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OK Computer: Mobility, Software and the Laptop Musician

Nick Prior

'I became obsessed with my laptop and my laptop speakers: I was trying to make a bubble you could exist in, a paradise' (Björk, Wired, May 2002).

INTRODUCTION

In a dark and cavernous gig venue in Edinburgh, a large table hosts a tangled swathe of cables, boxes and screens. Around the table sit eight young men equipped with laptops.ⁱ They have followed up a public invitation, advertised in the local listings magazine, to come and participate in an event hosted by an organisation from Brighton called 'Laptop Jams'. The only recommendations are that participants get to the venue early to guarantee a spot around the table and that they leave their full-sized keyboards at home: 'Richard Clayderman was bad enough the first time round' insists the website.ⁱⁱ Instead, the laptopists use an array of software to manage, cut, splice, generate and mix tones in real time. Some tweak and twiddle boxes known as MIDI controllers or trigger samples with rubber pads, whilst others sketch images on electronic palettes, projected onto nearby walls.ⁱⁱⁱ A small audience watches and listens as the laptop jam unfolds. Like any form of improvisation the results are unique and unpredictable: 'clash, then synthesis' as one description of a jam in Manhattan puts it (Jainchill, 2003). And whilst the audience members are patient they also look slightly perplexed for it is clear that they are searching for the tangible links between bodily movement and sound that characterise conventional forms of performance. But the visual hooks aren't there. Should one applaud, then, when the signs of creativity are so heavily mediated (Pinch and Bijsterveld, 2003)? Who is producing what? Are they really just checking their emails?

In this paper I'd like to address some images, categories and trajectories of the laptop in music production. I am interested in exploring the relationship between music and mobile

computerized space, in the way the laptop intervenes in the sites of music, in its environments and (un)foldings. Implicit in the paper is the claim that despite its increasing importance in various locales of music, from cyberspace to live venues, as well as in mobile infrastructures generally, the laptop is a neglected device. We need to account for its presence in urban networks and relationships, in everyday settings and virtual environments. Getting at some of the deeper issues revolving around the laptop's ambiguous status in music is one way of examining some possible ways into the complex entanglements and layerings of mobile space. It will also hint at how practices of music production in its widest sense are changing, giving rise to a set of anxieties about what is being left behind.

The laptop jam described represents one of a growing number of events staged across Japan, mainland Europe, the UK, and the US. Whilst still a minority interest, laptop jams demonstrate the increasing presence of the laptop in music production and performance. Making and playing music with laptops is becoming a regular feature of music fields, both at their 'restrained' and 'large-scale' poles to use Bourdieu's terminology (Bourdieu, 1993).^{iv} From the Kronos Quartet (who recently took to the stage with four laptops) to local rock guitarists, the laptop is moving inexorably into the spaces of music. In its most visible guise, the laptop takes centre stage. Indeed, the glowing Apple logo has itself accrued enough symbolic value in electronic music to signify a challenging set of glitchy soundscapes (Prior, forthcoming). Famously, with Madonna's live concerts, it is a cluster of computers, including Macintosh G5s, that co-ordinate the lights, video footage and pre-recorded audio sequences (Von Seggern, 2005). In less visible form, the laptop is the unsung mediator at the side of the stage, running the backing track or making a novelty appearance in one or two songs.

Outside of live environments, musicians are now composing straight onto their laptops, moving beyond its utilization as a quick sketchpad for ideas. At once a means for recording audio, generating drum patterns, hosting software synthesizers and mixing down to a single file, the laptop encapsulates technological convergence. Indeed, with the right software it replaces the function of a host of hardware devices, including multi-track portastudios, hardware synthesizers, mixing desks, samplers, channel strips, compressors,

guitar amplifiers, effects units and sound modules. Add to this the in-built digital connectivity of the laptop and the possibility of uploading songs to the Internet after production, as well as promoting, circulating and listening to them, and one has an all-in-one production unit that meshes composition with dissemination and consumption. This is what differentiates the laptop from other mobile music devices such as the four-track portastudio, Walkman or miniature keyboard. In effect, it is a meta-instrument, potentially containing all sounds (a feature it shares with the sampler) and production processes (a feature that transcends the sampler's capabilities). If conventional production chains are being bypassed by the digitalization of music and the rise of technologically-enabled independent musicians, the laptop turns the agent of circumvention into a moving target (Ryan and Hughes, 2004).

For all these reasons, the emergence of the laptop presents a unique opportunity to study the socio-technical becoming of a mobile material object. I'm going to start by identifying two inter-related features of the laptop in music – firstly, its portability and secondly, its associative coupling with particular forms of software. Whilst these features feed into broader tendencies in late-capitalist societies towards mobility and flexibility, in music they also translate as discomfiture over the amount of musical agency given to the laptop and its ambiguous status as a multi-purpose machine beyond music making. In these respects, the laptop is an instance of what the sociologist of music, Antoine Hennion, calls a mediating device that alerts us to the 'reciprocal, local, heterogeneous relations between art and public...constructing identities, bodies and subjectivities' (Hennion, 2003: 81). It is not merely an inert tool at the creative behest of the musician, but is itself implicit in the transformation of music, particularly regarding the unsettling and dismantling of expectations around practices of music production, creativity and performance. The third section pays attention to these transformations before concluding with an assessment of the laptop as an assemblage of human-non-human relations through which we can strategically make sense of changing expectations and practices in popular music.

THE DIFFERENCE IS...MOBILITY

The concept of mobility has become pivotal to understanding recent transformations towards complex, networked societies. Utilising insights from geography, sociology, architecture, cultural studies and related disciplines, scholars are forming an understanding of local and global processes in relation to the emergence of fast, dynamic informational flows consistent with the rise of 'flexible' or 'disorganized' capitalism (Lash and Urry, 1987). Here, information, money, commodities and people are conceived as flowing through myriad spaces, from fibre optic cables to local transport networks. Urry, for example, points to a heightened state of flow as central to structural and experiential changes in the nature of economic, political and social life:

Thus *people* travel along transportation scapes for work, education and holidays. *Objects* that are sent and received by companies and individuals move along postal and other freight systems. *Information, messages and images* flow along various cables and between satellites. *Messages* travel along microwave channels from one mobile phone to another (Urry, 2003: 5).

Equally, whilst Bauman (2000) characterises 'liquid' modern societies as the site of nomadic expeditions and identities, Castells (2000) argues that macro-processes of institutional change towards the diffusion of information are connected to the emergence of a new global system. In each case, a special role is reserved for the rise of new machines and technologies involved in the extension and constitution of networks and spaces. These include computer networks, satellites, faxes, jet planes, digital TVs, point-of-sale terminals, military technologies and audio-visual transmissions. Such machines, suggests Urry, 'generate new fluidities of astonishing speed and scale' (Urry, 2003: 56).

Very much a device that fits descriptions of contemporary society in these terms, the laptop is one of a number of nomadic machines of the digital age. Allied with prospects of unfettered International travel and promulgations of a flexible capitalism traversing the globe in networked circuits, the laptop is the image of the quick, mobile and efficient device. In a perspective of relationality, it is yet another node in a network of hubs, flows and networks, representing a new technological paradigm organized around powerful but flexible information technologies and information processing devices. From the perspective of

spatiality it is emblematic of socio-technical practices inherent in a new urban metabolism, practices at the interplay of physical mobility and mobile communications that themselves create and perpetuate 'urban spaces, technoscapes and encounters' (Sheller and Urry, 2006: 2).

The laptop's portability is its distinguishing feature. Designed to travel with the user, the laptop frees work from fixed working environments whilst inserting the user into mobile computer networks and dispersed spaces. For musicians, the popularity and portability of the laptop opens up a series of possibilities for music that sends it beyond spatial anchorages such as the recording studio or domestic space. Indeed, despite antecedents including magnetic tape recorders, early music computers, synthesizers and MIDI setups, the laptop is distinct precisely because these devices were never truly portable beyond their transportation by vans, buses and airplanes. Gone are the days when bands such as Tangerine Dream and Kraftwerk resorted to taking their recording studios on the road with them to recreate the sounds of their recorded sounds. Today, something similar can be packed into a small bag, carried to a venue and plugged into the PA without incurring the costs and glitches of labour intensive set-ups. Moreover, the untethering of music production from fixed locations has significant implications for both the everyday practices of musicians and the interrelationship between music and what Manuel Castells calls the 'space of flows', a spatial logic governed by the informational, global economy organized around a 'fluid network of exchanges' (Castells, 2000: 429). In short, the complete portability of the laptop underpins a subtle change with some less than subtle consequences.^v

As attention has shifted to the production and consumption of music in urban spaces, spatial metaphors and electronic practices are increasingly seen as interwoven with what Thibaud calls the 'technical mediation of spatio-phonic behaviours' (Thibaud, 2003: 330). In particular, the advent of the Walkman and the MP3 player suggests lines of connection between mobile forms of listening and the active construction of the urban experience (Bull, 2000). Mobility, here, concerns the mutual entanglement of bodily rhythms and technological artefacts that play out in public-private forms of cognition and consumption. Notably, this

moves us towards what Crang calls 'different media and associated spatialities folding into one another' (Crang, 2000: 301). Users of portable music players, for instance, encounter a garland of space-body mixes from the daily routes to work to the global circuits of images and commodities.

The increasing use of the laptop in music production raises a similar set of questions regarding the folding of spatialities, especially as they are mediated by emerging discourses and images. Here, mobility is not just a technological function, but also a commodified rhetoric attached to practices of marketing and promotion. The trope of mobility is particularly evident in music magazines, trade fairs and consumer literatures where manufacturers work up the idea of mobility as vital to cutting-edge music making. One of the overriding images is freedom, tinged with a masculinised individualism and proximity to the lighter elements such as air and water. 'Liberation' from the recording studio is framed in terms of a technological unhooking from the historical weight of outmoded artefacts and the facing towards a mobile future. There is a power of technology, here, but also a power over technology as human agency and craft are carefully re-inscribed in the setting rather than displaced by the machine. This is particularly pertinent in the case of consumer magazines such as Computer Music, Future Music and MusicTech, where care is taken to depict consumers as active and potentially masterful.

Whilst such images move effortlessly through the mediascape, they both package and adjust to new modes of working amongst musicians. A negotiation takes place between the practical accomplishments of everyday 'musicking' (Small, 1998) and their representation, to the extent that it is often difficult to unravel the image of mobility from emergent socio-technical practices. However, what can be said is that they, at the very least, hint at such practices. For instance, consideration of the interface between space and the everyday rhythms of laptop users raises a number of issues about the personal uses of mobile devices. In theoretical terms, the laptop, as Björk's opening quote indicates, is insinuated into the mobile individualisation of technologically-rendered space. Like the car, domestic space and

MP3 player, the laptop can be seen as a 'bubble' organised around a privatised desire for withdrawal - a kind of utopic hike into introspective technoculture. As Bach writes:

Laptop musicians spend so much time on their laptops, establishing such intimate relationships with their machines, that they appear to inhabit the spaces implied by the words, images and sounds scrolling down and across the screen (Bach, 2003: 4).

Here, the laptop becomes a dwelling, shelter or boundary as defined Bachelard (1994). It separates the inside from the outside and functions as a nest through which creative output is hatched and nurtured, transposing the personal and affective relationship musicians have with music into an inner technological space rendered by Graphic User Interfaces, projects and folders. In many ways, this echoes the way the traditional recording studio seals itself from the outside world, both acoustically and creatively. As Hennion argues, removed from the real world by sound proofing, the studio becomes an idealized microcosm of creativity in which trial and error testing and sonic experimentation takes place (Hennion, 1989).

But the figuration of the laptop as a detached and cocooned space (itself a vision concocted in corporate boardrooms) smacks of caricature, for it fails to address the device as both porous and a generator of new forms of communicative sociality and spatiality. In other words, whilst one might just about recognise a broad Weberian tendency in the history of music towards individualisation (from the drawing room piano to the laptop) a more nuanced analysis shows these devices to simultaneously invert this tendency. According to many musicians, open-ended collaboration is fundamental to the appeal of the laptop. Mirroring flexible work and leisure patterns in late-modern capitalist formations at large, the laptop supports planned and unplanned jams, spontaneous gatherings and modes of composition. The disposition, here, is towards short bursts of intense creativity rather than hard week-long slogs in the recording studio. For professional musicians on tour, mobile music making is an essential way to test out new ideas and collaborate with others, filling up commuter time with the production of music in 'non-spaces' such as cafes, trains, buses, airports and cars. Equally, for local musicians, making music happens with others in the spatial and temporal interstices of life, on a little and often basis:

I really enjoy packing up my little rig, going to someone's house for a day and making new music (SongCarver, in Delaney, 2004: 5).

It's really nice to be able to set up two, maybe even three to a table, and all be working on tracks, and all be able to flip a laptop around, ask for each others' opinions, and be able to mess with it or change it (Printz Board, in Delaney, 2004: 39).

Connecting movements of people with movements of music data supports a re-positioning of the laptop as a box of mobile delights which (notwithstanding errors and failures) can be opened in a range of unexpected spaces, from warehouses and abandoned silos, to alleyways and deserts (Von Seggern, 2005). In this respect, the laptop offers a number of unforeseen possibilities beyond the studio or the home, in principle linking musicians in the kinds of ephemeral encounters desired by 19th-century Parisian flâneurs. Notwithstanding historical and geographical distinctions, like the flâneur the laptop musician can be seen to react to their environment by mining the crowds and urban ambiances for creative input. They are the 'travelling player', passing through what is left of the urban phantasmagoria in moments of mobile fantasy, or what Makimoto and Manners (1997) call the 'digital nomad' carrying their creative hives around with them. Whilst the arcades are no more, flânerie goes on in transmuted form, retaining the spatial and temporal proclivities for catching things in flight. This potentially transforms the nature of communication and collective life in the locales of civic life, such as malls, cafes, squares and parks. These places need to be re-considered in the context of different patterns of movement and new forms of communication that take place within, across and through them:

In theory, a quiet studio or room at home should be the ideal creative environment, but it doesn't work out like that. Sitting at a table in a café – surrounded by people talking and moving around...can be more of an inspiration and less of a distraction than all those things to do around the house/studio (Delaney, 2005: 126).

The joy of having a laptop is that you can react to your environment. If you're having a problem with a tune it might not be the software, it might be where you're sitting. Turn round and face the opposite way...go out...a friend of mine does a lot of his stuff in a park. To avoid muggers he climbs trees...he puts his laptop in a rucksack, climbs twenty feet up a tree where nobody sees him, and sits up there with the thing harnessed to him (J-Lab, in Delaney, 2005: 126).

As a result, one ends up with a complex layering of spatial domains, both virtual and face-to-face, local and global, coded and material, individual and collective, all thickened by the acceleration of computer clock speeds and an intensification of cultural stimuli in everyday life. Here, a scrambling of energies and speeds forces us to attend to the intersections between physical mobilities of objects and populations with the 'virtual' mobilities of communication (Sheller and Urry, 2006). The image of bodies composing MIDI code on superfast laptops whilst whizzing through train stations in Wi-Fi enabled train carriages captures something of the complexity here. An interlacing of spaces takes place that updates Schivelbusch's (1979) comments regarding the significance of visual culture to the undertaking of train journeys in the 19th century. The 21st century folding of practice and delocalised movement points up the need for a new cartography of music, essential to which is acknowledgement of the heterogeneous co-ordinates of spatiality, the complex intersection of locales through which processes of production, text and consumption are enacted (Swiss, Sloop and Herman, 1998). Such a re-mapping extends from globalised networks of commodities and dataspaces to the mundane micro-movements of 'musicking' bodies. Composition is thereby striated with material and non-material flows that radically decentre where music is made and accelerate its distribution across space and time.

The practice of swapping semi-completed songs and ideas for songs is instructive here. Whilst place-based music has certainly not withered, co-existent with these local networks are what has been termed 'translocal' and 'virtual' music scenes made possible by the digitalisation of music and mobile music technologies (Bennett and Peterson, 2004). These cross-cut, rather than undermine civic networks, extending the possibilities of collaboration and iteration. For instance, band members no longer have to be physically co-present to collaborate with each other. Software files and audio files can be easily sent through electronic or regular mail to be added to, modified or mixed, then returned for further iteration. The US band, The Postal Service, work precisely in this way, with members Jimmy Tamborello and Ben Gibbard sending packages of audio and software files to each other from

their respective homes in Seattle and Los Angeles. The practice of swapping software-rendered song files is also becoming common amongst musicians. One of the most popular software studios amongst electronic music communities is Reason, manufactured by the Swedish company Propellerheads. This all-in-one software studio creates small song files that can be easily emailed, modified and returned, allowing musicians to create and swap song files in increasingly flexible ways or upload them for others to comment on in Internet forums.

Despite, then, being rooted in structures of global capital, commodification and productivity, the laptop remains a dynamic and emergent device open to inventions and rearticulations in moments of practice. Just as it drives the formation of new genres such as 'glitch' and the 'microsound scene' (Cascone, 2000), so it moves music production into myriad spaces and locales, reinforcing a suppleness in functionality and use. Just as it organizes and arranges certain practices and electronic vistas (including the desktop), it also widens and expands them, spawning new collectives, collaborations and scenes. Though mobility looks, at first sight, to be a somewhat subtle additional quality to the desktop computer, its impact on creative practices is significant, both in terms of what it makes possible in music and how it transforms the nature of contemporary urban landscapes. Indeed, when combined with mobile digital communication protocols such as Wi-Fi, the laptop affords a re-structuring of long-standing everyday practices associated with creativity and interaction across private-public boundaries and between material and non-material spaces.

THE DIFFERENCE IS...SOFTWARE

It sounds an unremarkable contention, but the laptop's hardware capabilities are only enacted in music by the software used to make it. This is what separates the laptop in music from its function as a business machine, word-processing device or means for sending email. It is the functionality and non-material properties of music software and its use by musicians that transforms the laptop from a generic personal computer to mobile studio or live performance instrument. In fact, for some scholars, software is what 'writes mobility' in that flows of

informational objects are mobilised by software-driven virtual environments and applications (Sheller and Urry, 2006). Mobility, here, is a function of networked capabilities embedded in urban infrastructures that result in new kinds of spatial awareness and movement. For Thrift, for instance, software is implicated in new kinds of cultural conventions and ‘forms of address’ that favour a sense of space as ‘folded and animate’ (Thrift, 2004); whilst for Mackenzie (2005), software protocols, algorithms and operating systems constitute culture-objects with their own performative conventions and modes of circulation.

Despite this attention, software remains a neglected topic in social studies of music, with a few exceptions (Durant, 1990; Théberge, 1997; Ayers, 2006; Richardson, 2005). More often than not, studies of the digitization of music tend to gloss the close details and practices of digital environments, in effect black boxing the digital or subsuming software under previous developments such as the synthesizer, MIDI or the sampler. Yet, in order to fully understand changing configurations of music and music making, it is essential to consider the construction, import and function of software applications, their associations with hardware and the kinds of music practices they afford.

One way of doing this would be to follow through the idea of software as a ‘technoscape’ or techno-cultural script through which identities, bodies and subjectivities are formed.^{vi} Scrutiny of the software might then take the form of a detailed analysis of the kinds of spaces, orders and models of the world privileged in the Graphic User Interface as well as the distinctive cultural practices they give rise to. Another possibility would be to account for the commodification and socio-technical construction of software since the 1980s, its packaging, circulation and performance, or to undertake the kind of close analysis of code that Mackenzie (2005) describes. For the more modest purposes of this section, I want to focus down on one particular software package as an object of cultural analysis. This follows a brief overview of the rise and placement of software in music production. The overall method follows Manovich’s attempt to ‘scrutinize the principles of computer hardware and software and the operations involved in creating cultural objects on a computer to uncover a new cultural logic at work’, a method he terms ‘digital materialism’ (Manovich, 2001: 10).

Software has been used in music making for half a century. Some of the first sound-generating computer programs were written in the late 1950s and emerged out of laboratories and academic departments. Max Matthews' 1957 program, Music I, is a good example of an early attempt at a computer program for music. This sound-generating program possessed just one voice and one waveform, although pitch, loudness and duration could be modified. A series of further experiments based around Bell Telephone Laboratories added the function of modularity and the ability to generate multiple sounds as well as input notes on a 'score'. By the mid-1960s the production of IBM computers such as the 360 permitted technical improvements in the running of software programmes, but they still had to be encoded onto punch cards - 3,500 of them in the case of Music V. It was not uncommon for musicians to score music by inputting various specifications only for them to have to wait several weeks for the input to be processed in several phases of calculation and for the music to be heard (Chadabe, 1997).

These early music programs were developed in cosseted research environments like CCRMA at Stanford and IRCAM in Paris and rarely reached beyond the academy. In most cases, it was a large mainframe computer that ran the programs, the interfaces of which were technical and opaque to outsiders. It wasn't until the 1980s, with the popularisation of personal computers such as the Atari ST, that commercially-available software programs began to take off. By then, applications could be used to input, arrange and sequence MIDI data, and by the 1990s, Virtual Studio Technology (VST) applications such as Cubase and Notator had emulated all the functions of the multi-track recording studio. Even the layout of these software interfaces drew upon the spatial rudiments of the hardware studio, with a mixer section, linear horizontal tracks, a transport section and a routing section. Rather than tweaking faders and pressing knobs, however, users were expected to use the computer mouse to select and change parameters.

The growth of music software applications in the early 2000s heralds one of the most dramatic transformations in music. There is no action, practice or convention that has been untouched by this growth, from recording, mixing and mastering right through to listening

and marketing. Despite the claim that digital lacks warmth, the take off of VST has emptied many recording studios of a good deal of analogue hardware. Indeed, it's rare to find a studio nowadays that does not have at least a Digital Audio Workstation, some virtual effects and a handful of software synthesizers. Software is no longer the domain of the sonic experimentalist but has become the staple of the industry. Musicians of all genres are learning to compose in software, necessitating a mental adjustment for many used to traditional equipment, whilst an industry of powerful manufacturers (Native Instruments, M-Audio, Novation, Steinberg, Yamaha, Korg) continues to expand into VST-based technologies (Durant, 2000; Holmes, 2002; Théberge, 1997). As Holmes writes:

Software “synthesizers” give the composer the ability to invent their own synthesizer voices. Software samplers capture and edit acoustic or electronic sounds from other sources. You can walk into any home electronics superstore and choose from dozens of programs designed for the digital recording, sampling, downloading, editing, playing, and mixing of music (Holmes, 2002: 236).

Though the analogue world of production and vintage gear retains its appeal, software is now fully integrated into the music creation process, insinuating itself into the mundane practices of musicians. The use of software applications is particularly popular amongst laptop musicians, not only because subcultures of collecting and swapping applications (legally and illegally) is central to laptop collaborations, but because software is eminently portable. Software, we might say, writes mobile music production.

One of the most popular and renowned pieces of software for live and mobile work, Ableton Live, is now in its sixth version.^{vii} According to the musicians who use it, it is a remarkably stable and versatile application that allows one to cue up, mix and warp audio files in real time as well as add filters and trigger virtual instruments using its MIDI capabilities. Unlike other applications, Ableton Live is marketed as an application primarily designed for live performance and music on the move. Its origins in experimental music gives the package sufficient kudos amongst experimental laptop musicians, whilst its emphasis upon flexibility allows it to be marketed to DJs, studio producers and mainstream performers alike.

Ableton Live began life in 2001 as a performance tool designed by two German electronic musicians, Robert Henke and Gerhard Behles (a.k.a. Monolake), who were frustrated at the lack of software dedicated to live improvisation. Stylistically lo-fi, with retro fonts and crudely-rendered buttons and knobs, Live's interface comprises semi-discrete sections dedicated to local functions such as browsing files, selecting tools, navigating through clips, adding effects and routing signal paths. The layout of these sections changes according to whether the user has chosen one of two meta-views. The 'session view' is where individual files or groups of files (known as 'scenes') can be triggered. The 'arrangement view' is where the interface takes the form of a more conventional time-based line of tracks in blocks of audio and MIDI data.

The operations available to Live's users are a hybrid of conventional 'cut and paste' tools, navigation commands and more local information behaviours particular to the software environment. This shapes how the user engages with the interface. The laying out of separate tracks and the rearrangement of blocks of data gives rise to a kind of modular approach where segments of MIDI and audio data take the form of malleable data-forms that can be cut and pasted into new formations. Here, one might recognise the trace of Live in the way computer music is structured in distinct patterns and clips. Richardson, for instance, refers to the fragmented and malleable nature of music produced by bands like Gorillaz as a product of the 'copy and paste' facilities of music software (Richardson, 2005). In conjunction with users' own actions, however, Live takes on a plasticity and variability befitting its own origins in play. Along with the laptop, it has altered our idea of what music consists of, setting new standards for what can be achieved with a single piece of software in multiple environments. It has also paved the way for a new generation of software applications to move away from the studio emulation.

Unlike the first generation of software synthesizers and studios, where the interface, layout and sound has been copied from an original, Live appears relatively indifferent to hardware precursors. For instance, there are only a few faders and a smattering of knobs. Instead, the application renders its own aesthetic conventions by creating a 'technoscape'

comprised of relatively distinct modes of working, including 'elastic audio' (of which more below). In this respect, Live points more to a logic of simulation (Baudrillard, 1988). Its technological form of life refers less to an original referent but to itself, to its own reality. This is particularly important as a new generation of musicians with little or no experience of the hardware studio is learning to make music in software environments, displacing the referent further from its image. In Live this indifference is reinforced by a stylistic 'flatness' compared to the first generation of emulations, where the Graphic User Interface almost approaches a formalist aesthetic of clips, scenes and MIDI data rendered in the idioms of versatility and speed. The 'warp' function, in particular, is significant to Live's playful aesthetic. Here, the key parameters of an audio file such as tempo and pitch can be altered independently and in real time, giving rise to what the manufacturers call 'elastic audio'. This is audio treated like regular MIDI data, as flexible and mutable in that audio files can be non-destructively mutated and re-coded to change the placement of individual beats, correct pitch or stretch the length of particular phases. In itself, this is a technique that has led to the stylistic 'mashing' of genres. As one DJ explains:

Everything fit[s] together; categories like Techno, Trance and House did not seem to matter anymore. Speed differences of 30bpm did not create audible problems – and pitching whole tracks over three semitones still sounded great. When I found out about the possibility of syncing a whole track by using Live's Warp Markers, I immediately loaded about 150 songs onto my G4, warp-marked them and tried to find matching combinations (Mijk Van Dijk, DJ, in Delaney, 2004: 68-69).

This hybridisation of music genres, itself an indicator of cultural trends termed 'postmodern' by some, blurs the boundaries between cultural canons and aesthetic forms (Sandywell and Beer, 2005). Software, to this extent, activates and subverts a flattening of musical forms, transforming the scenes of music into a series of elastic and provisional styles. Typical of the constraining/enabling features of technology at large, the software both shapes the user's space and modes of composition, but also enables a series of new operations and practices central to the production of new forms. Software is active and transformative, but only in relation to users' manipulations. This balance of agency is something the makers of Live are

themselves at pains to stress in the face of criticisms of the overly-automated nature of contemporary music. A cultural re-inscription of the rhetoric of ‘craft’ and ‘presence’ is produced by Live, such that its product is still attributed qualities of improvisation in use. This permits a degree of agency and personal achievement to remain at a moment when these are popularly seen to be dissolving. For even amongst musicians, the laptop and its applications are regularly seen as suspicious imposters, whose automative capabilities render them out of place in music, particularly in live performances.

THE ANXIETY IS...CYBORG PERFORMERS AND ‘MATTER OUT OF PLACE’

The fact of automation unsettles a particularly powerful sense that performance is, above all, a signature of corporeal dexterity. Hence, Roland Barthes’ distinction in the essay of 1970 ‘Musica Practica’ is between a music one listens to, and a music one plays. Even before MIDI and computer automation, Barthes laments the fact that ‘playing has ceased to exist; musical activity is no longer manual, muscular, kneadingly physical, but merely liquid, effusive, “lubrificating”’ (Barthes, 1970: 149-50). In this historical shift, the animated amateur has given way to the ‘technician, who relieves the listener of all activity, even by procurement, and abolishes in the sphere of music the very notion of *doing*’ (Barthes, 1970: 150). Devoid of all imagination, the technician is an operator or arranger whose home is a stage on which there is nothing left but the passing of one sound source to another.

In many ways, Barthes’ lament traces a recognisable struggle in the history of popular music itself around ideas of creativity and technology. From the first appearance of microphones, synthesizers and drum machines to the use of backing tracks and miming, popular music has figured in a set of largely 19th-century oppositions between technological fakery and human authenticity. As Frith (1986) notes, for instance, the whole idea of emotional honesty and truth in music works by dint of an ideological construction of its ‘other’ – machinic artificiality and lack of presence. Hence, in the 1960s, electronic amplification was claimed to destroy the close-knit intimacy of the folk *gemeinschaft*, whilst in the 1970s and 80s it was the synthesizer and the sampler that were killing individual craft

and talent (Durant, 2000). Meanwhile, ideas of ‘liveness’ have been firmly wedded to human musicality, giving momentum to campaigns such as the Musician’s Union ‘Keep Music Live’ campaign as well public indignation towards miming and lip synching (Bell, 2006).

Laptop music intensifies and radicalises these anxieties because it is seen to substitute and simulate human presence. For a start, during a laptop performance, the signs of corporeal involvement are subtle and minimal. Typically, the laptopist will stand, sit or crouch behind the open lid of the laptop, scarcely displaying any overt connection between the production of sound and the movements of the body.^{viii} This feeds the suspicion that, at best, the black or titanium box is doing most of the work, with the musician-technician having minimal input; at worst that they really are just pressing play and surfing the Internet. The ambivalence is evident in audience reactions to laptop sets, where there is often radical uncertainty about dancing or clapping (Cascone, 2003). So much more creative agency is being attributed to the machine than the musician that it becomes difficult to hold together the hegemonic idea of music as logocentric (that is, having a human author) with an unambiguously positive relationship to the performance. Commenting on a laptop set by Keiko Uenishi at New York’s weekly laptop event, Share, Erik Davis speaks for many when, he says:

Uenishi’s set is great; however, like most laptop musicians, she’s boring to watch. Calling up audio files and filters with a QWERTY keyboard lacks the visual punch of a guitar solo or a drumroll, and often there isn’t even a visible link between a keypunch and a specific change in sound. Is it live or is it Memorex? No one at Share seems to care, and for all I know, Uenishi might have spent her time playing *The Sims* (Davis, 2002: 2).

Davis, tellingly, titles his article ‘Songs in the key of F12’ and questions the liveness of musical cyborgs. This is despite his admission that the laptop has ‘become an instrument in its own right’ (Davis, 2002: 1) and despite the fact that laptop musicians are far more active than they look.^{ix} The presence of automation and lack of physical index disturbs, nevertheless, precisely because music is so heavily coded with ideas of unfettered human agency, playing itself out not just in the reactions of audiences, publics and reviewers, but with laptopists themselves. Many are responding to the ambiguity by giving the audience a peek at their craft, projecting live relays of their desktops onto large screens, displaying the frequency

bands of their music in real time or placing miniature cameras on the equipment to show the work in close-up detail. In other cases, the tension between automation and human creativity is ironized, a strategy used by the bands Kraftwerk and Daft Punk, who ‘roboticise’ their performances of high-tech craftsmanship (Bell, 2006). But these articulations take place amidst a potent mix of often contradictory attitudes swilling around the performance of laptop music sets. The computer is inanimate but is powerful enough to warrant critique; the musician becomes a technician (with connotations of desktop manual labour) but, as with DJs, is still present as an authorial figurehead; the audience laments the lack of gesture but nevertheless is still interested in knowing what the laptopist is doing. Cascone writes:

The reaction most audiences have to laptop performances has been mostly one of distrust. The root of this distrust is perplexing since other modalities of electronic music performance have survived and even flourished. DJs continue to perform on turntables and keyboard players have increasingly become black-box knob-twiddlers without much concern on the part of the audience. This raises the question: what differentiates a machine called a laptop from one called a synthesizer? (Cascone, 2003: 2).

The answer, perhaps, is that the laptop is not entirely matter in its right place (Douglas, 1970).^x It is an object with qualities that interact with certain expectations regarding its place in a cultural field historically suspicious of artifice and automation. For this reason, it doesn’t immediately or entirely ‘belong’ to the stage in the same way as other instruments because it retains a surplus of meaning as an amplifier of work. It is believed to perform a greater amount of work than the operator. In the majority of live performances it will be the only piece of visible kit not purpose-built for music, there being no onboard sounds in the usual sense. This reinforces the suspicion that it is an impostor tainted by its proximity to business and, hence, more a management device than an instrument. This is not to discount the fact that laptops are being popularly employed as multi-functional devices across entertainment, business and creative spheres. It has clearly outgrown its genesis as a single-function word-processor for wealthy businessmen. But, at the very least, its position reveals a status ambivalence regarding its place in music culture largely because music has its own relatively autonomous set of ideals, historically layered and ideologically reproduced (Frith, 1986). This

makes it a place-holder for conflicting meanings about what belongs in music: productivity and creation, reality and virtuality, play and work, the cybernetic and the organic.

CONCLUSION

The laptop, we might say, has boundary straddling qualities. It enters with historically-embedded meanings revolving around commerce and economy, into a relatively autonomous field whose currency depends on reputation, emotion and commodity value. A residual signification towards work renders it troublesome as an instrument, whilst the way it is reconfiguring musical practices changes our expectations of what performance consists of. At some point infiltration may tip into a collective horizon of indifference or acceptance. After all, conventions of listening and performing are not immutable, as Thompson shows in her analysis of the way early twentieth-century audiences had to adapt to reverb, loudspeakers and microphones in the new concert halls of America (Thompson, 2002). Indeed, a century's worth of recording and experimentation has already transformed our expectations of the way music is created, how it sounds and the spaces and formats through which we hear it.

Moreover, as younger more digitally-conversant audiences are emerging, so expectations regarding what belongs in music and what counts as music and the musician will also change. Finally, the more laptop musicians open up their desktops to audience scrutiny, the more the veil of business will be lifted to reveal the careful manipulations of music software and a creative labour often hidden in networked digital economies as a whole (Terranova, 2004).

Yet, these transformations are dependent on accumulative and subtle changes in values, including a gradual alignment between traditional norms and new practices (Pinch and Bjisterveld, 2003). For the time being, the laptop remains something of an incomer, especially in more established genres like rock music, whilst even in techno (a dance music so visibly inscribed and defined by technology) there are divisions between the 'digital natives' and those who refuse to see laptop DJ software and MP3s as a viable alternative to turntables and vinyl (Farrugia and Swiss, 2005). In order to attend to these ambiguities, there's something to be said for using the laptop as a lens through which contemporary and traditional norms

around music are revealed, unsettled and dismantled. As an agent provocateur the laptop tests the limits of belief around authorship, authenticity and automation, deconstructing naturalistic assumptions about the artist. As a mediating device it assists us in assessing the complex matrix of agents, instruments and machines that comprise the various stages of music production. As ‘matter out of place’, it calls attention to itself as a modulator and translator of shifting socio-technical networks of music, space and social relations. No wonder, then, that ‘debates about contemporary performance in the world of electronic and improvised music begin and end with the laptop computer’, according to Toop (Toop, 2004: 224). When one adds the laptop’s imbrication with questions around spatiality, software and performance, its analysis attains a significance beyond music to illuminate current trajectories of highly technologised societies.

If Pinch and Bijsterveld are correct in their assertion that ‘whole areas of music technology...remain completely uncharted’ (Pinch and Bijsterveld, 2004), the hope is that this paper has sketched a little corner of the terrain. For music is what Born calls the ‘paradigmatic multiply-mediated, immaterial and material, fluid quasi-object, in which subjects and objects collide and intermingle’ (Born, 2005: 7). It therefore supports assemblages of human-non-human phenomena, including musicians, devices, techniques and systems. The laptop and its users form one of these assemblages and its analysis goes some way to showing socio-technical imbroglios in action, where digitized music and code meet the material properties of technologies and the everyday practices of bodies. These encounters take place at a time of radicalised spatial dislocation and mobility, when societies are increasingly meeting the imperatives of digital networked economies and increasingly globalised infrastructures supported by mechanisms of flow. In these respects, the laptop and the software forms that inhabit it both afford and intensify music’s non-materiality and hyper-mobility, lubricating its diffusion into myriad spaces (virtual and face-to-face) and practices (collective and individual).

But there’s nothing inevitable about the laptop’s longevity in music. As work in Science and Technology Studies indicates, established technologies and patterns of socio-

technical organisation, though powerful, are neither immutable nor exclusive; there always remain possibilities for alternative arrangements and pathways (Bijker *et al*, 1987). In any case, such arrangements have to be actively constructed and performed rather than straightforwardly imposed. In which case, the laptop itself may well be a transient device, to be overtaken by smaller more portable derivatives or something altogether more unimaginable as expectations and requirements change. This is already evident in the use of Gameboys, iPods and various haptic devices in live and experimental music, as well as in the appearance of fully-automated robots, digital guitars and cyber-performances in virtual worlds such as Second Life. The appearance of new types of software, similarly, may make formerly dominant products like Ableton Live pass into relative obscurity as musicians seek out new practices in a context of late capitalist expansion in the digital economy. For the time being, however, the laptop and its code are representative objects of a specific ‘moment’ in music history and their configuration, deployment and use remain crucial to understanding the nature of that moment.

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NOTES

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ⁱⁱ <http://www.laptop-jams.com/>

ⁱⁱⁱ MIDI (Musical Instrument Digital Interface) is an industry-standard protocol introduced in the 1980s to allow digital instruments to connect and exchange data with one another.

^{iv} Bourdieu’s use of the terms ‘restrained’ and ‘large-scale’ points up the internal orientation of all cultural fields towards principles of heteronomy or autonomy determined by ratios of cultural and economic capital. The division supports the well-known bifurcation between products and practitioners associated with high art and popular culture.

^v Price, it must be acknowledged, is still an issue. At around £700 for a new mid-range unit we are still talking about an expensive piece of kit beyond the means of

most of the working population. Whilst a techno-romantic rhetoric claims the laptop to be the folk guitar of the late 20th and early 21st centuries, the claim is too casual to hold water. This isn't to say we can't still scrutinize its increasing visibility in music fields, however. Nor can we ignore the fact that, like desktop computers, laptops once only belonged to a business elite. Today, this is no longer the case, with budget laptops already available for around £300.

^{vi} The concept of the 'technoscape' comes from the work of Appadurai (1990) whose definition points to its relation to socio-technologies and spatial forms as both representations (as in *landscapes*) and material relations between physical objects and bodies (see also Sheller and Urry, 2006).

^{vii} At time of writing in mid-2007.

^{viii} If the musician died on stage, or fell asleep, there might be some disquiet among the audience, but as Toop notes (somewhat tongue in cheek) the computer would keep on playing (Toop, 2004).

^{ix} Typically, laptop musicians will be cueing up files, switching filters, manipulating pads, throwing crossfaders, and keeping the set running smoothly. In some cases, they will collaborate in real time by firing files of their performances to each other during the set in order to mangle and replay them.

^x It is the anthropologist Mary Douglas (1970) who has written about the importance of classificatory schemes in assigning status and spatial position to material objects, such that they become 'matter out of place'. In the case of hygiene, for instance, dirt is placed in a system of cultural understanding through which ideas of contamination, germs and illness are constructed. These ideas cement a wider cosmology around morality and moral purity based on certain categories and assumptions about the material world.

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