this chapter touch not so much upon the ways musicians establish rules and certainties, as upon how they enact concepts and categories in practice, as well as the ways they use pragmatic concepts to project order back upon activities which are primarily expressive and intuitive (Goehr [1992] 2007, 107). With respect to the specific ontological constructs of the rock tradition, Theodore Gracyk (1996, 24) has commented upon the 'extremely wide latitude of variation' they afford, sometimes leaving listeners and performers with only 'well-informed intuition' to distinguish one musical object from another.

156 On the latter point, note that major EDM festivals like CTM and MUTEK and conferences like NIME now routinely sponsor parallel workshop sessions designed to generate interest in sponsored software and hardware platforms, or 'hackathons' designed to source new product ideas from aspiring technicians. The companies I've seen involved in these marketing strategies include Ableton, Soundcloud, Korg, Microsoft and Cycling 74.

157 For older examples of strategic interaction between manufacturers and users of music software see Théberge 1997; Pinch and Trocco 2002.

Philip Bohlman (1999, 34) reiterates these pragmatic and historical principles, depicting ontologies as conceptual 'maps' which listeners and performers 'enact' in various aspects of musical experience. Bohlman's contribution takes a radically open position on the range of ways that musical works can be constituted. He argues that 'multiple ontologies of music exist at both the individual and local level, as well as at the global level' (Bohlman 1999, 17) and furthermore that musical material itself is 'internally complex and multiple' (Bohlman 1999, 34). In the specific domain of contemporary composition and improvisation practices, Georgina Born (2005a) has suggested that the work concept Goehr traced in the European art musics of the nineteenth century and early twentieth century has fragmented into a variety of 'provisional' work concepts in the wake of the upheavals set off by post-war avant-garde. More recently she has shaped a distinct notion of 'ontological politics', seeking to highlight the distinctly political nature of the enduring contestation of work concepts in institutional music production.¹⁵⁸ Born sets her approach apart by emphasising the mediations of intersubjective dynamics, identity and social hierarchy at play in the negotiation of musical ontologies.

Since the notion of the work in experimental electronic music increasingly pivots upon the functions of particular devices or assemblages, sometimes incorporating technical construction and modification in performance, it makes sense to explore the degree to which technical ontologies might also be understood as multiple and provisional in the senses that Bohlman and Born propose. However, most commentators on the role of music technologies in ontological constructions have focused on the ways they affect musical work concepts. Bohlman, for example, chooses to limit his discussion of technologies to the ways that reproduction systems change 'the functions and contexts of music', and modulate the feelings of authenticity attached to musical objects (1999, 31-33). He stops short of considering whether ontologies of technological objects can also be multiple and pragmatic. While linking the aesthetic and technical domains in this way may seem to

¹⁵⁸ Cf. Born 2013b, 150. While the notion of an ontological politics derives from Annemarie Mol's (2002) discussion of medical concepts of the body, Born's recent work extends and revises it in significant ways, particularly by stressing its practical, non-conceptual aspects. In recent unpublished talks Born has also applied her theories beyond institutional spheres, looking to the work of *Musica Elettronica Viva*, AMM and Henry Cow.

imply a drift towards a deterministic perspective, as I outlined in chapter two it is possible steer clear of socio-technical homologies by treating these registers not as causes or correlates of each other, but as dynamically co-inscribed in musical practice. The technical and aesthetic aspects of musical ontologies may overlap or feed back into each other. In a new study of concepts of composition and performance in EDM, for example, Mark Butler (2014) suggests that many of the ontological developments characteristic of this genre complex have their basis in the fusion of instruments and recording devices that has evolved alongside modern computing. Butler's folding together of technological and aesthetic innovations in EDM draws as well upon theories of the dialectical entanglement between production and reproduction in recent media theory (cf. Théberge 1997; Sterne 2003). By this account, ontologies of the 'live' activities of musical practice are irreversibly transformed in a mimetic feedback cycle with the recorded objects that mediate them (cf. Auslander 1999). To what extent can we extrapolate from this approach to look at the ways people differentiate among technological objects or systems?

Differences between digital and analogue technologies are often characterised in this way, highlighting the relationship between a particular digital software application and the analogue device or process it was designed to simulate. Paul Théberge's take on MIDI and multi-tracking, for example, emphasises the degree to which digital composition systems continue to function as forms of notation that keep 'language' separate from 'sound' (Théberge 1997, 222-231). Timothy Taylor (2001) and Mark Katz (2011) have both focused on the ways that sampling technologies transform notions of originality and craft in comparison with the creative practices that developed around analogue recording devices. These binary distinctions are facilitated by the fact that many digital technologies are designed as improvements upon previously analogue techniques, meant to achieve similar results more efficiently and thus clearly linked by path dependence. Few authors have explored the differences between analogue and digital technologies which aren't structured in this way, don't map easily onto the distinction between software as simulation and hardware as origin, and aren't reducible to their function as what Zoe Sofia (2000) has

called 'container technologies'. David Novak's (2013) description of hardware preferences in noise practices suggests aesthetic motivations for musicians' preference for analogue instruments and devices, but stops short of exploring the way they understand them as different from digital hardware. He shows how damaged and obsolete machines are used to signify destruction and dystopia, for example, emphasising their unique capacity for unexpected 'overload' and their physicality in performance. Nevertheless, Novak hedges his bets when it comes to the reasoning behind his interlocutors' concomitant avoidance of laptops, noting that the tendency is inconsistent and suggesting that for some people computers might just be 'too expensive to destroy' (Novak 2013, 250). If we pay attention to the ways musicians unpack the ontological distinction between analogue and digital differently depending on their aesthetic orientation, however, we might also find more complex motivations at work.

One way that I illustrate this is by comparing the DIY-oriented practices of noise musicians and circuit builders with other practices more directly related to the tradition of conceptual art. This is a field defined by criticism of the institutional, discursive and performative production of art objects (Lippard 1973). Indeed the musicians and sound artists I describe here are often directly inspired by theorists who have argued that the digital and the analogue should be understood as deeply intertwined. Addressing the common association of the digital with virtuality from a Deleuzian perspective in which the virtual is rather that which exceeds quantification, for instance, prominent Montreal-based communications theorist Brian Massumi (2002) has suggested that processes of coding and transducing are in fact always analogue, even when the form into which the information is processed or encoded is digital. 'The analog [sic] and the digital', writes Massumi, 'must be thought together, asymmetrically. Because the analog is always a fold ahead.' (2002, 141-143) Friedrich Kittler (1995) has taken a similar view. 'All code operations,' he writes, 'despite their metaphoric faculties such as "call" or "return", come down to absolutely local string manipulations and that is, I am afraid, to signifiers of voltage differences.' Deleuze himself takes a pragmatic position, arguing that the question

of difference between the analogue and the digital 'cannot be decided by appealing to clear-cut theory, but must be made the object of practical studies' (2004b, 94). Conceptual artists in Montreal extrapolate from such theoretical positions when thematizing a blur or union between the categories of digital and analogue in their work. Borrowing Gracyk's terms, we might say that the ontology these practitioners and theorists express is 'thicker' than those applied analytically by ethnographers like Katz and Novak (Gracyk 1996, 17-21). They make more complex distinctions between digital and analogue forms of mediation and inscription, seeking ways that they might be more difficult to entangle than a binary model would suggest.

It is not difficult to hear similarities between the 'thick' ontological assertions of conceptual artists and recent archaeologies of media formats. Jonathan Sterne's (2006b; 2012) examination of the MP3, for example, highlights the fact that it must be transduced to be heard, and thus never completely evades the analogue domain. Perspectives from philosophy and critical theory can contain a note of prescription, however, and must not be treated as explanatory at face value. To do so risks smoothing over the cultural and historical detail of ethnographic material (Born 2010b). I flag them, then, on the way to a series of empirical vignettes which show how the equipment of coding and transduction is differently valued, experienced and organised ontologically. I hold multiple hardware practices from recent electronic art music in Montreal in comparative suspension, showing how divisions between digital and analogue objects can cut across instruments, recording formats, theoretical systems and pedagogies. I approach each technical ontology with a slightly different style of theorisation, sensitive to the aesthetic and political projects which guide and motivate it.

5.2 Cooking the data

In past two decades ethnomusicologists have shown increasing interest in the role of electronic and mechanical technologies in musical practice. Until recently, the majority have focused more on the trappings of professional or aspiring studio complexes than on

the less standardized, often smaller scale assemblages of devices and instruments typical of experimental practices. In her work on with producers and engineers of popular music in South Africa, Louise Meintjes (2003, 74-89) reports on studio technologies as agents of 'rarefaction' both for expert technicians, who select components as tokens of experience and transnational credibility, and for musicians, who come to know them as quasi-magical consumer commodities. Her analysis focuses on what technical objects signify to listeners and users, whether as visual icons of scientific precision and leadership or as opaque containers filled with unknown and ephemeral sonic potential. Whether studio components can be identified as analogue or digital is central to their position in symbolic economy of Meintjes' studio personnel, but the categories of analogue and digital as such are ambivalent as markers of what she calls 'technological capital' (Meintjes 2003, 82). Digitalisation meant different things in different parts of the field. 'On the low end', she writes, 'small studios with the facility to produce a competitive sound quality mushroomed in backyards, garages, offices, flats, and houses. Most of them were independent ventures offering eight- or sixteen-track and/or digital programming facilities for demos, jingles, soundtracks, budget albums, and wholly programmed projects. [...] In high-end production, digital innovations enhanced the sound quality and the efficiency of recording. However, the overhaul of studio equipment and the redesign of analog studios to accommodate new digital gear put significant strain on studio budgets.' (Meintjes 2003, 78-79)

The economic effects of digitalisation on studio practices have been so ambiguous in part because the process has been manifested not in a single, unified transformation, but in a variety of objects and protocols that sometimes differ from each other widely in terms of purpose. Commercial digital audio recording as such originated in the early 1970s, and the first all-digital recordings were available for sale, albeit mostly on analogue consumer formats like vinyl or cassette, by the end of that decade. Early digital audio systems operated on a variety of competing reel-to-reel tape formats in a variety of sampling rates and resolutions. These were gradually replaced through miniaturisation, first by cassette

systems like DAT and ADAT, and later by the standalone hard disk recorders which are still in use in many professional studios.¹⁵⁹ The software used to interface with these devices for arrangement and editing purposes has developed along a separate trajectory. Self-contained computer-controlled systems for composition and arranging were first available in the late 1970s. Systems like the Synclavier and Fairlight CMS afforded relatively complex operations in sampling, sequencing and synthesis but did not have the memory capacity to make long recordings (see Chadabe 1997). They also had no standardised way of communicating control data with other components. The MIDI protocol was adopted as the industry-wide standard for this purpose in 1982, and within a few years MIDI-sequencing software running on an Apple or Atari computer had become a normal component in professional popular music studios (see Théberge 1997). Early sequencing or DAW softwares like Digital Performer (1984), Notator (1987) and Cubase (1989) didn't make any sound of their own, but sent control data to outboard, MIDI-compatible synthesizers and tape recorders. It was not until the late 1990s, when consumer-oriented computers became available which were capable of performing all of these tasks internally and simultaneously, that hard disk audio recording became an integrated feature of the DAW.¹⁶⁰ Nevertheless, high-end professional studios still often prefer to use dedicated components for recording, preferring to keep audio processing and arranging separate from the recording medium, which should be isolated from potential sources of electrical interference. Moreover, these software systems are often used with separate control devices which afford more practical access to the functions of the DAW. These include banks of keys, knobs, drum pads and jog wheels modelled on samplers and drum machines designed for dance music production. Popular devices like the EMU SP1200, Akai MPC60 and Korg Electribe, which became popular mainly through the work of Hip-Hop and EDM producers, had low resolution alphanumeric displays and thus afforded mainly aural-tactile feedback.¹⁶¹ Through sedimented use they gradually became associated

159 On the development of digital recording hardware applications in general and an overview of the theory behind them see Pohlman 2011. On the theory's genealogical relation to media formats see Sterne 2012.

160 On the design of contemporary DAW software see Kvifte 2010.

161 On the affordances of these instruments see especially Schloss 2004.

with new forms of literacy and virtuosity that in turn redefined the functions of digital audio software.

The teleologies of digitalisation in these three domains—studio recording media, arranging software, and interfaces—have been differently inflected in terms of both aesthetics and pricing. Devices designed to be cheap, accessible, and even disposable are conceived with different goals and users in mind than components tailored to the precision work of engineers. At the level of their political and social mediations, the properties of studio instruments and interfaces are not uniformly 'emergent' or 'residual', to borrow terms from Raymond Williams (1973), but rather messy composites resulting from decades of pragmatic adaptation. As close reading of accounts like Meintjes' shows, therefore, preconceived notions of what makes digital audio unique and separate from analogue are complicated in studio practices, where such heterogenous assemblages are the norm. But we can find similar complications in practices oriented around smaller technical repertoires. Technical ontologies also crystallise at a more immediate level defined by programming conventions, hardware standards and pedagogical principles. Here as well, the aesthetic and technical propensities of analogue and digital devices are conditioned by the rules of style and economy.

I want to illustrate this first by examining claims to technological politics in the context of a particular tradition of feminist intervention. Entrenched ontological concepts do not necessarily have to be strictly binary or repressive to rub against the politics of technological empowerment. Values like sophistication and accessibility may be useful as political tokens, but they require complex semiotic and disciplinary operations that cannot be guaranteed by any particular set of technological properties.

Several authors have called attention to the gendering of technical knowledge in musical practice, particularly as it pertains to instrument selection and the division between productive and reproductive labour.¹⁶² Broader feminist critiques of technological culture

¹⁶² See for example Shepherd 1987; McCartney 1995; Green 1997; Doubleday 2008; Rodgers 2010. Forthcoming research by Born and Devine conducted during the MusDig project highlights the persistent ways that gender structures musical institutions in the United Kingdom.

have been mounted with respect to two parallel problems: the accessibility of technological disciplines and professions; and the use of science and technology as instruments of patriarchal power. As Judy Wajcman (1991) has emphasised, however, the politics of access can be highly ambivalent. Science and technology have been divided from the rest of Euro-American culture along the same lines as rational and emotional knowledge. Social progress is widely associated with the former. So while reform projects aimed at correcting the underrepresentation of women in scientific and technological disciplines have seen limited success, it is problematic to assume that, if general conditions were corrected, women would naturally gravitate towards supposedly higher and thus 'more rational' professions. Limiting our understanding of technical knowledge exclusively to the preordained domains of power and industry, Wajcman argues, serves a reductive stereotype of women as technically deficient beings who need to overcome their underdevelopment so as to compete on patriarchal terms (1991, 17-19). Initiatives aimed at empowering women to use and design music production technologies must confront this ambiguity at a concrete level, balancing support and valorisation for the technical practices to which women have traditionally had access with critical engagements in dominant forms of knowledge and production.

This is the mission of the feminist ARC Studio XX, which was established in Montreal in 1994 and first received government funding in 1996. Vocalist and sound artist Kathy Kennedy initiated the organisation process in response to what she saw as the relatively limited opportunities available for women to access computer technology outside of the university system at the time. She aimed to address what she described as a 'real digital divide' between the men and women in the late 1980s and early 1990s. When she bought her first Powermac computer in 1993, she recalled, she had had only limited opportunities for training. Learning the programming environment Max-MSP, for example, meant attending classes at the university, where she would be the only adult woman in a group of twenty-year-old men. Kennedy also realised quickly that she wasn't alone in her interest in computing. Friends often wanted to borrow her equipment for projects because

they couldn't afford computers of their own. Collaborating with Concordia communications professor Kim Sawchuk and filmmaker Patricia Kearns, Kennedy decided to set up a centre where women could learn and use new technologies. Friends in the media art and electroacoustic music scenes began to offer computers and sound gear, and colleagues offered the centre a series of temporary homes over the next decade.

When they finally secured funding for the centre in 1996, however, it did not come from the arts councils. Institutions in most parts of Canada are ineligible for long-term government infrastructure funding until they have been in operation for three years or more. This can make it difficult for new institutions to develop, and many elect to throw underground rent parties or take under-the-table commercial contracts to make ends meet during the start-up period. Studio XX solved the problem by seeking their initial funding not as a cultural organisation, but as a community employment and education initiative under the mandate of the federal agency for the 'status of women'.¹⁶³ In keeping with their initial proposal, then, education and development projects have continued to make up the better part of the centre's activities. After regular arts council funding was eventually secured to cover more conventional exhibitions and residencies, the centre continued to focus on workshops and outreach, financing these activities with a combination of participant fees, and grants from the Quebec ministry of employment. Although workshop enrolment was technically open to participants of any gender, the centre extended access to men in the event that not enough women enrolled.

By the time of my fieldwork Studio XX occupied a large open-plan loft space in a building shared with a handful of other media arts organisations. The space was divided into office areas for administrators at one end, a 'white cube' presentation area, and a 'lab' area equipped with ten iMac computers for members to use. Early workshops had dealt mainly with emerging internet technologies, and membership fees still included server space for use on a personal website or art project. Later, hardware hacking and electronics

¹⁶³ This agency was formed in 1970 following recommendations of the Royal Commission on the Status of Women in 1967 and now operates as a branch of the Ministry of Human Resources and Skills Development. Most provinces have a similar agency for local matters as well. Québec's falls in the same portfolio as the Ministry of Culture and Communications.

workshops became more popular. Staff members I spoke with speculated that this was because participants could interact more with each other instead of devoting their attention to screens. Open source software was an official priority for the centre, and programming workshops in open source audio languages like Supercollider and Pure Data were prominently advertised on the centre's website, but no one I spoke with could tell me when these workshops had ever taken place or who might have taught them. Lab computers were configured to boot into either the open source Linux operating system or the current Mac OS, but most users seemed to prefer the latter. The workshop coordinator explained to me that the studio offered courses on proprietary software as an exception when it happened to correspond with 'professional standards'. Over the years this seems to have become the norm. The audiovisual programming environment Max-MSP (usually known simply as 'Max') had been a standard offering since the early 2000s, and in recent years the course had been expanded to encompass hardware interfaces and physical computing techniques. The range of systems in the curriculum entailed a mix of open and proprietary devices.

Partly because they could find no women to teach it at the time of my fieldwork, Studio XX hired a male instructor to teach their annual Max workshop. Patrice Coulombe, had earned his reputation over several years studying electroacoustic composition at Université de Montréal, working as a freelance programmer, teaching courses in the communications department at UQÀM, and organising the monthly performance series 24 Gauche. Participants paid a fee of a few hundred dollars, not including software or hardware, for eight sessions with him. The software cost a few hundred dollars, but Coulombe told me that he didn't find the materials expensive, and also didn't consider Max or Arduino to be nefariously 'corporate' in comparison with the open source alternatives. He discouraged students from adopting the 'geekier' open source versions until they'd attained a better grasp of programming. If cost was an issue, he invited them to download a free short term demonstration version. During workshop sessions, participants had access to the lab's computers or their own laptops with the centre's multi-user site license. The license software circulated on a small USB device called an iLok dongle. The iLok system

was a kind of encryption key that worked with different types of proprietary software to allow users to carry their authorisations with them if they needed to use a particular program on more than one computer. When one of the students asked if it was possible to obtain a pirated copy of Max, the instructor told her that the copyright protection was supposed to be virtually unbreakable. Since Max had adopted the iLok license almost a decade ago, working pirated copies had become rare. I watched as the student then spent much of the first session searching unsuccessfully through torrent tracking sites on her laptop trying to find a 'cracked' copy that circumvented the dongle encryption. By the end of the course six weeks later she was the only student of eight who had bought a license.

As far as Coulombe and the centre were concerned, however, Max's accessibility in comparison with open-source alternatives hinged upon its design rather than its price. The Max environment is comprised of a blank palette and a large set of pre-built graphical user interface (GUI) 'objects', each of which performs a simple function on a stream of audio or numerical data. By arranging and manipulating these functions on a screen into a 'patch' Max users can visualise the flow of data and audio while programming. The majority of computer programming systems require users to type instructions into a text file or command line. Max's designers at IRCAM in the mid 1980 targeted the system towards electroacoustic composers, and thus envisioned the system as a simulation of analogue modular synthesis.¹⁶⁴

The system's original graphics were quite spartan, but in recent years the GUI objects had been redesigned to give the software a more professional gloss modelled on the look and feel of the sequencing software Ableton Live. The companies which sell Max and Live had struck a partnership in 2008, and soon released an extension for Live called 'Max for Live' allowing users to program synthesis and effect plugins in the Max patching language. Max for Live was soon fully integrated into the Live interface, and in turn many

¹⁶⁴ For a summary of Max's history, construction, and bifurcation into other softwares see Puckette 2002. George Lewis (2008b) has argued that Max is at least partially inspired by the design of an earlier visual patching language called Hook-Up. This apparent precursor was designed and used by the African American composer and programmer Olly Wilson at MIT's Media Lab at the same time as Max designer Miller Puckette was a graduate student there.

elements of the Live workflow were also integrated into Max. This made many of Max's older GUI objects redundant, but most were still included to enable backwards compatibility with patches programmed in earlier versions. Objects' origins were designated by a new naming convention: the *gain~* object, for example, which had been part of the MSP library since the mid 1990s, was still included, but now an object called *live.gain~* appeared as well. The new object did more or less the same thing, but closely resembled the gain sliders in the Live user interface. The workshop instructor advised students to use the Live versions whenever possible, insisting that they were more reliable and easier to use. The new version of Max also included more options for differentiating between a patch's 'performance' and 'editing' modes. This distinction had been a part of Max for a long time. Performance mode locked the positioning of all objects on screen, hid any sub-windows, and allowed the user to click on and interact with GUI objects. Editing mode turned off GUI interaction and allowed the user to add new objects, reposition existing ones, and make or erase connections between them. In the new Live-oriented version, a third mode had been added in which all objects and connections were hidden aside from the GUI objects. In this mode the user could reposition the GUI objects arbitrarily and make the interface look even more intuitive in relation to standard studio applications.

The construction of Max's accessibility thus had little to do with its being more materially available or practical. It was rather a complex function of professional standards, corporate convergence, sedimented institutional norms, and anecdotal notions that visual schemas should be easier to learn than symbolic or mathematical systems. Discussions of programming style, however, revealed a more arbitrary and heterogeneous level of technical practice. There were conventions to deal with instruction order, variable naming, and the way code was laid out on the page. Coulombe encouraged students to make Max patches 'modular', for example, by building what were called 'abstractions' and 'subpatches'. Student projects and beginner patches tended to have linear and flat structures. It was easy to arrange a patch in a single window so that the entire flow of

operation was visible. But a patch could be made to work more efficiently, they were told, by 'abstracting' part of its function. This meant embedding complex fragments of code in separate windows and hiding them from view. The fragments could then be saved as separate files and reused as if they were objects. The key stylistic imperative, then, was that a patch should involve multiple parallel and asynchronous processes operating on many metaphorical surfaces at once. The organisation and content of these modular structures was partly pragmatic and partly a matter of convention.¹⁶⁵ When coding in Max became uneconomical in terms of processing time or complexity, for example, users could embed code written in other programming languages like Python or Javascript. Different layers of abstraction could interoperate using a kind of internal networking system of 'sends' and 'receives'. This attached names to data streams and removed them from view, allowing other objects to access them without having to be individually connected. Communication could also be expanded across multiple machines using their wireless or wired network interfaces. If the effect of Max's design was to appear intuitive and visual, the contradictory goal of programming seemed to be to seek depth, abstraction and complexity. Beginner patches could be accessible and messy. Professional patches wrapped unkempt functions and datasets into generalisable objects and classes that could be deployed invisibly and automatically.¹⁶⁶

Hardware interfaces proved significantly more popular than programming. At the beginning of April, the instructor even scheduled an extra class for physical computing in response to student demand. It was not difficult to speculate about where this bias originated, however. Coulombe told students outright that he expected them not to become committed or proficient programmers. Rather, he said, he hoped that the experience would enable them to communicate better with their future technicians. Overall, programming was constructed as something isolating and cerebral. When discussion turned to student projects, then, most chose to focus on embedded computing and physical interface devices.

¹⁶⁵ It relates to the older standard that Lev Manovich (2001, 30-31) refers to as 'structured computer programming' in his discussion of new media modularity.

¹⁶⁶ Although Max-MSP is not strictly speaking an object-oriented programming (OOP) language, it borrows several aspects of this paradigm. On abstractions and OOP more generally see Fuller 2008, 200-207.

The device used in the workshop was the Arduino, a brand of microcontroller prototyping board developed since 2005 by a small Italian electronics company who won the Prix Ars Electronica for their invention the following year. The Arduino was designed as a prebuilt interface to the inputs and outputs of a microcontroller chip called the Atmel AVR, a device normally used in the appliance and automobile industries (Atmel 2014). It mediated the functions on the chip so that a user could address it using a dedicated library in the C++ language, much more commonly used by artists, robot designers and signal processing engineers than its native Assembler language. As such, it was a perfect example of what historian Rachel Maines has called a 'hedonizing technology' appropriated by users concerned with shifting the purpose of a tool from 'production and efficiency to personal pleasure' (2009, 9). It connected to a computer via a USB cable or WIFI connection, and offered a set of output points which could be used to wire in other electrical devices like lights, sound generators, or physical sensors. In essence, then, the Arduino was a small embedded computer. It expanded upon the basic digital microchip to facilitate electronic interconnection without permanent wiring, soldering, or low-level programming. Once a program had been stored in its memory, it could be disconnected from the USB port to operate independently. It gave students a kind of universal prototyping board, priced around thirty dollars with a hobbyist market clearly in sight.¹⁶⁷ The board's accessibility was wrapped up with it being a more concrete mode of access to the digital world than either a software program or a microcontroller alone.

There were two types of connection on the board. Analogue outputs emitted a continuously changing voltage between zero and five volts. Digital outputs simply alternated between the low and high points. The two outputs could be used simultaneously and independently, depending on the type of electrical signal required by the user's components. But the technical distinction between the analogue and digital outputs of the Arduino was more blurry than the naming of the connectors suggested. Analogue ports emitted not a continuous voltage change, but a quantized, ten bit stream of digitally encoded numbers with user-determined sampling rate. On the programming side, then,

¹⁶⁷ For further discussion of the Arduino's musical uses see Vallis and Kapur 2011.

continuous signals were merely an approximation. To twist the knot of distinctions further, however, because the Arduino's outputs emitted electrical voltages and not encoded numerical data, both the digital and analogue sides were physically analogue. Outputs and inputs were prone to noise, environmental fluctuations and electromagnetic interference. The object translated between two basically incommensurable materialisations, digital and analogue, but also blurred the boundary between them. Communication across this blur depended on the ways of addressing them afforded by the computer and the programming language. As an object, the Arduino was only analogue when required by the programmer and the situation, and then only within a narrow set of physical limits.

The device's immediacy was similarly complicated. There was no 'real time' communication between the coding application and the chip. Each software program needed to be written ahead of time—specifying the inputs and outputs to be used, sampling rates and resolutions, and conditions for switching, looping, starting and stopping—before it could be loaded onto the Arduino over a USB cable. The open source application for programming the Arduino combined a code editing interface with controls to install the code onto the chip. Only once the C++ program was running on the board could it communicate independently with another software such as Max. Again, however, there were differences in the timing afforded by the microprocessor on the Arduino and the much faster central processing unit in the computer. Each program needed to specify micro-delays to ensure that the uptake of the signals by the computer was not too fast for the Arduino to handle. Once communication was happening at this deliberately slower rate, and data was being received successfully in Max, it could then be translated into other formats to perform other types of processing, including audio and video. In one instance Coulombe instructed students on how to gather luminescence signals from an analogue light sensor. The Arduino program sampled the electrical signal and sent the resulting stream of numbers to Max-MSP in the form of binary data. There the binary data needed to be converted into decimal numbers being scaled and processed to control audio, video, or other media. 'Raw' data, the instructor told us, does not exist, and would not be

useful if it did. Signals from any source whatsoever must be translated and processed multiple times in order to make sense in the context of computing. He referred to this process as 'cooking' (*cuisiner*) the data. Every patch required a mathematical transformation of data from one state to another, and every transformation slowed down the process. Cooking made signals intelligible, in a sense translating them—to borrow loosely and figuratively from Claude Lévi-Strauss's (1969) culinary metaphor—between the 'natural' domain of voltages and the 'cultural' domain of data. As Lisa Gitelman and Virginia Jackson (2013) have suggested, however, these domains are often mutually constitutive. 'Data [like photographs] need to be understood as framed and framing', they write, 'understood, that is, according to the uses to which they are and can be put. Indeed, the seemingly indispensable misperception that data are ever raw seems to be one way in which data are forever contextualized—that is, framed—according to a mythology of their own supposed decontextualisation.' (Gitelman and Jackson 2013, 5)

The actions denoted by the metaphor of 'cooking the data' recalled the accumulations of inscriptions remarked upon by scholars of technical cultures such as Latour and Woolgar (1979) and Born (1997). Compared to early mainframe AI processing and complex microbiological testing, however, mediations in the Max and Arduino systems accumulate relatively more unevenly and asynchronously, distributed across multiple machines, languages and mediators. Inscriptions and re-codings were not imposed upon Studio XX workshop participants by an overarching centralised force, but distributed and performed in every aspect of practice. Technical concepts were framed in a discourse that connected commercial protocols and aesthetic conventions with complex distinctions between digital and analogue to form a technical ontology that rationalised a gendered division of labour. The popular interest in physical computing was not reducible to a simple technical distinction, nor could it be explained with reference to stereotypes of women as naturally drawn towards intimate, private and tactile labour. Software was a more expensive endeavour right from the start, its logic was presented as more arbitrary and difficult, and its role models appeared only as autistic virtuosos.

The political project of extending technical knowledge at Studio XX was thus complicated in similar ways to the mediation of politics and identity in Meintjes' South African studios. The structure and content of Coulombe's Max course suggested that such workshops offered not an unbiased introduction to a set of neutral tools, but a technical ontology that situated the physical and gestural as women's most immediate and natural territory. Components of the technological assemblage were presented as inherently ambivalent: both analogue and digital, both mediate and immediate. Wiring them together only multiplied the web of possible meanings and categorisations.

5.3 '*Aimer la concrèscence*'

If technical ontologies in this didactic context depended largely upon unspoken guidance, conceptual sound artists in Montreal have often been far more self-conscious and literal about the aesthetic significance of recording platforms and instruments. The musicians associated with the group K.A.N.T.N.A.G.A.N.O. provide a case in point. All three members were born and raised in Quebec and have been active in sound art, theatre, performance art, and various forms of experimental music since the late 1990s. Guitarist Jonathan Parent had his start in the instrumental post rock band Fly Pan Am alongside Jean-Sébastien Truchy and Roger Tellier-Craig. Alexandre St-Onge built his reputation as a bassist in the *musique actuelle* scene, but has also been active as a solo performer, and member of conceptual art collectives like *Mine Mine Mine*, with Éric Létourneau and Magali Babin. Alexander Wilson came to the project from a background in experimental theatre, video, and installation art, and has taught theoretical courses to visual and intermedia art students at Concordia University. At the time of my fieldwork both St-Onge and Wilson were pursuing doctoral studies in the interdisciplinary humanities program at UQÀM. Both focused their thesis work in philosophy and media theory rather than music. Although they resisted associating their music with academic composition, however, with K.A.N.T.N.A.G.A.N.O. they treated the boundary between serious and popular as a source of formal friction and stylistic tension. This deliberate ambivalence put them equally at

home in rock clubs, electronic music festivals, and art galleries, but unlike the postmodernist syntheses of previous generations their aesthetic was not informed by a politics of reconciliation. Instead their shifting pastiche of forms and styles recalled early avant-garde strategies of collage.¹⁶⁸ The group's idiosyncratic name—a cryptic play on the name of the musical director of the Montreal Symphony Orchestra, Kent Nagano—enacted a similar kind of irreverence in relation to art music convention. At the same time it called to mind their interests in philosophy and a penchant for punning and irony they described to me as typical of Quebecois humour.¹⁶⁹

The group took a similar approach to both recording formats and instrumentation. They established their label *Les encodages de l'oubli* ('Encodings of oblivion') in 2010 to release work by the band and close friends. Described cryptically on its website as a label for the 'encoding of music and other' dedicated to 'sonic anamnesis', the label's output materialised in two forms at once: on a Bandcamp page, and in small runs of CDRs. Although exclusively digital, the band's ironic play with musical style crossed over into technical ontology. In the spring of 2012, for example, they announced a first release on 'vinyl' entitled *Blessure narcissique* ('Narcissistic Injury') in conjunction with a forty-five minute audiovisual performance at the MACM. Audience members eager to obtain a copy were in for a surprise, however, when it was revealed after the show that what the band had produced instead was a sarcastic swipe at analogue fetishism: a run of thirty large-format vinyl stickers, cut to fit into hand-numbered twelve inch LP sleeves. Each was printed with a Quick Response or QR Code, which, when scanned with a cell phone camera, directed the listener's web browser to a Bandcamp page where the sound files then could be downloaded.¹⁷⁰ The materialisations of the analogue and the digital infected and inflected each other in a deliberately ironic and obfuscatory act of what St-Onge referred to in an

168 For the contrast between modernist and postmodernist attempts to bridge avant-garde and popular forms see Born 1987 and Gendron 2002.

169 Word play, often suggesting fluidities between official and vernacular French or between French and English, is indeed a common element of verbal performance in Quebec, permeating everything from advertising to poetry. See Simon 1994 for further discussion of the proliferation of registers and codes in Quebecois literary culture. Although it is conceivable that the specific pun in the band's name could be construed as an expression of cultural or racial intolerance (e.g. playing on the English word *can't*), none of my interlocutors suggested that they understood it in this way.

170 In the discography see K.A.N.T.N.A.G.A.N.O. 2012.

interview as 'impurification'.¹⁷¹

St-Onge characterized K.A.N.T.N.A.G.A.N.O. as an absurdist experiment emerging from provocative juxtapositions of styles and materials. The band's creative process, he told me, unfolded by accumulating juxtapositions and then narrowing down when they became too extreme. 'We got more abstract,' he told me. 'And then we also kind of found something that we all wanted to centre ourselves on, instead of working on just pure abjections, on the edge of what is tolerable.'¹⁷² This process brought the group to a combination of sounds evoking an incongruous range of genres and cultural reference points, including cybernetics, science fiction kitsch, avant-garde modernism, and a kind of psychedelic sublime. Performances augmented with costumes, lights, choreographed narratives and theatrical staging became intrinsic to their aesthetic. The point of these multiple layers of juxtaposition, St-Onge told me, was to set up conditions in which aesthetic agency would slip in and out of the performer's grasp. 'That's the thing,' Wilson put it to me, clarifying the group's use of the term 'experimental'. 'It's not only about having control, it's really about losing control. It's about multiplying the inputs and outputs so that we can get intertwined within it, have a direct relationship with it, but not know exactly what's going to come out of it.' Being 'experimental' implied setting up situations with unforeseen circumstances. Assembling materials and devices into an experimental setup (*dispositif*) distributed musical agency across a network of devices.¹⁷³

In a similar vein, Wilson emphasised the degree to which the group's practice was oriented around notions of 'code', both as means of translation between instruments and machines, and as a kind of aesthetic distancing technique. St-Onge and Parant played MIDI augmented guitars that controlled software-based synthesizers and sequencers. Wilson used both analog and digital interfaces to operate an assemblage of analog

171 The similarity to Latour's (1988) concept of 'irreduction' is notable but as far as I can tell not intentional on St-Onge's part.

172 For further discussion of 'abjection' as an aesthetic strategy see Schwartz's (1997, 143) work on Diamanda Galás or Deleuze's (2004b, 15-16) analysis of the representation of bodies and meat in the paintings of Francis Bacon.

173 I choose the translation 'setup' here for the French term *dispositif* partly to distinguish it from the well known Michel Foucault's ([1977] 1995) concept commonly translated as 'apparatus', and partly because it was the closest equivalent term used by my anglophone interlocutors.

synthesizers, homemade circuits and software sequencers, as well as automated lasers and video projections. The group's use of MIDI controllers to interface such a complex synthesis and sequencing setup had multiple motivations. At an inter-textual level, it was an ironic gesture towards the material culture of academic computer music. Musicians in the *musique actuelle* and noise scenes in Montreal often performed their own exclusion from local academic electroacoustic research through the use of intuitive, 'low-tech' setups.¹⁷⁴ Computers, digital synthesis and MIDI controllers in any configuration contrasted sharply with this strategy. At a more immediate aesthetic level, the group's instrumentation also played on the defining anxieties of academic electroacousticians, who have worked for decades to invent more organic, high bandwidth ways of interfacing digital synthesis and often express frustration at the MIDI protocol's shortcomings. As composer and engineer F. Richard Moore (1988, 22) wrote shortly after its adoption, insufficient bandwidth and 'sluggish', serial transmission channels made the standard anathema to the ideal of 'control intimacy' exemplified by the human voice, in which 'the microgestural movements of the performer's body are translated into sound in ways that allow the performer to evoke a wide range of affective quality in the musical sound.'¹⁷⁵ Seen in a more productive light, MIDI and other digital interface technologies thus also afforded what Wilson and St-Onge referred to as an 'encrypted' or 'alienated' interface to sound production. Using their instruments as MIDI interfaces instead of more 'intimate' configurations allowed them to substitute disguised, processed and deliberately artificial samples of drums, animals and machines for recognizable guitar, keyboard and vocal noises. The effect was analogous to the verbal and visual punning which characterised the packaging of the group's recordings and promotional material. One example was their cassette *Se resigner au silence extra terrestre* ('Resigning oneself to the extraterrestrial silence'), released in 2011 on Los Discos Enfantasmes, which came with packaging information entirely in morse code, and an inlay card featuring an image of a walrus [*un*

174 On the historical self-exclusion of free jazz from the academic avant-garde in Montreal see also Stévançe 2012.

175 See also the discussions of MIDI in Manning 2004. Théberge 1997 presents an early criticism of some of these value-laden, essentialist accounts.

morse] playing a saxophone.¹⁷⁶ Their 'vinyl' project *Blessure Narcissique* similarly reenacted the group's self-professed obsessions with cybernetics, the multiplication of codes and interfaces, and the problematisation of the boundary between academic and popular genres.

The ironic mix of digital and analogue technologies performed by K.A.N.T.N.A.G.A.N.O. thus permeated every aspect of their aesthetic. During fieldwork I witnessed several performances by the group's members, but none featuring a uniformly analogue or digital setup. St-Onge, for instance, would often perform in costume and augment his instrument with theatrical props, software, and electronics. At a collective event curated by *Encodages* in April 2012, he gave a solo performance entitled *Aimer la concrecence* ('Loving Concrecence').¹⁷⁷ Standing hunched in front of a microphone with his bass guitar lying on the floor, he hummed and sang while breaking a bundle of wooden sticks in his mouth, the pieces of which scattered below. A few minutes later he repeated the action with a piece of paper, only this time finishing by rolling it into a ball and dropping it on the strings of the bass. The bass, in turn, was connected via a small portable sound interface to a laptop running Ableton Live. The software processed the audio from his voice and his guitar while also controlling an analogue synthesizer. Control of the synthesizer was also modulated by a Nintendo Wii game controller which St-Onge wore at the end of a long stick attached to his back. In essence, *Aimer la concrecence* was a series of actions to trigger a feedback system, but one with remarkably discontinuous and unpredictable sonic results. The fractal recursion and discontinuity afforded by the software processes enabled the feedback to run in asynchronous layers rather than a single linear stream. The noisy and unstable operation of the analogue components made it difficult to predict which sonic events the feedback loops would amplify. The surreal series of actions and vocalisations gave the slowly evolving composite a dream-like, disjointed feeling.

¹⁷⁶ In the discography see K.A.N.T.N.A.G.A.N.O. 2011. *Los Discos Enfantasmes* is a cassette-only imprint run by former Fly Pan Am guitarist Jean-Sébastien Truchy.

¹⁷⁷ For the studio version see, in the discography, St-Onge 2012.

Often drawing upon their background in philosophy, the group's members were highly articulate about what motivated their technological decisions. After a K.A.N.T.N.A.G.A.N.O. performance at the MUTEK festival in 2012, for example, I mentioned to Wilson that I had recently attempted to build an oscillator circuit, hoping get a feel for this prominent aspect of the practice of many of the musicians I was working with at the time. He compared it to building a Max patch, where coded connections between objects and operations are made using visual representations of analogue 'patch cables'. The crucial difference between circuits and software, he told me, is that physical circuits are more 'abstract'. After first noting the statement I found it odd. There was something paradoxical about the notion that a physical circuit was less concrete than a software simulation. It wasn't until months after fieldwork that I began to grasp that he meant this not in the sense of the tactile or conceptual engagement required to construct or interpret them, but in a more specific theoretical sense.

As I noted in chapter two, both Wilson and St-Onge drew heavily upon the work of Gilbert Simondon, a student of Canguilhem and Merleau-Ponty whose work on ontology and technology was an important influence on the development of poststructuralism in France.¹⁷⁸ Earlier I discussed more general aspects of their Simondonian ontology and pointed to how it compared with the theoretical toolkit I brought with me to the field. In this instance it seemed to structure their practice more directly. For Simondon, especially in his widely-read 1958 monograph *Mode d'existence des objets techniques*, the evolution of technological objects over time could be understood as an oscillation between successive phases that he characterised as 'abstract' and 'concrete'. During their abstract phase technological objects were comprised of a patchwork of distinct components whose functions were differentiated and unadapted in relation to each other. Their unity was therefore an abstraction, their assembly fragile and reversible. As elements became adapted to each other's functions, becoming inseparable both from each other and from the object as a whole, their unity became more concrete. Abstract machines could be easily taken

¹⁷⁸ See Deleuze 2004a; Combes 2013. Wilson also maintained connections with the Hexagram-based *Senselab* founded by Erin Manning and Brian Massumi. For the incubation of Simondonian theorisations in this context see also Manning 2013.

apart and remade otherwise, while concrete ones were hyper-adapted to a single mode of operation (Dumouchel 1995, 261-263). It was possible to distinguish a continuum of states of concretisation between these two poles, and thereby to explain the evolution of particular objects or families of objects over time.¹⁷⁹ Laptop computers and smart phones, for example, operate at an advanced phase of concrescence, their microscopic components depending upon each other to a degree which makes it impossible for them to function independently. A mainframe computer, in comparison, is extremely abstract, having interchangeable and redundant parts which can be moved easily from one machine to another. In Wilson's thinking, the difference between an oscillator circuit and a Max patch could be characterised in a similar way. The objects and functions combined in a Max patch were written into a system-specific software program and couldn't be used outside of it. Max objects were thus hyperadapted both to each other, and to the system as a unit. The components required to build an analogue oscillator circuit had no necessary relation to each other, operated independently, and could be moved easily from system to system.¹⁸⁰

In summary, the members of K.A.N.T.N.A.G.A.N.O. saw their strategies explicitly as ways to get around the closed and fixed nature of their instruments and devices. Subverting recording objects from their function as sound containers, and acoustic instruments from their function as sound sources, was not only ironically redundant and alienating, however. It also represented a way of 'adding inputs and outputs' to the overall technological assemblage, and thus of opening up their work to chance. Distributing agency across the setup generated agencies no longer linearly related to the functions of individual instruments or components. The group's actions suggested a synthetic and processual ontology, always casting connections and significations across the analogue-digital binary.

179 Massumi (1992) suggests that a useful analogy might be made between the Simondonian concretisation spectrum and the Deleuzian distinction between molecular and molar. Cf. Deleuze and Guattari 2004.

180 It is important to make clear that this does not suggest that the analogue is more abstract than the digital as a rule. The model merely differentiates technical objects in terms of the degree of internal adaption of their components.

5.4 Dressing it up

Several scholars have noted how elaborate, handmade, rare and cryptic recording formats—not to mention more idiosyncratic forms of objecthood—can reinforce the social and economic boundaries of noise and other electronic art music scenes. As David Novak (2011, 626) has written, the 'distortion' of analogue formats indexes an ethical and aesthetic link with underground cultures of circulation which serve as modes of access to a 'recursive public' of experimental listeners. Theorists of noise aesthetics like Hegarty (2007) and Demers (2010) have folded this tendency into the opposition noise genres present to what are regarded as mainstream conventions of beauty and dominant notions of technological progress. As many music industries moved towards cheaper and more mobile digital forms of distribution in the 2000s, noise's saturation with obfuscatory 'residual media' formats seemed to constitute a kind of economic resistance.¹⁸¹ It re-instated and intensified the fetishistic 'paratexts' gradually shed by digital music commodities beginning with the popularization of compact disc copying technology in the mid 1990s (Straw 2009). According to Novak it also re-enchanting the musical commodity by inscribing it in a nostalgic and socially exclusive 'culture of circulation' rooted in the DIY barter networks of Punk and Indie rock (Novak 2013, 198-225; cf. Lee and LiPuma 2004).

By characterising musicians' use of tangible formats primarily as reactions to digital hegemony, these interpretations presume the kind of dialectical relationship between old media and new media that Bolter and Grusin (2000) have called 'remediation'. When used as instruments or processing devices, however, the same objects appear to be integral to the production of genre identity, affective belonging, performance spectacle, and sonic effect.¹⁸² One thing that sets primarily electronic idioms apart from other instrumental music is the degree to which their technological repertoire affords a blurring of the line between instrument and recording format. In many cases, then, the negative socio-economic account of noise's format aesthetics is far from exhaustive. A look at some of the noise practices developing in Montreal will show that this complicates the often rehearsed

181 These media are 'residual' in the sense of being obsolete and nostalgic (cf. Acland 2007; Williams 1973).

182 See among other examples Novak 2013, 144.

value distinction between digital and analogue technologies in the genre's instrumentarium.

One of the city's most prominent and long standing noise institutions is a small, informal label and promotion unit known as Fluorescent Friends. Its Ottawa-born founder Blake Hargreaves started performing and promoting noise and other styles of experimental rock music after first moving to Montreal in 2002. Working with friends he established his microlabel a year later to publish his own projects alongside work by other noise performers mainly in Montreal and New England. He played in several bands but became most known for his work in the duo Dreamcatcher with bandmate Katherine Kline. In 2007 he began organising a series of weekend-long noise festivals under the ironic title Cool Fest, collaborating with the collectively-run loft studio La Brique before the venue's closure in 2013. The audience for Hargreaves' label and festival cut across the indie rock and noise scenes. Its roster of artists ranged from guitar-based post punk to drone and techno-inflected electronic sounds. Publicity was initially generated by word of mouth and via anglophone student radio. As the label's activities grew, this was gradually supplemented by a Facebook group, a permanent website, and Bandcamp pages for large-scale releases.

According to Hargreaves, however, having a label was initially less of a publicity strategy than an intuitive aesthetic move. He considered a label name a precondition for producing a recording, a necessary part of the framing of a release. 'It was like window dressing,' he told me. 'I don't know why I thought I needed it.' He had been exposed to the early-2000s American east coast noise scene, but paid less attention to its economics than to its aesthetics. 'I was a bit ignorant of the culture and especially the people doing it at the time. [...] I spent one year in New Jersey and saw a lot of music that was happening in New York in 2000. Lightning Bolt, Black Dice, Arab on Radar were some of them. They had releases that were a little more [like ours]... and so I was sort of picking up on it. But I never really thought about it. To me, I was so caught up with just what the music is, and how they make it and what they are doing with it.'¹⁸³ The style of noise associated with the

¹⁸³ A paradigmatic example of the sound that defined this scene is the opening track 'Seabird' from the Black Dice album *Beaches and Canyons*. In the discography see Black Dice 2002.

bands Hargreaves listed was more rhythmic and melodic than the raw, unstructured sounds normally seen as typifying the genre.¹⁸⁴ The artwork and performances produced by these American bands combined the images of psychedelic kitsch, political or sexual subversion, and ironic violence. Performing, recording, and promotion practices were embedded together in an ethos of underground authenticity and craft. As Hargreaves put it, 'The closest I can get to just instinct and then thinking about it later, the better.'

Fluorescent Friends releases trickled out in a variety of formats, in runs of anywhere between 1 and 300 copies, almost always with handmade artwork. In most cases they were manufactured at home by Hargreaves and his friends, whether dubbed onto blank cassette, burned onto CDR, or etched into roughly cut sheets of hand decorated plexiglas. These lathe-cut discs were particularly distinctive. Each was first painted in multiple layers with stencils and spray cans, and then etched directly on an antique mastering lathe Hargreaves purchased on the online auction website Ebay. As the difficulty of repeating the etching process made it impractical to use for standard purposes, however, he decided to treat the device as part of his creative process. 'I know somebody who tried that,' he told me, 'and he sold his lathe after the first seven-inch he made, because it was just so fucking impossible, and he probably spent like three times as much as getting someone to master it. So for me it's one-off music art. Sort of concept pieces.' Although the discs were unique as objects and resolutely analogue at a mechanical level, the tracks etched into them, collected from past festivals and home recordings, came from a pool of digital sound files that Hargreaves could reuse as often as he liked. In practice, then, it was often possible to buy two copies of the same sound recording. But each would have undergone slightly different distortions during the etching process, and might also have radically different packaging. Tracks from an album released originally on cassette could show up later on a lathe-cut disc, on a Bandcamp page, or on a CDR from another label. Formats were chosen not for their value as reproduction media but as aesthetic objects in their own right.

¹⁸⁴ For example in Hegarty 2007; Demers 2010; Novak 2013.

Although Hargreaves did his best to make the discs aesthetically appealing, his expectations about their potential profitability were low. When he displayed finished products for sale at gigs and festivals, he set what he saw as 'sustainable' prices based on the labour and materials involved. 'That's like forty dollars for an LP,' he told me before the second of four installments of Cool Fest 12.¹⁸⁵ 'That, people when they see it, they don't really feel sure that its going to sound as good as they want it to. I don't sell ones that sound fucked up or really bad. They sound a little sketchy, but I can get it to sound pretty good, and I set pretty high standards for that.' When I asked Hargreaves' bandmate Kline, if she was involved in the sale of the records, she responded with sarcasm. 'Yeah, I give a lot away!' she laughed, 'I mean they sit in a box at the foot of my bed, right? My "vault".' Both recognised that stylised formats would limit circulation to a face-to-face network of producers and connoisseurs who shared the ability to participate directly in listening, trading and gifting.¹⁸⁶ Crucially, however, the decoration of recordings inscribed them in the same aesthetic register as the sounds and instruments Dreamcatcher used in performance.

When describing the role of artwork and packaging, Hargreaves compared the operation of the label to an experimental theatre troupe like that of prominent Quebecois auteur Robert Lepage. 'We are the company and everything is sort of generated within,' he told me. 'It is kind of theatrical. Its not just the acting, you dress it up.' Treating format aesthetics as part of the *mise en scène* rather than as reproductive media meant that he could also contract his design work to other musicians. In the spring of 2012, for example, he received a commission from established local turntable improviser Martin Tétreault, a prominent figure in the tradition of *musique actuelle*, to cut a set of discs to be used in a composition for turntable ensemble in Quebec City. Tétreault uses records as part of a strategy for eliciting the noise of the turntable as an amplification mechanism—the needle as a contact microphone and the platter as a resonator—rather than a transducer of

185 Cool Fest 12 was presented in four installments to mark the solstices and equinoxes leading up to the end of the Mayan calendar.

186 Novak (2013, 201) has made similar remarks about the packaging of noise cassettes in Japan and the northeastern United States.

recorded sounds per se.¹⁸⁷ Hargreaves found this elision of the distinction between format and instrument particularly satisfying because it allowed him to discard the usual criteria of marketability. 'Projects like that are nice because I'm just trying to do a good job with the lathe,' he said. 'I'm not really thinking about this band, will people want this or... I'm this craftsman. Like a cabinet maker or something. Just giving him the specs of what he needs.'

In the noise scene, however, it was rare to see the kinds of large ensemble instrumentation, or the long-term virtuoso careers associated with *musique actuelle*. Noise performers worked on an unspoken principle of heterogeneity, constructing setups that embodied the look and sound of the genre in their embrace of disjuncture and feigned amateurism. The loose, haphazard style extended to many of the groups associated with Fluorescent Friends. A duo formed by Mélissa Gagné and Sadaf Nava known as Institutional Prostitution, for example, performed with a combination of digital hardware samplers, second-hand digital keyboards, and analogue guitar pedals, either triggering sounds with the keyboards or looping and processing their own vocal or violin sounds. Both their first cassette, released on Los Discos Enfantasmes, and their 2012 LP for Fluorescent Friends included passcodes to download digital versions from a Bandcamp page.¹⁸⁸ In performance the two women huddled over their instruments draped in second-hand bathrobes, cheap plastic rain gear or evening gowns, their faces concealed behind colourful layers of costume makeup. Institutional Prostitution lyrics sounded like a cross between poorly edited art school writing and computer-generated spam emails celebrating digital consumerism. 'I wrote some essays,' chanted Gagné in a bored monotone on Institutional Prostitution's cassette *Baroque Roccoco*, 'of works of art regarding the korg mini-synth type songs of word documents and pdf catalogue of selling all my shit...' Their cryptic website described them as, among other things, a 'new fashion company'. Its pages were adorned with elaborate digital cut-ups, a lengthy video of the two performers burying a car, and advertisements for a planned 'dance performance about suburban pool masochism'. If the group's work was fetishistic about anything, it was the Internet. What

187 See the interview and description of Tétreault's practice and career trajectory in Jones 1995.

188 In the discography, see Institutional Prostitution 2011.

mattered was not that their aesthetic was digital or analogue so much as the camp value of an ephemeral and anachronistic technological imaginary.¹⁸⁹

Critics of popular music have depicted the digital afterlife of cassette culture as a detached evocation of nostalgia for a lost moment in popular culture (cf. Reynolds 2011). From this perspective, the cassette's redundancy as a medium appears to leave it little value other than arbitrary subcultural validation. Its classic role as a grassroots medium – as in Peter Manuel's (1993) account of the democratisation of popular music recording in India – has eroded to the point that, as Elodie Roy (2014) has recently written, 'tapes are no longer for sharing: they are for keeping'. For Fluorescent Friends, however, an understanding of the economics of cassette culture was still tightly woven into the aesthetics of performance and production. The label's first release was a run of fifty home-dubbed tapes. 'I had this tape deck and it was like, we would just go to the Dollar Store and tapes were a buck.' Hargreaves told me. 'You could just buy fifty and do it. It was not something that was really planned. The whole thing happened in four days. Including recording the thing. We'd never even planned to jam or anything.' For his bandmate Kline, using tapes also indexed a personal history of mix-tape and zine trading. She used cassettes in her performance practice, playing them back through the external input on her digital Electribe ER-1 drum machine. She tapped into their unique temporal affordances, making what she called 'live loops' by intermittently switching sides. 'It's always a surprise as well,' she told me. 'Because I don't mix. I haven't chosen specific loops or moments. There are moments that work better than others with certain beats, but I'll just let it play [...] and you know it will come through and it always, depending on where the tape is at, it always kind changes the quality of the music.' Some of Kline's tapes came from second-hand stores, but she also used tapes she'd made herself, or received from other bands. Here, cassette as instrument faded seamlessly into cassette as medium. Cycles of non-monetized exchange and serendipitous discovery bridged the economic and the aesthetic. Our conversation here is about the production of Dreamcatcher's 2008 cassette *A Team Come True*.¹⁹⁰

189 From a visual standpoint Institutional Prostitution's work bears comparison with the 'vaporwave' movement documented by critic Adam Harper (2013).

190 In the discography see Dreamcatcher 2008.

Valiquet: Where do you shop for the cassettes?

Kline: I don't shop. I don't buy music.

Valiquet: You don't buy them?

Kline: Actually at second-hand stores you can find good ones. Like if you want to find good New Age cassettes and that kind of thing. Like Zamphir.

Valiquet: Where do you... so you just sort of find them?

Kline: I find them. That's another thing where it's, like, found. Yeah, second hand stores. And also I don't buy music. It's an interesting thing about starting to play with Blake. It's like kind of this economy of trade. I don't buy things anymore, I mean occasionally I'll download, but mostly I'll get whatever people give to me. It seems to be the theme with what I play and also with what I've been listening to.

Like her label-mates in *Institutional Prostitution*, Kline definitely played upon the trappings of cultural detritus and kitsch (seeking out Zamphir and New Age tapes). She also embraced consumer-grade digital instruments in her performance setup. It would be short sighted to read her almost naturalistic engagement with recording formats as a naïve critique of digital immateriality, however. Kline, who is now studying towards a doctorate in communication studies, recalled the dismissive response she received when she raised the issue in a seminar as a master's student. 'I remember saying so in sound class, "Well people still put out tapes." And this was like, *pffff* [deflating], you know?' What her professor forgot to consider was the aesthetic content of the practices in which these tapes were implicated. Online and offline objects can be 'dressed up' in analogous ways: made to look sloppy, ironically cryptic, and obnoxiously colourful. Analogue and digital materialisations of music were not in competition. Their circulatory, instrumental and paratextual functions were complementary and cumulative.

5.5 'Record Release'

When the term 'postdigital' was coined in the late 1990s it bore a distinct sense of

modernist negation.¹⁹¹ In a widely cited article now over a decade old, composer and sound designer Kim Cascone (2000) famously argued that the ubiquitous circulation of composition software over the internet afforded non-academic musicians the means to appropriate the 'failures' of digital technology and force a reexamination of its discarded side-effects. More recently, the term postdigital has been used to describe a kind of return to the qualities of old media, whether as a fetishistic embrace of human affect and embodiment, or as a re-inscription of the immediacy of pre-digital technologies within the practices and economics of the Internet era (cf. Cramer 2014). Similar accounts circulate in popular culture as well. Rumours of the impending 'return' of vinyl and analogue media captured a significant amount of attention among music journalists during my fieldwork (e.g. Lepage 2012). These repeated a narrative heard multiple times since the record industry's massive adoption of the compact disc in the late 1980s, but were newly inflected by initiatives such as 'Record Store Day', which played on the mistrust of digital immateriality just as it sounded a note of desperation among retailers. Getting back into the business of physical media seemed to represent a last chance to repair the economic damage inflicted by the plunge in the price of recorded music over the past decade.

These readings of non-digital practices and aesthetics as moves against the digital enact a pessimism similar to that once voiced by Eric Rothenbuhler and John Durham Peters (1997) in their lament that the arbitrary coding of the compact disc has discarded analogue media's qualitative correspondence to historical reality. As Jonathan Sterne (2006a) has argued, the various versions of this critique of digital mediation entail an imaginary teleology of fidelity and definition that brushes aside both the practical differences and the material advantages of digital malleability. Both sides of this argument, however, focus on recording technologies as containers or mediators of organised sonic content rather than as objects whose very function is open to different aesthetic interpretations. Rothenbuhler and Peters, for example, characterise their concern as a 'hermeneutics of testimony', dismissing the idea that the audiophile's intuition about the quality of recording devices boils down to a 'fetishist's obsession with fine differences'

191 For further discussion of the links between modernism and philosophies of negation see Born 1993.

(1997, 243). Sterne, for his part, shifts the focus from 'definition' to 'transmission', highlighting the constant give and take between the design of digital audio containers, new contexts of listening, and styles of audio engineering (2006a, 345-346). In the examples I've described in this chapter, however, it is precisely the fetishist's obsession—the 'grain' of particular audio technologies—which is at stake. Their shapes, colours, and mechanical idiosyncrasies take centre stage. Including minuscule runs of hand-etched plexiglas discs, home-dubbed cassettes, QR codes printed on vinyl stickers, and blinking microcontrollers in a putative industry-wide 'return of analogue' is surely a vast overestimation of their circulatory potential.

Christof Migone's series of conceptual projects under the title *Record Release* cleverly deconstructs vinyl's return by reducing it to its elementary components. Records are normally consumed as solid objects, but they are formed by melting down hundreds of minuscule petroleum pellets. In Migone's project, a version of which appeared in a studio gathering held for the Montreal sound art publisher 'Squint Fucker' in August 2012, a collection of these pellets weighing a total of 180 grams—the standard weight of a twelve inch audiophile disc—is set out for sale at one dollar per piece. Each comes with a numbered certificate of authenticity. Those not sold are placed in public or given away to friends. The 'release' of each 'record' in the series is measured out and temporalised, perhaps over a period of months or years. The exchange of the analogue object is ironically transformed into a digital process, a flow of samples. Migone's project undermines the fetishistic authenticity of vinyl in a similar way to K.A.N.T.N.A.G.A.N.O.'s *Blessure narcissique*. By stopping the audiophile object at a more 'abstract' stage in its development, he also opens it up and renders it multiple.

There is obviously no hope that such objects will ever replace or compete with digital formats as forms of circulation. Instead they ironically materialise the exchange practices that consolidate and differentiate musical genres and ideologies. Redundancy renders the meanings of physical technological objects fluid and negotiable, such that they are easily recontextualised, deployed as markers of authenticity in aesthetic practice, put to

work as engines of complex historical and conceptual articulation, or inscribed within discourses of professional empowerment. At the same time, the way conceptual boundaries between technologies and technological systems are drawn is increasingly a matter that engages both engineering and aesthetic practice. Many authors have remarked upon the gradual closing of this gap in music production since the popularisation of electronic technologies.¹⁹² As each of the foregoing examples shows, although dominant conceptions of musical materiality may still have a certain projective power, difference between the analogue and the digital is often not a fixed precondition for these reinterpretations but a product of them.

¹⁹² See among others Kealy 1990; Attali 1985; Porcello 1991; Théberge 1997.

Conclusion: Genre effects

6.1 Associating electroacoustic music and sound art

This thesis has examined the negotiation of relationships between digital audio technologies and processes of aesthetic transformation in electroacoustic music and sound art in Montreal. Each chapter turned upon a different mechanism of negotiation: theoretical production; cultural, professional and generational territorialisation; political subject formation; and technological construction. In the process of summarizing my findings and drawing conclusions, I want to elaborate upon a fifth mechanism brought to bear by my ethnographic interlocutors upon the relationship between digital technology and the aesthetic. I explore different facets of the genre formation process, not only as a separate site of negotiation in its own right, but also as an aspect of all the topics I've covered so far.

As illustrated in my discussion of glitch in chapter two, my discussion of electroacoustic canonisation in chapter three, and elsewhere, issues of genre and categorisation are hotly contested in electroacoustic music and sound art. Theoretical work in the field is marked by strong anxieties around issues of association, naming and genealogy.¹⁹³ The problem at the centre of the genre negotiations I will describe here is what many theorists have described as a transformation of the genre hierarchy of the Western Art Music traditions writ large, a process of diversification leading to a gradual overshadowing of the academic electroacoustic tradition by its epigones. Some of these theorists characterise the transformation in terms of decline, while others describe it in terms of positive pluralisation and diversification.¹⁹⁴ Here I want to examine it in terms of concrete changes in conceptions, performances and negotiations of genre, the ways genre is brought about in, and brought to bear upon the practices of electroacousticians and

193 See for example the second chapter of Leigh Landy's (2007) book *Understanding the Art of Sound Organization*, in which the author spends upwards of one hundred pages developing a system of classification in the interest of what he calls 'co-hear-ence'.

194 For various expressions of these conflicting positions see Meyer 1967; Waters 2000; Landy 2007; Clarke 2007.

sound artists, both in terms of codified norms, and voluntary rhetorical effects. I do this in order to shed light on the specific transformations in progress in relation to my research site, and suggest how broader understandings of genre change might be re-inflected in light of ethnographic research like mine.

By gathering together and highlighting these aspects of genre formation in my conclusion, I mean to put them to work them as kind of index to the rest of the thesis, articulating how the negotiations in previous chapters can also, in different ways, be traced back to notions of genre. I foreground the work of genre formation in particular practices and materialities that previous chapters deal with in relation to other domains of negotiation. I revisit circuit bending and hardware hacking practices, for example, repeatedly in chapters three, four and five because of their remarkable rise in legitimacy over the course of my fieldwork. Only here, however, do I extrapolate from these discussions to look at the ways that these practices constituted and distinguished among a complex and shifting assortment of genres. I also deal with institutional boundaries and genealogies throughout my thesis, but only here do I draw together the ways that these formations intervene (through the planning and provision of funding and education, for instance) in the process of constituting what I refer to as 'genred' musical subjects and objects. As I will describe, these identifications connect to wider cultural, technical and epistemological formations, both past and present, sometimes re-inflecting them in the process. Exploring these issues at a close level of detail will help to counteract any impression that the co-transformation of the technologies and genre identities in these scenes has been monolithic or deterministic.

Electroacoustic music and sound art have always encompassed a variety of sub-genres, valued in different ways, and not always articulated to a single and distinct listening community. In this chapter I survey two overarching domains which have played a generative role in shaping the way these sub-genres are articulated. I refer to the first as technological. I illustrate its recent digital inflection by talking to the upsurge in the use of the internet as a tool for constructing aesthetic genealogies and technical literacies, and the recent turn to artisanal modes of instrument and media construction. I suggest how the

disembedding effect of certain online platforms, many of them driven by amateur curators or music information retrieval (MIR) software, may have helped to intensify a sense of breakdown and diversification. I also offer a number of examples of traditions and practices which have been disarticulated from each other in part through the anonymising mediation of internet platforms and social media. In this connection I also revisit the aesthetics of technical personalisation, enumerating its complex role in the process of disembedding, and its multiple re-articulations in the recent practices I've explored in previous chapters. The second domain I refer to as institutional. Here I look to the over-coding of the distinction between music and sound art by cultural policies and institutions in Montreal, showing how the clashes between definitions produced by policy makers and those they seek to regulate can generate hybrid subject positions and complex exclusions. Finally, I discuss the ways that institutional and policy reforms reenact, but also reframe, a longer term struggle to rethink musical canons and disciplines.

In the third section I pull these two threads of observation together into a deeper consideration of the challenges they bring to genre theory. Here I explore how empirical observations might help to revitalise the ways that generic distinctions are envisioned both by analysts and policy makers. Rather than reduce genre either to a matter of arbitrary codification, or to a matter of rhetorical choice, I want to emphasise that genre production in electroacoustic music and sound art is always an effect of both. Finally, by way of a postscript, and in recognition of the ongoing and open-ended nature of the negotiation of digital technologies in Montreal's electroacoustic and sound art scenes, I end the chapter by recapitulating the genre effects of institutional and technological change, and revisiting some of my thesis's key actors to show how their practices and identities have continued to develop since the end of my fieldwork.

The overall assertion I want to make in tying the thesis together in this way is that, while digitalisation is a global process with implications for almost every aspect of human experience in the twenty-first century, its effect on specific musical practices is structured by the concerns and conventions into which it is taken up. As genre is in many ways the paradigmatic domain of negotiated convention in musical practice (cf. Frith 1996; Negus

1999; Born 2010b), I use it here as a prism through which to review the thesis as a whole.

6.2 Technological effects

There are many ways that the negotiation and recognition of genre is linked to the technologies used by electroacoustic and sound art practitioners. These include the kinds of direct fetishisation and re-appropriation I discussed in chapter five. Musicians with different social and aesthetic projects experience the affordances and meanings of production technologies differently. Genre is also embedded in the technological processes and infrastructures that enframe musical production and reception on a less intimate scale.

Internet platforms rarely occupied the foreground of the practices and ideological struggles I witnessed during fieldwork, but their background role in facilitating musicians' immediate social networks, as well as in conditioning their wider aesthetic and technical imaginaries, was undeniable. Furthermore, the proliferation of digital technologies was not limited to the objects of my fieldwork. They broke through the ethnographic lens to mediate the writing process, the gathering and management of documentation, and the storage and transportation of artefacts. They had both enabling and disabling effects on communication with colleagues and interlocutors. My research group, based in Oxford but sometimes dispersed across four continents, generated a constant stream of digital documents in the form of references, reports, protocols, wiki pages and emails. Frustrated attempts at teleconferencing and remote archiving highlighted the degree to which digital platforms could be broken by anything from software bugs to electrical or telephone outage. It was sometimes necessary to wait for certain times of day, or travel to other locations to make a digital contact or transfer a file. Digital technology thus shaped both the times and spaces of research, as much as its objects and subjects.

At home my archive expanded with every new recording, link and journal entry. My use of digital technologies in the act of ethnographic writing was conditioned by a combination of prior habit and sensitivity to the ethical and aesthetic conventions of my site. Thus the devices I could bring into the field also depended upon their physical

dimensions and affordances. As fieldwork went on I eventually combined longhand notes and diaries with a more fragmented record of correspondence and spontaneous reflections kept using a journaling software on a smart phone that I could synchronise with my laptop and expand upon when I returned home. Photo and video hardware was embedded in mobile devices so pervasively that I was rarely the only person recording in a given situation. In some cases I could even go online the day after an event and compare my documentation with videos uploaded by anonymous audience members online or taken by interlocutors themselves. Digital platforms also became a key form of mediation in the exchange of recordings, references and contacts with my interlocutors. I followed Soundcloud and Facebook feeds to track production and promotion. I kept in touch with musicians and found out about concerts and releases by 'friending' and 'following' them, usually on multiple platforms at once.¹⁹⁵ Some of these contacts stayed online, and others coalesced into manifestations of offline publics which I in turn became a part of as a researcher, whether by asking questions, eavesdropping, or simply 'liking'.

Beyond the fact that I couldn't avoid noticing the degree of interpenetration between online and offline worlds in classrooms, concerts and rehearsals, it would have been difficult given the scope of my study to follow interlocutors in their everyday wanderings through cyberspace. I can attest to the Internet's centrality, however, through my participation in the online lives of the scenes I studied and through the fact that the same technologies mediated my research practice. I can also point to the aesthetic and social idiosyncrasies that seemed to be correlated with Internet technologies, and the transnational trends they mediated. Genre was one of the key points of mediation in this regard, especially insofar as it served musicians as a way of ordering and accessing the music of the past and of other places. Personal contact with something resembling a 'genre community' often came second to serendipitous moments of discovery afforded by material organised—or simply aggregated—algorithmically, or by anonymous agents abroad. This appeared to increase the amount of 'drift' in the meanings of genres, ideas and objects experienced as being from other times or places (cf. Latour 1988; Piekut 2014). Internet

¹⁹⁵ Madianou and Miller (2013) have recently put forward the notion that online platforms such as these operate as an integrated and relational 'polymedia'.

platforms might be seen as intensifying instances of what ethnomusicologists have variously referred to as 'schismogenesis' and 'untranslation' (cf. Feld 1994; Novak 2010, 37). Especially in the non-academic field, musicians seemed to use these technologies in a way that mediated genre and genealogy differently than may have been possible in the past.

The dominant platforms for accessing experimental and avant-garde music at the time of my fieldwork were Youtube and Ubuweb. Ubuweb is curated as an independent educational repository aimed at deliberately 'recontextualising' avant-garde artworks (Krukowski 2008). Youtube, on the other hand, relies on tracking user behaviour to organise individual tracks into lists of recommendations tuned to personal patterns of behaviour and 'unarticulated wants' (Davidson et al 2010). MP3 blogs devoted to everything from obscure sound art LPs to underground Industrial cassettes filled in the margins of these more prominent systems. Finding music on these platforms was not the same as encountering it in a classroom, where it would be embedded in discourses and disciplines regulated by academic convention. Instead, Internet platforms like Youtube and Ubuweb couched experimental and avant-garde music in the affective language of the fan, encouraging free association through 'suggested' links or comments. With respect to their effect on genre formation and canonisation, then, they operated as engines of drift and diversification.

To illustrate this I return briefly to an example I introduced briefly in chapter three, Roger Tellier-Craig's remediation of Jean Piché's *Heliograms*. The process that eventually provoked Piché to create new videos and remaster the original tracks originated with the album being put back into circulation after being deposited for several months on an amateur-curated MP3 blog geared towards fans of obscure experimental music. While I focused on Piché's version in my discussion of the territoriality of the digital art scene in chapter 3, it's interesting here to note the ways the process effected Tellier-Craig's creative output as well. Comparing the video for Piché's *Rouge* with Sabrina Ratté's video for the 2012 track *Data Daze* by Tellier-Craig's solo project *Le Révélateur* serves as an apt

illustration.¹⁹⁶ The two are strikingly similar. Both feature pulsing minimalist-derived algorithmic patterns and shimmering string-like synthesizer pads accompanied by shifting, brightly coloured, almost fractal checker board images. While Piché's video is produced in intricately layered high definition digital video, the elements that Ratté's video and Tellier-Craig's audio retain from it reinforce and fetishize the 'vintage' aspects of *Heliograms*. In effect, *Data Daze* re-imagines Rouge as the rarified object it was for the MP3 blogger who set the chain of remediations in motion. Listening to the two side by side, it's almost as if the historical sequence linking the two tracks were reversed: *Data Daze* sounds and looks like a distant precursor to *Rouge*.

The exact extent to which search and MIR algorithms as such have any agency in this changing dynamic of disembedding is difficult to determine, especially on the scale of individual cases like the one I've just described. MIR software, now developed and applied by almost every online music consumption platform, extracts data either directly from sound files or from listener selections, and embeds it in 'metadata' which allows them to be easily sorted into databases and arranged automatically into user-specific lists of recommendations.¹⁹⁷ It would be impossible to speculate about a recursive connection to the music research happening at McGill or Université de Montréal, both important centres in MIR research. It is however possible to point to the link between an intensified aesthetics of misappropriation in Montreal and the genre conventions of EDM. Several authors have noted the importance of anonymity and obscurity in EDM (cf. Thornton 1995; Toynebee 2000). Indeed, the prominent new EDM genres that emerged during and leading up to my fieldwork seemed almost to celebrate this aspect of the culture. Some interlocutors referred to the phenomenon as 'tumblr aesthetics' [sic], after a popular micro-blogging platform which emphasised graphics and downplayed written information.¹⁹⁸ Popular acts like SALEM and The Weeknd [sic]—both of which seemed to mix sonic

196 See the videography entires for Piché [1977] 2012 and *Le Révélateur* and Ratté 2012.

197 For a description of the range of topics and players in the field, and the problematisation of genre as a matter of automated recognition and reconstruction see Gerhard 2006. The automated wrapping of digital music in metadata has earlier roots in grassroots tagging projects such as Compact Disc Database and ID3. On the 'recontextualising' and 'paratextual' effects of these metadata projects see Morris 2012.

198 Tumblr was an independent start-up at the time of my fieldwork, but was purchased by Yahoo in 2013. See Brown 2013.

elements of R'n'B and Shoegaze—capitalized on the moody, gothic imagery popular on tumblr blogs at the time, going to far as to build entire marketing campaigns around the platform and its aesthetics.¹⁹⁹ Received by my interlocutors on a similar level, Robert Ashley's *Perfect Lives* videos—highly sought after copies of which circulated among my interlocutors on memory sticks and DVDs—developed a cachet correlated as much with their passing resemblance to so-called 'seapunk' videos²⁰⁰ as with any cultivated awareness of Ashley's involvement with the ONCE group, the Sonic Arts Union, or the wider postmodern moment in American opera that his late-1970s 'opera for television' may once have heralded.

One of Montreal's most popular self-taught noise improvisers and circuit benders, Lisa Gamble—known by the playful stage name Gambletron—connected the kind of 'levelling' made possible by the internet to her experiences of rave culture in the early 1990s.

The one the thing I remember that seemed really cool, and I know because the internet was not really like the way it is now, but I knew that if you could make a single [...] it seemed to me you could be a nobody and that DJs who were going out and searching for something to go into their set, like it didn't matter who you were. If you made something that a DJ liked then you would sell it. I feel like it was the dance music scene that was levelled first.

While they may have recognised a shared aspect of the changing genre dynamic of EDM, it is important to note that the electroacoustic and sound art worlds did not link up smoothly to its social and technical networks. As Marilyn Strathern (1996) has argued in response to the rhetoric of ANT, network metaphors often fail to account for the restrictions and hierarchies that continue to structure social life outside of the domain of communication technologies. The meanings of musics and instruments may have seemed to drift freely, in the Latourian sense, both online and on the dance floor, but offline their

199 Although both were popular during my fieldwork, neither act was from Montreal. Interlocutors discovered the work of these groups through the Internet (cf. Colly 2011). In the discography, see SALEM 2010 and The Weeknd 2011.

200 On the aesthetics of the Seapunk genre see Raymer 2012.

networks were often stopped or contained when publics and practices failed to mix or coalesce. Electroacousticians, sound artists and noise producers in Montreal might sometimes join the public of EDM as listeners, but they would rarely participate as producers or promoters. Katherine Kline, whose work with the noise duo Dreamcatcher I examined in chapter five, described the way that these social limits inflected the aesthetic scope within which she felt that she could use her drum machine, an instrument ostensibly 'native' to EDM. Her practice was partly inspired by the electroclash of bands like Detroit-based Adult, she told me, but her expectations changed in the face of the noise scene's concert conventions.²⁰¹

When I started playing, I thought I would be making dance music. I remember, at that time when I got that drum machine, I was listening to a lot of Adult. [...] And I was like, I really want to make music like this. And I remember some shows where people danced were such a success for me. It's like I was so excited when people were dancing! But that doesn't, I mean our music isn't... that doesn't happen very often. I mean, people don't dance at a lot of those sorts of shows here anyways.

Invited by experimental concert promoter Eric Mattson to play at the MUTEK festival a few years after Dreamcatcher started, Kline found herself confronted with the distinction again. Here it seemed to split the allegiances of the artists as well. In our conversation we mused on the reasons why this should be so, comparing Kline's work with that of famous minimal techno producer Richie Hawtin, who had repeatedly headlined the festival.²⁰²

Kline: I think some people there were really into MUTEK as a festival and some of us were just like, okay, yeah, why not? [...] There are some artists there who I've liked and who I've listened to in the past, but I ...

Valiquet: You don't associate what you do with what they do?

Kline: No not really. I can see why there could... I can make a link. I can see why there could be an association in some way.

201 In the discography see Adult 2000.

202 Hawtin also goes by the pseudonym Plastikman. In the discography, see Plastikman 1998.

Valiquet: Like on a technological level?

Kline: Yeah maybe on a technological level [laughing]. 'We all use machines here.' I don't know! [...] Or it's like, 'I make beats, and so do you.'

Valiquet: You and Richie Hawtin?

Kline: Exactly! Yeah that's it!

Valiquet: Something tells me that his fans would take issue with that!

Kline: That's the thing. It's funny. It's funny that that happens because I probably imagined when I started playing with that drum machine that something would come out that was closer to Richie Hawtin than to what we do now.

To paraphrase, Kline's drum machine proved unlikely to make people want to dance in the context of the noise scene, but then when she later brought it to the MUTEK festival—where people *do* normally dance—her work felt out of place. Drift thus manifested just as much offline as online, as machines and musicians moved from one genre to another over time. I can cite multiple instances of this in my fieldwork. Gamble, who had taken inspiration from the economics of the EDM world as a teenager, would only later find her way to electronics as an established musician. She did this largely with the help of resources that circulated free of cost over the internet, with the help of circuit bending and synth building diagrams by artists from abroad. Although manuals like these were a common thread in the genealogical narratives of builders and hackers I met during fieldwork, diverse receptions linked the same texts and technical blueprints to a variety of idiosyncratic and highly personal aesthetic approaches. Gamble's beat-driven improvisations were a far cry from the squelchy free-form synthesizer jams of Emilie Mouchous and the stagey, competition-based performances of Darsha Hewitt, both of whom learned online from similar sources.²⁰³ Practices like Gamble's and Kline's dramatise the degree of difference between noise practices and the technical conventions of EDM, a genre complex which has never valued artisanal instruments or builder individuality in quite the same way.²⁰⁴

203 In the discography see Gambletron 2012. The release comes from a recording I made of Gamble during fieldwork and shared with her during our interview.

204 This is of course not to say that EDM technicians, producers and DJs are unconcerned with the aesthetics or social hierarchies mediated by their technological assemblages. See for example Fikentscher 2000 and

In addition to an intensifying dynamics of drift in the circulation of musical objects over the internet, these practices also illustrate the occurrence of drift in the use of technological objects between genred producers. Novak (2013, 186) draws links between the 'japanoise' musician's table of miniaturised effect devices and the postwar effort to solidify the identity of the Japanese consumer technology industry around notions of 'electronic individualism'. Bull (2000; 2005) and Kassabian (2013) trace the ways that these tendencies have shaped contemporary listening practices, bringing music into more and more intimate relation with the banalities of everyday life. Jean and John Comaroff (2000) connect the way consumption pervades production in the early twenty-first century with the shaping of selfhood under a neoliberal capitalist order. The ideological manifestation of consumption as 'consumerism', they argue, rebalances the relationship of work with private life and ultimately fragments class consciousness (Comaroff and Comaroff 2000, 293-294). As I indicated in chapter four, there is a sense in which individualisation at the level of disciplines and literacies might contribute to the absorption of electroacoustic and sound art practices into encroaching neoliberal frameworks. A similar consumerism also seems to permeate the 'thickening' (cf. Gracyk 1996) which I noted in chapter five in my discussion of technical ontologies. The attitudes to musical production I discuss there favour an accumulation of technical and material distinctions over sonic discourses that could be interpreted as being engendered by a consumerist attitude.

Meanwhile, the increasing symbolic capital accruing to 'low-level', 'open' and 'analogue' engineering also constitutes a re-articulation of some of the older essentialisms still embedded in the theoretical discourse of academic electroacoustic and computer music. The drive for musicians to train as technologists can be found in Pierre Schaeffer's (1966; [1952] 2012) prescriptions for reforming compositional education to give electroacoustic composers more virtuosity as engineers and engender finer attention to sonic detail. It also comes up in the postwar Cologne school's critique Schaeffer. In an early theoretical text, for example, engineer and composer Gottfried Michael Koenig

Lawrence 2003.

argued that in the new studio environment composers needed to be equipped to effect a direct mapping between 'musical structure' and 'technical structure'. 'The realisation of electronic music', he wrote, 'Is entirely conditioned by this dual musico-technical character.' (Koenig 1957) We have seen in Born's (1995) early ethnography how serialist ideas such as these have been mobilised in the past to support totalising, modernist rationalisations of the music making process. What's interesting in the present data is the degree to which such ideas have since been extended and re-articulated, as I argued in chapter three and four, to neoliberal and ostensibly postmodernist regimes. A similar call to mastery of the musician's material and technological resources lay behind diverse political and material projects during my fieldwork: for example Alain Thibault's call to strive towards a 'digital culture', [The USER]'s interest in exploring the affordances of technological 'grain', and feminist calls for technological re-appropriation and repurposing. Nevertheless, the particular music technologies I encountered in my fieldwork—whether those mobilised in research, circulation, or in production—didn't seem to embody strict and fixed distinctions between new and old ways of making musical genres. These technologies inflected but did not break the webs of interpretation and negotiation into which they were inserted.

6.3 Institutional effects

In chapter three I looked at how the shaping of organisations and institutions by artists and musicians has been transformed by the changing priorities of arts council regulators. I focused there, among other things, on the ways that these changes mapped onto the mounting challenge that the newly constructed category of digital art poses to the academic authority of Montreal's electroacoustic tradition. Institutions in these domains have sought to limit their aesthetic intervention as much as possible. In marking off a new territory for the digital art scene within its funding programs, the CALQ claimed instead to merely 'recognise' an already operating social and material division. The council's 'clients', however, had to navigate between the arbitrary ways that different organisations

interpreted and reproduced these divisions. When I spoke with sound artist Emmanuel Madan towards the end of my fieldwork, for instance, he described the difficulties that [The USER] had with funding their activities in a format still not fully recognised by any of the councils. Their problems would not necessarily be solved by nascent efforts to change provincial funding categories.

In the Quebec budget there was language devoted to the creation of a digital arts section at the Quebec council. It's more nominal than anything else. It's not a completely new section. They just split media arts, which had always had these two sides: one being film and video practices, and new media. They split off new media, including audio art into digital art. The budget envelope that had already been allotted to that went to digital arts. There isn't even a new agent. There's a new discipline on paper. It has a life of its own. [...] At the Montreal level, the phrase digital arts has already been adopted. The groupings are different. There's a section that's just digital art, whereas cinema and video are a different department with a different committee.

The existing categories had also had lasting effects on [The USER]'s practice. In one sense the current dilemma was rooted in Madan's having chosen early in his career not to apply for funding as a musician. He graduated from a composition program at the University of Montreal, and he had no shortage of colleagues who had dealt mainly with the music departments of the arts councils and were still considered musicians, in spite of doing comparable work. 'It's more [a matter] of where people end up than any strict definition of what we do', he told me. As I mentioned in chapter three, however, he was hesitant to describe what he did as music. When our conversation turned to the aspects of his work that challenged traditional notions of musical ontology and reception history, he corrected my categorisation, but was also ambivalent about it.

Valiquet: The iterative ways that works are developed. The idea of a finished work to which you can hold intellectual property seems to be disturbed.

Madan: I don't think in those terms because it's rare that, certainly [The USER]

never operates within that realm anymore. I sometimes still do but it's so marginal to my practice that I don't really think about it.

Valiquet: Had it come up as an issue?

Madan: From the point that it became apparent that we're not really considered by the music world to be musicians. I mean I'm a SOCAN²⁰⁵ member, but. There is music in what we do. There are soundtracks. There's no doubt in my mind that these are works of music. However, it's not like the gallery is in any way part of that system and thinks in those terms. So sure, my music has been heard by 300,000 [visitors] in a gallery, but it's not how it's perceived. It's not how it's thought about.

Modifying genre definitions on paper thus reinforced the boundaries separating media and disciplines. On one hand, practitioners of various kinds identifying their work as audio or sound art could choose to move out of competition for funding with more traditional composers by simply applying in the media arts or digital arts categories. The music category, on the other hand, could easily focus its efforts on supporting more conservative genres like jazz and classical without having to worry about criteria for evaluating conceptual or installation works. This unique feature of the policies of Canada's cultural governance sometimes worked against efforts from within the individual councils to liberalise the ways funding could be allocated. At the Canada Council, for example, staff in the New Music section had worked since the 1980s to break down barriers to musicians working without traditional notation. At the same time, however, officials I spoke with said they had little to no control over the kinds of specialised training and professional qualifications grant applicants would be expected to have in order to succeed in the eyes of peer reviewers, whose decisions were kept strictly at arms length. Without intervening in the peer review process, all the councils could do was to change the gatekeeping criteria. It would be impossible to see how this affected matters without systematic observation of the closed-door review process of course, but circumstantial evidence pointed to an

²⁰⁵ SOCAN stands for Society of Composers, Authors and Music Publishers of Canada. This has been the main copyright protection organisation for music in Canada since the 1990 merger of the previously separate publishing and performing rights organisations.

entrenchment of several problematic distinctions.

One way that this manifested itself was the difference in gendering between music and media art. The CALQ rarely published gender statistics in its annual reports, so the most recent analysis I was able to find in the provincial archives dated back to 2000. The numbers there were striking nevertheless. Most categories funded by the council awarded grants to around 45% women and 55% men. The only exceptions were dance at 73% women and 27% men, craft at 60% women and 40% men, and music at 28% women and 72% men (Conseil des arts et des lettres du Québec 2000). The imbalanced gendering of the music disciplines in Quebec may reflect the fact that the category excludes popular genres entirely, partly on the basis of their higher ability to raise private funding (see Berland 2000). As Marcia Citron (1993) has pointed out, genre divisions such as those between art and popular music have long been organised according to gendered hierarchies. '[H]ierarchic notions have served as a barometer of women's participation in various levels of the artistic pecking order', she writes. She also points to how distinctions such as these extend to the 'epistemological legitimacy', the content, and the semiotic values of different genres (Citron 1993, 130-131). As Dana Reason-Myers (2002) has argued in the context of experimental improvised music, the existence of such gendered discourses and hierarchies shouldn't be reduced to an essentialised notion that women are not interested in or suited to participating in the kinds of production normally associated with men. Still, these numbers do provide an index of the degree to which certain exclusions are institutionalised.

During my fieldwork I saw such a split dramatised on a number of occasions between music and what my interlocutors saw as 'non-music'—genres like digital art or sound art. Montreal institutions built around feminism and gender neutrality – ARCs like Studio XX, for example—identified exclusively as media art or digital art spaces, even when they also regularly hosted musical performances. For smaller institutions like these, the construction of a non-musical identity played a key role in the professionalisation process. Obtaining long-term organisational funding also meant complying with accepted standards of structure and programming with the required arts council discipline.

For small institutions founded as musical venues, this sometimes meant a radical refocusing of discourses and resources. This was the case with the small digital art gallery Eastern Bloc, for example. Eastern Bloc began as a music venue in 2007, but was gradually transformed into an ARC with the help of federal, provincial and municipal funding. On its website, Eastern Bloc is now described as a space in which to 'push the creative boundaries situated at the intersection of art, technology, and science, as well as all other emerging digital practices' (Eastern Bloc 2014). In a 2010 interview with a local arts magazine about the changing face of Montreal's underground music venues, founder Eliane Ellbogen suggested that legitimacy required coming up to the standard of facilities and practices required by the digital art sector. 'We've kind of been renovating since day one,' said Ellbogen. 'It's been a very steady ongoing process of getting the space to a level where it feels more professional than underground. We kind of ride that line.' (M. Coleman 2010) In conversations with me, Ellbogen and other Eastern Bloc staff members described themselves as 'proud' of its 'underground roots'—indeed they were quick to point to other institutions they claimed had developed along the same trajectory—but the need to adhere to official funding standards worked against the institution's genealogy. These restrictions also complicated programming. Efforts to extend ties with non-artist hardware and software hackers, for example, were strained in part because arts council understandings of what constituted an artist were restricted in terms of training, experience and intention. Builders and hobbyists who chose not to identify their work as art had no specific training or recognition to back up their claim to a space in the gallery. Ellbogen and the curators of Eastern Bloc thematised this problem in an exhibition in January 2012. In it they re-contextualised projects by members of the hacker space Foulab as collaborative artworks and held a public discussion about how to make space for technical practices in the gallery context.

Multiple options exist in the literature for defining the difference between music and the sonic practices of self-described non-musicians. A growing number of authors are proposing critical criteria for recognising sound art, for example, as a practice distinct from musical composition or improvisation. Holly Rogers (2011) gives a genealogical rationale

for the definition of an 'art-music' that developed alongside the introduction of portable video technology in the 1960s. Some of its practitioners experimented with identifying as composers—Nam June Paik, for instance, who studied at Darmstadt, and Yoko Ono, who worked extensively with Toshi Ichiyanagi and John Cage—while others came from disciplines like sculpture in which sound was for the most part a new concern. Rogers suggests that these new 'intermedial' practices and historiographies emerged out of the 'synergistic' agency of new technologies linking media and disciplines. Gascia Ouzounian (2013) emphasises the way sound art practices—and particularly sound installation—generate their particular critical power by intersecting physical, social and political space. She points to a historical shift between musical works protected into space according to abstract designs, and those of sound artists who 'transform' space on an experiential level. In contrast, Joanna Demers (2009) argues that it is not entirely sufficient to distinguish sound art from music on the basis of discursive content or site specificity alone. Instead she adopts the notion of 'objecthood' from the language of minimalist sculpture to show how, for example, environmental recordings with minimal post-production intervention such as those of Francisco Lopez might also be experienced in spatial terms rather than the temporal terms more common to music.

As rich as all of these genealogical and theoretical accounts of the boundaries of sound art may be, none of them quite captures the messy collectivities that can be formed by overlapping institutional efforts to negotiate relationships with their established clienteles, or the unstable subjectivities engendered by their mutual interference. Although they do not do so exclusively—at spaces like La Brique which existed for several years without arts council funding, for example—institutional over-codings often shape the spaces and interpersonal alliances in which such differences are enshrined. They can also complicate the difference between music and sound art at the subjective level.

I want to illustrate this over-coding further by zooming in on the career of another practitioner I worked with in the field. I touched briefly upon the practice of Magali Babin in my descriptions of the sound art concert series 24 Gauche and my autoethnography of noise practices in chapter four. Babin's formative musical experiences came playing bass

guitar for the feminist punk band Nitroglycérine and working behind the bar at the punk club Fougounes Électriques in the late 1980s.²⁰⁶ In our conversations she described Punk as the ethical and aesthetic foundation for her work, both in the sense of providing positive support for grassroots social and artistic experimentation, and in the sense of encouraging participation by those without access to legitimized sources of knowledge and expertise. With help from friends in the *musique actuelle* scene, Babin reoriented her creative practice towards experimental music in the late 1990s, releasing a CD of her improvisations with amplified objects called *Chemin de fer* for the local label No Type in 2002.²⁰⁷ By the time I met her in 2011, Babin had begun to change emphasis again, this time towards projects featuring installation and public participation. In 2012 she also decided to pursue a graduate degree in a program called 'experimental media' at UQÀM, with an eye towards gaining experience with the art world's specialised theoretical discourses, and thereby increasing her legitimacy as a professional. Contradictory attitudes towards the definitions of sound art and music at the federal and provincial arts councils were partly to blame for her decision to choose a media art rather than a music program for her studies. She described in detail how each level of government placed work that she conceived of as *art audio* ['sound art'] differently and how it confounded her own efforts at definition.

[E]ven I have trouble, depending on the project. I have problems saying if I make media art, even when I can also simply say that I make compositions and that it's *also* media art. And that works... it's strange. [...] Sound art, well that can exist in music and it can exist in media art. It's sound. Sounds can be music, can be a mixture of the two, can be anything at all. So there's a willingness [at the Canada Council] to start from where *musique actuelle* comes from—from jazz, free jazz, all that—and put [my work] in that category. And that goes very far towards delineating sound art [as music]. Meanwhile in Quebec they don't do that delineation. That may not be a bad thing. But at the same time I find it's a bad thing in the sense that there's like a lack of definition in Quebec about what sound art is.

206 In the discography see Nitroglycérine 1990.

207 In the discography see Babin 2000.

Because if we go under music we're in competition with all the artisans of music – who play on the radio, who go on TV, who are commercial, even popular. That makes no sense. And if you're a little too strange they'll put you in 'world beat', but that makes less sense! I really don't understand. Because there's not enough willingness to define what sound art is, so they put it in media art with cinema, video and all that.²⁰⁸

Here Babin points to the ways institutional definitions orient her practice on a number of levels: placing her work genealogically, and situating it within the wider economy of musical genres. Again, paralleling the trajectories of institutions like Eastern Bloc, Babin's academic decision to move from music to non-music came from a desire to establish herself professionally. She considered that an art degree would grant her practice more stability, in terms that made sense to local institutions. A degree in visual art or media presented her with more options for advancement than one in music, a field gendered against her.

When I asked her if a return to academia suggested that she might seek a career in teaching or research, however, she corrected me.

No I really don't think that's my goal. If that happens, fine, once I have my Master's maybe, but probably not in a university. I'm not going to go as far as a doctorate and all that. In any case at my age there comes a time... [...] I'm coming to another step, maybe more to take stock of certain things. Maybe the willingness to do a little more to direct myself towards sound installations. I want to do... in a way, I want to understand what I'm going to do, to have something to say really. And I think that there are things that I've learned by myself maybe that I haven't got to the bottom of. Maybe even at a technical level. Especially at a technical level.

Babin's association of the academic environment with technical and discursive authority leads me to a final point of aesthetic transformation in the institutional ecology of Montreal's electroacoustic and sound art scene: the distinction between its academic and

²⁰⁸ My translation from Babin's French.

non-academic domains. In previous chapters I've discussed the way previously transgressive genres were becoming acceptable in academic electroacoustic music: glitch in chapter two, for example, and various styles of improvised music in chapter four. Both stem from genre communities that originally defined themselves in opposition to the academic avant-garde (cf. Cascone 2000; Stévanec 2011; 2012). In Montreal, these recent incorporations have seen mixed receptions: praised as expansions and liberalisations inside the academic world, but suspected as classicising absorptions by those outside.

In a way, both of these receptions are true. The academic reforms I witnessed in fieldwork can be traced back to a wave of polemic which crested in the 1990s and transformed the study of music, especially in the anglophone world. A progressive younger generation of electroacousticians joined musicologists inspired by continental critical theory in criticising what they saw as the prevailing conservatism of the disciplines of composition, music history and music theory. A great deal of this criticism was aimed at the aesthetic quality of the music that then held sway. Commentators on academic computer music such as Eshun (1999) and Ostertag (1996) wondered aloud why the field had let itself become so monotonous and insular. Prominent musicologists like McClary (1989, 62) helped set the stage for this critique with their own examinations of the modernist 'rhetoric of survival' among academic composers in the 1980s.²⁰⁹ The academic avant-garde had become this way, they suggested, primarily by holding on to nineteenth century notions of aesthetic superiority, and cutting itself off from political and social concerns. These critics saw academic computer music and its disciplines as being starved of social or political content. 'The music produced under those hothouse conditions has been heard by few and has had next to no social impact,' wrote McClary. 'By retreating from the public ear,' she went on, 'Avant-garde music has in some important sense silenced itself.' (1989, 64-66) Neither musicologists nor electroacoustic critics ever suggested that the solution was to remove composers from the classroom altogether. Instead they called upon the academic music discipline to open its doors to the marginalised musics that it had previously posed as threatening or inferior.

²⁰⁹ See also Subotnik 1991, 265-293.

Electroacousticians like the ones I encountered at Concordia, McGill and Université de Montréal can no longer be described as unconcerned with or retreating from their social and political 'contexts'. In part this may be a result of increased competition from disciplines less invested in the classical canon, such as digital art with its historical precursors drawn variously from the traditions of music, visual arts and engineering. Have these incorporations and investments solved the problem of insularity? Perhaps partially. As the aspirations of musicians like Babin indicate—not to mention several other improvisers and sound artists I met during fieldwork who have now moved into the academic sphere—the practice of electroacoustic music and sound art, in Montreal's universities at least, is being pluralised aesthetically. It bears noting, however, that change in the class, gender and racial make-up of the Montreal electroacoustic and sound art scene has been relatively slower to change. In my thesis I have presented a viewpoint which includes several compelling contributions by women, but the scene as a whole remains predominantly middle-class, white and male.²¹⁰ As some of my interlocutors suggested, women may be overrepresented precisely because concert programmers and curators recognise their rarity and wish to correct the obvious imbalance. As my conversations with Babin illustrate, despite organised attempts by institutions to diversify, academic artists and composers are still considered dominant in terms of authority and innovation. Although the academic scene in Montreal could be seen as having faced aesthetic challenges similar to those posed by New Musicologists in the 1980s and 1990s, then, the effort has not translated into a broader transformation of its social and political imagination, its positioning as a site of exclusion and prestige, or its dominance as an arbiter of musical taste and knowledge. Contrary to what postmodernist critics of contemporary music imagined, expanding the scene's aesthetic repertoire did not necessarily correct its social hierarchies and exclusions.

210 On intersections of race, masculinity and sexuality in musical avant-gardes compare Osmond-Smith and Attinello 2007; Piekut 2010. By contrast, Hisama (2001) challenges the notion that modernism was an essentially male, misogynist aesthetic.

6.4 Genre effects

Genre theory has undergone a resurgence in recent years, especially as it concerns the study of contemporary and late twentieth century music.²¹¹ Because avant-garde domains of musical production place a high degree of value on innovation and individuality, they present a particular challenge to common sense notions of genre (cf. Wilson 2004; Atton 2012; Malcolmson 2013). Musicians who see inspired invention and unimpeded material manipulation as the defining elements of their creative process may even completely disavow the kinds of convention that identification with a genre implies. Musicologists and ethnographers have begun to shape more flexible and multifaceted theories of genrefication to respond to these complexities. Born, for example, builds upon and moves beyond Bourdieu's class-derived account of genre hierarchy to argue for 'a positive account of aesthetic formations, attentive to their productivity and genealogical longevity as well as to artists' role in reproducing or transforming them.' She also insists on attention to the ways genres are transformed in relation to 'other social, political and economic dynamics.' (Born 2010b, 188) Other recent theorists, building upon Born's work, have turned to ANT as a way of thinking about the production of genres. These scholars, whose work I will examine further in a moment, highlight flexibility and rhetorical invention over long-term codification. Here, I want to explore an alternative to ANT that synthesises both sides of Born's genre theory, adhering to the principles of productivity, agency and dynamism while also accounting for the effects of the technological and institutional mediations that I observed ethnographically. I also want to suggest how this synthesis might expand the understandings of genre embedded in the discourses of Montreal's academic institutions, festivals and funding bodies.

Conceptualisations of genre have varied across music's sub-disciplines both in approach and in frequency. Studies of popular music, for example, typically emphasise the way genres work to encapsulate social hierarchy and normalize creativity (Fabbri 1982). Seen from the field's predominantly sociological perspective, the rules, restraints and distinctions negotiated by musicians, intermediaries and audiences exist as ways of

211 See among others Born 2010a; 2010b; Piekut 2011; Drott 2011; Drott 2013; Novak 2013.

assembling listening publics into more or less stable 'genre cultures' or 'taste communities' (see Frith 1996; Negus 1999). The simple homological relationship this approach seems to imply between social and aesthetic entities can be complicated by emphasising the experiential aspects of the ways genres are organised and used in everyday life. Ruth Finnegan ([1989] 2007), for example, charts the formation of habitual 'pathways' by musicians and listeners navigating a local scene made up of contrasting musical 'worlds' that may or may not map to genre, class, generation or gender. Simon Frith (1996) suggests a similarly porous and experiential notion of interlocking genre worlds when he writes of the different ways we might think of listeners as working together to live '*in a genre*'. '[T]he genre labeling process is better understood as something collusive than as something invented individually,' Frith writes, 'As the result of a loose *agreement* among musicians, fans, writers and disc jockeys.' (1996, 88-89 [original emphasis]) As much as these approaches complicate the ways listeners and producers access or organise genres, they leave us with a notion of genre as a kind of normative socio-aesthetic contract about music, connecting a certain set of sound conventions with a certain set of people, however dynamically or continually.

Borrowing selectively from Frith, we might say that the normative understanding of genre is concerned with 'musicological' and 'sociological' conventions—that is, conventions regarding the organisation of both musical sound and the people who make or use it. From the musicological perspective, genre has traditionally been seen as one level in a telescoping understanding of style, with personal style at the lowest level, generic and geographical somewhere in the middle, and perhaps the epochal at the top. The classic musicological tradition of 'style history' identified with figures like Adler (1934) and Rosen (1998) exemplifies this approach. Perhaps its most systematic expression is that of Meyer (1989), who argues that an historical succession of stylistic 'schemata' has operated to limit the set of creative articulations that would be intelligible for a given period and place, and thus can be analysed so as to understand why certain strategies for negotiating constraints worked for certain musicians at certain times.²¹² Alternating periods of change and

²¹² Although Meyer does not draw the connection himself, his notion of changing historical and cultural stylistic 'schemata' recalls the Jauss' (1982) account of the 'horizons of expectation' that make music

stagnation, according to this approach, boil down to the effects of successive acts of deviation that occur when generic codes are enlisted as vehicles of personal expression or extramusical interest.²¹³ From the sociological perspective, the normative function of genre can be seen as an instrument either for the division of labour or for class struggle. Becker (1982: 48), for example, argues that genres help the members of 'art worlds' distinguish between the different kinds of access and achievement that characterise their systems of social ties. Bourdieu (1993) argues that the division of artworks into genres expresses structural dissensus between class dispositions. For Bourdieu, self-interested individuals and institutions act out genrefications so as reproduce a state of competition over a limited supply of convertible cultural and economic capital. Again from these sociological perspectives, deviations are said to both prove the norm and drive forward the process of transformation.

The innovations, transgressions and re-articulations that seem to proliferate in musics with strong generic conventions have been given so much attention in part because they inhabit a zone of productive exception that explains the existence of dynamism. Jason Toynbee (2000) uses what he sees as the tension between basic forces of 'reason' and 'desire' to explain the way that accumulated deviations led to the transformation of House into Jungle in the UK rave scene. David Brackett (2005) points to the ways this kind of tension has also been mobilised to articulate marginal identities in Black popular music through the production of 'crossover' covers. Fabian Holt's (2007, 59-60) theory of generic change characterises the way that 'shared conventions' are challenged as an 'interconnected process' of 'disruption', 'outreach', and 'resistance'. Exploring the practices of British free improvisation, Christopher Atton (2012) has put forward the suggestion that the act of stylistic 'disruption' can become a norm in itself through the construction of territorial regularities. His argument recalls Line Grenier's (1990) description of how transgressions not conceived as such during the act of performance or composition are produced after the

intelligible to listeners.

213 See Meyer (1989). Coincidentally, Meyer argued elsewhere that late twentieth century 'radical pluralism' could be analysed as a radical openness to the coexistence of divergent styles in a kind of 'fluctuating stasis' (Meyer 1967; cf. Taruskin 2009, 46). Born has argued that Meyer's account falls short of explaining the 'different self-reflective cultural, psychological, and affective properties' that motivate these stylistic pluralities. Cf. Born and Hesmondhalgh 2000, 39.

fact by the enforcement of 'representative diversity' in Canadian broadcasting regulations. I will return to Grenier's example in a moment because I believe it illustrates an important point about how Canadian cultural policy still engenders unintentional divergences by intervening in the genrefication process. For the moment, however, I want to turn to a complication arising from the notion that genre can be reduced to such dialectical spirals of 'repetition and difference' (Neale 1980).

If these cycles intensify, and difference appears to win out over repetition, as electroacoustic theorists like those I described in chapter two have suggested may be the case with electroacoustic music and sound art, does this indicate that genrefication is no longer a relevant analytical concept? Eric Drott (2013) suggests that the historical musicologists who have made such a generalization have gone too far.

'[W]hat Dahlhaus and others mistook for the “deterioration of genre” was in fact the deterioration of a certain conception of genre, the deterioration of a specific, historically contingent way of ordering the universe of musical texts. What changed was not the impulse to group such texts together, or the tendency to interpret them against the backdrop of this broader grouping, but the criteria used to perform such acts.' (Drott 2013, 6)

Drott takes up the principle of genre's 'inevitability' from Toynbee and other scholars of popular music, arguing that those who see genrefication as opposed by increasing pluralism have failed to recognise that the criteria by which genre distinctions are made are themselves historically contingent. Faced with the task of analysing the styles of genrefication typical of late twentieth century Western Art Music, Drott argues for a 'more flexible, pragmatic understanding of the concept' that links together 'a variety of material, institutional, social, and symbolic resources' (2013, 9). Drott's crucial move, then, is to favour the pragmatic agency of the producers of genred texts above the abstract agency of the genre as code. 'As an ensemble of correlations,' he goes on, 'a genre is not so much a *group* as a *grouping*, the gerund ending calling attention to the fact that it is something that must be continually produced and reproduced. Genres, in other words,

result from acts of assemblage, acts performed by specific agents in specific social and institutional settings.' (Drott 2013, 9 [original emphasis]) One thing this means for Drott is that the 'conventions' we perceive as constituting genres are partly perspectival, and may vary in importance at different places and times. Stability is thus similarly pragmatic and performative, depending on the 'appearance' of substance that is produced through acts of 'recursive inscription' (Drott 2013, 12). Instability of interpretation, on the other hand, results from contestation over what Kevin Korsyn (1999) has referred to as the 'privileged contexts' which frame the ways works are defined and heard. Drawing upon the analytical toolkit of ANT, according to Drott, allows us to see genres as built through the very kinds of enactment which normative accounts consider to be deviations. In the analysis of Gérard Grisey's *Les espaces acoustiques* which his argument frames, he points to the mobilisation of generic associations as contextualising resources. From this perspective, genres give composers the tools to inscribe in the text 'the numerous groupings that pieces of music afford' (Drott 2013, 39).

If we zoom out to a broader perspective, however, there appears to be little novelty in the 'pragmatism' Drott attributes to ANT. He himself acknowledges that his call for a turn to plurality owes a strong debt to poststructuralism, echoing its 'fissured' and 'heterogeneous' approach to the negotiation of 'codes and competences' (Drott 2013, 40-41). Ethnomusicologists working from the perspective of American linguistic anthropology have long highlighted the use of genre as mutable expressive resource in its own right. In this tradition, genre functions as a means with which to creatively bind the intertextual connections that situate musical utterances socially, historically and semantically (Feld and Fox 1994; Bauman 2000, 84-87; cf. Bakhtin 1986). Louise Meintjes (2003) highlights the importance of this process in performances of professional and cultural prestige as well. If on one hand, genre for Meintjes indexes notions of identity by coming to embody 'our music', it is also 'intimately tied to the self-making rhetoric that elaborates artistic reputations' (Meintjes 2003, 19-36). Scholars in other traditions have also developed more pragmatic accounts of the workings of genre. Musicologist Jeffrey Kallberg (1988), for example, has argued for a Wittgensteinian perspective that highlights the way 'family

resemblances' between particular utterances can articulate differently genred statements within the same work. He highlights the ways that such combinations could be deployed by 19th century piano composers to mediate a variety of gendered, musical and ideological associations (cf. Kallberg 1998). Charles Kronengold (2008) also stretches the normative notion of genre, examining differences in the ways that genres like disco, new wave and album-oriented rock (AOR) shared and exchanged an overlapping set of conventions. 'Genres', Kronengold writes, 'are in works as much as works are in genres.' (2008, 43) He uses Mauss's account of gift exchange as a metaphor for the mixing of conventions across a group of genres differentiated from each other in terms of function, politics, or format.

From a poststructuralist viewpoint, then, the flexible and rhetorically productive manner in which conventions are mobilised by musicians both confirms and complicates the normative account. These authors agree with Drott in attending to the particular situations in which generic mobilisations occur. Recalling Jacques Derrida's (1980) play upon the homonymy in French of the concepts of 'genre' and 'gender', they point to the importance of considering how and why the 'laws' of genre are enacted to make social and aesthetic categories. Taking this rhetorical move somewhat literally, the poststructuralist account of the pragmatics of genre can be considered 'performative' in the sense that Judith Butler (1990) uses to describe the range of gendered expressions that fall outside the biological understand of sex. Thus Marcia Citron's (1993, 125) study of the gendered nature of canonisation, for example, shows that the marking of musical genre can be just as powerful for what and whom it excludes and delegitimises as for what and whom it enshrines.

What complicates the apparently stark contrast between the normative and pragmatic accounts of genre further is the fact that the systems of allusion and social hierarchy that genre indexes are both synchronically heterogeneous, and subject to historical change. Drott sees this as a paradox in Dahlhaus's account of genre's decline. According to Drott, Dahlhaus presumed that a certain way of identifying genre was the only way of doing so. '[It] would appear that Dahlhaus carved out from the universe of musical texts a group of pieces defined by their adherence to the requirements of his thesis,

by their self-conscious repudiation of traditional genre markers.' (Drott 2013, 6) Elsewhere, in his *Foundations of Music History* (1983), however, Dahlhaus does discuss the existence of change and plurality in the way genre complexes are formed and recognised.

'Clearly there is no little arbitrariness to historian's decisions as to which congeries of features are sufficient to establish the historical continuity of a genre or, conversely, which change are so far-reaching as to signify the emergence of a new genre despite the fact that some earlier characteristics have been retained. Yet in principle it is quite possible to establish by empirical methods (rather than by normative or dogmatic decree) for a given age just how much importance to attach to continuity or discontinuity in text and function, style and technique, and terminology when deciding whether a genre has survived or died out.' (Dahlhaus 1983, 46-47)

According to Citron, Dahlhaus's mistake in positing a general decline in genrefication was not so much an inflexible and anachronistic notion of genre itself, as a 'narrow view of functionality' (1993, 126). The solution she proposes is to broaden our understanding of music's mediating role in social and political affairs. The 'relative weight' of the critical criteria for musical value shifts among a wide variety of factors, including intention, style, performance practice, genre and class. As much as new expressions and transgressions appear to proliferate at any given time, then, the classifications of the past can still be valid and intelligible. Their significations merely change in response to new historical perspectives. In her work on British television production, Born (2005b) suggests a similar kind of active reassessment at work in the genred practices of BBC staff. She shows how the 'situated ethics and aesthetics' of each genre underwent 'reflection and renewal' as producers worked to 'forge knowing links between generic pasts and imagined generic futures.' (Born 2005b, 84-85) Anne Shreffler's (2003) examination of Dahlhaus's historiography in the context of a divided postwar Berlin corroborates these diagnoses by showing how his interpretation of genre was situated as well. 'The dualism enforced by the two political systems and physically inscribed on the city by the Wall extended implicitly to intellectual systems as well', she writes (Shreffler 2003, 501). Working against rivals on

the Soviet side of the city motivated a vehement interest in constructing unified narratives of historical rise and decline which opposed the Marxist conception of music as a human activity invested with ideological power. Dahlhaus's post hoc invention of a process of musical modernisation guided by the principle of 'autonomy' from social and political interests represented a strong and perhaps overstated attempt to shore up the boundaries of *Geisteswissenschaft* against attacks from the perspective of East German *Gesellschaftswissenschaft* (cf. Pederson 2009).

Dahlhaus's biased portrayal of social mediation aside, his emphasis on perspective and interpretation can help us to understand the kinds of plurality and dynamism Drott wants to negotiate in bringing ANT to the work of the spectralists. Dahlhaus's emphasis is on the reflexive side of the ways we identify our historical subjects, and the 'literary dimension' of the ways we depict them. 'The past is changeable', he writes. 'It is always the past relative to a particular present, and hence is prey to the open-endedness of the future.' (Dahlhaus 1983, 47-48) From the 'modern' historiographical perspective that Dahlhaus occupies, there are plural subjects of history, crossed by several conflicting teleologies. The challenge for the modern observer is to understand how the apparent shapes and significations of these subjects are conditioned by changing contexts, textual conventions and interpretive frameworks.²¹⁴ As Drott's (2013, 6-7) criticism implicitly demonstrates, the example of a 'decline' in the connection between 'a formal model' and 'a type of scoring', which Dahlhaus read as the end of genre as a whole, turned out to be a transition to a quite different way of valuing and associating musical works. Similar shifts are to be found all over the literature on music history. Suzanne Cusick (1993), for example, has shown how the gendering of Western notions of innovation and tradition has shifted from the seventeenth to the twentieth century. Recent studies such as those of Erlmann (2010), Steege (2012) and Devine (2013) show how the physical effects of musical sound on the human auditory system are also subject to critical and scientific reinterpretation over time, and thus far from providing an absolute basis for determining the value of particular kinds of music.²¹⁵ By emphasising local acts of inscription over these longer institutional and

214 For a similar perspective on modern historiography see also White 1966.

215 On changing regimes of musical naturalism considered in a broader context see also Clark and Rehding,

historical arcs, ANT offers only a very narrow lens through which to look at the variety of ways that the meanings of genres are made historical, malleable and relational. It does not give us a broader perspective on the ways these meanings are institutionalised, or the ways that the range of malleability is negotiated.

My intention in pausing over these debates at such length has thus been to argue that a swing from the normative to the rhetorical does not necessarily result in a reliable remedy to the problems generated by the interaction of digitalisation and genrefication. More than simply recognising that new genre norms can be enacted by musicians as a kind of *détournement*, an adequate account of digitalisation's complex aesthetic articulations requires a more complex account of genre as such. The historical meanings and material ramifications of the digital depend upon a complex combination of semiotic operations and performances of belonging. The genred technological and institutional effects I enumerated earlier in this chapter, for example, occur as a result of the intersection of digital expression with other domains of mediation and organisation. Each of these intersections can have more than one level of influence on musical imagination and production. Technological materiality is wrapped up in the pragmatics of genre because it touches upon the ways musicians conceive and execute their work. It also touches the normative aspect of genrefication by mediating access and association between the types of music listeners consume. Institutions and governing bodies, although internally diverse, help to sustain nationalist and modernist ideals of cultural sovereignty and freedom which operate as large-scale social norms, but also play an intimate role in musical self-selection and self-conception by setting up pathways towards success and recognition.

In short, where other theorists have opted to weigh on the technological side of technoaesthetic transformations—using terms such as 'phonograph effect' (Katz 2010, 2), for instance—I have sought to hold together the technological and the aesthetic within a broader account of 'genre effects'. I argue that it is not sufficient to explain the transformation of genrefication as an effect of digital mediation as such because, as I have emphasised in my thesis as a whole, it is not possible to separate the agency or identity of

eds. 2006.

music technologies from the historically- and culturally-situated process of critical negotiation by individuals and institutions. The domains of cultural production and media technology are among the most ideologically loaded and thus the most regulated, both in Montreal and elsewhere (cf. Taylor 1993; Barry 2001). The interaction between technological change and musical genre is circular, and moreover tightly interwoven with structures of governance and negotiation in other domains. How musical systems and practices change is an effect of the complex interrelation between these systems, their material and institutional manifestations, and the interests of those who use them.

6.5 Postscript

Before returning to the ongoing negotiations of my interlocutors, I want to take a moment now to look beyond Montreal to the broader Canadian context. The contorted adaptation of the electroacoustic music and sound art scenes to digitalisation is not the first, nor even the most peculiar of the over-codings of genre and identity that have emerged in the history of Canadian cultural policy. Simon Frith has been the most prominent figure to comment on the thorny issue of how Canadian legislators have often gone about inventing generic borders by simply mapping them. Drawing on earlier work by Jody Berland and Line Grenier, Frith highlights idiosyncratic application of genre-specific restrictions placed on radio broadcasting licenses during the 1980s. On one hand, policy makers sought to apply a principle of 'balance' to ensure that broadcasters provided services that satisfied what they saw as the population's 'right' to a diversity of cultural interests.²¹⁶ On the other, policy makers saw it as their duty to make all broadcasters subject to a content law that defined quotas for programming certain percentages of 'Canadian' music according to an official measurement that quantified the participation of demonstrably Canadian people in its production (Frith 1996, 79-80; cf. Berland 1988). A number of *imbalances* arose from the tensions in this contradictory effort. First, it became clear that certain genres had smaller pools of Canadian product to draw upon. Thus, content restrictions designed to protect Canadians' right to define themselves culturally had

216 On the investment of Canadian musicians and institutions in notions of diversity see also Keillor 2006.

to be applied unevenly so as to adequately serve Canadians' right to choose among a range of cultural products which represented their interests.

Line Grenier (1990) identifies a further problem thrown up by this approach. The fact that certain types of Canadian songs—in particular francophone MOR ('Middle of the Road') ballads—could work in several of the officially defined genre niches in certain parts of the country led to them being played more often than others. Artists complained of overexposure and further rules had to be introduced to restrict the number of plays a song could have in a day. An arcane set of restrictions that regulators had invented in order to protect an imagined range of cultural differences wound up engendering new meanings for the categories they sought to regulate, and new strategies to subvert them. For Grenier, the paradoxical situation of Canadian radio illustrates a defining feature of musical mediation in general. 'Music is neither a message that follows a linear path through production and consumption nor a material which is simply “processed” by technological and economic factors', she writes. 'It is rather the result of a constant process of iteration between various actors who through their respective practices, construct musics as socially and culturally meaningful realities.' (Grenier 1990, 231)

This musicological anecdote speaks to larger questions of identity and belonging. Canada has often aspired to be a nation state in the classic European sense, but as Charles Taylor (1993) and others have suggested, its best hope is probably to portray itself as a kind of 'post-nation' (cf. Heller 2011). It was designed primarily as an administrative jurisdiction to protect British colonial commerce from encroaching upheavals in the south, and has sustained its small, predominantly settler-descended urban population mostly by expanding the exploitation and extraction of natural resources to the north and at sea (cf. Innis 1956; Jacobs 1981). Culturally as well as politically, the main identity building resource among its anglophone population derives from a continued drive to differentiate itself from the United States. As Grenier's observations seem to indicate, however, the use of concepts like 'representative diversity' to distinguish the Canadianness of cultural policy works alongside a broader rhetoric of cosmopolitan fragmentation (via classic tropes like the 'cultural mosaic' and the 'two solitudes') to mask a certain hypocrisy (cf. Berland 2000).

Canadian diversity has alternately been articulated as a subset of American and British identity throughout its history on the basis of considerable overlap in, among other things, language and media. Although the situation is somewhat more complicated in Quebec, very similar principles are in play. Constructions of plurality and ineffability in Canadian and Quebecois identity serve as bulwarks against what are perceived as ongoing threats from more powerful neighbours, but also as marks of authenticity to distinguish local production at a transnational level. The power of this kind of ideological protectionism only intensified in the wake of the North American free trade agreements of the 1990s, which made it effectively illegal to shore up industries economically (Grenier 1996; Martin 1996).

Plurality enforced by policy can become a double-sided sword, generating both exclusions and inventions when refracted through an unforeseen set of epistemological, social and technological transformations. It is difficult to conceive of a viable or desirable way to change policy so that institutional genre conventions could respond to such contingencies. Furthermore, as the criteria of genrefication can change over time, there is no reason to assume that the basic principles of differentiation which emerged under one set of historical and cultural circumstances can be applied to another without friction and opposition. It may even be that genre theories as such are conditioned by the affordances of the media and markets they apply to. Canonical discussions of genrefication in popular music such as those of Frith (1996) and Negus (1999) theorise the concept on the basis of participation in a market for sound recordings which dealt in physical objects, practices and ideologies many of which are now long past. Twentieth century genre culture formed around a similar kind of commodity fetishism to that which Walter Benjamin urged us to witness in the practices of the book collector. The 'personal owner' gave meaning to the collection by feeling a sense of responsibility towards her possessions and by wanting to preserve their meaning (Benjamin [1968] 2011b). As recent commentators like Sterne (2012) and Kassabian (2013) have pointed out, however, it no longer makes a great deal of sense to consider the MP3 or streaming audio listener in terms that highlight the same kind of fetishized collection and connoisseurship. If the perspective of the MP3 listener doesn't

so much collect to remember as re-aggregate and re-associate repeatedly, why shouldn't the paradigm of genre associated with an era of MP3 listening be similarly soluble and reconfigurable? In the long run, then, is the understanding of genre as stylistic constraint better suited a market that dealt in radically different kinds of commodities?²¹⁷ As an alternative, I have suggested that, in the case of electroacoustic music and sound art, genred norms and practices can be thought of as effects of particular acts of assembly and negotiation. They both enlist and exceed the agencies of the individuals, institutions and technologies that seem to produce them.

It goes without saying that other research would be required to deal with such questions at a more general level. There would be little point in isolating the issue from the material and institutional forces listeners and producers mobilise to ensure continuity in the ways they organise and associate music and musical practice. Ubiquitous digitalisation might be new, but it will always be woven into an ongoing debate about what aspects of mediation matter and why. In this thesis, I have limited myself to such a debate among producers rather than consumers per se. My aim has not been to give an exhaustive account of their lives or work, but to add complicating detail to their narratives and rationalisations, point to continuities, contrasts and contradictions between their practices, and take up their inventions as correctives to the theoretical presumptions of my own field.

I have depicted the struggle between the electroacoustic tradition and its epigones as a debate over the manifestations and meanings of the technological democratisation and aesthetic pluralisation wrought by the digital. At the same time I have demonstrated that, although this is a mythological rupture which smooths over many of the specificities of technological systems, beliefs and practices, it has taken on a life of its own, both as a persistent element of electroacoustic and sound art ideology, and by being mobilised by policy makers and intermediaries in the regulation and promotion of electroacoustic and sound art practices. If these practices have risen in public prominence, it is in part because the electroacoustic narrative of democratisation has been extended to the point where electroacoustic practices are now understood as effective ways of liberalising music

²¹⁷ Compare the Marxist perspective on aesthetic change as a technical phenomenon in Manuel 2002.

education in general. At least in Montreal, however, the ideas of democratisation and diversification have in many ways not opened up the field so much as sustained a limited space of autonomous competition between already empowered cultural producers. The entrenchment of these conflicts shouldn't obscure the fact that there has been real aesthetic change or diversity in these scenes. Nor should it suggest that change and plurality in technological practices are not positive things, as many scholars have argued they are (e.g. Sterne 2012: 244). It merely complicates the notion that aesthetic diversification must be related in any consistent way with positive changes in social structure. It may be that the oft-cited struggle between modernist and postmodernist camps in Western Art Music was in some cases an expression of cyclical or dialectical patterns of generational change rather than a historical decline of the former. Indeed, as I have shown in many instances among my interlocutors, the act of positioning oneself against the actors in power is in many cases a stage in the process of identification and incorporation, and not a major challenge to the prevailing aesthetic at all.

At any rate, there are doubtless still questions to be asked that would add detail to our knowledge of how musicians negotiate the aesthetics of digital mediation. Certain gaps will need to be filled if scholars of electroacoustic music and sound art are going to begin to pose them. For one thing, more historical research is needed to enrich our understanding of how and why these particular epistemologies and pedagogies have become so central in the pressure on art music institutions to liberalise, and to suggest what the implications might be on broader understandings of musical discipline and aesthetics as the process moves forward. I have allocated some energy to historical descriptions—in Chapters one and three in particular—because I wanted to attend the work of multiple generations of musicians over time. The problem may be acute in Montreal, but it also exists in other places. For another thing, addressing these traditions requires musicologists and ethnomusicologists to obtain a higher degree of technical literacy than is currently the norm. Commentators both inside and outside electroacoustic music have been calling for this for a long time (cf. Emmerson 1986), and as new approaches to musical scoring, instrumentation and storage continue to develop it will become increasingly pertinent. Both

of these gaps also point to the need for an increased attention to the music of the late twentieth century, beyond the work of generalists (cf. Taruskin 2009a). As they fade from present memory, it will become crucial to investigate the institutional debates and upheavals that came during and after the 1980s from a historical perspective. The new controversies opened up may strike us as uncomfortably close to current beliefs and practices, but that makes them even more important to reopen and re-evaluate as our perspectives change.

I want to reaffirm the importance of historical perspective in closing. From my present position, with fieldwork almost two years behind me, new developments have started accumulate that either confirm or slightly reframe the material I gathered in notes and recordings during fieldwork. I see this not as a flaw but as a confirmation of the importance of ethnography as a way of bringing critical attention to phenomena which are inherently historically-situated. In some cases, these new developments point to the consolidation and stabilisation of the movements I've dealt with here. In others, they point to the degree to which survival as a cultural producer in this domain necessitates constant renegotiation and reinvention.

At Concordia's music department, efforts to bring electroacoustic teaching in line with digital arts research at Hexagram have begun to stabilise. The 'live electroacoustics' course that housed the department's laptop orchestra has been renamed 'live digital practices', and its instructor has been promoted to a tenure-track position. Its networked performances have increased in frequency and decreased in technical complexity as infrastructures improve (cf. Tsabary 2014). Hexagram itself will soon be up for a third round of funding, and rumours have begun to circulate about how the consortium might play to the strengths of its now 14 year history in its next bid. McGill's role in the Canada-wide improvisation research network ICASP has been strongly affirmed with the help of a \$2.5 million SSHRC partnership grant to establish a new International Institute for the Critical Study of Improvisation with offices in Montreal. The move promises to place improvised practices at the centre of ongoing music research at McGill in the long term.

The second edition of ACREQ's BIAN, which took place in the spring of 2014, struck similar notes of convergence. Mounted under the theme *physicalité*, the festival invoked a growing allegiance with the turn to hacking, physical computing and 'embodied' approaches to the digital arts, both locally and transnationally. Several of my interlocutors who worked only on the fringes of the first edition of BIAN—Erin Sexton and Alain Lefebvre for example—were now featured. This year ACREQ also sought to throw off its high-brow mantle by partnering with the EDM-oriented MUTEK to launch a shared celebration of their fifteenth anniversary entitled 'EM15' (Lévesque 2014). While the partnership was advertised as an expression of mutual affirmation, however, it may also have belied a pressure to regroup in the face of decreases in funding that occurred under a Parti Québécois minority government elected on the heels of the 2012 student strikes. This has certainly been the case with smaller organisations like Eastern Bloc and Perte de Signal, pinpointed as two of a handful of exemplary new initiatives in the CALQ's digital art report in 2011, but since experiencing major cut-backs in operating budgets and space. Indeed, during the provincial election campaign in the spring of 2014, which led to the re-election of a majority Liberal government, future premier Philippe Couillard would not commit publicly to funding the previous government's digital culture strategies (Journet 2014). The mood of austerity has been confirmed, and promises to persist.

Among individual interlocutors the years following my fieldwork have proven to be promising in other ways. Since beginning her MA in experimental media at UQÀM, Magali Babin has focused her efforts on curatorial and community-based interdisciplinary projects in Montreal, where she continues to raise her family. Her successes have brought her momentarily out of the circle of improvising musicians in which I met her. Others have chosen to seek opportunities for professionalisation elsewhere. After finishing her PhD at Brown, Freida Abtan moved on to a lectureship in the Music department at Goldsmiths' College in London. She continues to focus her efforts on transforming the electroacoustic tradition from within. Darsha Hewitt spent a year of intensive residencies and exhibitions in Europe before securing a research position in media design at the Bauhaus University in Weimar, Germany. While her engagement with the music world during my fieldwork was

more selective and strategic, oriented more towards non-academic sites like Club Transmediale in Berlin than to the academic electroacoustic world, her acceptance of a university research position and her appointment to the jury of this year's NIME conference in London indicate that her work is now generating heightened interest in academic quarters as well. It also means, however, that she must adapt to new pressures. It remains to be seen what effect the continued movement of once marginal musicians into the academic field will have on its power structures and social conventions. On an aesthetic level, however, it suggests that new and unexpected twists in the negotiation of the digital will never be far ahead.

Appendix 1: List of key consultants

Name	Role
Abtan, Freida	Lecturer, Music, Goldsmiths' College University of London (2013-present); Sessional Instructor, Computation Arts, Concordia University (2008-2013); Student, Electroacoustic Composition, Université de Montréal (2006-2008); Student, Electroacoustic Composition, Concordia University (2002-2006)
Austin, Kevin	Professor, Electroacoustic Studies, Concordia University (1970-present); technician, McGill University (1966-1972)
Babin, Magali	Freelance Musician and Sound Artist, (1988-present); Student, Université du Québec à Montréal (2013-present);
Bachand, Nathalie	Development Coordinator, Elektra Festival/BIAN (2007-present)
Coulombe, Patrice	Workshop Instructor, Studio XX (2006-present); Sessional Instructor, Communication Studies, Université du Québec à Montréal (2006-present); Student, Electroacoustic Composition, Université de Montréal (1993-1997)
Denis, Jean-François	Director, empreintes DIGITALes, (1989-present); Student and later Instructor, Electroacoustic Studies, Concordia University (1981-1989)
Ellbogen, Eliane	Artistic Director, Eastern Bloc (2007-present)
Hargreaves, Blake	Founder and director, Fluorescent Friends (2003-present); Member, Dreamcatcher (2003-present)
Hewitt, Darsha	Research Assistant, Bauhaus University Weimar (2014-present); Member, Perte de Signal (2012-present); Student, Fine Arts, Concordia University (2007-2013)

Izagirre, Aitor	Visiting Doctoral Student, ICASP, McGill University (2011)
Kline, Katherine	Doctoral Student, Communication Studies, Concordia University (2013-present); Member, Dreamcatcher (2003-present)
Lefebvre, Alain	Freelance Musician (2009-present); Student, Fine Arts, Concordia University (2001-2009)
Madan, Emmanuel	Member, [The USER] (1998-present); student, Université de Montréal (1993-1997)
Piché, Jean	Professor, Electroacoustic Composition and Digital Musics, Université de Montréal (1988-present); Director, New Music America Festival (1990); Music Program Officer, Canada Council 1983-1988); Student, Université Laval (1974-1978)
Sexton, Erin	Member, Perte de Signal (2012-present); Student, Intermedia and Cyberarts, Concordia University (2005-2009)
St-Onge, Alexandre	Freelance Musician (1995-present); Doctoral Student, Université du Québec à Montréal (2009-2013)
Thibault, Alain	Artistic Director, Association pour la Création et la Recherche Électroacoustique du Québec (1993-present); Student and later Instructor, Electroacoustic Composition, Université de Montréal (1980-1993); Student, Université Laval (1974-1978)
Tsabary, Eldad	Assistant Professor, Electroacoustic Studies, Concordia University (2005-present)
Wilson, Alexander	Doctoral Student, Université du Québec à Montréal (2009-2014); Sessional Instructor, Intermedia and Cyberarts, Concordia University (2011-2013)

Appendix 2: List of conversations and interviews

Principal fieldwork was conducted in Montreal between 1 May 2011 and 31 August 2012. The following is a list of recorded interviews and group conversations that took place in addition to regular concert, classroom, and rehearsal observations.

	Names	Location	Date
1	Eldad Tsabary	Concordia University	04 May 2011
2	Ricardo Dal Farra	Private	24 May 2011
3	Darsha Hewitt	Private	11 June 2011
4	Patti Schmidt	Private	28 June 2011
5	Lewis Braden	Private	08 July 2011
6	Sarah Choukah	Private	10 July 2011
7	Amber Berson, Eliane Ellbogen	Eastern Bloc	27 July 2011
8	Lisa Gamble	Private	11 August 2011
9	Katherine Kline	Private	12 August 2011
10	Freida Abtan	Casa del Popolo	22 August 2011
11	Ricardo Dal Farra	Concordia University	23 August 2011
12	Lewis Braden	Private	30 August 2011
13	Brad Lynham	Private	01 September 2011
14	Stephanie Loveless	Video call	09 September 2011
15	Alain Lefebvre	Private	09 September 2011
16	Christine Beckett	Concordia University	09 September 2011
17	Kevin Austin	Concordia University	14 September 2011
18	Dan Hadley	Death of Vinyl	18 September 2011
19	Ricardo Dal Farra	Concordia University	03 October 2011
20	Eldad Tsabary	Concordia University	06 October 2011

21	Sebastian Cowan	Private	16 October 2011
22	Alain Lefebvre, Aitor Izagirre	Private	25 October 2011
23	Kevin Austin	Concordia University	26 October 2011
24	Anonymous Student	Concordia University	23 November 2011
25	Anonymous Students	Concordia University	25 November 2011
26	Anonymous Students	Concordia University	25 November 2011
27	Rosemary Mountain	Concordia University	28 November 2011
28	Jeff Wayne	Private	29 November 2011
29	Anonymous Workshop Participants	Concordia University	30 November 2011
30	Mike Pinsonneault	Concordia University	13 December 2011
31	Mark Corwin	Concordia University	15 December 2011
32	Lynn Hughes	Concordia University	15 December 2011
33	Kevin Austin	Concordia University	16 December 2011
34	Mike Pinsonneault	Concordia University	20 December 2011
35	Alcides Lanza	McGill University	06 January 2012
36	Jean-François Denis	empreintes DIGITALEs	12 January 2012
37	Patrice Coulombe	Private	09 February 2012
38	Robert Normandeau	Université de Montréal	16 February 2012
39	Max Stein, Jen Reimer	Private	02 March 2012
40	Eldad Tsabary	Concordia University	15 March 2012
41	Anonymous Workshop Participants	Studio XX	17 March 2012
42	Sean Ferguson	McGill University	19 March 2012
43	Anonymous	Studio XX	21 March 2012
44	Blake Hargreaves	La Brique	23 March 2012
45	Richard Mackenzie	McGill University	28 March 2012
46	Alain Thibault	ACREQ	29 March 2012
47	Kathy Kennedy	Private	16 April 2012
48	Magali Babin	Private	19 April 2012

49	Jean Piché	Université de Montréal	16 May 2012
50	Nathalie Bachand	Private	28 May 2012
51	Marcelle Deschênes	Private	05 June 2012
52	Emmanuel Madan	[The USER] Studio	28 June 2012
53	Jeff Morton	Private	29 June 2012
54	Marcelle Deschênes	Private	06 July 2012
55	Alexander Wilson, Alexandre St-Onge	Private	18 August 2012
56	Robin Dupuis	Perte de Signal	29 August 2012

Videography

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