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Composition Portfolio

Producing Techno Grooves

Commentary

Submitted for the degree of Doctor of Philosophy

International Centre for Music Studies

University of Newcastle upon Tyne

March 2011

Abstract

PhD submission consisting of a portfolio of recordings presented both in their published form on five twelve-inch vinyl records and on two compact discs. The portfolio is accompanied by a commentary intended to facilitate access to the aesthetic statement presented in the portfolio

Following Charles Keil's distinction between 'embodied meaning' and 'engendered feeling' this project investigates approaches to the creation of Techno music in terms of the significance of specific sounds, techniques and technologies in generating subsyntactic value. The concept of the groove and the importance of microtiming as they operate in my practice are discussed in the commentary and demonstrated through the production of a series of Techno records including both original compositions and remixes.

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List of Audio Recordings

For convenience the material is presented both on vinyl records and CDs. This composition portfolio comprises a selection of 10 representative pieces from my work over the period of study. Of these the following are completely original compositions:

Felix	- CD1 track 1	- vinyl ADAPT07 side A, track 1
Citadel	- CD1 track 2	- vinyl ADAPT07 side B, track 2
Trajan	- CD1 track 3	- vinyl ADAPT07 side B, track 1
Baikal	- CD1 track 4	- vinyl ADAPT07 side A, track 2
Fast Breeder	- CD1 track 5	- vinyl ADAPT01 side B, track 1
POM	- CD1 track 6	- vinyl ADAPT01 side B, track 2
Targa	- CD2 track 1	- vinyl ADAPT02 side B, track 2

The following pieces are remixes based on other pieces including one collaborative remix with Gamma (Steve Legget from Artwhore). I have also included the original versions for comparison:

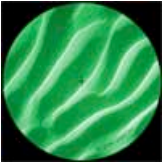

Swerve Angle	- CD2 track 2	- vinyl ADAPT03 side B, track 2
Frank - Tycho mix	- CD2 track 3	- vinyl ADAPT04 side A, track 2
Frank - Suade + Gamma mix	- CD2 track 4	- vinyl ADAPT04 side B, track 1
Swerve (Original Version) by Mindtours	- CD2 track 5	- vinyl ADAPT03 side A, track 2
Frank (Original Version) by Artwhore	- CD2 track 6	- vinyl ADAPT04 side B, track 2

Vinyl Records Key:

ADAPT 01 side A  side B 

ADAPT 02 side A  side B 

ADAPT 03 side A  side B 

ADAPT 04 side A  side B 

ADAPT 07 side A  side B 

Acknowledgments

This thesis is dedicated to my mother Heidi Bergemann. Thank you for your unconditional love and continuous support. Your eternal fascination with the world has inspired me with a passion for knowledge which is essential to my character. Your engagement with me intellectually throughout my life has provided me with an enabling confidence in the value of my own thoughts. Nothing has meant more to me.

Thanks to Will Edmondson, Ian Biddle, Agustín Fernández, Richard Middleton and Rachel Morse whose consultation and advice have been valuable to me during the process of developing my academic work.

Thanks to Paul Smyth, Steve Oliver, Steve Legget, Stuart Holt, Paddy Freeform, Graeme Smith and Tom Demac for their continuing friendship and many theoretical and practical investigations into the potentials of musical sound.

Thanks to Universal Vibes, BCN Records, 'Testin' Out, Mindtours, Minus, Liebe-Details, 22 Digit, Tasmaniac, La Ruta Natural, Nufonix, Overload Media, Integral, Infectious and many others for supporting, publishing and disseminating my work throughout the world. Thanks to the many people in the Techno scenes of Newcastle, Barcelona and Detroit and elsewhere who have provided me with friendship, opportunities and experiences of great value to my musical life.

Thanks to Magda Chojnacka, Mike Banks, Brendan Gillen, Lars Sandberg, Jeff Mills, Stewart Walker, Keith Tenniswood, Juan Atkins, Marcel Janovsky, Alan Oldham, Ben Ewy, Kym She-Devil and Dave Moxon for your time, advice and perspective over the years.

Special thanks to my family for looking kindly on my youthful fascination with synthesizers and their decision to pool their resources so I could own my first musical instrument. All my music has followed from that moment.

Declaration

I grant powers of discretion to the University Librarian to allow this thesis to be copied in whole or in part without further reference to me. This permission covers only single copies made for study purposes, subject to normal conditions of acknowledgement.

Suade Bergemann

Introduction

This commentary is written with the purpose of facilitating access to the aesthetic statements presented in the Composition Portfolio and to illustrate the construction work that underlies my creative practice. Rather than offering a full description of each of the tracks submitted, I have chosen to focus on specific techniques, technologies and particular features of the tracks.

Techno is a vast genre with a myriad of subgenres whose development and proliferation challenge attempts at providing a unifying viewpoint. My particular experience of Techno is based on the Newcastle scene as known through attendance at numerous club nights, free parties, raves and private parties and then participation as a performer at Reverb, Freaky Dancing and Fast Breeder and Cleer club nights and the Free Rotation festival where I was/am a resident DJ. This experience is supplemented by guest DJ appearances in the US, Canada and Europe and attendance at a wide variety of UK and international events including, in particular, the Sonar Festival (1999-2010) in Barcelona. In addition to these direct personal experiences the music press, television and online resources provide exposure to a proliferation of mediated viewpoints.

I have chosen to produce music in the form of vinyl records as the best way to fully engage with my chosen aesthetic field. Despite the recent trend towards digital formats the tradition in the Techno scene has been to consider the vinyl record as the authentic form both for listening consumption and for DJ performance. The current situation is perhaps more debatable but it was widely understood to be the case when I started releasing records on my label Adapted Vinyl in 1999 that vinyl would be the appropriate choice of medium for the professional techno artist. The arguments used to justify this are, of course, constructed but, nevertheless, they are/were the ideas of authenticity at play in my field. In many other music cultures performance is considered the authentic site. So, in this way, for me to not release records would be not to perform.

By choosing to produce, publish and market these records I have been exposed to a range of experiences, people and information that would otherwise have remained somewhat mysterious. This includes enhancement of my awareness of

the concerns and behaviour of record shops, distributors, mastering houses and manufacturers. Approaching any of these people as a record label acts as a gateway to inclusion in the insider perspectives of these rarely heard and well-informed viewpoints. Being treated as an insider allows one to join in on the conversations particular to these perspectives. Personal exposure has been my primary resource in penetrating Techno culture. Contact with these people, places and sounds has furnished me with a lifeworld of Techno experience and that understanding forms the basis for much of what I have to say here.

The accounts I give of various issues within this commentary will repeatedly touch on the fluidity between different areas of my practice. My working mode includes multiple roles (Composer / Engineer / Performer etc.) that inter-relate and inter-penetrate. My aesthetic is one of contextual integration. It is a theme I find running through my work on a number of levels. In choosing music to release on my label I'm considering how each track fits in amongst the others on the same release, how the release fits in amongst the label's output as a whole and also how my label fits in amongst the other labels in the scene. As a DJ I'm working to fit each new element into the mix vertically against the other track(s) I'm playing at the same moment and horizontally with the trajectories of events occurring in these tracks on a local level and also at the larger timescale with the music I've been playing and am intending to play later in that set. Also as a DJ, I'm aware of how my entire set acts as part of the whole experience of the event and how it might affect the other performers on the night. I will choose different music and a different intensity of presentation of that music depending on the role of my set within the flow of the entire event. Extending from there I also may consider how the set I play will be perceived in relation to other sets I've played at previous events in the same town or series of events. As a mastering engineer I work to optimise the relationship between individual tracks or sets of tracks with the destination media and its future range of possible contexts (club play, home listening, online browsing etc). In my role as producer I work with an awareness that the track I'm working on should be suitable for becoming part of a DJ mix in particular ways and also that parts of tracks I'm playing as a DJ can be useful in production (by sampling, live remixing in a DJ set, or as a sonic reference). In the context of mixing a single track in the studio I'm also considering how each individual part integrates into the context of all of the others in the mix. It is worth noting that this results in procedures that are indirectly effective as well as ones that are clearly evident e.g. the removal of sub-

bass from parts that aren't intended to be sub-bass parts. Although these unnecessary low frequencies are subliminal, working to purge them from the relevant parts of the mix enhances the clarity of the intended sub-bass parts.

My approach to the Techno sensibility is one of music as part of a socio-technological system, which can be considered as extending outwards from the recording itself and includes the producer, the studio, the music, the mastering process, the recording itself and its duplication and distribution, its promotion, the DJ and their performance, the turntables, mixer and PA system, the venue and its visual presentation and finally the individual and collective body of the dancefloor itself. In human terms this is an acknowledgement that there is a tripartite relationship between the producer, the DJ and the dancers with all three roles forming integral parts in the relationship. The role of the dancefloor and the vibe in the success of the musical enterprise can be considered as a challenge to the traditional musicological division between creation and reception. The fact that in many cases (such as my own) the same people will inhabit all three roles at differing times underlines the fluidity between areas that is characteristic of my practice.

In Chapter One, following Charles Keil's work on the distinction between 'embodied meaning' and 'engendered feeling' that advocates a shift of emphasis in favour of the latter category when considering African and Afro-diasporic musical forms, I discuss the 'groove' as a key concept for the understanding of my practice. Identifying syntactic pattern and subsyntactic details of timing, pitch and timbre (which are termed participatory discrepancies by Keil) as essential elements in the perception of groove I critique Butler's dismissal of them in favour of syntactic (mis)readings in his book *Unlocking the Groove*¹. Sarah Thornton's *Club Cultures*² is also critiqued for its implicit dismissal of aesthetic value in favour of subcultural capital.

An overview of the overall trajectory of development of the portfolio is given in Chapter Two. This is followed by an account of each individual track including its date, tempo and consideration of its provenance and use along with indications of specific features that are discussed later in the text.

¹ Mark Butler, *Unlocking the Groove* (Bloomington IN: Indiana University Press, 2006).

² Sarah Thornton, *Club Cultures*, (London: Polity Press, 1995).

In Chapter Three, in line with the emphasis advocated by Keil's distinction, I give an account of my practice in terms of the significance of specific sounds and technologies illustrated by examples from the portfolio. My uses of technology as a means of interfacing with musical material is covered as is the discussion of sampling from existing music and the technical aspects of realising electronic grooves in microrhythmic detail realising electronic grooves in the service of embodied listening and understanding arising from the social.

Chapter One - Theory

Thus far academic study of Techno and related dance music genres has tended to focus on their cultural, historical and sociological aspects (e.g. Brewster and Broughton 2000³, Fikentscher 2000⁴, Gilbert and Pearson 1999⁵, Langlois 1992⁶, Marsh 2006⁷, Reynolds, 1998⁸, Sicko 1999⁹, Thornton 1995¹⁰). However, by focussing exclusively on these facets of electronic dance music culture this type of research risks losing sight of the primary material at the heart of that culture – the music itself, as evidenced by the following discussion of Thornton's *Club Cultures*¹¹. The detailed presentation I give my own work here is intended as an alternative to that approach which has a tendency to treat the music as an undifferentiated mass. The role of technology and its relationship with musical production and consumption have been investigated in general terms by Reinecke 2009¹², Moorefield 2005¹³, Taylor 2001¹⁴ and Théberge 1997¹⁵. Sampling and musical ownership have been examined in relevant ways by Demers 2006¹⁶, Katz 2004¹⁷, Porcello 1991¹⁸ and Schloss 2004¹⁹. Although these discussions are often centred on Hip-hop the commonalities with Techno, particularly in the mode of production, allows for much of the same argument. Schloss (2004) is particularly good at elucidating the distinctions and orientations circulating amongst producers about sampling practice.

³ Brewster, Bill and Broughton, Frank, *Last Night a DJ Saved my Life* (London: Headline, 2000).

⁴ Fikentscher, Kai, *"You Better Work!" Underground Dance Music in New York City* (Hanover NH: Wesleyan University Press, 2000).

⁵ Gilbert, Jeremy and Pearson, Ewan, *Discographies: Dance Music, Culture and the Politics of Sound* (New York: Routledge, 1999).

⁶ Langlois, Tony, 'Can you feel it? DJs and House Music culture in the UK?', *Popular Music* (1992), 11 : 229-238.

⁷ Marsh, Charity, "'Understand us before you end us': regulation, governmentality, and the confessional practices of raving bodies', *Popular Music* (2006) Volume 25/3, 415–430.

⁸ Reynolds, Simon, *Generation Ecstasy: Into the World of Techno and Rave Culture* (New York: Routledge, 1998).

⁹ Sicko, Dan, *Techno Rebels: The Renegades of Electronic Funk* (New York: Billboard Books, 1999).

¹⁰ Sarah Thornton, *Club Cultures*, (London: Polity Press, 1995)

¹¹ Ibid.

¹² Reinecke, David, "'When I Count to Four ...': James Brown, Kraftwerk, and the Practice of Musical Time Keeping before Techno', *Popular Music and Society*, 32: 5, 607 — 616.

¹³ Moorefield, Virgil, *The Producer as Composer: Shaping the sounds of popular music* (Cambridge MA: MIT Press, 2005).

¹⁴ Taylor, Tim, *Strange Sounds* (New York: Routledge, 2001).

¹⁵ Théberge, Paul, *Any Sound You Can Imagine: Making Music/Consuming Technology* (Hanover NH: Wesleyan University Press, 1997).

¹⁶ Demers, Joanna, *Steal This Music: How Intellectual Property Law Affects Musical Creativity* (Athens and London: The University of Georgia Press, 2006).

¹⁷ Katz, Mark, *Capturing Sound: How Technology Has Changed Music* (Berkeley and Los Angeles: University of California Press, 2004).

¹⁸ Porcello, Thomas, 'The Ethics of Digital Audio-Sampling: Engineers' Discourse', *Popular Music*, Vol. 10, No. 1, The 1890s (Jan., 1991), 69-84.

¹⁹ Schloss, J., *Making Beats: The Art of Sample-Based Hip-Hop* (CT, Wesleyan University Press, 2004)

In 1995 Sarah Thornton wrote a book entitled *Club Cultures*²⁰ in which she identifies what she calls ‘disc cultures’ – subcultures based around recorded music. Drawing on the work of Pierre Bourdieu she suggests that these cultures operate on the basis of their own set of power relations which are indexed by a participants’ specialized knowledge of that subculture – termed as their subcultural capital – and their perceived position along the line between (their particular subcultures’) underground and the mainstream. In *Club Cultures*, Thornton seeks to undermine the validity of the distinction between the underground and the mainstream as it operates in dance music discourse. She does this by suggesting that it is a solely theoretical construct of the subculture whose only purpose is to increase the social status of the individual making the distinction. In her argument subcultural distinctions function to provide alternative hierarchies by which participants in dance music culture, whom she refers to as ‘clubbers’, interpret the social and cultural worlds to their advantage.

The most objectionable thing about Thornton’s presentation of club cultures is that by focussing so intently on dynamics of social status and disregarding considerations of aesthetic value she leaves the distinct impression that clubbers’ engagement with their culture is primarily motivated by its effect on their perceived subcultural capital. She suggests, in effect, that the fundamental reason that people like this music is to appear ‘cool’ rather than that they find it compelling as art. The situation of displaying your tastes for the benefit of others and that of choosing aesthetic experiences for ones’ own benefit are notionally distinct however difficult it may be to discern them from the outside. One concerns only the relationship between the art object (or perceptual field) and its receiver and the other need only concern the relationship between the receiver and their perception of their peer. It seems that it would be insulting at least and almost definitely wrong to suggest that all reports of aesthetic preference originate solely in the intention to make an impression on ones’ fellows. Thornton’s reputation stands on the basis of her insights into club culture and yet the lynchpin observation in her work, the use of subcultural knowledge as a means of acquiring social status, is never assessed in her work for its particularity to club culture. Rather than being a specific characteristic of club culture it is a socio-psychological phenomenon readily found in any community which involves specialized knowledge; in the Art Appreciation Society

²⁰ Sarah Thornton, *Club Cultures*, (London: Polity Press, 1995)

the people with more extensive knowledge of the great painters and their works will have more social status too and yet this shouldn't suggest that the value of the relationship with the art itself resides solely or even mainly in enabling you to be well thought of by others at the society meetings or indeed that this is the prime motivation for attending them. Undercurrents of competition for status and power permeate human social relations so it is no surprise that Thornton is successful at observing these in operation within club cultures but her account of them as consisting solely of or being dominated by such considerations appears as a mask for the assumption that there is little or nothing in the way of genuine aesthetic engagement going on – a prejudice which continues to lurk in the background of academic readings of popular culture despite the obvious sea change in the amount of consideration it receives.

The account provided in *Club Cultures* has validity but only in a limited way. The observation made applies in some situations to some degree but falls far short of accounting for the materiality of Techno culture. By focussing purely on the sociological Thornton fails to acknowledge the primacy of the social, the empirical experience gathered through interaction in the musical spaces of Techno that is so fundamental to understanding the work I present here.

In treating the music at the heart of these cultures as undifferentiated other than through its role in establishing subcultural capital and refusing to acknowledge the evaluative distinctions that are important to participants in club cultures Thornton positions herself as an outsider, giving up on the project of understanding these worlds on their own terms as locations of aesthetic evaluation rooted in shared musical experience. The close analytical exposition of aspects of my compositional work in the third chapter of this document will aim to demonstrate the type of finely-detailed and considered musical formation that goes into constructing the materiality of Techno experience and constitutes an argument for consideration of Techno as functioning musical material deployed in the service of intentions towards a responsive and interacting audience.

Specific musical processes in action in Techno or related electronic dance forms appear to have received relatively little attention until recently. In the majority of writing about Techno the music is referred to in general terms in marked contrast to the attention to particulars of musical sound within the scenes and the role of

that sound (and in particular the groove) in defining those scenes. Philip Tagg²¹ has made an effort towards connecting some of the music's features with social configurations but his perspective remains tentative and has apparently not been followed up thus far. Professor Anne Danielsen and colleagues in Oslo are currently preparing an anthology of work entitled: *Rhythm in the Age of Digital Reproduction - Micro-Rhythmic Relationships in Computer-based, Groove-oriented Music* to be published later this year (2010) but until that arrives the most in-depth piece of work in this area is Mark Butler's *Unlocking the Groove* (2006)²² which provides a good overall survey and focuses on rhythmic structures in what Butler refers to in general terms as EDM (electronic dance music). Butler makes some valuable observations about the prevalence in EDM of common even rhythms and diatonic rhythms exhibiting mathematical properties of maximal evenness and maximal individuation²³ and also about the characteristic anacrusic orientation in which elements of the texture have the role of leading energetically towards the downbeat on a variety of structural levels²⁴. However some of his other theoretical interpretations are problematic from my viewpoint as a practitioner because they invoke an inappropriate Eurological²⁵ hermeneutic model to justify the dismissal of rhythmic details. Butler takes a stance that aims to avoid these issues somewhat by his invocation of multiple specific viewpoints as being required in understanding the topic at hand, positing his viewpoint as one of many possible - that of a 'listener' or 'perceiver'. The type of listeners' viewpoint that Butler supplies here seems somewhat inappropriate to the task however, in that it incorporates a model of rhythmic and metrical expectations that stems from music theory based on the common practice period of music rather than one that acknowledges the Afro-diasporic roots of EDM. The work of Lerdahl and Jackendoff²⁶ is drawn upon as are developments from it in the field of Rock music analysis by David Temperley²⁷ that lead Butler to interpretations that involve the dismissal of rhythmic distinctions that I consider critical components of the groove at that point in the musical structure.

²¹Philip Tagg, 'From refrain to rave: the decline of figure and rise of the ground', *Popular Music*, May (1994), 209-222.

²²Mark Butler, *Unlocking the Groove* (Bloomington IN: Indiana University Press, 2006).

²³ *Unlocking the Groove*, 81-5.

²⁴ *Unlocking the Groove*, 93.

²⁵ George E. Lewis, 'Improvised Music after 1950: Afrological and Eurological perspectives' in *Black Music Research Journal*, Vol. 16, No.1 (Spring, 1996), 91-122.

²⁶ Fred Lerdahl, and Ray Jackendoff, *A Generative Theory of Tonal Music* (Cambridge, Mass.: MIT Press, 1983).

²⁷ David Temperley, 'Syncopation in Rock: A Perceptual Perspective' in *Popular Music* 18, No.1, 18-40.

Butler also points out moments in EDM where the rhythm is underdefined and indicates ways in which these can be interpreted according to a common-practice based model as (temporarily) suggesting alternative interpretations of the meter either in its cyclical duration or its phase (the location of the downbeat). Where my understanding diverges from this is in conceiving of the groove as an ongoing presence throughout the musical experience of Techno with these moments that Butler singles out as places where the clarity of meter is reduced by the removal of the kick drum from the texture. My position on this is that these are places where the focus of the groove is less clear from the texture but the logic of the groove is still understood to be in place. The difficulty in clearly discerning it caused by the exposure of cross-rhythmic elements without their anchoring beat creates a tension in the listener that is resolved in the cathartic return of the kick drum, which once again makes the groove's logic explicit. Butler interprets the exposed cross rhythms in the breaks as pointing to a different downbeat which is then shifted back when the kick drum returns and names the phenomenon 'turning the beat around' (TBA), however, for anybody involved in producing or DJing this type of music, it is important to think in terms of a single correct orientation of the beat (the underlying groove). In order to work with the material and play in this way with the listener's expectations it is important not to lose track of the groove, to perceive the cross-rhythms as cross-rhythms with reference to the meter regardless of whether the meter is overtly expressed in the texture at that moment or not. Doffman²⁸ describes listeners who (mistakenly) perceive a similar phenomenon of TBA in the context of Jazz performance intros as 'non-literate' because they interpret according to an inappropriate model.

Butler mobilises a number of dismissals of small rhythmic distinctions in support of his interpretations²⁹ but to me these distinctions are essential components of the experience of this music. In stating that 3+3+3 rhythms can be perceptually indistinguishable from 3+3+2³⁰ he is suggesting that the differences in groove between the two don't matter whereas I would indicate these differences are essential aspects of the music; as Duke Ellington neatly puts it: 'It don't mean a thing if it ain't got *that* swing' (my emphasis). Butler makes use of the idea of

²⁸ Mark Doffman, *Feeling the groove: shared time and its meanings for three jazz trios*, PhD thesis, Open University 2008, 111.

²⁹ Butler, *Unlocking the Groove*, 89, 133, 146, 156.

³⁰ Butler, *Unlocking the Groove*, 89.

ambiguity as providing an opportunity for positive readings that may dismiss some of the evidence rather than (more cautiously) interpreting these ambiguous passages as simply underdetermined expressions of the underlying groove logic – places where the groove is less focussed metrically towards the duple model prescriptive of this musical form. In considering Mario Più's *Communication*³¹ he describes part of it as an example of turning the beat around (TBA) 'unless the listener decides to hold on doggedly to a quarter note pulse'³² but I would suggest that attempting to hold on to the pulse is exactly the challenge presented by such a passage. The tension between the listener's internal pulse and the musical texture at this point is constitutive of the musical experience here. The listener is aware of the presence of an elusive groove logic hanging in the air like a question that gets answered when the beat kicks back in again. Being technologically delivered the groove's logic has authority due to its superhuman accuracy. When it is underdetermined we are not led to think that there is an error in execution as we might with human performers and thus we are challenged to follow its logic. In presenting these discussions Butler has achieved one of his aims, which is to highlight the complexity of rhythmic and metric deployment in EDM but his valorization of multiple specific viewpoints³³ seems to have led him away from evaluating the merits of the claims of these viewpoints in context. In his review of *Unlocking the Groove* Vijay Iyer³⁴ points these out as differences of Eurological and Afrological approach and indicates that the latter would be more appropriate given the historical connections between EDM and Afro-diasporic forms.

A heterogeneous sound ideal³⁵ has long been identified as a characteristic of many African and African-American musical idioms. In these types of textural construction it is common for more regular metrical parts to contrast with cross-rhythmic parts in making up the full arrangement. The removal of the kick drum in Techno frequently exposes these cross-rhythms and temporarily allows them to dominate, sometimes challenging attempts to clearly discern the previously established meter. In context, the listener is aware that this is a temporary

³¹ Mario Più, *Communication* (Warner-Chappell Music, 1999).

³² Butler, *Unlocking the Groove*, 146.

³³ Butler, *Unlocking the Groove*, 14-18. An attempt by Rick Smith of Underworld to indicate Butler's interpretation of TBA in their track *Cups* as an error was dismissed as being demonstrative of the different viewpoints of producer and listener, 217.

³⁴ Vijay Iyer, 'Review of *Unlocking the Groove*', *Journal of the Society for American Music* Vol. 2, No. 2 (2008), 269-276.

³⁵ Olly Wilson, 'The Heterogeneous sound ideal in African-American music', in Owens, Jessie Ann, and Cummings, Anthony M., (eds) *New Perspectives on Music: Essays in Honor of Eileen Southern*, (Warren, Michigan: Harmonic Park Press, 1992), 327-38.

suspension of clarity so it would be better to interpret this phenomenon as a window into the complexity of the groove, a momentary lifting of the bonnet that exposes the mechanics that have been driving the vehicle all along.

Keil Distinction

On the understanding, following Frith³⁶ and Peckham³⁷, that the fundamental activity in aesthetics is evaluation it seems fair to ask of musicology that it reflect the actual criteria of evaluation as operational in the artistic practices of both production and reception. The tools of traditional musicology that were developed around the repertoire of the common practice period have long been criticised as less than successful at aiding understandings of value in Popular music and music from other cultures (Keil 1966, Chester 1970, Shepherd 1982). In response to Leonard Meyer's work³⁸ Charles Keil³⁹ has proposed that in contrast to Meyer's 'embodied meaning', which is understood to derive from syntactic understanding of music as a text, that music is also valued for 'engendered feeling' derived from its subsyntactical details of expressive timing, dynamics and timbre which reside beyond the notated score and are only materialised in performance. Keil later developed his theory by introducing the term 'participatory discrepancies' to refer to the small deviations from metric regularity in rhythm, pitch and variations in timbre which occur in performance, suggesting that 'Music, to be personally involving and socially valuable, must be 'out of time' and 'out of tune'⁴⁰ (Keil 1987, 276). The inclusion of the word 'discrepancy' in this rather awkward term has led some researchers⁴¹ into conflating it with error and inaccuracy rather than desired expressive features. As these details arise by design in my music rather than as the result of the process of human performance they are, *a priori*, analytically distinct entities and I prefer to refer to them specifically in terms of their means of

³⁶ Simon Frith, *Performing Rites: On the Value of Popular Music* (Massachusetts: Harvard University Press, 1998).

³⁷ Morse Peckham, *Man's Rage for Chaos* (New York: Schocken 1967).

³⁸ Leonard Meyer, *Emotion and Meaning in Music* (1956), 'Some remarks on value and greatness in music' in *The Journal of Aesthetics and Art Criticism*, Vol. 17, No. 4 (Jun., 1959), 486-500.

³⁹ Charles Keil, 'Motion and feeling through music' *The Journal of Aesthetics and Art Criticism*, Vol. 24, No. 3 (Spring, 1966), 337-349.

⁴⁰ Charles Keil, 'Participatory Discrepancies and the Power of Music' *Cultural Anthropology*, Vol. 2, No. 3 (Aug., 1987), 276.

⁴¹ Vijay Iyer, 'Embodied Mind, Situated Cognition, and Expressive Microtiming in African-American Music.' *Music Perception* 19(3) (2002), 387-414. Taylor, Tim, *Strange Sounds* (New York: Routledge, 2001), 172)

execution i.e. shuffle, TB303 pitch slide, microrhythmic offset, jitter, etc. rather than using Keil's term 'participatory discrepancy'.

According to Keil the characteristics attributed the most value in traditional musicology with its basis in the canon of Western Art music and the ontological primacy of the score are those of 'embodied meaning'. When considering music outside of that tradition, especially African-derived forms, as Keil points out, the syntactic approach to understanding is particularly insufficient as it is the second, 'engendered feeling' set of characteristics, which have priority in these styles which generate form through the repetition and variation of a basic framework⁴². To illustrate the type of details to which he refers that generate engendered feeling Keil follows his exposition of this distinction with a detailed discussion of how different styles of Jazz bass players and drummers have different feels individually and in combination as a result of their individual approaches to striking notes and the resulting variations from metrically precise timing locations.

In considering Keil's distinction it is worth noting that the division implied is an analytical one invoked to draw attention to the latter set of characteristics and that what is actually being sought is a balance of consideration between the two that is appropriate to the particular music under consideration.⁴³ Indeed I would posit that performance inflections (or participatory discrepancies) are essential to the enjoyment of works wholly within the classical tradition that is central to Meyer's arguments. Despite musicological valorisation of the structural sophistication of such music and notions such as 'adequate listening' which prescribe a normative response to such music there has been no significant uptake of the possibility of an 'ideal' performance of such music by mechanical means – no favoured Platonic sequencer renditions. The world of classical music is as performer- and conductor-focused as it was before the introduction of sequencer technology, which suggests that the implicit values in this field are closer to Keil's second category than might readily be admitted. Music that is purely syntax appears to be available but unwanted.

⁴² Andrew Chester has termed this approach 'intensional' in contrast to the 'extensional' development characteristic of the Western Art canon. 'Second thoughts on a rock aesthetic: The Band', *New Left Review*, 62 (1970), 75-82.

⁴³ Charles Keil, 'Motion and feeling through music' *The Journal of Aesthetics and Art Criticism*, Vol. 24, No. 3 (Spring, 1966), 345.

It is important to emphasize that if the two categories are conceived of as hypothetical polarities any actual musical experience will be located somewhere along the axis between the two. In the case of Techno the aesthetic is frequently so minimal in deployment of syntactic structures that the location tends to be particularly far towards the ‘engendered feeling’ pole when considered relative to other musical forms⁴⁴. As a result, evaluating Techno in architectural, syntactical terms is particularly problematic, as it would preclude attention to the key elements that give this music its power – its articulation of sound and groove. As a result I will be attempting, in this commentary, to draw attention to the efforts made towards achieving the results that fall into Keil’s engendered feeling category: specific sounds, machines, and samples, and specific microrhythmic, spatial and timbral relationships.

Groove

In theorizing my practice I make use of the concept of the groove. It operates as a defining logic for my musical decisions. The concept has several dimensions, with process (grooving, getting into the groove) arising from cognition of a musical object; the groove.

Groove as object

Although the groove takes place in the perception of the listener and has, therefore, a subjective aspect, it is rooted in the qualities of the musical object instantiating it and its reception requires certain material qualities of that object, namely that it is rhythmic, cyclical and, to some degree, percussive. The material constituents of the groove as a musical object can be differentiated (with increasing specificity) in terms of the syntactical patterns of its parts, their component sounds and the subsyntactical inflections of timing, pitch and timbre that modulate those sounds. The exact positions of notes with respect to the overall meter and to other notes are significant in defining a groove but so also are the durations of the notes and their spectral morphology, particularly the transient details. Groove is an emergent property of the whole texture.

⁴⁴ Within the Portfolio I would indicate *Swerve Angle* as being positioned furthest towards this engendered feeling pole of the axis because of its reduced level of structural articulation.

Mix engineer Michael Stavrou⁴⁵ has noted interactions between note timing and dynamic level as aspects of rhythmic feel. Discussing possibilities for dealing with poorly timed recorded performances, Stavrou suggests that the perceived timing of a recorded part can be modified by alteration of its level with respect to the texture with pushed notes sounding more correct with respect to the groove by increasing their level in the mix and vice versa. The significance of volume relationships within the texture as well as envelope shape and transient detail to the perception of groove indicate that care must be taken in the use of compression so as not to have undesired effects on its character.

Groove as process

The notion of groove works on many levels as a conceptual access point to my activity. It is the patterning of time by music and it can be understood in detail on an analytical material level but groove is enabling on a participatory level also, sufficiently so that it implies participation when I employ it in my practice. The notion of groove implies kinesthetic listening – it is intimately connected with the sense of motion implied by dance even when that sense is entirely mental and not acted out in physical motion. The act of ‘getting into the groove’ has been described in terms of entrainment⁴⁶ (the synchronization of two oscillatory systems) but this does little to capture the sense of involvement experienced. Grooves are about a shared sense of musical time (even if it is between one person and a recording...) and imply fluidity and integration, not disjuncture and alienation. In the Techno context the groove is a shared framework for individual action, (this is not line dancing) which is valued for its ability to occasion a sense of community. The sense that there are multiple parallel perspectives on the moment’s flow that can be embodied in kinetic response is engendered by the groove.

The rooting of groove in kinesthetic processes demands a functional logic of the musical texture. A sense of groove is fundamental to appreciation of this music. Intelligently handled it conveys a sense of that intelligence to the experienced listener. Conversely, it displays a jarring stupidity when poorly handled. The groove

⁴⁵ Michael Stavrou, *Mixing with your Mind* (Mosman NSW: Flux Research, 2003), 235-237.

⁴⁶ Martin Clayton, *Observing entrainment in Indian music performance: Video-based observational analysis of tanpura playing and beat marking* (PhD Thesis, Open University, 2005), Doffman, Mark, *Feeling the groove: shared time and its meanings for three jazz trios* (PhD Thesis, Open University, 2008).

must function. Events on the timeline must make sense within the logic of the groove or the flow of the music is spoiled.

The proposition that groove arises out of the interaction of multiple human performers, which often emerges from studies of groove that focus on the Jazz repertoire⁴⁷ is limiting as it excludes both electronically-realized grooves and those produced by a single human performer. I prefer the broader conception that, emphasizing the cognitive aspect of groove, draws the conclusion that groove, like beauty, is in the perception of the beholder. This permits a groove relationship with a much wider range of rhythmic sources including sequencers and drum machines as well as other mechanical and natural processes. Rather than interpreting the feel of a metrically precise machine performance as lacking in groove I posit that this is a type of groove; a particular rhythmic feel with its own sensations and connotations. It is also worth noting that it would be incorrect to assume metrical precision as automatically resulting from machine performances as different technologies have different degrees of regularity in this regard which can be used as compositional variables as illustrated in the discussion of the microrhythmic construction of *Trajan* in Chapter Three.

Groove as interface

I choose to address my music to specific contexts that I see as representing opportunities to use the groove as an interface, a meeting point between my sound and other sounds, and between my perspective on sound and that of others. It is an element of musical function; simultaneously an organizing principle for musical parts and for dancing bodies, integrating them into their contexts. It enables modularity in production and deployment by acting as an interface between interchangeable parts. As an interface the groove is a point of contact that allows information to flow.

Conceiving of groove as an interface at the level of music production entails auditioning prospective elements within the texture and assessing them with respect to the groove and their effect on it. Even the most apparently disparate of sonic gestures can be thrown into aesthetic relation by finessing their relationship

⁴⁷ Mark Doffman, *Feeling the groove: shared time and its meanings for three jazz trios* (PhD Thesis, Open University, 2008).

within a groove⁴⁸. The co-presence of what Butler describes as metrically dissonant⁴⁹ layers is satisfying if their total effect is logical within the structure of the groove. Its revelation by the removal of the groove-anchoring kick drum can temporarily throw this ambiguous texture into stark relief as in the main breakdown of *Frank – Suade and Gamma* mix 2:37 – 3:32 which temporarily brings the triple-meter elements of its groove into a more equal relationship with the duple which otherwise dominates. In general, decisions regarding the logic of the groove draw on accumulated empirical social experience – knowledge gained through embodied physical experience on the dancefloor and in the DJ booth.

Within the practice of DJing the groove operates as an interface between one track and another track in the mix with the information from each component combining with that of the other into an emergent whole. This interface is not guaranteed. Success depends on the correct choices with respect to the relationship at hand, which must be handled dynamically by the DJ. Its possibilities depend on the DJ's skill and equipment as well as the potential of the material itself. Wholly incompatible choices will resist attempts at fluid mixing whereas partial incompatibilities can be overcome by skilful manipulation. If two tracks will mix well in the bass and midrange but have clashing hi-hat feels it may be possible for the DJ to mix the lower frequencies freely while ensuring that only one of the two hi-hat patterns sounds at any given time. This depends on the presence of suitable equalization features on the channels of the DJ mixer. Without these facilities or without the necessary awareness in the mind of the DJ, based on accumulated social experience, satisfactory mixing of these tracks is rendered impossible.

The groove interface allows for modularity in construction of the mix such that each component (instrumental part in production, track in DJing) could be substituted with another as long as it has a functioning interface; a compatible groove. In both situations the interface depends on the technical possibility of successful synchronization and therefore relies on enabling technology. The

⁴⁸ I would put forward the 'bicycle chain' sound heard in *Citadel* (6:43-6:51) as an example of this. Despite its rhythmic and spectro-morphological complexity, its exact placement generates a fluid, anacrusic gesture, which I feel as a contributing element to the articulation of the groove at this point in the arrangement.

⁴⁹ I am resistant to Butler's description of metrical relationships with ratios such as 3:2 and 4:3 as dissonant or antimetrical when the same ratios employed in harmony are referred to as consonant. It would perhaps be better to reserve those terms for more complex ratios or inharmonic relationships rather than these simple ratios that result in cross-rhythmic interplay rather than a more antagonistic relation between parts.

difficulty of beat-matching recordings of human-performed grooves is sufficient to preclude it as a practical possibility for DJ performance.

Considering the groove as an interface with the dancefloor entails attention to the flow of information between the DJ and the crowd via the sound of the records played and the kinetic response of the dancers. The groove is what engenders the physical response through movement and presence on the dancefloor. This response then informs the choices made by the DJ with regards to what and how to play. The choice of type of groove will be responded to by the dancefloor according to taste. In this way the choice of groove structure by the producer is a choice about which scene(s) to interface with.

In Chapter Three I will discuss specific details of implementation in the construction of grooves.

Chapter Two - Portfolio Overview

The Composition Portfolio can be divided broadly into two sections: earlier pieces written in Newcastle, UK (*Fast Breeder*, *POM*, *Targa*, *Swerve Angle*, *Frank – Suade* and *Gamma mix* and *Frank – Tycho mix*) and later pieces written in Barcelona, Spain (*Felix*, *Trajan*, *Baikal*, *Citadel*).

In composing the earlier tracks I was focused primarily on exploring intellectual approaches to the generation of musical structures, whereas the later pieces mark stages in a transitional phase after which my sensibility has emerged as an orientation towards valuing the music for the relationship I could personally have with it on a much less rational, more bodily level, both emotionally and physically through motion and feel in terms that reflect to some degree the Keil distinction or Christopher Small's⁵⁰ division between considering music as text and music as process. In terms of music production this has enhanced my focus on groove and tone and as a result I have learned a great deal more about techniques of music production during this period as a result of having quite different questions in mind when making decisions about sound.

In approaching the earlier tracks I sought complexity of the syntactical aspects of composition whereas later this shifted towards an emphasis on negotiating the material sonic relationships between sounds timbrally, temporally and spatially hence the enhanced focus on achieving specific results requiring greater production finesse. In working on the earlier pieces, I was aiming to generate intriguing structures by appropriating techniques from other genres as in the Reich-esque hocketing of *POM* and Public Enemy-influenced sample-complexes of *Targa* and *Swerve Angle* whereas with the later pieces I have turned towards intuitive approaches to musical material allied with an exacting approach to execution. The cultivated simplicity of design in the music of Kraftwerk shows that sophistication does not require overt complexity. The lessons learned in working through my earlier approaches have become naturalised into my practice and the techniques that were in the foreground then have taken their place amongst a palette of possibilities I draw from in my current practice. Thus the gradual transformations of filtered, rhythmically triggered sample patterns that dominate the sound of *Targa*

⁵⁰ Christopher Small, *Musicking: the Meanings of Performing and Listening* (Hanover, NH.: Wesleyan University Press, 1998).

and *Swerve Angle* are reprised in a much more fluid relation to the overall texture in the snare figurations of *Felix*. This shift in my compositional concerns has been towards more tactile approaches generally; appreciating the bodily pleasure of manipulating the materiality of the sounding cross-rhythms, modulating their flow in time by physical control via my chosen interfaces as in *Citadel* (discussed in the following chapter) or by creating parts vocally as in *Felix*.

The other main development in my practice has been the increasing specificity of the technological means at my disposal. Working on the earliest pieces (*Fast Breeder*, *POM*) I was operating in a general purpose studio whereas by the time of the production of *Trajan* I had a range of choices of specialized technologies with which to address each element of the process and had developed a sufficiently sophisticated awareness of the range of their potentials to make an informed choice from amongst them. These technologies will be discussed further in the following chapter.

The Tracks

In chronological order of completion

Fast Breeder

135 BPM

1999

This track is the third version of an aesthetic response to what I interpreted as a dialogue between Jeff Mills in his track *Lifecycle*⁵¹ and Surgeon with his *Magneze*⁵². I've chosen to include it in the portfolio as an example of a formative track that consciously engages with its influences. The previous two versions of *Fast Breeder* have not been included as they are outside the timescale and also unfortunately contain irreparable flaws that prevent me from wanting to present them publicly. The relationship between *Fast Breeder* and Mills' and Surgeon's tracks is discussed further in Chapter Three.

This version is based on a single measure sample of the synth part from the first version of *Fast Breeder*. The looped sample can be heard solo from 3:33 subject to treatment with stereo phasing combined with the modulated band-pass filtering. This third version of *Fast Breeder* was an exercise in digital editing after the timbral excesses and quasi-Serialist explorations of the previous two versions and is markedly discontinuous relative to the later pieces in the portfolio. The choppy, intercut sections of this track (1:39-2:08 and 2:37-3:05) in which contrasting material is horizontally juxtaposed reflects crossfader cutting between tracks in DJ practice as does the cyclic alternation between beats every 8 bars from 4:02 onwards. This alternation of similar beats with different sounds is not something I'm aware of being used in other Techno tracks.

The discontinuous nature of *Fast Breeder* makes it suitable for a section in a DJ set in which the pace of structural change is relatively rapid in contrast to other areas of the set characterised by more gradual development. The cutting written into the track is likely to complement similar gestures between tracks made in performance; as one DJ reported to me about playing this track 'All the cutting in it makes me sound like a much better DJ than I really am'⁵³.

⁵¹ Jeff Mills - *Waveform Transmission Vol. 3* (Tresor, 1994)

⁵² Surgeon *Magneze* (Downwards, 1995)

⁵³ DJ Andy Gordon, private conversation.

POM

137 BPM

1999

POM was the first track I wrote using both Roland TR808 and 909 drum machines together and so it began as an exploration of rhythm pattern design using their sounds and interfaces. Once I had established the rather nervous antiphonal drum groove I sampled a single note from a Roland SH-101 into an Emu sampler and then sampled a second copy of the same note with added Lexicon 300 reverb. I then combined and manipulated these two samples to make the repeating half-bar cyclic pattern with its stereo reverse reverb anacrusis. The sampled SH-101 note was then re-used for the Montuno-esque melody but was thickened by layering with two additional copies tuned slightly above and below the original pitch resulting in a slightly enharmonic quality reminiscent of a steel drum. This melody was then subjected to transformational processes reminiscent of Steve Reich's *Six Pianos*.

In *POM* I have appropriated and developed a compositional technique from the Minimalist repertoire. In Steve Reich's *Six Pianos* (1973) a cyclical pattern is established and then juxtaposed with a phase-shifted version of the same cycle in order to produce shifting resultant patterns. In *POM* I have done a similar thing but in this case as well as being phase-shifted the pattern is subject to transposition also. The initial version of the pattern starts entering the texture gradually around 0:13. It is then joined by the second version around 0:57 until they are both fully established at 1:38. The first version then fades away until 3:02 when the third version begins to fade in. These melodic transformations are akin to Minimalist process pieces in their manner of unfolding – as gradual processes rather than having been shaped by performative dynamics – clear, straight lines of sonic translation against the groove structure. This differentiates them from the approaches taken in later pieces such as *Citadel* where the tonal interplay of separate pitched elements was rendered in real-time by hand in reference to inner perception of timing (see Figures Two and Three in Chapter Three).



Example One: *POM* melodies in order of appearance.

Targa

134 BPM

1999

Targa was inspired by a combination of factors: Jeff Mills *Purpose Maker EP*⁵⁴, with its construction based on sampled fragments arranged in short cycles, and also by Public Enemy's producer, Hank Shocklee of the Bomb Squad, talking about their approach to re-using musical material. Mills' record appealed to me as a kind of sonic equivalent to a Mark Rothko painting – a continuous, strong material presence with very little in the way of articulation. A very pure kind of groove – originally designed for use as a DJ tool – material to glue other records together with in the mix. The effect of this production recalls Richard Middleton's observation about the force of repetition pleasurably obliterating the significance of content.⁵⁵ At the time there was nothing else quite like it and I, like many others, bought two copies so that I could mix between all four of its tracks in any combination. *Targa* takes the sheer material presence from these two influences and builds a suitable structure for playing out in my sets at Newcastle Techno events; an exercise in intensity and twisting sound, shaped energetically in an arch form, building to 3:08 and then holding for a minute before gradually dissipating again. The construction of *Targa* is discussed further in Chapter Three.

⁵⁴ Jeff Mills, *The Purpose Maker* (Axis, 1995)

⁵⁵ Richard Middleton, 'In the groove or blowing your mind? The pleasures of musical repetition', in *The Popular Music Studies Reader*, Eds. Bennett, A., Shank, B., and Toynbee, J., (Abingdon, Routledge, 2006), 20.

Judging this piece retrospectively it strikes me that the framing sounds of TR909 kick and hi-hat are not as well suited to the context as I would have them be if I was producing the track now. Both seem in need of small amounts of added sound to thicken them up and give them more punch to suit the rest of the texture. This suggests to me the possibility of experimenting with *Targa* in the context of a DJ mix in search of solutions.

Swerve Angle

138 BPM

Completed August 2000

This track is a remix of the Mindtours track *Swerve*. It represents a development of the method employed in *Targa* (see Chapter Three for a detailed account) but differs from it in that all of the sampled fragment patterns were chosen for their ability to be manipulated into a coherent relationship with the *Swerve* riff, which can be heard unaccompanied in the opening bars of the Mindtours original. In a similar fashion to *Targa* the form has been built up through subjecting multiple layers of percussive sampled material to gradual linear processes of transformation through filtering.

As the longest track in the portfolio *Swerve Angle* exceeds the optimum length of around seven minutes for cutting to vinyl and as a result the record fades the track out before its end whereas the CD version allows its full span. The closing section of the track involves a gradual dissolve into synthetic ambience created by vocoding with the full texture of the track acting as modulator and a synthesized chord as carrier providing continuity between textures as the exchange progresses.

In preparing the final mixdown of *Swerve Angle* I found that I was most pleased with the results when the original *Swerve* riff sample that the track was constructed around was removed from the texture. The outcome is a remix that contains only a negative imprint of the groove of the original riff. The relationship between this remix and the original is distinct in their rhythmic morphology but is expressed in the form of an absence – the patterns that have been used leave spaces in the texture which would have been filled by the *Swerve* riff. This relationship becomes most apparent when the remix is combined with the original version of *Swerve* in a DJ mix where the patterns dovetail perfectly. This unusual situation is one example

of the novel ways in which a groove can function as an interface. Approaches to remixing are discussed further in the next chapter.

Frank - Suade + Gamma mix

137 BPM

Completed March 2001

Frank - Tycho mix

137 BPM

Completed May 2001

This track is a remix of Artwhore's *Frank*. The original version of *Frank* arose from Artwhore's engagement with a vinyl-based sonic recycling approach that parallels that taken in my own work. In their work at that time Artwhore employed physical and electronic manipulation of records deemed to have no value to them as a means of producing new material. In contrast to my practice at that time, which was oriented towards exploring samples from (still cared-for) vinyl and their transformational possibilities within the sampler. Artwhore were working in a large, mainly analogue electronic studio and their predisposition was towards physical manipulation. In the case of *Frank* they subjected a Frank Sinatra album to various types of abuse including applying stickers to the surface to cause the stylus to stick to repeating a single groove and also cutting / scratching the surface of the record radially to generate strategically placed glitch percussive events into the 'stuck-record' loops. Samples taken from the outcome of this process were then combined with manipulated Roland TR808 drum machine samples and an orchestral chord sampled from the Frank Sinatra record (prior to its abuse) to produce the finished piece. The finished result bears little trace of its analogue past however, as in the final mixdown the texture is dominated by the chaotic sounding processed 808 samples.

When I became aware of Artwhore's work I was intrigued by the parallels with my own interest in using vinyl records as a source of new material and decided to base a new 12" release on Adapted Vinyl on this particular track. Amongst all of the music that they had available for release the non-diatonic melodic and harmonic structure of *Frank* appealed to me as having the right balance of clarity and intrigue. Within these structures I perceived the potential for building a new

version suitable for club play in the tradition of driving, Detroit Techno-style tracks based on chordal themes such as actual Detroit records like The Martian's *Sex in Zero Gravity*, Missing Channel's *At the Edge of Infinity* and Underground Resistance's *Amazon* or UK respondents such as Funk D'Void's *V-ger*, Vince Watson's *Aurelon* and Luke Slater's *Love*. Use of these chordal themes often gives rise to these records being considered soulful or emotional, an aspect that is explicitly referenced in the title of Funk D'Void's *Emotional Behaviour*, which is another, later example of this type.

The original version of *Frank* only existed in a final mixed form so no access was available to its individual layers. In order to aid in decoding the construction of the original I asked Artwhore's Steven Legget (aka Gamma) to join me in the studio. As a result of spending the day in the studio together Steven and I decided to collaborate on a remix in addition to my working on another mix independently. A third remix for the release was provided by Desmond Kodak and can be heard on the vinyl record of the *Frank EP* (ADAPT04) but is beyond the scope of the portfolio. After the completion of the collaborative (Suade and Gamma) mix of *Frank* I set out to create another remix for use in a straight techno⁵⁶ set for the interposition of a downshift in groove energy to a broken beat where the return to the 4-on-the-floor beat is made within the track itself instead of being handled as the transition between two records by the DJ. Alternatively it could be used to allow a smooth transition from a set that has been all broken beat into a straight, 4-on-the-floor groove. The approach taken to the construction of both of the *Frank* remixes I was involved in are discussed in Chapter Three.

Felix

135 BPM

Completed August 2004

Felix emerged from experimentation with a variation on the compositional technique employed in many of the earlier pieces; the use of a fragment of existing musical material. The creation of *Felix* was initiated by my desire to explore the possibilities of creating a hybrid instrument through the combination of stereo software sampler (Native Instruments Kontakt) and stereo analogue modular synthesizer processing (Roland System 100m). This is discussed further in Chapter

⁵⁶ I use the term here to differentiate the set from one that contains broken-beat rhythms.

Three. Having hooked up this system I created the basic pattern that can be heard accompanied only by kick drum from 0:57 with the low-pass filters quite closed at that point but opening from there as the track progresses.

The composition of the other melodic parts of the track, of which there are many, more than any other track in the portfolio, was approached using a method that, although it is probably one of the oldest compositional strategies, was novel to me at the time for use in the context of writing techno. In this case I improvised vocally until I found a melodic line I liked and then programmed it into the sequencer before choosing a sound to realise it. This procedure was followed iteratively for the bass line and the many small decorative parts that enrich the texture as the track unfolds. I didn't find it a suitable approach for writing an acid line⁵⁷ however as I wanted a more rhythmic, percussive effect. For that part (which can be heard entering the texture as a lead part where the main break begins at around 3:36 and continues until it plays the last note of the track) I resorted to improvising on a keyboard (to contrast to the lyricism of the vocal approach) and selecting a four bar section from that improvisation that then had to be painstakingly programmed into the Roland TB303 to take advantage of its particular qualities⁵⁸.

The style of this track is appropriate for use in an energetic, emotional Techno set of the sort played by DJs like Funk D'Void, Vince Watson, Dave Angel or Jori Hulkonnen who play high energy sets but with soulful/emotional sections where a track like this could play a role. It has the character of a warm, melodic House track but at a faster tempo (135bpm) than would be typical for House (125-128bpm).

It should be noted that due to the loss of a computer I was unable to put the finishing touches to the production of *Felix*. The extant version is a preliminary draft and contains a few flaws such as the audible crackles in the first few minutes. Nevertheless I felt the track itself to be sufficiently valid as to warrant publication and inclusion in the portfolio.

⁵⁷ An acid line is a commonly used term for a squelchy synthesizer lead playing a prominent riff, which is usually subject to extensive manipulation of its filter and envelope settings. The archetypal instrument for producing such a line is the Roland TB303 and the term stems from its deployment in Acid House.

⁵⁸ See discussion of *Trajan* later in this section for details of this.

Citadel

122 BPM

Completed January 2005

The aesthetic space for this track arose from my experience of DJing at chiringuitos (beach bars) on the coast around Barcelona. In the early part of the evening (i.e. up until midnight) nobody's dancing yet as they're still eating and talking but they still want music with beats to listen to. Writing for this site suggested to me a more languid mode of address and slower tempo although the more active kick drum pattern used here can give the impression of greater velocity than some of the faster tracks in the portfolio. The sounds I've chosen for *Citadel* exhibit a tendency towards lightness and delicacy. With the tracks in the portfolio intended for the club dancefloor I generally aim to deliver a sense of weight and thickness with all of the sounds in order to engender a markedly kinetic response whereas here I've deliberately limited the sense of power behind the sounds for a more gentle, buoyant texture. In the case of the drum sounds this was achieved simply by choosing appropriate samples whereas for the main synthesizer patterns the choice of Native Instruments Reaktor software for sound generation rather than attempting commensurate results using analogue technology had the desired effect with the often-derided thin sound of digital synthesizers acting as an asset in this case.

In terms of execution this track is distinct from the rest of the portfolio in that it is based around a single improvised performance, which was subsequently built upon to create the finished track. This is discussed in detail in Chapter Three.

After finishing this track I realised that there were no samples from records involved and I felt that I wanted there to be some element of that type within the texture for ideological reasons despite not having felt the need to do so purely for sonic reasons so I experimented with mixing some other records against *Citadel* until I found something that I could weave almost imperceptibly into the texture. This element was then added into the arrangement subject to some dynamic filtering. I wanted to include a literal point of contact with other music as a reflection of DJ culture and as a symbolic act of resistance to the corporate strangleholds on intellectual property represented by the operation of the current laws on copyright.

Baikal

131 BPM

Completed April 2005

In comparison to the other pieces in the portfolio *Baikal* is an exercise in restraint with the texture being built from just a few elements: synthetic organ with delay effects, kick drum and percussion ensemble with occasional decoration from mark tree chimes. The other key musical agent, only heard indirectly, is the compressor that handles the relationship between the other elements dynamically as the piece unfolds. *Baikal* is structured around a simple gesture from high to low frequencies and is designed as an arresting, pausing moment within a fast-paced DJ set.

The compositional essence of this piece lies in the interaction between the lively percussion ensemble with its energetic semiquaver pulsation and the slow organ progression whose shortest durations equal one measure. These two elements form continuous streams in the composition rather than being broken into sections and are subject to only subtle variations as they proceed. The organ part plays a simple, spare harmonic progression based on a I, VI, III, I turnaround in C minor but only played using open 5ths (no third).

The particular use of compression in *Baikal* achieves an effect I haven't heard used in quite this way anywhere else. The entire mix is fed through a Native Instruments Reaktor software compressor. The threshold of this compressor is set such that most of the time it is providing occasional bursts of gain reduction less than 1dB but when the very lowest notes of the organ progression sound they have much greater volume than the rest and this triggers the compression to reduce the volume of the entire mix such that the percussion and other higher frequency sounds are squeezed back and creating an effect that I would describe as the mix 'bulging at the seams' under the weight of the heavy bass note. This bass overload breaks the flow of the music in a way that seems opposite to the usual gesture in Techno, which is to remove the bass and/or kick drum anacrusically to create anticipation of their return to the mix, which, when it occurs is typically on the first beat of the bar to an energetic response from the dancefloor. The bass overload breaks in *Baikal* arrest the flow of the rhythm and seem to make the groove drag with bass-heaviness.

I think of this piece as being best suited for use at the end of a 5-6am DJ set where the music has been at a high level of intensity for over an hour and the set needs to change, to lift and become lighter. Previous music will perhaps have had increasing waves of high-energy breakdowns and returns with contrasting sections between short loop driving sections and variegated with longer stretches of gradual transformation. The percussive texture of the opening of the track will allow the DJ to introduce this track from the top of the frequency range or with mixer equalisation flat and then have the midrange gradually introduce itself from the top down over the first 68 measures (approx 2 minutes) by means of its filtering within the mix.

Trajan

128 BPM

Completed May 2005

In creating *Trajan* I set out to achieve a truly satisfactory sonic impact. With my previous work I was never completely happy with the way the tracks sounded in clubs and in the context of a DJ mix. I was aware that other producers were achieving more punch and clarity, more definition to their grooves. Some time before the composition of *Trajan* I had had the opportunity to hear Kraftwerk perform live. At the beginning of their set I was struck by the impact of their arrangements as heard through the loud, high quality club sound system at Sala Razzmatazz in Barcelona. The elegant simplicity and spaciousness of their arrangements conveyed a civilized intelligence and struck me as the ideal type of texture for deployment over a large sound system in a big room. In writing *Trajan* I determined to bring the lessons of that experience to bear in my own production.

The first step in approaching this goal was the construction of an arrangement with a clear distinction between the roles of all of the parts. In contrast to much of the material in the portfolio *Trajan* has relatively little contact between the separate sounds. Each is heard quite distinctly in the mix and the patterns they play have been constructed such that each includes space for the others to sound. The arrangement was built around the tritone melodic riff that plays throughout. The bass line was written in my head as a Roland TB303 part including its distinctive pitch slides and programmed directly into the TB303. This choice, along with the

use of a Roland TR909 shuffled closed hat pattern⁵⁹, is what lends the groove its ‘old-school’ quality, reminiscent of the feel of Probe Records releases from the early 1990s. The sound of this track is timbrally quite distinct from those records however. The sequencer of the TB303 is unique⁶⁰ in that it has the ability to program a slide between successive notes which differs from the usual portamento or glide feature found on synthesizers in that the slide in pitch begins during the previous note and arrives at the pitch of the new note on the exact (semiquaver or quaver triplet) subdivision of the beat. This highly characteristic slide feature is one of the keys to the particular appeal of this iconic instrument. The point-focused relationship that this pitch slide has with the groove renders it appropriate for contributing to a ‘tight’ feel whereas the conventional portamento that, by technical necessity⁶¹, occurs after the attack of the second note of the pair connected by the slide, has the effect of increasingly defocusing the groove the more pronounced it becomes. In producing *Trajan* I wanted to use the characteristic slide effect of the TB303 but not the sound that it produces so I took advantage of its control voltage output and used that to drive the oscillators of the Moog Modular, detuning a pair of square waves for each side of the stereo spread before separating the signal into upper and lower frequency bands with a crossover around 180Hz and panning the left and right channels of the lower part to the centre so that the bass and sub-bass are presented equally to both speakers for greater clarity and also for avoiding tracking problems when cutting to vinyl.

Of all of the pieces in the portfolio *Trajan* has had the greatest amount of time spent on adjusting the character of the individual sounds with the bass and kick drum in particular being considered and reconsidered over a period of weeks before arriving at their final form. In working on all of the sounds here I focused my attention on them in a specific way, considering them sculpturally in terms of the qualities of spatially arranged physical objects. In doing so I became aware of the need to use various subtle processes to achieve the necessary timbral qualities that defy verbal description but that I think of by analogy with ‘taking the same object but lighting it more brightly or with more contrast’ or ‘printing the image of the object on metal or on felt’. The actual processes used to achieve these results

⁵⁹ The microrhythmic feel of *Trajan* is discussed in Chapter Three.

⁶⁰ Except of course for accurate TB303 recreations that feature a sequencer such as the Audiorealism Bassline software instrument.

⁶¹ Other than in the case of the Roland TB303, synthesizer portamento is featured independently of sequencer functions and is thus unable to initiate a slide in pitch until the new note is already being sounded.

included fairly standard ones such as equalisation and compression but also more exotic ones such as tape layback⁶², phase rotation using all-pass filters, as well as the use of gain stages of mixing desk channels, triode and pentode valve preamps, FET amplifiers and compressors (without dynamic gain reduction). These processes were rendered far more useful by employing them in parallel with each other or with the original signal. Parallel processing was also used to treat separate frequency ranges of the same sound in differing ways e.g. the kick drum sound whose upper frequencies (above around 800 Hz) have been shifted earlier in time by a few samples relative to the lower frequencies to give more bite.

The percussion sounds were chosen and developed by focusing on how far forward they could be in the mix and keep the groove in balance. As the bass sound is dark and sustained it suited the percussion to be hard sounding, short and penetrating to cut clearly through without taking up a lot of space, which would obscure the bass. Likewise a bright, clicky kick drum was chosen whose fundamental frequency is around 65Hz and sits in its own space in the frequency spectrum between the first and second harmonics of the main bass notes at 43-46Hz and 86-92Hz respectively for clarity. In order to enhance the separation of the bass line and the kick drum the bass line (which otherwise would be a continuous drone without dynamic articulation) is ducked in volume when the kick sounds using volume envelope automation in Ableton Live in a manner that simulates the commonly employed compressor side-chain ducking in which the compressor applying gain reduction to one signal (in this case the bass) is keyed using another signal (the kick). The pink shaded area of Figure One below indicates the volume automation of the bass and the waveform shown is that of the kick drum.

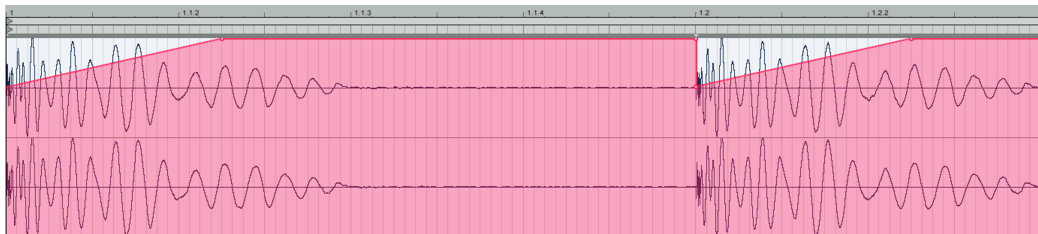


Figure One: Volume automation of *Trajan* bass part against kick drum waveform.

⁶² Tape layback is a technique whereby a digitally recorded signal is recorded onto magnetic tape and then re-recorded digitally in order to impart the sonic characteristics of the tape recording to it.

The final aspect of attaining the sound of *Trajan* was mastering it myself. Optimizing the relationship between the sound of the track and the media space, in this case digital audio at 16-bit, 44.1kHz. In the main this involved finessing the relationship between the frequency balance of the track, its dynamic characteristics and the available headroom. One of the goals of mastering is to maintain the integrity of the musical statement when played back through a variety of sound systems. To aid with this I made each mastering decision with reference to my main monitors and also to a pair of 4-inch walkman speakers at a variety of volume levels. I gained the illusion of more bass by reducing the level of the first harmonic of the bass line and increasing the level of the second harmonic taking advantage of the psycho-acoustic phenomenon known as missing or suppressed fundamental whereby the brain will tend to perceive the fundamental to be louder by inference from the volume of the upper harmonics. Reducing the actual sub-bass level allowed me to increase the overall level of the track without unacceptable distortion. The remainder of the job of filling out the available media space was accomplished by the combination of a slower compressor followed by a fast limiter with each giving around 2.5dB of gain reduction during the loudest passages. Application of this dynamics processing altered the proportions of the groove slightly by reducing the level of the kick drum. This was compensated for by carefully balancing of the compressor and limiter threshold settings with the level of the kick drum channel.

Chapter Three – Sound, Technology and Technique – connecting with the Social

The subsyntactic details that engender the specific feel of listening to my compositions are of considerable significance in my work due to the relatively reduced syntactic aspect. This significance can be understood by analogy with the contribution made by body language, timing of gesture and appearance to an actors' performance. If the actor has fewer lines of dialogue then these non-verbal attributes of their performance have greater importance in communicating the scene they play. The realm of understanding from which appreciation of this aspect emerges is that of the social. Being non-verbal (or sub-syntactical) these facets become meaningful not through cerebral explication but through the accumulation of experience of their function in other settings. In a similar way the choices I make when constructing the experience of my music are rooted in awareness developed through the social experiences of listening, playing and dancing to this music. The discussion which follows will illustrate the efforts required to adequately address the sophisticated powers of apprehension that develop through those social experiences. In each case the fine distinctions employed are understood to be operational factors on evaluation of the music in those sites accessed through embodied, participant listening.

My relationship with technology is of key importance to my musical work. The choice of technological process simultaneously determines my working method and features of the results. At the heart of my activity is the electronic and digital manipulation of sound. Ever since the advent of recording, concern with the quality of recorded sound has been prevalent. At first, the ideal was considered to be that of high-fidelity reproduction of the acoustic sound of concert performances. However, since the early Rock'n'Roll recordings of the 1950s the recording studio has been used to create artificial results for aesthetic reasons; the slapback echo used on Elvis's voice in *Heartbreak Hotel*⁶³ does not simulate a natural acoustic environment but it does significantly enhance the record's impact and uniqueness. As the usable range and degree of definition of sound available to record producers increased with the advance of technology, its aesthetic potential was explored and exploited. This is not the place to give an account of the

⁶³ Elvis Presley, *Heartbreak Hotel* (RCA, 1956).

development of the role of the record producer so it shall suffice to say that in the Popular music of today the producer's contribution to the (aesthetic and financial) success of any particular Pop recording is considered absolutely vital, topped only by the singer.⁶⁴ As Simon Frith points out 'by the end of the 1960s the studio was, in itself, the most important Rock instrument.'⁶⁵ The sophistication of modern recording and reproduction technology allows aspects of sound that were previously considered to be outside the realm of music to be treated as compositional variables. Before the advent of recording, a piece of music written for the piano for example, would vary in terms of the specific instrument it was played on, the reverberant characteristics of the room it was played in, and even the temperature and humidity of the air in the room at the time as well as the tempo, dynamics and phrasing of the interpreter. These are all valued features that reside on the engendered feeling side of the Keil distinction. With recording it becomes possible to take control of the contributions made by these factors to the actual resulting sound. The art of recording has developed from that of capturing performances into the art of 'record making'.

In common with other producers of electronic music I operate on the basis of a direct apprehension of the specific characteristics of sound in contrast to the situation of a composer working with imagined sound whilst writing a score. The sounds that I deal with are the sounds that will eventually be heard as part or all of the end result.⁶⁶ Specific decisions about the manipulation of those sounds are based on empirical judgments of their function and effectiveness with the sounding result acting as telemetry enabling fully live interaction and performance of sonic parameters. Continual attention is paid to the balance and degree of separation between sounds as well as the fine details of their individual characters. The adjustment of the details of equalisation and dynamics of any one particular sound takes place in the context of the relationships it has with other sounds

In the Techno scenes I've participated in the characteristics of each individual

⁶⁴ One indication of this is the way that it has become standard practice in many styles of popular music for the recording to be 'produced' many times by different people in the form of the various different remixes that accompany and/or follow the release of a record. This does not just apply to singles anymore as there are now many entire albums that get the remix treatment e.g. those of Bjork, Massive Attack and The Advent.

⁶⁵ Simon Frith, 'Art vs technology: the strange case of popular music' in Frith, Simon (ed), *Popular Music: Critical Concepts in Media and Cultural Studies* (London: Routledge, 2004), Vol II, 115.

⁶⁶ There are inevitable differences between the characteristics of different sound reproduction equipment and its relationship to the listener - even two people sitting in front of the same pair of speakers will receive somewhat different sonic information owing to the disparity of listening position and the vagaries of acoustics in real-life listening situations.

sound are considered a matter of importance, integral to the composition of the music, as is the overall resulting sound. I've frequently come across judgements pronounced against a track on the basis that something about one of its sounds 'spoils' the record. The choices of certain types sounds used on a track can also have associations with developments or trends in the usage of similar sounds on other tracks and will be likely to be interpreted as indicators of affiliation to a particular music scene or as references to another scene. An example of this would be the 'Reese bass' sound associated with and first used by Kevin 'Master Reese' Saunderson on his track *Just Want Another Chance*⁶⁷ in 1988. This type of bass sound was subject to a revival and became fashionable in the late-1990s techno scene and featured on underground hits such as Adam Beyer's *Remainings III*⁶⁸. The Reese bass sound also went on to figure prominently within the Drum and Bass scene albeit framed within quite a different type of groove. The bass sound used on *Trajan* could be considered a variant on the Reese bass because of its continually open volume envelope although it lacks the characteristic modulation associated with the Reese bass.

Realisation of the desired sound requires the Techno producer to attend to fine distinctions between similar sounds. An indication of the significance attached to fine differences in sound is demonstrated by the fact that producers of a drum machine sample collection⁶⁹ chose to include 435 different samples of the 11 instruments of the Roland TR909 drum machine. My own collection of kick drum samples includes around 1500 different sounds and yet, even with this large range of choices I invariably feel the need to process the chosen sounds and/or layer them to create hybrids in order to get a sound which works perfectly with the overall sound of the track. Such judgements are necessarily based on accumulated experience of focussed attention on the effect of changing these types of details and take place with respect to an awareness of the stylistic connotations of particular sonic characteristics. The hard, clicky kick drum sound on *Trajan* for example, is far more typical of Techno produced since the mid-1990s whereas the groove character of the upper percussion and hi-hat parts and the classic Roland TR909 hi-hat sound are suggestive of early Techno history when production tended to take place using hardware sequencing rather than digital audio workstation software.

⁶⁷ Reese, *Just Want Another Chance* (Incognito, 1988)

⁶⁸ Adam Beyer, *Remainings III* (Drumcode, 2000)

⁶⁹ Wave Alchemy *Drum Machines 02* sample pack.

Importance of specific technologies

The refinement of sounds in the context of Techno production can be achieved by effectively utilising the characteristics of specific technologies. To this end I cultivate a working knowledge and appreciation of the possibilities afforded by a large range of specific musical devices including synthesizers, drum machines, sequencers, samplers as well as effects, processors and the tools available from the rapidly proliferating software arena. The study of music technology is an ongoing passion whose development contributes to that of my music. As a collector of vintage electronic instruments I have an appreciation of these machines that includes their historical and aesthetic qualities but my aim in employing them is to capitalize on their most singular facilities and capability, to use their distinctiveness to enhance that of my output. The depth of this appreciation runs to a level of particularity that delves below the surface of the devices' interface to considerations of distinctions about the underlying technology; my choice to use my SCI Prophet 5 is not simply a matter of wanting to use the sound of an analogue subtractive synthesizer or wanting the sound of a Prophet 5 but stems from the awareness that my particular Prophet 5 is a rev.2 model with SSM filter chips rather than the more common Curtis filter chips used in later, more common rev.3 Prophet 5s and many other designs by Roland and Oberheim. Knowledge of the musical character embodied in such a distinction allows it to become part of my palette. In this example, the rev 2 Prophet 5 sound has an extremely loose quality such that repeating patterns realised using it will exhibit a large degree of variation relative to that possible using other devices. That degree of variation can be employed to characterise a particular part within an overall groove and distinguish it from a other layers in the texture that have been realised with greater regularity. Accumulated social experience of the operation of such parts within a groove enables decisions to be made that can draw upon this type of distinction. A practical example of this type of contrast is given in the detailed analysis of microrhythmic features of *Trajan* later in this chapter.

Charles Keil has made the observation that studio technology has a role in generating his 'participatory discrepancies'⁷⁰ and I would expand that by noting that

⁷⁰ Charles Keil, 'Participatory Discrepancies and the Power of Music', *Cultural Anthropology*, Vol.

the understanding of the contribution made by such equipment has become a highly-developed tradition in the field of music production as evidenced by the frequent veneration of specific devices and the proliferation of hardware and software simulations of these ‘classic’ machines which exhibit desired forms of irregularity in their behaviour. The ubiquity of digital devices that tend to be inherently regular and neutral has led to a widespread appreciation of the benefits of working with devices that display non-linearities that are considered musically desirable.

It is important to distinguish between sonic parameters and actual operational ones. The latter are the ones adjusted using the controls on the equipment which is being used whereas the former are abstract qualities which can be understood independently from any actual application of them. To illustrate this, consider for example, compression, a technique with a standard set of operating parameters, threshold, ratio, attack and release time etc. An understanding of these is useful no matter which studio one finds oneself working in. However the actual sonic effect of employing a particular type of compression can vary greatly from one machine to another, which is why a Manley compressor, that does approximately the same job using the same control parameters as a Behringer compressor, costs around 20 times as much. The sonic parameters are understood independently of any specific implementation of them much as a melody can be understood independently of different performances of it, say on flute and then on violin – they are different actual sounds but they are in some ideal sense ‘musically’ the same.

As I have a large collection of studio equipment at my disposal my choices are often between which actual tools to use even if I know which sonic parameter I want to manipulate. A key distinction in this regard is between analogue and digital technology. Nearly all of the physical devices I have in my studio have software counterparts. In many cases the virtual equipment is simply an emulation of the physical but there are also a large number of devices with novel features. There is a large and impassioned debate surrounding the distinction between digital and analogue music production techniques. In general people view the sonic results of analogue technology favourably by comparison to the digital whilst admitting the advantages in convenience offered by the latter. I hold the somewhat less

commonly expressed view that rather than seeking to find which one is better it is more fruitful to ask what the difference is between them and to use them in different circumstances accordingly as the following examples from the portfolio illustrate.

Felix emerged from experimentation with a variation on the compositional technique employed in many of the earlier pieces – the use of a fragment of existing musical material. One of the key differences of technique in this example is that although the sample is itself a digital recording I have used analogue filtering techniques instead of the digital filters provided within the sampler itself for both the differences they allow sonically and also in the interface used to control that filtering. The sound of different filter designs imparts on each a particular character. The Kontakt sampler contains a variety of filter algorithms but, being a software instrument, they are necessarily digital and have a different type of sound to that available through analogue processing. Comparative descriptions of the sounds of digital and analogue filters typically cast the digital in terms of coldness, sterility and thinness whereas analogue filters are praised for their warmth, non-linearity and fatness. In use, analogue filters are most frequently fed using analogue oscillators with their mathematically described waveforms such as triangle, sine and square in an arrangement which stems from the Moog Minimoog and has been repeated with variation on the majority of analogue synthesizers ever since. This analogue combination has a range of typical sounds that are familiar from their frequent deployment in popular music since the late 1960s. The combination of a digital source with analogue filtering is comparatively rare appearing on few production instruments such as the Wolfgang Palm's PPG Wave. The hybrid arrangement employed in the construction of *Felix* was chosen as it allowed me the possibility of exploring a relatively unusual range of possibilities. A Roland System 100m 121 dual VCF module was fed with the left and right channel signals from the Native Instruments Kontakt sampler being fed into separate inputs. The cutoff frequencies of the VCFs were independently modulated using sine wave outputs from LFOs from Roland System 100m modules 140 and 150. The frequencies and amounts of the LFOs were adjusted in conjunction with the cutoff frequency settings of the VCFs to provide a delimited field of variation that interacted with the metrical properties of the pattern in a satisfying way. This modulation was then supplemented on mixdown by manual adjustments riding the dynamic profile of the track. These adjustments were readily available to me because of my choice to

use the Roland 100m 121 filter modules which have a dedicated control for that purpose whereas the default means of interacting with the Kontakt sampler's filter controls is the computer mouse which is highly compromised as a musical interface due to the low fidelity between input and response. Routing of a control signal from a physical device to the Kontakt sampler's parameters is of course possible but is far less immediate and satisfying in terms of workflow.

The ping-pong delayed tritone melody riff in *Trajan* is another example of this type of distinction, this time with the digital choice suiting the context better. Although this part is played using a common type of subtractive synthesizer patch created by low-pass filtering the output of a single square wave oscillator and sweeping the filter and amplifier with an envelope generator it was quite an involved process to arrive at the particular sound that suited this track as it involved creating the same type of sound on various synthesizers (Roland System 100m, ARP 2600, Moog Modular) until I located one that had the required qualities for integrating into the context of the mix. After trying the various possibilities I found that software emulation in the form of the virtual analogue capabilities of the Roland V-Synth GT provided the solution. Neither analogue nor digital can be chosen in general terms as superior as it is not until you locate their implementation within the requirements of a specific context that their sonic effect can be established.

A contextual concern that informs my choice of specific technology to employ is that that choice can aid in distinguishing my creative output from the large number of other players in the field who are working with only virtual instruments. Although with sufficient hard work it is possible to achieve comparable results using software synthesizers and samples, there are certain characteristics of variability and tonal quality that signal the usage of hardware technologies. My choice of these technologies for their specific characteristics is encouraged by their potential for distinguishing my work from that of others using more prevalent and convenient (and thus somewhat devalued) modes of operation.

Loop Technology

One of the basic elements in all of my Techno work has been the loop; sonic material or structure, which repeats cyclically. The continuous cycling of a short musical entity is greatly facilitated by electronic technologies of sequencing and

sampling. The early Roland drum machines and sequencers⁷¹ which are so iconic and influential for electronic dance music were not designed with the production of loop-based music in mind; they are the products of the early 1980s. The loop modes on them were originally intended for constructing and editing of short patterns, which were then intended to be combined into song-length tracks. Nevertheless, their usage purely in pattern mode has formed the structural basis for much early House, Acid House and Techno and is a good example of how essential the appropriation of technological features is to these cultural forms.

The Roland TR909 drum machine (see Plate 1) exemplifies an interface that is well suited to the production of cyclical musical patterns. The row of sixteen illuminated buttons along the bottom of its control surface allow immediate physical access to a single bar of music divided into semiquaver steps for a single percussion sound at a time. With this interface it is easy to try out pattern ideas and alter them in response to the results in real time. The facility of its interface coupled with the quality of its sound has made this a paradigmatic instrument for both House and Techno.



Plate 1 – Roland TR909 Drum Machine

Since the rise in popularity of these Roland machines following their adoption by dance producers many new products have been designed and brought to market for loop-based production. The tools that I find particularly useful in this regard

⁷¹ Amongst these I would include the Roland TR808 and TR909 drum machines and the TB303 bassline synthesizer/ sequencer hybrid and, to a lesser degree, the TR606, TR707 and TR727 drum machines also.

are the Notron sequencer (see Plate 2), the Moog 960 Sequential Controller (see Plate 3), and Ableton's Live software. The former is a rare hardware MIDI sequencer (one of only 175 that were built). It is a performance sequencer, allowing physical manipulation in real-time of multiple separate sequences that can be instantly transposed, rhythmically offset and have their loop-length altered. Adding or removing notes from the pattern is also instantaneous as is dynamic variation of MIDI velocity. The Notron's control surface is roughly the size and shape of a toilet seat and has no screen. Visual feedback is provided solely by rows of coloured LEDs. This is a very pleasing interface to work with as it provides a great deal of flexibility with the minimum of distractions. One of the key advantages in using it is its physicality, which allows an immediacy of gesture and tactile response denied with the computers' screen, mouse and keyboard interface. This sense of direct, physical connection with the music as it sounds enables an embodied relationship that helpfully locates the producer's awareness within the kinaesthetic experience of the social. It enables the sounding groove to interface with the producer's accumulated knowledge and experience of functional grooves from the realm of the social. The moment-to-moment decisions benefit from a long history of value judgements played out in similar perceptual fields.

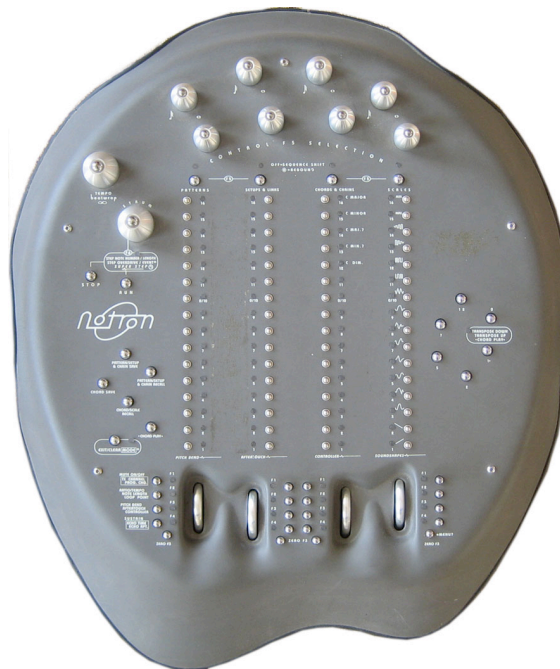
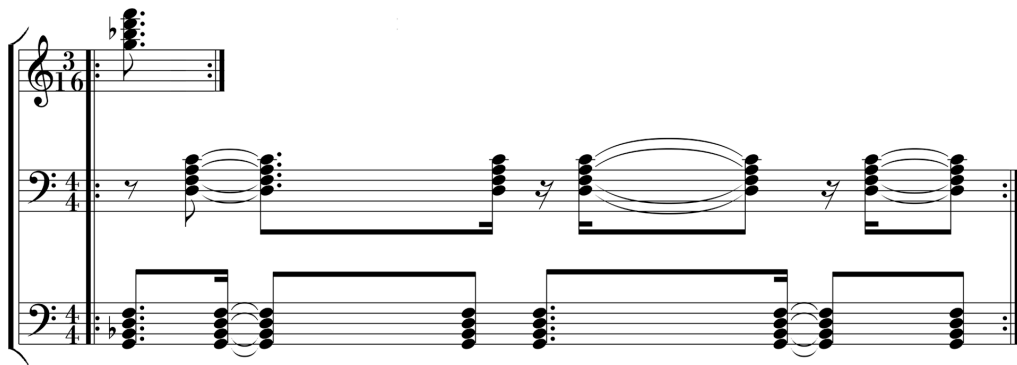


Plate 2 – Latronic Notron Sequencer

The fluidity of manipulation allowed by the Notron interface is demonstrated in my use of it in *Citadel*. This track in the portfolio is unusual in that it is based around a single improvisation; an exercise in contrapuntal filter manipulation performed on the Latronic Notron. Using the Notron I constructed three patterns with independent cycle lengths of minim, semibreve and three quavers respectively and used them to trigger a single polyphonic synthesizer patch using Native Instruments Reaktor software hosted within Ableton Live. The four oscillators of this synthesizer were tuned to produce a minor seventh chord in a similar fashion to the chord memory function found on various synthesizers. The resulting rhythmic and harmonic relationships can be seen in Example Two.



Example Two: *Citadel* chord patterns.

This structure was then used as the basis for an improvised performance in which the MIDI velocity output of the Notron for each note was used to control a complex filter array such that the response to a linear increase in velocity was decidedly non-linear in nature. That response can be perceived particularly clearly when the lowest part is swept through most of its range rapidly between 1:58 and 2:02. As the Notron is a MIDI sequencer it is simple to record its output using another sequencer (in this case Ableton Live) and retain full editing capability over the performance. The amount of editing employed here was relatively minimal however, and consisted of adding steady sections at the intro and outro and two or three other bits of fine-tuning. The overall form of the piece can be seen on Figure Two including a graph of the velocities of all three Notron parts at the bottom of the diagram. Figure Three shows the velocities of each Notron part separately in order to show their inter-relation. Note how the middle line shows where the velocity of a single note from that pattern is manipulated separately to the others between mm25 and 35. This small variation was not pre-planned but executed *extempore* at the time of recording. This ability to readily control fine details using a

comfortable physical interface enables a degree of performative facility unattainable with the use of mouse and keyboard and engenders a greater sense of connection with the sounding materials. The decisions about large-scale form implemented using the Notron interface in real time draw upon an embodied sense of time that relates through memory to the accumulated social experience of listening and dancing. Approaching the same decisions through cerebral consideration of lengths of time as represented by the x-axis of the arrangement page of sequencer software would be likely to result in different choices as they would lack the direct connection to the resource of embodied dancefloor groove sensibility permitted by the real time physical interface.

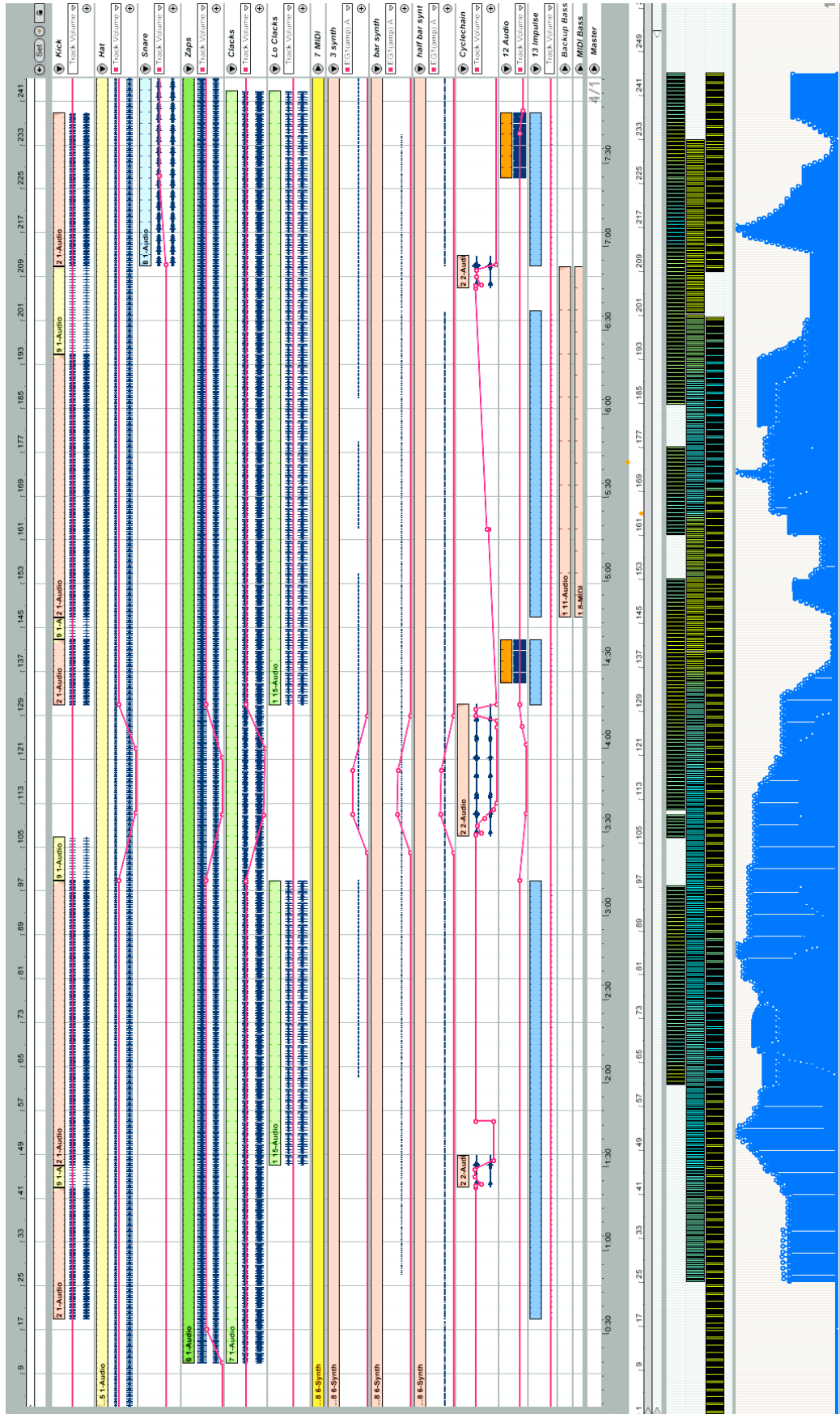


Figure Two: *Citadel* – Overall form

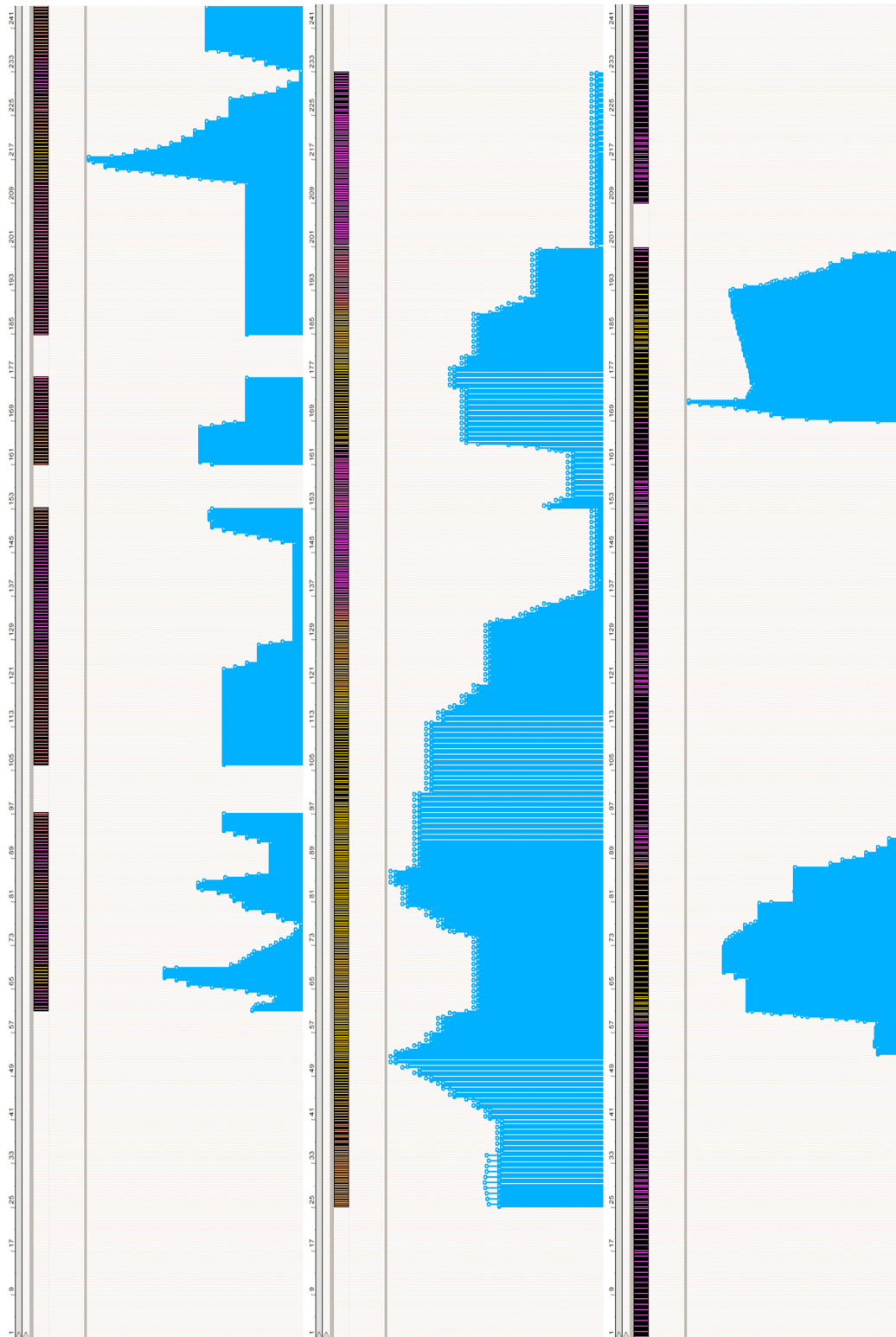


Figure Three: *Citadel* – Notron velocities – individual channels

Similar physical performance possibilities are available in the analogue domain using the Moog 960, which is a hardware voltage sequencer (see Plate 3) that allows experimental physical manipulation of its output as each parameters' value at each step of the sequencer has its own control. As I have a pair of these it is possible to readily generate complex results by connecting them together in such a way that they interact with each other.

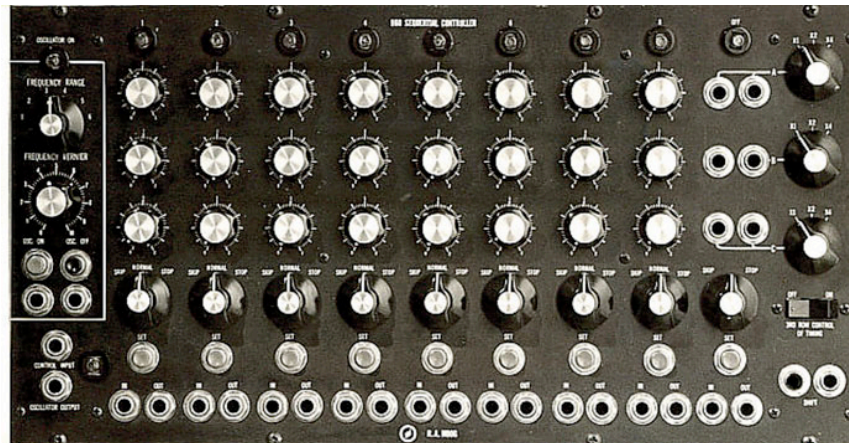


Plate 3 – Moog 960 Sequential Controller

Because of the multiple implementations of loop sequencing at my disposal it is a relatively simple matter to combine loops with different lengths to create a much longer, resultant pattern. The overall composite pattern can then repeat at a period equal to the lowest common multiple of those of the individual loops. Using the Notron polycyclic sequence constructions can be manipulated physically and readily selected empirically for use in composition and judged with respect to their effect on the resulting groove.

It is worth noting that it is not just sounds or sequences of notes that are looped but also control structures such as modulations of the other sonic parameters. These can be employed in rational mathematical relation to the pulse or independent of it for a crossing effect. An example of the latter can be heard on the main appoggiatura chord sound used in *Felix* where a pair of independent cyclic modulations vary the low-pass filter cutoff frequency on either side of the stereo field causing the stereo sample being filtered to vary its apparent position and dynamic level in a pattern which doesn't relate in a simple mathematical way to the

meter. For the final mixdown this modulation was supplemented by manual manipulation to sculpt the overall dynamic shape of this part.

Another example of periodic function of parameters whose cycle is inharmonic to the pulse can be found in *Targa* at 3:50. This takes the form of a transformation of the metrical properties of a part that has been part of the texture throughout the track; the handclap-like upper frequency percussive pattern that can be heard most distinctly when it leads the re-entry of the full texture after the main break at 3:07. This part has a clear relationship to the metre as it plays a one-bar cycle in which each semiquaver has a note except for those on the actual downbeats:



Example Three: *Targa* clap-like sound pattern.

At 3:51 this part is modified through introduction of cyclic modulation of its 4th order high-pass filtering so as to produce a shifting pattern of accentuation within the pattern. The period of this modulation is somewhere close to but not equal to one beat in length and as a result the pattern of accentuation behaves as though it is shifting phase with the pattern of attacks and can be heard as the part changing rhythm roughly every four bars.

In both of the above cases I have chosen to control the cyclic modulations using free-running low-frequency oscillators resulting in a different rendering of their patterns on each instance of starting sequencer playback and thus introducing an indeterminate element into the piece at that point in the process.

Technology for deferral of syntactic focus

With the aim of generating and exploring new possibilities in composition it can be useful to seek out ways of subverting established strategies and orientations. In this project I have sought a variety of means to do this including appropriating techniques from other repertoires. With the same aim I have also used techniques for distancing my perception of musical material from theoretical understandings where those understandings could be limitations and also engaging with existing

materials in ways that generate artificial limitations. These procedures share in common an element of deferral of syntactic focus, which can be understood as reflecting my orientation towards the Keil distinction outlined in Chapter One. This position should not be taken as dismissive of syntactic structure but instead reflects a wish for it to emerge from a process in which it is not the central focus. In the examples that follow the use of technology is not employed directly for its sound but instead for its ability to engender a particular relationship with material during the compositional process that draws upon my accumulated social experience of listening, performing and dancing to this music.

Conventional tonal thinking can be subverted by using the tuning control on a synthesizer such as the Roland TB303 (see Plate 4). Turning this control will transpose the entire pattern of notes being played by its internal sequencer across a continuous range of over 2 octaves within a 300-degree rotation of the control. Such a physical approach does not invite traditional considerations of transposition such as harmonic relation as much as it does an empirical approach bidding higher or lower with results chosen regardless of their nominal value; all values are equally presented. A similar distancing from harmonic concerns arises in the use of samples with intervallic structure such as chords or melodic fragments as in the construction of *Targa* (discussed further later in this chapter), or the chord memory function which outputs a (pre-chosen, fixed) chord when single notes are played on a keyboard as in *Baikal* or selected through a sequencer interface as in the case of *Frank* and *Citadel*. In these circumstances harmonic structure results from choices made monophonically and evaluated for their sounding result rather than their musical syntax. In practice decisions made on the basis of sounding result will inevitably result from awareness of musical structure on some level. Nevertheless, the harmonies are not chosen nominally and this can be employed as a strategy for liberating oneself from learned harmonic tendencies and aid in focussing attention on the qualities of music on the engendered feeling side of Keil's distinction by disengaging from the syntactic side.



Plate 4 – Roland TB303 Bassline synthesizer / sequencer

Sampling

At the heart of DJ culture is the conception of music as a communal art form to be shared and manipulated to suit specific situations. The creative appropriation of existing musical material is an essential practice in this culture and questions of authorship lose priority. In *The Signifying Monkey*⁷² Henry Louis Gates Jr. indicates the degree to which this mode of cultural understanding is prevalent in, and characteristic of, African and Afro-diasporic communities. By contrast, the dominant paradigm as reflected in the copyright laws privileges the identification and value of specific authors and discrete works over conceptions of shared cultural property. The case that existing copyright law represents a form of discrimination against this approach to cultural production has been made by Thomas Schumacher in “‘This Is a Sampling Sport’: Digital Sampling, Rap Music and the Law in Cultural Production”⁷³. Although a detailed discussion of sampling and musical ownership in general terms is beyond the scope of this commentary, I would like to outline my position before leading on to discussion of my own work with samples.

I concur with Lawrence Lessig⁷⁴ that the key issue with regard to intellectual property is that of the balance of interests between the private and public domains. Copyright was initially made into law with the intention of encouraging cultural creators to bring their work into the public domain. It was decided that the best way to do this was to allow the originator of a piece of work a temporary monopoly on its profits. After that time had expired it would then pass into the

⁷² Henry Louis Gates Jr., *The Signifying Monkey: Towards A Theory of Afro-American Literary Criticism* (Oxford: Oxford University Press, 1988).

⁷³ Thomas Schumacher, “‘This Is a Sampling Sport’: Digital Sampling, Rap Music and the Law in Cultural Production” *Media, Culture and Society* 17, No. 2 (1995), 253-73.

⁷⁴ Lawrence Lessig, *Free Culture* (London: Penguin, 2004)

public domain for the benefit of everyone. The original period of copyright (and patent) was to be just fourteen years with an optional extension of a further fourteen years. That original intention has subsequently been subverted with the emphasis shifting to that of protecting private income and away from serving the public good. This move has not been led by creative artists but instead by the corporate publishers and managers in an effort to enhance their own and their clients' income and has come at the expense of other artists who would use appropriative practices. As MacCauley argued in 1841, 'it is good that authors should be remunerated; and the least exceptionable way of remunerating them is by a monopoly. Yet monopoly is an evil. For the sake of the good we must submit to the evil; but the evil ought not to last a day longer than is necessary for the purpose of securing the good.'⁷⁵ The historical trajectory of the copyright laws has seen the term of copyright extended repeatedly such that they effectively mandate an indefinite monopoly in which entrenched corporate interests leverage their political and economic power to ring-fence areas of culture for private gain to the detriment of the common good.

As Joanna Demers discusses in *Steal This Music*⁷⁶, aside from the general iniquity of copyright law there is the specific problem of its failure to distinguish between creative appropriation and bootlegging. As an alternative to the current form of copyright legislation there should be an extension of the definition of 'fair use' to include provision for the creative re-use of all types of information.⁷⁷ When a copyright owner wishes to contest someone else's use of their material the burden should be on them to demonstrate that that use has not resulted in the creation of a new artistic work; that it is, in fact, bootlegging. In practice this is rarely a difficult distinction but it is one that the present law is unwilling to acknowledge. This law is wrong because it enshrines the ideology of the artistic work as private economic commodity to the exclusion of all other forms of value. It is important for artists to be able to sample from existing cultural artefacts particularly because among these are some of the most potent symbols of our culture and to delimit those as being outside the realm of what can be used to make art is to curtail creative freedom unnecessarily. The current situation does not make it impossible for artists to create

⁷⁵ Thomas Babington MacCauley, Speech to House of Commons on 5 February 1841.

⁷⁶ Joanna Demers, *Steal This Music: How Intellectual Property Law Affects Musical Creativity* (Athens, Ga. and London: The University of Georgia Press, 2006).

⁷⁷ Recommendations along these lines have been made in the recent Gowers Review of Intellectual Property (ISBN: 978-0-11-84083-9).

‘collage’ works. It does, however, tend to make it expensive and time-consuming and thus skews the playing field to the detriment of poorer and less-established artists. It also gives the copyright owner of the sampled work veto power over the very existence of the new work. The distressing consequence of this is that the content of creative work is now, to some degree, being regulated by corporations rather than artists.

Whereas many artists, particularly in the field of Hip-Hop production, are interested in sampling from existing music in order to use the presence of the original as a consciously perceived element I prefer to use a sample for its more abstract formal characteristics and usually as an ingredient in combination with purer, synthetic sounds. This aesthetic has developed under the purview of the current legislation under which the practice of sampling from existing works is possible either without permission of the copyright holder, which involves the risk of prosecution for infringement (which increases the more recognizable the sample is) or by seeking the permission of the copyright holder, which can be difficult or even impossible and is invariably expensive. In line with my general understanding of DJ culture my aesthetic allegiance is towards an Afrological conception of culture as shared and interconnected whereas I operate under the spectre of legal conditions which enshrine the Eurological conception of culture as a form of discrete and individually-owned property. I find the idea of using samples from other music attractive but I’m reluctant to do so in a way that will require expensive and difficult sample clearance. As a result when I create music for the purpose of release to the public I’m limited to using samples in a way that will avoid their being readily identified by the listener. This restriction doesn’t apply to my live performances however, in which I enjoy the possibility of blending my stance between that of a DJ, using material created by others, and a live electronic performer, manipulating my own sonic structures.

Strictly in legal terms some of the sampling I do is transgressive of mechanical copyrights. However at the musically atomistic scale that I sample and with the relatively low public profile I have it is unlikely that anyone will identify a copyright-protected sample and then be sufficiently motivated as to take legal action for infringement. I don’t feel an ethical concern over the practice, as I doubt very much that it has any practical effect on the copyright holders. My views on the workings of the copyright laws and their effects on musicians motivate me to

infringe those laws as a recalcitrant political symbolic act that is located internally within the working process without necessarily being legible from the musical surface. I find this conceptually attractive as a component of my work without feeling the need to place it in the foreground.

I see my practice in terms of interceptions into an ongoing sonic ecology in which participants in the music scene exchange and develop musical ideas, stylistic features and sound itself (through the practices of DJ performance and sampling). In a process akin to evolution, new ideas inspire creators to develop and disseminate them. Unsuccessful ideas are left behind, ignored, perhaps to be rediscovered later, whilst successful ideas spread rapidly and proliferate with many variations. This conception of cultural activity as a distributed creative force contrasts with accounts of culture in terms of the activities of prominent individual geniuses that lead the culture from a position far ahead of the majority of participants. Although the contributions made by different practitioners are far from equal in import and consequence, this celebrity-oriented conception of cultural progress belies the degree to which those 'genius' individuals' work is based upon the complexes of ideas circulating within their artistic milieu and their shared development by artists working at many different levels. There are a few notable examples of creative scenes that have received recognition by cultural historians (the Fluxus movement, Dadaism etc.) but in the main the story of cultural development is told in terms of a canon of genius artists. The problem with this approach is that it underplays the role of the myriad of lesser-known figures and mass phenomena which transform culture in broader and more significant ways through networks of shared ideas and practices. Cultural areas in which this type of scene-based development is widely recognised such as popular music tend to be attributed less value than those understood in terms of prominent individuals. This bias towards the individual genius and the discrete masterpiece is also reflected in the financial structures of the culture industry in the form of copyright laws which have been gradually corrupted over time until they fail to recognise the importance of the public domain of shared ideas and instead favour the marking out of intellectual property for individual gain.

Within this notional sonic ecology in which knowledge emerges from musical / social interaction, regardless of whether or not I choose to join in there is a flow of musical elements being constructed into patterns, sounds being assembled, records

being made and mixed with other records and reacted to by dancefloors and then remade, remixed and sampled once again. Confronted by this river of activity I have the opportunity to add my own particular characteristics expressed through musical choices to the ongoing torrent. In choosing to participate I can select the level of involvement moving down in scale from choosing tracks as a DJ, choosing sounds and patterns as a composer and choosing technologies as a sound designer. At each level there is creative work left to others. Even if I choose to design and build my own instruments it is unlikely that I will extract the materials from nature myself so at every level there is a degree of collaboration, an element of selection from pre-made materials crafted by other people.

Discourses surrounding musical production and consumption contain a range of more or less problematic ideologies and orthodoxies regarding proper behaviour with regard to the authorship / ownership of sonic materials which I generally regard as artificially constructed and not as valid concerns regarding my own practice. The decision that certain premade materials are valid and others invalid (E.g. a TR909 sample of a hi-hat as against a hi-hat sample from a record) is not a distinction that I can support intellectually. My view is that it isn't a mechanical question of the means employed in the re-use of some form of premade musical material but rather that it is an issue of the specific way in which that material is used that can be used to argue its validity in a given context.

At the most atomistic level I use samples as an alternative to subtractive synthesis waveforms, as a raw ingredient for synthesis. Typical subtractive synthesizer voice architecture employs a number of oscillators fed into a filter and then an amplifier with the parameters of these processes being subject to time-variant modulation. One of the basic limitations of this traditional synthesis approach has always been the static nature of the standard oscillator waveforms (square, sawtooth, triangle etc.) that lack the rich variability of acoustic tones. It was partly this shortcoming that prompted the invention of wavetable synthesis as well as the development of sampling technology in place of or in combination with synthesis. By using a sample in place of a mathematical oscillator waveform such as a square or sawtooth wave I can use a sound that already has some interesting spectral morphology to use as the basis for synthetic development.

Using this approach the samples are typically transfigured beyond recognition. One of my aims in using the sample is to explore its possibility for transformation, to reveal some previously hidden inner aspect of its spectromorphology and put it to use in a new context. The use of a sampled *objet trouvé* provides me with a malleable structure, which nevertheless carries certain limiting characteristics within it. Such a use of samples can bring elements of the grain of the original source into the new location without being directly intelligible as samples or heard as references. In my use of samples from existing works the production values of the original, its surface, the recording quality, the sound of the instruments and the traces of the acoustic they were recorded in, become part of the new piece, giving it a depth and opacity which is difficult to achieve with purely synthetic sound sources. In this way the sampler permits a new type of sonic ecology; old music as the fertiliser for new.

Sampling practice and *Targa*

Watching Channel 4's *Hip Hop Years* documentary series in 1999 I saw Hank Shocklee⁷⁸ of the Bomb Squad production team talking about the writing method used in constructing Public Enemy's landmark album *It Takes a Nation of Millions*.⁷⁹ Part of their avowed aim was 'to destroy music' – to make the nastiest possible sound that they could and still make it groove. The method of doing this was what excited me. They would record long sessions of improvisation with three or more people in the studio working samples, drum programs and scratching on turntables simultaneously and then listen through the recordings searching for inspired moments amongst the chaos. This was a record with which I was intimately familiar, as I had been fascinated by its unique sonic construction for many years at this point but without any clue as to how it was achieved. As a result of finding out the approach taken I decided to attempt something similar with *Targa*.

Jeff Mills *Purpose Maker* EP⁸⁰ was designed as a relatively steady background groove for use as a mixing tool in his notorious / reputable furious 3-deck mixing style.

⁷⁸ Since then, Hank Shocklee has spoken more extensively about this approach in a video seminar on the Red Bull Music Academy website - <http://www.redbullmusicacademy.com/video-archive/lectures> (8th March, 2011).

⁷⁹ Public Enemy, *It Takes a Nation of Millions* (Def Jam Recordings, 1988).

⁸⁰ Jeff Mills, *Purpose Maker EP* (Axis Records, 1995).

Prior to release Jeff Mills thought that this record would only be of interest as a DJ tool and was surprised by the scale of response it generated. Indeed, the record was so popular that Mills set up a label of the same name to continue releasing music with a similar concept. All of the *Purpose Maker* records seem to have in common that they are constructed out of multiple layers of samples of existing records alongside a TR909. Having been purpose made for Mills' DJing style the structure is minimally teleological with each of the tracks sounding as if they could have been cut from a continuous flow. By comparison *Targa* is relatively developmental in form with an arch structure in response to the functional demands of the turntable mix for DJs less rapid in mixing style than Mills.

With *Targa* I was attempting to craft a record completely from vinyl samples but without it having referential qualities to the specific sources. Instead I was aiming for a fairly abstract result but with specific rhythmic profiles that were presented to the sampler by the sequencer. I'm not sure of the origins of most of the samples that were used by Mills in the *Purpose Maker* series but two of the ones I have managed to recognise are reproduced in situ. i.e. they have not been cut up, repositioned or significantly transformed. This is something I didn't want to do with *Targa* and in general I avoid the use of un-processed samples of entire bars of material.

The procedure I used was to just grab bits of vinyl (usually bright 80s records) and quickly check them out not for their music but for their sound, the quality of the production and the tone of the instruments. On locating suitable material – typically a section of the record with some space in the texture – I recorded a few seconds of material into the sampler. After around ten iterations of this collection process I began to interrogate the recorded material by triggering the samples rhythmically and altering their start points, direction (forwards or reverse playback) and pitch alongside a steady kick drum pattern to see if anything emerged with groove potential. Using this method most of the sound emerged as overly chaotic (as expected) but occasionally I would line up a sample in a way that resulted in an intriguing pattern. This process was repeated with all of the samples individually and then combinations of patterns were tested and rhythmic adjustments made to help the material to integrate. The triggering patterns sent to the sampler can be seen in Example Four along with the TR909 drum machine parts that frame them. The patterns shown can't be heard as musical notes as such but instead represent

MIDI information used to trigger the sampler. Note that in some of the parts the sample is not simply being triggered at a single pitch but instead includes transposition of the sampled sound pattern as part of its pattern.

The image displays a musical score for a drum set and sampler tracks. It consists of ten staves, all in 4/4 time. The first two staves are for TR909 Kick and TR909 Hi Hat, both in bass clef. The remaining eight staves are labeled 'Sample' and are in treble clef. The TR909 Kick track shows four quarter notes on a single pitch. The TR909 Hi Hat track shows a rhythmic pattern of eighth notes with occasional rests and a sharp sign. The ten Sampler tracks show various patterns of notes, including quarter notes, eighth notes, and rests, with some notes having sharp signs, indicating transposition of the sampled sound.

Example Four: TR909 and sampler patterns from *Targa*.

This approach is distinct from the procedure of cutting up a functioning breakbeat that is already synchronized as in the script proposed by software such as Steinberg's Recycle which engages with source samples in terms of specified metrical structure. In the method I employed in constructing *Targa* there was no

attempt to organise the metrical relationship between the materials in advance. As a result of this process of abstraction a much wider range of configurations were tested in the groove context. This process aided in seeking out unusual rhythmic relationships between the source material and the resultant groove in order to generate novel musical structures.

Whilst processing the samples various ranges of possible sonic variation were also being established so that the individual parts could exhibit dynamic variation in their performance, primarily through various types of filtering. The final arrangement on the timeline was constructed such that at any given point at least one of the parts is undergoing a process of gradual transformation and as a result the overall texture is never static although the effect is also very repetitive at the bar by bar level. The choice to make these transformations gradual linear processes rather than expressive gestures was influenced by my appreciation of Steve Reich's tape pieces *Come Out* (1966) and *It's Gonna Rain* (1965) which exhibit related characteristics albeit through dissimilar means.

Approaches to remixing

The scope for the DJ to imprint their personal sound on the music they play is extended by the practice of remixing. The practice of 'versioning' that originated in Jamaican Dub culture involved the use of studio tapes from existing tracks being used as the starting point for a new type of creation – one-off recordings made as dub plates for use by the sound systems. By the late 1960s these 'versions' were beginning to appear on the b-sides of Reggae singles and by the early 1970s King Tubby and Lee 'Scratch' Perry had established themselves as dub artists whose alternative mixes of Reggae songs subjected the original to radical transformations. Similar developments in Disco in the 1970s and early 1980s share the characteristic of creatively reworking original material in the studio to create versions suitable for DJ play, primarily through extension of their length and development of their rhythm sections at first and then developing into increasingly radical transmutations. By the time that I began to produce Techno in the mid-1990s the remix had evolved from the practice of upgrading existing music into forms suitable for the dancefloor into a creative opportunity with little sense of obligation towards the structures of the original. Remixes such as Luke Slater's Filtered mix of

JB3's *Forklift*⁸¹ build a new track around a single sampled sound from the original and several of Aphex Twin's remixes from this period display little aural connection with their original source leading to questions as to whether there was indeed any contact at all between the prior work and the remix. As a result of these sorts of examples I have never felt constrained in any way regarding possible approaches to remixing. Any element, however small or abstract, can be used as a component of the new construction, in any way. My remix of Mindtours *Sverve* (discussed in Chapter Two) was not met with any queries from the original artist despite not directly featuring any material from the original version. Some of my more recent remixes outside this portfolio such as my remixes of Young David's *Dub*⁸² and Maximo Park's *Questing Not Coasting*⁸³ are more like cover versions than what would be expected of dance remixes in that they involved the painstaking re-creation of musical structures from the original versions in order for me to keep those structures whilst transforming the sound world of the track. In between this degree of structural fidelity to the original and the approach used for *Sverve Angle* lies a huge range of possible approaches.

The question of whether a track constitutes a remix or not is further complicated by my use of samples from existing music in creating my own productions. Each of these could, in theory, be considered as a remix of the source of those samples but in practice I don't think of them that way. If the same production had emerged from an engagement to produce a remix of that source then that is how I would classify the work. The version of *Fast Breeder* included in the portfolio could also be classified as a remix of one of my earlier versions of it as the basis for its construction was a single one-measure sample of its riff. If another producer had done the same work with that material I would consider it a remix but as I did the work on both versions it isn't deemed to be one. In this way the definition of a remix depends more on the intentions, and social and commercial arrangements involved than it does on the material practice. Although I frequently use sampled material from other music it is only in the situation where I've been asked by somebody else to produce a remix based on that material that I would consider the work to be a remix. This distinction is maintained by the fact that I only use material from other music in a way that obscures its origin through the

⁸¹ JB3, *Forklift* (Novamute, 1996).

⁸² Young David, 'Duh (Suade remix)', *The Bubble EP* (Universal Vibes, 2010)

⁸³ Maximo Park, 'Questing Not Coasting (Suade's Human mix)', *Quicken the Heart Remixes* (Warp, 2010)

transformation of the sample through studio production techniques. If I was to create a track in such a way that it presented a recognizable sample from another piece it is likely that I would consider it a remix although its categorization would be far from important as it would only be deployed in a live setting and as a result its status would be of little consequence.

Remixing Artwhore's *Frank*

In approaching the two remixes of Artwhore's track *Frank* I have chosen to extract musical structures from the original version by transcription rather than sampling any part of it.



Example Five: Transcription of *Frank* chord sequence



Example Six: Transcription of *Frank* melody

As the *Frank* chord sequence was originally produced by transposition of a single sampled chord the resulting harmony is parallel giving a similar effect to the use of the chord memory feature on a synthesizer which memorizes the intervallic structure of a chord and then allows that chord to be played by pressing a single note on the keyboard. I have a liking for this sort of harmony and hearing it in Artwhore's *Frank* added to the appeal of using it as a basis for a new project.

The original version of *Frank* only existed in a final mixed form so no access was available to its individual layers. In order to aid in decoding the construction of the original I asked Artwhore's Steven Legget to join me in the studio. However, as Steven is from a Fine Arts background rather than having had any musical training he was unable to provide many structural clues beyond identifying the chord as a sample, which confirmed my aural impression of the harmony as parallel. As a result I had to transcribe the chord pattern and melody by ear before programming them into the sequencer. An unexpected consequence of asking Steven to join me in the studio that day was that we decided to collaborate on a remix in addition to

my working on another mix independently. In the production of our collaborative remix, Steven and I shared the aesthetic decision-making but it was my role to take care of the technical execution and its details.

With the chord sequence programmed into the sequencer (Logic Audio) and a Novation Nova synthesizer producing its sound we proceeded to develop a rhythm section using a similar approach to that described for *Targa* and *Swerve Angle*. However this time the source material from vinyl was only used for the bass part and the shuffly snare fills. This was then built on with samples edited and re-contextualised in a similar fashion but sourced from solo percussion performances instead of full tracks in order to create a cleaner texture to make space for the chords.

The fifteen semiquaver long *Frank* melody was sequenced and synthesized but Steven and I weren't happy with the effect on the groove of the rhythmic wandering created by the polycyclic construction in the context of our rhythm section and added a semiquaver to the melodic part to create a four beat cycle that causes it to maintain its position with respect to the meter. The melody was layered using several synthesizers and treated with reverb and dynamically varied echoes.

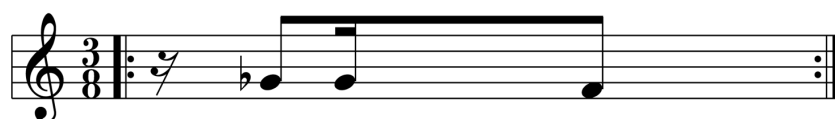
After the completion of the collaborative (Suade and Gamma) mix of *Frank* I set out to create another remix for use in a straight techno set for the interposition of a downshift in groove energy to a broken beat where the return to the 4-on-the-floor beat is made within the track itself instead of being handled as the transition between two records by the DJ. Alternatively it could be used to allow a smooth transition from a set that has been all broken beat into a straight, 4-on-the-floor groove.

The use of a broken beat pattern in the earlier half of this mix supports the swooping chords in a way that lends them a buoyant quality that recalls the original version of *Frank*. The harmony has been altered from major to minor and is rhythmically triggered with a longer portamento time that also reflects the original character of the part. Following on from where the previous remix had concluded the chords were again synthesized using the oscillators of the Novation Nova but this time they were sent straight to the output of the Nova with its filters and amplifiers wide open into the Nord Modular which was used for the particular

sound of its digital emulations of 4th order analogue filters that gave a harder, more upfront tone than the filter algorithms within the Nova. Using this composite synthesizer enabled the chord part to sit far better within the context of the percussion parts as these have a concentration of energy in the region between 2 and 5 kHz.

The unusual form of the bass line results from a sample from vinyl that has been low-pass filtered to give it its particular texture and sound. A similar effect would be very difficult to achieve using conventional synthesis as it has the quality of having a functionally distinct rhythm but very little clarity of attack and pitch. This bass line holds a consistent, asymmetrical heartbeat-like pattern throughout which is organized according to duple meter but is syncopated such that it under-articulates the metre when heard in isolation from the kick drum pattern during the main break (approx 2:37-3:31) thus allowing the triple-time patterns to gain more purchase over the overall sense of meter in this section. The kick drum has a syncopated, broken-beat pattern before the break that is steadied by the introduction of a snare and clap backbeat (hits on beats 2 and 4) at 1:40. On its return after the break the kick drum resumes with a steady 4-on-the-floor pattern which should be particularly satisfying as it will most likely be experienced as having been deferred for several minutes in the context of a normal techno set. That this small change in pattern can be felt as such a radical transformation of the resulting feel is indicative of the degree of importance of the kick drum in articulating the groove.

The upper layers of percussion include several which are based on three-quaver or three-semiquaver length cycles some of which are simple pulse patterns and some articulated with less stable structures such as the pitched pattern shown in Example Seven.



Example Seven: *Frank – Tycho mix* pattern

The crossplay between the triple and duple elements of the texture is used to articulate differing degrees of focus of the groove as discussed in the context of my critique of Butler in Chapter One.

Aesthetic response to the work of other producers

I conceive of my practice in terms of involvement in an ongoing cultural conversation. The relationship my work has with that of others can be literalized in the form of the DJ mix or can be somewhat more distanced as in the case of an aesthetic response to ideas put forward in the work of other producers which can, of course, then be folded back into the DJ mix. On hearing Surgeon's *Magneze*⁸⁴ I recognized the relationship it had with Jeff Mills' *Lifecycle*⁸⁵ and I was inspired to join the discussion with the aim of taking it further by developing my track *Fast Breeder*. What all three tracks have in common is the combination of a dense semiquaver riff accompanied only by drums. These riffs share the characteristic that each contains within it the possibility of suggesting emergent sub-riffs to the listener depending on their sonic treatment within the track

Example Eight: Riff(s) from *Fast Breeder*



Example Nine: Riff(s) from Jeff Mills - *Lifecycle*



⁸⁴ Surgeon *Magneze* (Downwards, 1995)

⁸⁵ Jeff Mills 'Lifecycle', *Waveform Transmission Vol. 3* (Tresor, 1994)

Example Ten: Riff from Surgeon - *Magneze*



One of the clear differences between these other two tracks and my own is that their riffs are held fixed in their cycles for the duration of their tracks whereas in this third version of *Fast Breeder* the riff has been sampled and subjected to numerous transformations in terms of repositioning rhythmically including triggering in a stuttering fashion. On releasing this record I was gratified to find that a good number of knowledgeable people from within the fields of record distribution and retail recognised my intentions and acknowledged this track's relationship to the other tracks confirming the functional operation of this concept in the realm of the social.

Microtime and Groove

Consideration of the micro-rhythmic aspects of music is an essential part of my practice. Treating this as a compositional element comes about as a result of the technological ability to control it. Previously, in acoustic music, it was an element that was mainly a matter of performance choice but with computer sequencing and digital audio editing it becomes possible to exert a fine degree of control over the placement in time of each event and thus it becomes a compositional decision. When music was primarily communicated in the form of notation a composer's intentions regarding details of timing were communicated using textual instructions with interpretation being left to the performer and as a result there was little opportunity to develop them in a sophisticated way. In contemporary electronic dance music composition this aspect has been the focus of significant expansion both technically and technologically. One example of this is that procedures are now available in various implementations which facilitate the extraction of timing and dynamic information from a recording independently of its sound so that templates of feel (commonly known as groove templates) can be used to regulate new sonic material. However, as I usually use short cycles of material I prefer to

adjust the timing of events individually or by offsetting the timing of an entire part relative to the rest of the groove rather than using a template.

In my composition work the rhythmic feel of each track is of great importance if the music is to achieve success in engaging the dancefloor. This feel comes about partly as a result of the interaction between different musical parts' accentuation and timing. For this reason the timing and dynamic level of each event of a repeating pattern is individually adjusted to provide the desired effect. The large number of separate events in each piece would make this a significant practical challenge if it weren't for the cyclical nature of most of the parts in my music. It is also this cyclical schema that makes the manipulation of fine variations in timing particularly relevant however, as without their continued presence as part of a repeated pattern it would be difficult to discern them distinctly⁸⁶.

The starting point for working with the microtiming of an electronic groove is to have a fixed element that establishes the pulse and operates as a zero co-ordinate for the virtual timing grid against which differences in timing can be used to generate feel. The practical choice for this role is the kick drum in Techno as it typically dominates the experience of pulse and meter. The use of simple, cyclical elements in building the overall texture is typical of dance genres. These structures are useful because of their fixity and clarity; they act like the gridlines on graph paper by serving to elucidate the important information; the relationships between the events. If any given event is ahead of its metrical subdivision I refer to it as 'pushed', 'pushed forward' or as pushing the groove forward whereas events delayed relative to the grid are 'pulled' or pull the groove back. These terms arise intuitively from the practice of DJing with vinyl records, which involves physical pushing and pulling of the record being cued with respect to its direction of travel. They also highlight the physical nature of the kinesthetic sense required to perceive these fine rhythmic distinctions.

Shuffle

Shuffle, or swing, is the rhythmic characteristic in which the second of each pair of metrical subdivisions is delayed relative to the first. In my work I frequently use some degree of semiquaver 'shuffle' or swing such that any events that are placed

⁸⁶ The listening practice involved in DJing helps to focus attention on these fine timing details in the sound as it is here that the DJ needs to be able to discern that two records are going out of synchronization before anybody else does so that he or she may correct the slippage.

on the syntactical location of the second of any given pair of semiquavers will be positioned later than their metrically accurate location. Most sequencers and drum machines allow the user to select the amount of shuffle, with software usually allowing the user to specify the amount of shuffle as a percentage of the quaver value whereas the Roland TR909 gives the user a choice from amongst seven different preset amounts of shuffle. Although I sometimes use a single shuffle ratio for all of the parts of a track it is also quite typical for different degrees of shuffle to be applied to separate parts as in *Trajan* (discussed later in this Chapter). The importance of the unique characteristics of specific pieces of music technology has been discussed above. This includes their timing idiosyncracies also. For example the shuffle feels produced by the Roland TR909 drum machine have a distinct character compared to those of the E-mu SP1200 for example. I like using the Notron sequencer for its interface for generating MIDI patterns but I dislike its shuffle settings. In practice I will select an approximation of the shuffle I want from the Notron and then later correct the timing using some other technology.

Accuracy – Latency

When working with sequencer technology the composer is provided with a notional grid framework for both rhythm and pitch. The ability of any particular technology to accurately place events is variable however. Finite processing times incur a delay between the notional grid and the actual realisation of events, termed latency. Compensating for software latencies is usually quite straightforward, if not totally automatic, as these tend to be fixed. However when working with hardware devices things are not so simple. The sequencer itself is not responsible for producing the sound of the note. Instead it sends an instruction to its MIDI interface to send a note-on message at a given time. It is then up to the instrument receiving the message to interpret the instruction and produce the desired sound. This takes some amount of time and that amount is not necessarily consistent from one instrument to the next. This delay between receiving an instruction to produce a sound and the actual onset of the sound is called latency. The result of this latency is that two notes intended to be played simultaneously on two separate MIDI instruments may require that the sequencer sends them at slightly different times spaced by the correct amount to achieve a high degree of accuracy. The distinctions here are fine and latencies for MIDI instruments are usually close to or below the threshold of perception for individual events. The fact that they cannot

be discerned in isolation as rhythmic defects doesn't mean that these latencies don't have a significant effect on the perceived feel of the music however.

In addition to the latency of the instruments receiving instructions via MIDI there are also latency issues with the MIDI protocol itself. MIDI is a serial data protocol running at 31,250 bits per second which is very slow by today's computing standards. Messages are transmitted in series rather than simultaneously. If you wish to play for example a 3-note chord the MIDI protocol will have to send the three Note On messages one after the other. Each note-on message takes at least 0.96 of a millisecond so the quickest that this can happen is about 3 milliseconds. This becomes even more of an issue is when a larger number of notes are requested simultaneously as can happen easily at key points such as the first beat of a bar. This will result in an inevitable smearing of the timing of the events which are intended to be simultaneous. To help circumvent this problem I use a multiport midi interface that allows me up to 8 separate MIDI streams. Allocating simultaneous events across these separate outputs helps limit the impact of MIDI timing smears due to the serial nature of the data protocol.

Accuracy - Jitter

Jitter is the degree of variability in the nominally equal timing of events produced by a digital system. The term is typically applied to high-frequency signals but I'm using it here to refer to the much lower frequencies of the rhythm patterns produced by sequencers and drum machines. Clock interface designer David Lackey has published results of his jitter tests of various musical technologies on his Innerclock Systems website⁸⁷. The results he reports indicate that significant degrees of jitter can be detected with certain machines (up to around 2.5 milliseconds for the Roland CR8000 drum machine). The timing variations exhibited by software sequencers can be much greater and are the reason that a highly-successful and wealthy electronic musician such as Vince Clarke has chosen to continue using an otherwise antiquated BBC Model B computer running UMI sequencer software for decades after it ceased production. I haven't tested the DAW that I currently use (Ableton Live) but I can hear that its timing is sometimes compromised so I use offline rendering for the generation of audio files whenever possible as the results are audibly superior. The use of digital editing processes and offline rendering are immune to jitter as they are sample-accurate so I take

⁸⁷ <http://www.innerclocksystems.com> (8th March, 2011).

advantage of those procedures where I wish to ensure that degree of precision. More accurately rendered parts can be contrasted with recorded machine performances that feature jitter as in the case of *Trajan* (discussed below).

Accuracy - Human

The threshold of perception for changes in the timing of events in a groove depends on a number of factors including, but not limited to, the individual listener, the tempo, the nature of the events' transient attack, its pitch and overall timbre and the nature of the framework against which the judgement is made. In practice I elevate degrees of precision by bifurcation moving from millisecond steps to 0.5 millisecond steps and further on to 0.25 millisecond steps if necessary. I haven't had to adjust timing of events for groove feel at any finer resolution than this thus far and in most instances I'm satisfied by adjustment to the nearest whole millisecond. As far as I'm aware my perception of timing differences wasn't always this fine. I have distinct memories of trying to make these adjustments many years ago and finding it much more difficult to hear the differences. It seems likely that I have cultivated this degree of awareness through repeatedly focusing my attention on this aspect over the last ten years. The experience of these fine differences seems to be kinesthetic in nature with late events feeling like a drag on the motion of my body and early ones feeling like being pushed to go faster. Wherever possible I adjust the timing of events using the computer keyboard to step forward and backward in time rather than setting values numerically or by scrolling a mouse. This minimises the distraction that can be caused by the interface.

Haas Effect

For events that are intended to occupy the same point in musical time as each other, the manipulation of their exact timing can also change the sound itself. This is due to a phenomenon known as the Haas effect. The human hearing system perceives similar sounds that occur in very close succession as a single event⁸⁸. Exactly how close depends on the nature of the sound but the threshold for the Haas effect is around 20-30ms. If two similar but different sounds both occur within that timescale then the characteristics of the first sound will dominate – it will appear as if there is only the first sound with the second functioning only to

⁸⁸ This description is actually a simplification of the Haas effect. The main function of it is to allow subtle timing differences in the reception of sound between one ear and the other to indicate the direction of the source of the sound.

increase the apparent volume of the first. This happens even if the second sound is up to 10dB louder than the first. Working as a composer, if I put two sounds onto the same point in musical time, I also have to manipulate their timing at this microscopic level to ensure that the emergent total sonic event has the desired character rather than leaving it as a matter of contingency. One of the pieces in the portfolio has what I would consider to be a flaw in this regard as a result of my lack of awareness of the issue at this earlier stage in the development of my work. The clap and snare sounds on *Frank – Tycho mix* suffer from jitter in their execution resulting in a shifting relationship with each other. Their separate panning accentuates the effect of this jitter, as does the internal morphology of the clap sound with its succession of individual fine attacks.

If metronomic precision were all that was required it would be comparatively straightforward to measure the latencies of all the equipment concerned and offset the timings of events accordingly. However what is desired instead is to optimize the perceived feel of the groove. For this reason the exact placement of each event is adjusted empirically to achieve the most suitable timing. This is not necessarily straightforward however, as differences in timing interact with dynamic differences in producing their resultant effect on the feel of the music. This consideration is further complicated by working in stereo. The apparent position of a sound in the stereo soundfield is a function not just of the level of that sound in each speaker but also of whether there is any timing differential between its images in the two speakers. It is possible to manipulate the perceived spatial location of a sound but adjustments of this must be made with their possible effect on the rhythmic feel being taken into account also.

Subtle timing differences can be deliberately employed to manipulate the stereo image because of psychoacoustic effects they can generate. An example of this from the portfolio is during the main break of *Citadel* (3:28-4:15) in which the attack time on the amplifier envelopes of the synth lines are increased to create the softening, dissolving effect. At this point the entire mix is crossfaded with another version of its signal which has been fed into separate delays on the left and right channels with the left channel delayed by a fixed 1.3 milliseconds and the right channels delay time varied between 2.1 and 3.7 milliseconds using sine wave modulation with a frequency of 0.83Hz in order to give a specific type of chorusing effect with shifting spatial location of sounds that crosses the boundary between

that produced by summing localization (up to 2ms) and the precedence effect (2-50ms). Using these subtle psychoacoustic effects rather than simple panning allows the preservation of a wide stereo field with movement occurring within it rather than the more heavy-handed modulation of a narrower or point image within the overall range.

(De-)constructing a Groove – *Trajan*

In the context of this commentary a close reading of the microrhythmic features of one of the tracks is necessary to demonstrate the level of detail applied to this aspect of my work. This degree of finesse in dealing with time is part of my aesthetic. Given the dismissal of fine rhythmic distinctions in Mark Butler's *Unlocking the Groove*⁸⁹ it cannot be considered a safe conclusion that this information would necessarily be conveyed by its mere presence in the recorded output. In addition to this concern there is also the possibility that unless attention is deliberately focussed on this facet of the work it could be overlooked completely due to its liminality or not distinguished as a deliberate part of the composition work rather than a contingent feature arising from its process of execution.

Figure Four shows some of the microrhythmic features of *Trajan*. It is a close-up view of roughly three beats duration with the central beat at (e) being the first beat of bar 89 (2:45). The vertical gridlines represent metrical subdivisions at the semiquaver level. The tempo of *Trajan* is 128 BPM so each semiquaver has a duration of 0.11719 seconds. The transient attack of the kick drum can be seen to line up with the gridlines at each crotchet beat. In constructing the groove of *Trajan* this kick drum part was the constant that the other parts were coordinated with. It is worth noting that the timing of the events shown was adjusted by ear alone without reference to the visual representation shown here which has been used for *post hoc* analysis only.

The alternating pattern of metrically accurate and delayed events of the shuffled Roland TR909 hi-hat part can be seen at the bottom of Figure Four. Note also the visible jitter in the TR909's performance which can be seen in the delayed transients at (a) and (h). This variability in the TR909's timing is one of the

⁸⁹ Mark Butler, *Unlocking the Groove* (Bloomington IN: Indiana University Press, 2006).

characteristics of its sound and was the reason why I've chosen to record an entire performance of the hi-hat pattern for the duration it occupies in the track rather than looping a short section and repeating that in the DAW. In this case the duration of the cycle of the hi-hat's syntactic pattern is one crotchet beat due to the off-beat accents which can be seen at (c), (f) and (h).

The inspection of the first percussion part (Perc 1) reveals that it has a heavier shuffle than the hi-hat and that the whole part has been shifted earlier in time such that its shuffled events (those occurring on the second of any pair of semiquaver subdivisions) line up with those played by the hi-hat. The synchronization between Perc 1 and hi-hat can be seen at (b) and (d). The early placement of Perc 1's transient at (c) shows the amount of offset applied to this part in order to provide a push that drives the groove. The heavier shuffle of Perc 1 relative to the hi-hat is apparent in the smaller time between its transients at (b) and (c) compared to transients at the same points in the hi-hat part.

The second percussion part (Perc 2) only displays a single event in this example but can be clearly seen to be earlier than the gridline at (g) pushing the groove here on beat two of the bar. Note that the degree of offset here is somewhat greater than that exhibited by Perc 1 at (c).

The third percussion part (Perc 3) occurs on each off-beat, matching the accent pattern of the hi-hat part. Close inspection shows that it exhibits some jitter in its placement relative to the grid and that the average placement is slightly ahead. This gives this part the quality of pushing the groove forward at each off-beat by a variable amount and interacts with the jitter of the hi-hat part to provide a groove with definite articulation but also with a degree of variation. The small degree of microrhythmic fluctuation gained by using recordings of jittery machine performances gives my grooves a slightly lively quality that subtly distinguishes them from sample-accurate, digitally rendered grooves constructed using timeline editing or virtual instruments which tend to be clinically accurate by comparison. The balance between highly stable rhythmic parts and those with a degree of jitter is difficult to consciously discern but contributes subliminally to the overall feeling that the track produces. It is by the process of repeatedly refining these types of distinctions on many levels that arrives at the end result that then exhibits a distinct difference to an otherwise superficially similar piece of work that had not received

that degree of attention. Whether these subsyntactic details receive conscious recognition or not they contribute to the message being delivered by the music in a similar manner to the role that a person's tone of voice has in inflecting the message they are communicating. Such details are perceived by means of accustomization to the flow of their behaviour. In a similar way to that in which non-verbal knowledge about water can be gained by drinking it and swimming in it, similarly non-verbal knowledge about the feel of dancefloor grooves can be gained by experiencing them through the social activities of playing, listening and dancing. The exact placement of these various percussion sounds has been carefully constructed to create the overall groove feel that emerges from the perception of these events. The particular character of each sound and its relative volume and spatial location are also components of the same construction and are equally critical in engendering the specific feel of this groove. In making decisions regarding these fine details I'm relating any changes to my kinesthetic perception of the groove. That perception is in turn informed by my social experience as a listener, DJ and dancer to this music.

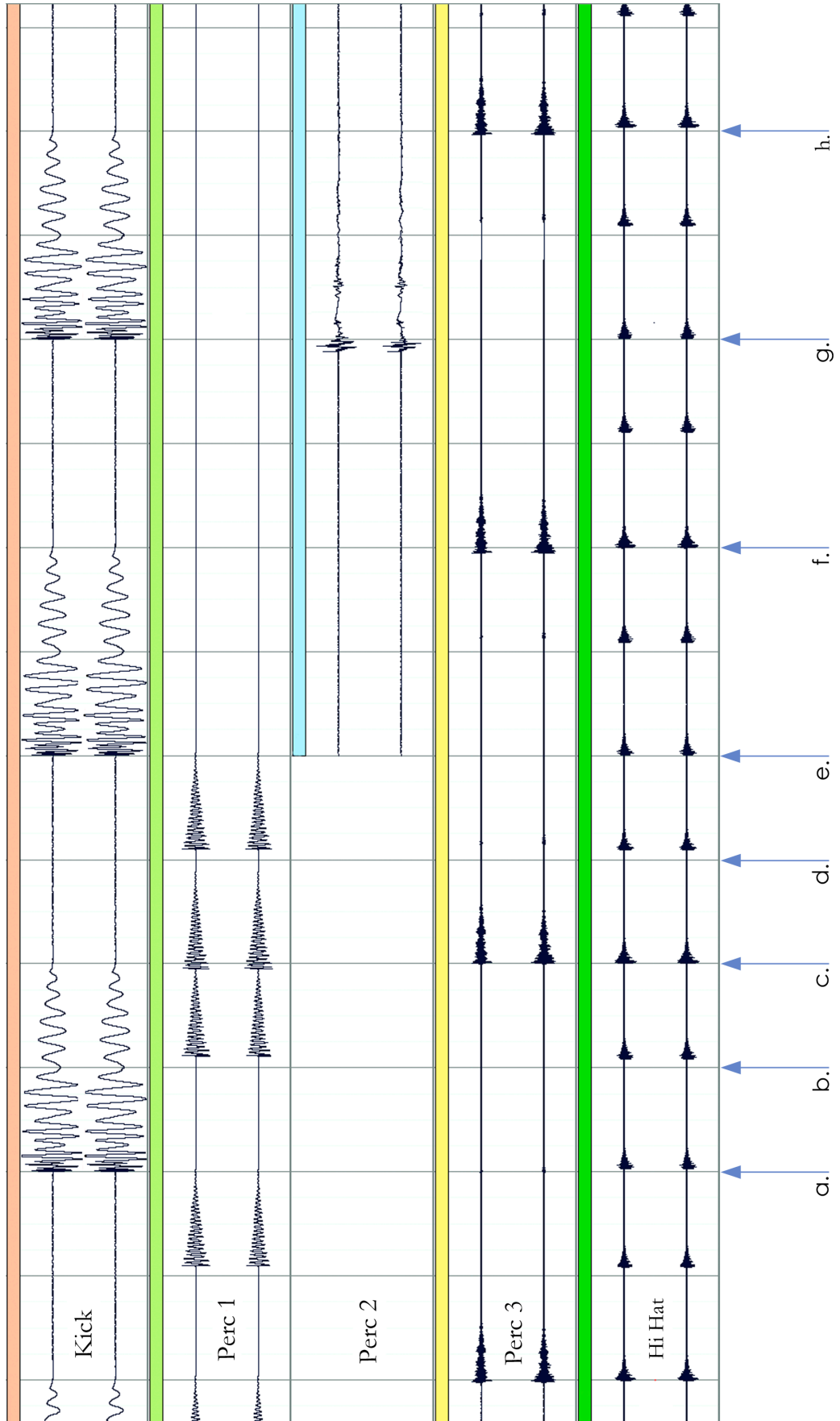


Figure Four: Microrhythmic detail of *Trajan*

Conclusion

Over the course of working on this portfolio my compositional orientation has shifted increasingly towards focusing on the aspects of music on the engendered feeling side of Charles Keil's distinction. It is my hope that the attention I give to those facets of the musical experience is readily demonstrated here in both my written commentary and the recorded tracks included in this portfolio. Keil's original 1966 article has had a degree of influence since its publication but the examples of dismissal of these aspects to be found in Butler's *Unlocking the Groove* demonstrate that there is still work to be done in informing musicological practice of the importance of these features of musical experience of Techno.

The consideration of specific technologies and techniques that generate value on this non-syntactic side of Keil's distinction is gaining ground. I would like to see study of these aspects develop further with the roles of unique instruments, techniques and studio technologies in the construction of iconic and influential recordings being documented before the relevant information is lost to history. The taxonomy of grooves including their microrhythmic detail is another area that warrants future development, as there is a wealth of information preserved in recorded sound that can be drawn upon in the search for patterns of inter-relation. Readings of Techno that give consideration to the musical processes in operation and acknowledge their role in constituting the material experience of Techno as played out in the realm of the social are to be encouraged as they would be a useful counter to the tendency exhibited so far by sociological forms of study of electronic dance music to treat it as an undifferentiated mass of material without reference to the distinctions that are of key importance to participants in the field.

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