

More than ‘Just a Hammer’: Critical Techniques in Electroacoustic Practice

Owen Green

SoundAsArt Conference, Aberdeen, 26th November 2006

Introduction

... we are now at the beginning of a musical revolution so profound as to alter our definition of music, our definition of what constitutes a musical instrument, and our perception of the function of music in our culture... technology... is at the heart of this revolution... (Chadabe, 2004)

Technology is often directly implicated in the huge changes in the way we think about music—a combination of increased sophistication and greater accessibility afford a greater number of people an increased range of possibilities (Chadabe, 2004; Emmer-son, 2001; Waters, 2000; Wishart, 1996[1985]). The fact of its availability, however, is taken for granted and consideration is seldom given to how the technological milieu came to take its form. The dominant discourses on technology have in common that technological change is assumed to be autonomous with regard to social or cultural factors. The philosopher Andrew Feenberg argues that this is not the case, and that there is an emerging micro-politics of resistance that takes the form of re-appropriating engagements with technology that can in turn affect the direction of future technological change.

Whilst technological changes exert substantive effects on the scope and nature of sonic arts practice, as Chadabe noted, appropriations and misuses by electroacoustic musicians have exerted substantive effects on the technological environment. Furthermore, I will argue that a critical awareness of this reciprocal relationship with technology can be seen to emerge in recent electroacoustic musical ideas and practices, like glitch or circuit bending, which are partly defined by a manner of engaging with technologies. The same critical concerns are made more explicit and developed in two sets of work I will concentrate on, Agostino Di Scipio's *Audible Ecosystemic Interface* and John Bowers' and Phil Archer's work on "infra-instruments", where the activity of composition has changed from the production of works to the construction of technologised musical environments in which music happens, and that emphasise music as a situated and interactive occasion rather than something that lends itself necessarily to repeatability and mediated reproduction.

Progress and Subversive Rationalisation

The most common discourses around technology argue that technological change is autonomous of human interactions with technological objects. Some argue that social and cultural factors play no part in technological design, meaning that the resulting objects must be inherently neutral, that the direction of technological change arises solely from technical concerns, and must be understood as representing 'progress'. As neutral devices, technologies represent nothing more than a means to an already prefigured end that is more efficient—that is, quicker or cheaper—than whatever preceded it. As milestones of progress, negative side-effects of technologies are a necessary price of our development and should be mutely forborne, lest one be taken for a technophobe (Feenberg, 1995, 1999, 2002).

Others propose that technological objects are anything but neutral, that they exert substantive effects upon the cultures they come into contact with, but that the nature of technological development still follows solely technical logic that is beyond our means to influence. Such an approach lends itself to either unrestrained triumphalism or unmitigated defeatism (Feenberg, 1995, 1999, 2002).

The work of the philosopher Andrew Feenberg seeks to provide an alternative thesis to autonomous technological change. He proposes that technological design is intertwined with cultural and social values, and that given a surplus of purely technical solutions to any given problem, which is commonly the case, the final decision will be determined by the values that reflect the cultural and social sensibilities of the design environment. The resulting technology embodies and *reenforces* those values, forming what Feenberg calls the object's *cultural horizon* (Feenberg, 1995). Because the capability to design and disseminate technology is concentrated among corporate and military institutions, the values reproduced tend to be those of profit and power¹. The location of human agency in directing technological change and propagating embedded values makes involvement in technological design an issue of empowerment. As such, there exists a politics of technology (Feenberg, 1995).

Feenberg argues that, in the absence of full democratic participation in technological design, diffuse sites of resistance can be identified that represent an emerging micro-political engagement with, and contesting of, the distribution of technological power. These resistances are characterised by re-appropriations of technological objects that serve to expose their cultural horizons, and have the capacity to alter the definition of an object by enlarging the field of its commonly understood legitimate uses. For example, Feenberg explains how users of the French minitel system, which was intended to be a passive information broadcast service, hacked it to allow inter-user communication and thus changed its cultural horizon. Feenberg has called this process 'subversive

¹In music technology, for example, the various corporate sequencer offerings invariably orientate themselves to the speedy production of commercial music within a fairly rigid workflow at the expense of flexibility that would afford experimental approaches. Their primary concern is to enable profit making, rather than to provide a creative environment. The assumption is that the musical ideas exist independently of the environment, so the sequencer is just a glorified tape recorder rather than a place in which art actually occurs.

rationalisation' (Feenberg, 1995, 2002).

Electroacoustic Subversion

Agostino Di Scipio has noted that electroacoustic practice is actually founded on acts of subversive rationalisation (Di Scipio, 1997a,b, 1998). Non-musical and reproductive sound technologies were appropriated for creative ends, in the form of laboratory equipment, computers, record players, tape machines, recordings, microphones and loudspeakers, amongst others. The difference in the use of these reproductive objects is subtle, but significant—the technologies had now become the medium in which to work, rather than a means of passively documenting some independent, separable sounding event.

Some later appropriations have served to reinforce these earlier ones. The turntable and the use of samples, for example, have become well integrated into the musical and technological landscape; they feature in a diverse range of musics, including the commercial mainstream, and are now catered for by specific sectors of the music technology industry. Meanwhile, newer offerings of industry are themselves subverted. For example, drum machines and bass-line boxes were originally conceived as automatic accompanists for instrumental musicians and were woefully inadequate for the job. These were appropriated by artists and used to produce music—house and techno, for instance—whose aesthetics are inseparable from the very machine-ness that makes the devices so poor at their intended function. In fact, in this case, the subverted application has come to dominate the designed-for application as the widely conceived function of these devices: it is more common to think of a drum machine as a device for making dance music than it is to seriously conceive of it as a practical accompaniment for instrumental play.

Glitch, Lo-Fi, Hacking, Bending

Electroacoustic practices have more recently emerged that indicate a critical appreciation by artists of the contestability of technological decision making power. Glitch and lo-fi, if understood as a way of working rather than just a flavour of sonic result, embody critiques of dominant notions about our artistic relationships with technology. Glitch could be characterised as working with sounds that result from technology operating in an aberrant state, beyond determinable responses; mutilated CDs or digital audio connections crashing, for example. As such, there is a critique of the idea of our mastery of tools and of their transparency in the creative process. Lo-fi approaches critique normative values about quality and correctness; they rebel, as Simon Waters put it, against the "smooth surface" (Waters, 2000) by employing deliberately retrograde signal chains or 'bad' technique.

Hardware hacking or circuit bending practices have a critical content that has much in common with glitch and lo-fi. Although their origins are in the 1960s, they have been

becoming steadily more popular recently, which is possibly interpretable as a continuation or reinvigoration of lo-fi and indeterministic aesthetics. They also suggest a more militant message about our relationship to commercial music technology offerings. By altering the operation of electronic objects, or by building one's own versions of equipment, musicians will be introduced to bodies of knowledge and technique that are new to them, and that are immediately empowering as they de-privilege the capacity to produce music technology and, through lower cost and reduced mystery, can serve to democratise access.

These practices also raise provocative questions about the mediated experience of music as reproduction that is the dominant mode of listening today. Is listening to a CD reproduction of another CD that has been deliberately mutilated still experiencing a glitch, as such? Are high-tech simulations of degraded signal chains categorically the same things as an actually degraded signal chain? Does a solely aural experience of a bent circuit 'mean' as much if one hasn't experienced the object itself and its manipulation by a performer? Questions of ambiguous authenticity around solely aural reproductions and discourses arise that seem to indicate one way in which a critical shift has occurred in electroacoustic practice.

Audible Ecosystemics and Infra-Instruments

The work of Agostino Di Scipio and of John Bowers and Phil Archer incorporate and extend critical themes present in glitch, lo-fi and hacking. Di Scipio's *Audible Ecosystemic Interface Project* critiques established notions of interactivity by focusing on indeterminacy and the substantive and inseparable role of the sound technology in the system, and is informed by Andrew Feenberg's theories (Di Scipio, 1997a,b, 1998). Bowers' and Archer's *Infra-Instruments* have a good deal common with the hacking and bending tradition; they challenge the cultural horizon of some live electronics research by describing an approach to the development of technological environments for playing in that limit the possibilities for traditional expressions of virtuosity and complexity in favour of exploration and flexibility.

Di Scipio's Audible Ecosystemic Interface

The Audible Ecosystemic Interface consists of a computer program that is not only connected, but structurally coupled to its environment via microphones and loudspeakers, meaning that the software, like an organism, is dependent on an external environment to function. The program attempts to gauge from the microphone inputs the effect that it has had on the environment with the sounds it has just made. The results of this determine subsequent changes in signal processing parameters, so that there is a feedback loop present via the enclosing environment, although at the level of control signals rather than audio signals. Di Scipio contrasts this to what he sees as a standard approach to interactivity, where changes to processing parameters are necessarily mediated by a performer's ears and action, and which, therefore, employs technology as

if it were just an instrument of human will. Instead, changes to system behaviour arise only as a result of changes in external sounding conditions, independent of a mediating human operator, leading Di Scipio to observe that “sound is the interface” (Di Scipio, 2003b,a). This doesn’t rule out the involvement of human action and performance, but this would happen on the basis of acoustic actions rather than mediation through knobs, sliders or other sensors.

The system’s state at any point is determined by all previous states: every component leaves an accumulating trace on the emerging behaviour. This applies not just to the characteristics of the listening space and the signal processing operations, but to signal chain components more normally regarded as invisible—microphones, loudspeakers, preamplifiers, analogue to digital converters and so forth. As such, the work makes an explicit comment on the notion of technological neutrality by insisting upon, and making structural use of, the very non-neutrality of these devices. In Di Scipio’s terms, it makes a “heretical” use of technology that is less about problem solving than about “problem raising” (Anderson, 2005; Di Scipio, 1997a).

Di Scipio’s work emphasises the structural coupling of humans, technology and their environment. The environment is not something we control, but interact with, and it exerts reciprocal effects on us; technology it not a means to exercise control, but again something we interact with that affects the course of our actions. The Audible Ecosystemic Interface actively makes mastery of it impossible, perhaps nonsensical. Because its behaviour is the accumulating result of contributing factors of every element in its signal chain and surrounding acoustic environment, it cannot be controlled, only interacted with. The authority of the performer-composer over the audience in having sole control over what sounds are made is weakened also, as any listener could, in principle, make sound that would affect the emerging sonority.

Bowers’ and Archer’s Infra-Instruments

John Bower’s and Phil Archer’s ideas about *Infra-Instruments* incorporate similar critical themes to Di Scipio’s work. An Infra-Instrument is a musical object whose capabilities stop some way short of fulfilling a comprehensive instrumental brief, providing limited musical scope rather than seeking to augment a player’s capacity for sound-making, as is more often the case. Bowers and Archer propose a number of ways that this can be approached:

- purposefully trammelling existing instruments
- making configurations that are incomplete, contingent or amenable to ad-hoc restructuring
- assemblies that include “obvious mistakes”
- using sound-producing objects that are purportedly non-musical by employing non-instrumental objects, like phone-diallers, or already extant infra-instruments, such as musical toys.

These ideas are informed by lo-fi and hacking aesthetics, as discussed above, and underline an accessibility of technique by orientating around simple devices whose functions can be easily grasped. This challenges traditional notions of technical virtuosity as a measure of musical worth by making it unachievable in the context of any single infra-instrument. As such, the construction of diffuse creative environments composed of many simple objects is encouraged, as is a practice that emerges and evolves over time by exploring various possible interactions between devices (Bowers and Archer, 2005).

Assemblies of simple components also afford what Bowers calls 'variable interactivity', where audiences are presented with an assortment of simple, understandable interactions with a range of objects, rather than a performer's inscrutable relationship with a mysterious black box that turns the performance into a puzzle to solve in 'decoding' the interactive relationship. In this way, Bowers sees greater potential for live electroacoustic performances to be 'about' something other than their underlying algorithms and mappings (Bowers, 2003).

Variable interactivity as a means for improving interaction with the audience, along with an emphasis on an improvised approach to the actual music making implies a type of structural coupling, in common with Di Scipio's work, but of a different sort. Where the *Audible Ecosystemic Interface* highlights the mutual interdependencies between humans, technology and the environment, here we see a coupling between performers, their technologies and the audience. That is, musical activity will be affected both by the affordances of the performance environment and by perceived audience feedback, which will in turn be affected by the types of discernible activity between musical action and sounding result.

Such structural couplings to the time and place of musicking imply that first-hand experience of the event in question is essential to a fulsome, interactive appreciation of it, and that, as with glitch *et al* above, an audio recording can only provide an incomplete account. This is true for any performed music, of course, but here it is the result of strategic decisions. In both the *Audible Ecosystemic Interface* and in a performance that exhibits variable interactivity, the interactive aspect is quite deliberately and explicitly non-sounding. As such, the emphasis is on direct, rather than mediated, experience, that reinforces music as a social phenomenon, and offers critique to a reproductive, consumption orientated mode of production.

Conclusion

The works of Agostino Di Scipio and of John Bowers and Phil Archer are representative of blurred boundaries between music and other art forms in two key ways. Firstly, the focus of creative work is shifted from the production of reproducible sounding works to the construction of objects and environments in which music, or sonic art, is facilitated. Secondly, they resist comprehensive interpretation through reproduced experience by insisting on meaning being located in various forms of inaudible interaction that are specific to the sounding moment; through insistence on first-hand experience, the so-

ciality of music and, more generally, art are emphasised. Whilst this latter point is true generally of any performed—and especially improvised—music, what is key here is that it is the result of strategic approaches to their respective technological means and, as such, representative of a critical relationship to the contemporary technologised musical milieu.

I've suggested that the critical themes in the Audible Ecosystemic Interface and in the idea of Infra-Instruments are present more generally in recent electroacoustic activity, such as some glitch and lo-fi based approaches, and the expanding scene around hardware hacking. These, in turn, are indicative of an emerging awareness of how electroacoustic practices have historically re-appropriated and subverted technologies in ways that substantively affected the make-up of the music technological environment, offering challenge to dominating discourses which assert our powerlessness to interfere with technological progress and the neutrality of means with respect to ends.

As such, I hope to have shown that a critical discourse of technology has a useful place in exploring contemporary electroacoustic sonic-arts and its blurred boundaries with other practices, as it helps illustrate a particular critical shift that can, in turn, explain a change in compositional priorities. Furthermore, and as a closing thought, critical discourses around, and approaches to, our technologised means in creative practice are of value in relating our work back to wider social and cultural contexts. A number of significant contemporary issues are substantively intertwined with technology and its politics. For example, our relationship with the wider environment; growing disparities in material wealth; increased mediation and alienation from each other; and political-economic elites who develop and violently use highly technologised means to preserve privileged and dominating positions. Art-forms that can critically engage with technology and its politics may well have the scope to illustrate the non-inevitability of such states of affairs and promote wider debate and engagement.

References

- Anderson, Christine: 'Dynamic Networks of Sonic Interactions: An Interview with Agostino Di Scipio', *Computer Music Journal*, 29(3,2005), 11–28.
- Bowers, John: 2003, 'Improvising Machines: Ethnographically Informed Design for Improvised Electro-acoustic Music', URL <http://www.ariada.uea.ac.uk/ariadatexts/ariada4/>, accessed 27th October, 2006.
- Bowers, John and Archer, Phil: 'Not Hyper, Not Meta, Not Cyber but Infra-Instruments', in *Proceedings of the 2005 International Conference on New Interfaces for Musical Expression (NIME05)* (2005), 5–10.
- Chadabe, Joel: 'Electronic Music and Life', *Organised Sound*, 9(1,2004), 3–6.
- Di Scipio, Agostino: 'Interpreting music technology: From Heidegger to subversive rationalization.', *Sonus: A Journal of Investigations into Global Musical Possibilities*, 18(1,1997a), 63–80.

- 'Towards a critical theory of (music) technology. Computer music and subversive rationalization', in *Proceedings of the International Computer Music Conference 1997* (1997b), 62–65, URL [http://xoomer.virgilio.it/adiscipi/tct\(m\)t.htm](http://xoomer.virgilio.it/adiscipi/tct(m)t.htm), accessed 27th October 2006.
- 'Questions Concerning Music Technology', *Angelaki: Journal of the Theoretical Humanities*, 3(2,1998), 31–40.
- '"Sound is the interface": From interactive to ecosystemic signal processing.', *Organised Sound*, 8(3,2003a), 269–277.
- 'Sound is the interface. Sketches of a constructivistic ecosystemic view of interactive signal processing', in *Proceedings of the 14th Colloquium on Musical Informatics* (2003b).
- Emmerson, Simon: 'From *Dance!* to "*Dance*": Distance and Digits', *Computer Music Journal*, 1(25,2001), 13–20.
- Feenberg, Andrew: 'Subversive Rationalization: Technology, Power and Democracy', in Andrew Feenberg and Alastair Hannay (eds.), *Technology and the Politics of Knowledge* (Bloomington and Indianapolis: Indiana University Press, 1995), 3–22.
- *Questioning Technology* (London: Routledge, 1999).
- *Transforming Technology* (Oxford: Oxford University Press, 2002).
- Waters, Simon: 'Beyond the Acousmatic: Hybrid Tendencies in Electroacoustic Music', in Simon Emmerson (ed.), *Music, Electronic Media and Culture*, chapter 3 (Aldershot: Ashgate, 2000), 56–83.
- Wishart, Trevor: *On Sonic Art* (Amsterdam: Harwood Academic Publishers, 1996[1985]).