CHAPTER THREE

Beyond the acousmatic: hybrid tendencies in electroacoustic music

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The contemporary cultural context: from 'acousmatics' to 'sampling'

Until recently, electroacoustic composers have been less interested in the social and cultural than the acoustic construction of their music. This concern with acousmatics and the phenomenology of sound has resulted in some wonderful, if obsessively self-referential pieces of music, but it has potentially impoverished the aesthetic development of the genre and stifled some aspects of a serious investigation of the application of electronic and digital means to music. A key hypothesis in this chapter is that a change in sensibility from what I characterise as an acousmatic culture (broadly concerned with sounds as 'material', and based – in historical practice – on analogue technology) to a sampling culture (concerned with context, and based on digital technology) has occurred, and that this is intimately bound up with a broader shift in cultural perspective, sometimes characterised as a shift from the modern to the postmodern. The culture of sampling has problematised the acousmatic approach considerably, increasing the likelihood of hybrid forms which owe their existence to the collision of different musical worlds, different disciplines, different modes of thought and understanding. This chapter identifies a range of broad cultural and attitudinal shifts which may be regarded as establishing the preconditions for 'hybrid thought'. It also attempts to uncover a few of these hybridising tendencies in current electroacoustic practice and draws some connections with similar developments in other signifying practices: writing, film-making, and so forth. The function of this chapter is therefore twofold: to survey a series of issues which impact upon artistic production and new signifying practices in general, and to connect these to shifts in thought and practice relating to electroacoustic music. I have been particularly concerned to illustrate that what I have characterised as a shift in sensibility from an acousmatic[1] to a sampling culture, although linked at the material level to a technical

change, is intimately bound up with issues beyond the merely technical.

Many of the cultural shifts examined share the sense of a relativisation of certain things which were perhaps previously regarded as absolutes; of boundaries which have broken down – between media, between disciplines, between knowledge-systems, between styles and genres, between so-called serious and popular arts. A process of hybridisation is at work. This inevitably leads many of our concerns to be about the nature of reuse and recontextualisation: about taking something associated with one genre, one historical time-frame, one culture and putting it in another. Sampling is a particularly powerful engine for the investigation of such phenomena.

Seven issues have been chosen as illustrative of the broad cultural shift with which I am concerned. These phenomena are interrelated and their separation therefore somewhat arbitrary, but they form a useful checklist against which to consider emergent tendencies in electroacoustic music and in the arts generally:

- New technologies: new practices and associated concepts: storage; dissemination; sampling.
- Cultural pluralism: difference; exchange; hybridisation.
- Perceptions of authority: including authorship; consensus; institution and where ownership, meaning and value might lie.
- Tradition and innovation: modern and postmodern perspectives; general/social and specialist/professional conceptions of a practice and the institutional basis of tradition.
- Representation: changes in language; coding; the learned nature of interpretation; problems in relation to verbal analysis of electroacoustic music.
- Economics: funding and the political economy of electroacoustic music.
- Environment.

New technologies

New technologies bring about the most immediately visible changes in the cultures within which the arts operate. Indeed, a consideration of the impact and influence of new technologies cuts across all of the other areas of conceptual shift listed above and many issues emerging here will be elaborated further under these later headings.

The change from analogue to digital technology is resulting in a wholesale reconfiguring of our experience of music, at levels from the global to

the personal, from the economic to the aesthetic. As an issue directly affecting composers using electronic technology it has been most intelligently addressed in terms of a problematics of human-machine interface by Mike Vaughan (Vaughan, 1994, pp. 119–21). The essential changes lie in the nature of the data itself which, being in digital systems non-linear, symbolic, and therefore formally arbitrary in relation to the information it represents, allows new modes of control and addressing. Such changes are exemplified in the notions of storage and 'instant recall'. As the relationship between data and information is a constructed mapping rather than a physical analogue, interfaces can be designed which are familiar from other practices or which are customised to particular requirements. As working environments across disciplines become more similar, common concerns emerge, as does a common critical language, and such disciplines may hybridise. As the technology becomes cheaper and its availability broadens it is consolidated in society in ways which potentially radically restructure activities like composing and listening.

Storage and 'instant recall'

The vast increase in data storage, and the speed with which that data can be recalled, is paradigmatic of the intimate interrelation of technical and aesthetic change. Whereas analogue storage allowed only linear access, digital storage allows virtually instantaneous addressing of data at any point. Scanning vast amounts of material in order to locate an appropriate selection therefore becomes a much more efficient and realistic proposition. However, the inexpensive nature of digital storage (compared with, for example, analogue tape) also tends to lead to the archiving of much greater amounts of material and to the putting into abeyance of much decision making. An inability to keep an adequate mental grasp of the vast amounts of potential musical material available for a given compositional decision has a crucial impact on composing practice, in the sense that what is technically possible often transmutes into what is aesthetically desirable. It is thus possible to read polystylism and musical eclecticism not only as a rejection of modernist predilections for formal coherence but as simple mechanical adaptation to the inadequacy of human memory.

Viewed from a broader perspective the issue of memory at the cultural rather than the personal level is equally problematic. The collective memory or cultural data bank can be represented (metaphorically) as a bathtub from which, historically, as much flowed out as in, but which has long since become plugged and overflowed. As a result of the increasingly efficient 'plugging effect' of new media storage (photography,

film and video, all forms of sound recording, in fact any form of data retention), cultural activity has ceased to be a strictly historical phenomenon, in which artefacts and ideas are constantly being lost and forgotten, and has become instead an accumulative phenomenon in which artefacts and ideas from all historical periods and cultures exist simultaneously in the present. This releases such a confusion of meaning-generating contexts from different times and places that the common cultural experience which enabled critical assessment has all but disappeared. This lack of consensus affects compositional judgement at the public and private levels. How can one decide what is current if there is no sense of historical flow and how can one judge the intentions of others from what they produce? Is this quotation a cynical appropriation or a parody? Is its political agenda conservatism or radicalism?

Evaluation is particularly problematic for a generation of composers convinced of the benefits of investigation, integrity and personal work. It is far more difficult to distinguish between postmodern ironic juxtaposition and pure laziness or incompetence than it was to see value in the earnest searchings of modernism.

The quest for ever more reliable storage and rapid access may have led us to overlook two preconditions for creativity which are not aided by such an archival, potentially museal approach – inefficiency and forgetting. I propose these quite seriously as threatened species in the creative ecology. Information overload is not only a characteristic of a given instant, but is an ongoing process in which current activity is always potentially invaded or impinged upon by vast banks of previous data which need to be taken into consideration. Storage therefore occupies a paradoxical position for the composer. The aesthetic plurality that results from the lack of a consensual critical frame, and which itself stems from the simultaneous existence of all histories and places that recording/storage allows (the overflowing bathtub metaphor), is exciting. Suddenly there is unprecedented scope for aesthetic experiment, and this results from technology's transformation of the cultural context as much as from its instrumentality in specific goal-oriented musical tasks. But there is a sense of loss in the knowledge that filtering processes must now be consciously constructed, or the result of human inadequacy, rather than the result of real technical constraint or of the 'resistance' of the material.

Interfaces, hybridisation, vocabulary

The increasingly similar interfaces presented to us for the control of computers make the previously very different tasks of organising and

transforming text, static and moving visual images and sound into experientially ever more similar processes. The new electronic technologies therefore form a seductive potential meeting point for many previously separate arts practices. Such interfaces make use of identical concepts – frame, freeze, copy, paste, loop – as controlling strategies, and this is already resulting in a commonality of language between practitioners who were previously unaware of conceptual connections between their fields of activity.

Of course the conceptual connections themselves are not new, as a browse through Paul Klee's notebooks (Spiller, 1961) or other documents associated with the Bauhaus will attest, but the extent of conscious acknowledgement of such a connection is now far greater. This interconnection reaches its zenith in the concept of hypermedia, in which complete control over and navigation through the presentation and transformation of all media is available from a single computer platform. Technological determinists are fond of arguing that such possibilities render obsolete previously functional technologies such as painting and the book. A more rational view would be that painting and books are likely to continue to occupy a lively place in our culture, but that those who choose to continue to work in such 'old technologies' will in future inevitably have to consider their work and its 'meaning' in the light of the existence of new technologies (and their associated conceptual baggage) because these are likely to become very widespread.

Technology and social practice

The paradox for composers presented by mass storage and 'instant recall' is reflected in a similarly paradoxical relation between music technologies and public use. One of the most significant ways in which storage technologies have become consolidated in society is exemplified by the Walkman; something (music) which was until relatively recently an explicitly social phenomenon, a shared process in which people participated inevitably, not just as listeners but as makers and doers, has the potential to exist primarily as a commodity. The argument follows that 'walkpeople', isolated in their personal portable acoustic space, are indicative of a practice which has become primarily non-participative, desocialised, and exists predominantly to placate its audience, rather than to excite, challenge or stimulate them. But of course the counterbalancing factor is that mass-production techniques have driven down the cost of new technologies to the point of widespread accessibility and that the sampler, as the fundamental tool of musical reuse, points the

way to a resurgence of composition, rather than consumption, as a model for the future political economy of music.[2]

Institutional and economic pressures towards the first of the two models mentioned (passive consumption) are powerful, the operation of our education in music currently seeming to make it different from other fields of activity like the visual arts, or the written and spoken word. This is because, whereas we all see and therefore inevitably develop some sense of a visual language, and we all speak, read and (mostly) write to some extent and therefore also have a sense of the way words work, our musical sense is developed primarily as non-expert recipients: we participate primarily by listening. But of course listening is not merely passive consumption, and sampling may yet prove crucial in restructuring and stimulating broader public expectations of listening.

The culture of sampling is by no means restricted to the sonic arts. Parallel developments in other media include Woody Allen's film *What's up Tiger Lily*, which began life as a fairly vicious Japanese film but which Allen, treating it as a 'found object', recut and dubbed,[3] turning it into a comedy – an instructive example of the power of the acoustic domain to modulate the meaning of image. A quotation from a recent conference on new media gives a sense of the literary world's engagement with the same processes:[4]

> The books written by Paul Valéry, Walter Benjamin, Ludwig Wittgenstein, Marshall McLuhan, Gilles Deleuze, Douglas Hofstadter, and Niklas Luhmann can be understood as attempts to do justice to the New Media world at a level of technical depiction. And what is more: these books are no longer books in the strict sense of the word, but mosaics consisting of quotations and fragments of thought. They perform an art of writing which might be called cinematic – composing books as if they were movies. These books try to burst through the limits of the book form. Of course, most of these attempts have failed. But even this failure is instructive. The information processing system 'book' is clearly no longer up to the complexity of our social systems. For this reason, authors who are aware of this and yet want to remain authors, organise their books according to structures and patterns taken from non-linear information processing systems (Bolz, 1994, p. 2).

Cost

In addition to the fact that mass-production techniques have driven down the cost of new technologies to the point of widespread accessibility, the cost of travel has also reduced to a point which stimulates a radical restructuring of our mental geography. This increased mobility happens also at increased speed, so that it is not only our geography,

but our sense of time, which is being altered. Both economic and temporal issues are considered at greater length below.

Five principles

Roy Ascott[5] has identified five principles which may be regarded as particularly enhanced by digital technologies: *connectivity*, *immersion*, *interaction*, *transformation* and *emergence*. Connectivity and interaction have been discussed above in relation to interfaces and hypermedia, although the connectivity which is enhanced is not only between disciplines but between individuals, institutions and locations. Immersion relates to the scientific insight that the observer is always an implicit participant in the observation being made which translates in compositional terms into a concern with the sensory immersion of the subject (listener) in the work. In electroacoustic music the technique of multi-loudspeaker diffusion emerged relatively early as a solution to this problem, but it is only more recently that the visual world has addressed similar concerns in experiments which project visual data directly onto the retina, removing any sense of a separate external 'represented' world. (Even this has its precedent in J.M.W. Turner's experiments with the retinal afterimage of the sun in the 1840s (Crary, 1990, pp. 138–43)). The term transformation reflects a prioritising of time, rather than space, as the concern of those in digitally-based arts practice. A 'time-base' is frequently identified by those artists who eschew conventional categorisation as the essential factor in their work, and is obviously crucial to any analysis of common ground in interdisciplinary arts practices. Emergence signifies a conscious utilisation of the changing boundaries between the subject (listener, interpreter) and the composer (artist, maker). This is particularly clear in situations where the former interacts with what the latter has made, and the work can be said to emerge in its completion by the user, rather than having been designed in its entirety by the artist and then 'presented'.

Cultural plurality and hybridity

We are increasingly aware of, and participatory in, a plurality of cultures – cultures associated with disciplines and working patterns, with social expectations, with gender roles or with nation states – each of which has many voices, multiple stories of how the world is, each with its own dynamic validity. Identities, allegiances and constituting contexts can be individually chosen to an extent not possible within the

consensus-based socially determining epistemological structures characteristic of more geographically constrained, self-contained societies. Cultural identity has thus become mutable and open to choice. The complex and polymorphous nature of societies is evident not only in an increased awareness of oversimple ethnic/racial and sexuality/gender separations, but also in an awareness of the inadequacy of analysing cultural phenomena on the basis of unwieldy monolithic concepts such as 'mass culture', 'high art', 'popular culture' and in the complex notion of consensus itself.

Cultural plurality provides a striking social rationale for an increasingly interdisciplinary approach to theory and practice in that it draws attention to the cultural and historical specificity of separations between 'disciplines' and of the idea of 'arts' as a phenomenon separable from social/utilitarian or social/ritual function.

An awareness that there are many cultures which shape us and which we sustain and transform through our participation in them has two fundamental effects on a composer. One is empowerment, because it acknowledges the possibility that an individual can help to shape a culture. The other is to provide a continuously critical context in which the (often dominant) culture to which the artist or composer belongs is always juxtaposed with cultures which construct or describe the world differently.

The increased ease with which we can travel, by air and other means, has reconstituted our imaginary map of the world. Geographical proximity is ceasing to be a fundamental issue of connection as electronic communications technology allows broadcasters, writers and designers to work from home via modem, and surgeons in the USA to operate on patients in London via remote satellite link. This is exciting but also causes problems, as proximity, previously a major determinant in cultural identity and commonality (and therefore in possible meanings for any given experience) becomes less relevant. Its relevance for electroacoustic composition is that judgements of value or comprehensibility are likely to be shared by composers and support structures (international festivals and conferences) between whom there is frequent contact but that potential audiences are unlikely to share this same specialised network of connections. The security of this 'international acclaim' from their peers has insulated composers from the need to address more local social and economic issues.

Cultural pluralism has surfaced musically in many ways and has resulted both in an immensely broadened field of different (and distinct) musical possibilities and in an incredible hybridisation of concern and language. Pluralism (which implies difference and therefore some degree

of separateness) and hybridity, although ideologically distinct, often coexist in musical practice. An obvious manifestation is 'World Music', which in Britain was initially very dependent on organisations like WOMAD[6] and figures like Peter Gabriel and DJ Andy Kershaw for its success, and which embraces a number of culturally separatist tendencies but which has also produced intriguing hybrid musical activity. Even in an isolated regional town it is now possible to find a cross-section of music from Venezuela or Zaire in a record store. And there has also been a hybridising of genres – Bristol 'trip-hop' group Massive Attack have worked with classical Indian musicians; Frank Zappa's three 'final' CDs make use of the *Ensemble Modern* both as improvisers and 'conventional' contemporary performers; Irish folk band Moving Hearts use soprano sax as a melody instrument as idiomatic as a tin whistle or uillean pipes, and in a similar manner Indian musicians have confounded the technical limitations of the violin and clarinet to incorporate them idiomatically within a sophisticated non-western classical tradition. Contemporary pirate radio stations (such as Pulse FM, which operates semi-legally from Harringay in North London) use a rapid montage sampling technique which deliberately incorporates as many genres as possible – perhaps a reggae beat, with chords from a film soundtrack, fragments of jazz saxophone and operatic vocals – and naturally enough such developments are reflected in electroacoustic music.

Sampling, in addition to functioning as a tool of time manipulation and repetition, encourages this type of recontextualisation, allowing the easy manipulation, transformation and juxtaposition of genre or culture. As 'morphing' techniques become more widespread, collisions of culture and genre increasingly result in complex hybridisation.

One particular tendency which is illustrative both of the instinct to hybridisation and of juxtaposition of different 'realities' (of genre, technique, etc.) has been theorised by Alejandro Viñao (1988), among others, as relating to the literary movement of *realismo fantastico,* exemplified by Jorge Luis Borges, Gabriel Garcia Marquez and others, in which everyday objects and situations can imperceptibly mutate into magical or impossible ones. *Realismo fantastico* has been internationally influential[7] and in Britain there is a considerable group of electroacoustic composers, some with Latin American connections, who might be regarded as working within a sort of 'magical realism', being particularly interested in the morphological changing of one sound object or environment into another. This is a concern shared at a technical level by Trevor Wishart whose *Vox 5* is frequently cited as an investigation of morphological shift between indexically significant

sounds (Wishart, 1994). Viñao's *Chant d'ailleurs* (Viñao, 1994) provides another sophisticated musical example of this type of hybridisation, as the transformation takes place on at least two distinct musical levels. At the level of pure acoustic fact, digital interpolation is used to transform the sound of a Turkish shawm into the sound of a female human voice; and at the 'higher' level of genre, expressive elements and semantic strategies from Mongolian folk musics transform into and interact with western extended vocal techniques and an acousmatic sensibility without any apparent conflict.[8]

Perceptions of authority

The multiple narratives which emerge in a pluralistic society – the multiple stories of how the world is – serve to draw attention to those meta-narratives which seem to be invested with a particular authority, perhaps the most notable of these in the late twentieth century being the narrative of scientific knowledge. Jean-François Lyotard has characterised the increasing scepticism about the status of such 'objective truths' as an 'incredulity toward meta-narratives' (Lyotard, 1986, p. xxiv). Such healthy scepticism towards authorities is not without its problems, as we tend to construct our own ways of being in the world, of making our experience mean something, against the legitimating authority of narratives which are consensual or in some way 'bigger than us'. When such consensus disappears and all authority and power structures become open to critique, the nature of the relation between the individual and the social is fundamentally changed. The individual is invested with massively increased levels of potential power and responsibility, and overloaded by the need for constant conscious decision making.

In relation to composition such seemingly abstruse considerations are most significant in that they concern a shifting of the balance between composer and listener, investing the latter with an authority to decide something's value or meaning which until recently was the preserve of the composer. Authorship (compositional autonomy) can be deconstructed as another kind of institutionalised power. Comfortable ideas about a 'canon' of objectively 'Great Art' or 'Great Music' which is timeless and international are also undermined, as attention is drawn to the historically contingent, ideological nature of the way in which such a 'consensus' emerges. But without these comfortable certainties it becomes increasingly difficult to find general criteria for criticism, evaluation or legitimation of the arts (or anything else, for these upheavals are as prevalent in scientific as in artistic thought). Perhaps one of the

few remaining legitimate criteria for a composer may be the need to discover or verify something through activity.

Authority resides to a great extent in language. Foucault and others have demonstrated the extent to which the concepts which are in place to explain a phenomenon can become self-perpetuating, and 'music' and 'electroacoustic composition' are no exception. Of course, at one level terms such as 'visual art', 'music', 'drama', 'dance', and their subdivisions into genres or styles – 'electroacoustic music', 'free jazz', 'microtonality', 'jungle' – have an obvious currency and utility. On another level they act as constraints, which need constant testing and reformulating and against which new types of activity are constantly working. Boundaries between disciplines and genres are given immense authority by their enshrinement in the institutions which mediate our artistic experience: colleges, universities, museums, galleries, concert halls, theatres, funding agencies, television programmes; yet it is clearly the interaction of choice and historical accident rather than some innate order which has resulted in our world being parcelled experientially as it is. Paradoxically, the scientific disciplines have been quicker to hybridise and reconstitute themselves than the arts. It seems possible, however, that as music is at almost every point mediated by electronic technology, and as aesthetic distinctions become increasingly problematic, the notion of 'electroacoustic music' as a definable area of activity may become redundant. It is increasingly characteristic for young electroacoustic composers to be involved in other musical or artistic activity, and many successful musicians and artists are increasingly unhappy about labelling themselves too narrowly as, for example, 'choreographer' or 'composer', resorting instead to more general terms such as 'maker', or just 'artist', in an attempt not to delimit their field of possible creativity.

Access, replication, distribution, ownership

Through their ability to manipulate any data by means of symbolic languages, computers have opened access to many people previously disenfranchised from the compositional process either through lack of technical skill or by the mystique and protective languages involved. The means of production and dissemination have become widespread and accessible. The flexible nature of the interface between user and data allows the development of tools which look familiar but which are mapped onto unfamiliar skills or processes. This allows the rapid production of phenomena which seem to exhibit the characteristics previously associated with skill, intelligence and 'professionalism'. 'It is

now relatively simple, for example, for someone with little conventional musical knowledge to produce a printed score and a digitally recorded 'performance' of considerable sophistication' (Strange, 1987, p. 19). This is a threat to those power élites who have relied on such characteristics to justify their privileged status. It has resulted in rapid shifts of 'aesthetic' criteria, as specialists attempt to keep distance between their own production and that of non-specialists. In general, it has led to a situation identified by many authors (for example, Born, 1995), in which the criteria of aesthetic success have become synonymous with those of technical innovation. This concern with innovation for its own sake can be criticised for reflecting the interest of a small group at a particular historical moment at the expense of acknowledging the more complex relation between innovation and tradition that exists in other cultures.

If the criteria of 'successful' composition have not always equated precisely with those of technical innovation, they have nevertheless been sufficiently confused with pure technical skill for Mike Vaughan to be able to write, without fear of rebuke:

> With respect to the poietic dimension, it is generally thought that it is appropriate for those processes of construction associated with the studio environment to remain hidden in performance (Vaughan, 1994, p. 116).

Increasingly however, composers have been prepared to challenge this aesthetic norm. Those who do so with a critical agenda tend to react against the smooth surface which is now easy to produce in any medium using digital technology. In the digital composition studio the urge to polish and clarify – to smooth out – is very strong, as a result of which certain types of filtered resonance have now become as much of a cliché[9] as obviously reversed sounds, or as loops with glitches in them used to be. The work of Tom Wallace, for example, marks a deliberate refusal of this aesthetic position, this being most evident in abrupt cuts to silence and in fades which draw attention to themselves by their use of unusual or uneven envelopes.[10] While clearly a composer with plenty of conventional technical skill, Wallace reacts against the 'smooth surface', which he sees as falsely indicative of such skill, and therefore associated with spurious notions of professionalism.

Another refusal of surface smoothness takes the form of the deliberate introduction of 'surface noise' associated with vinyl recordings, evident in the work *Tautology* by David Prior.[11] This establishes an additional discursive dimension to the work which is analogous to the spatial (left/right or distant/present continua), but which establishes an additional continuum of 'resolution' (of clear/unclear or 'hi-fi'/'lo-fi'

sound). It is significant for the current state of electroacoustic music that such tendencies were preceded by similarly interesting work in the 'pop' music world. Portishead, a band which emerged from the Bristol club scene,[12] use turntables and samplers and have established their own distinctive studio production aesthetic which not only makes use of explicit quotes from many other records but attempts to reproduce, and make play with, different characteristic historic production techniques. These have included the 'sonic signatures' of 1960s spy films, Miles Davis/early Blue Note jazz, Isaac Hayes, and many others, often by using only a short explicit sample of the original which they always credit. A typical track, *Strangers*,[13] begins with a fragment of a Wayne Shorter sax solo before juxtaposing various different genres and degrees of presence and clarity in a manner which is simultaneously archaeological and hybridising in instinct. The extent to which they are prepared to experiment to achieve their particular aesthetic predilections – privately pressing LPs of some of their own material in order to re-record it 'off-vinyl' for remixing into the publicly-released CD; utilising elaborately unconventional recording situations and equipment – is indicative of the level of 'electroacoustic' subtlety and complexity achieved in more inventive pop music.[14]

Authorship and ownership

The nature of digital information allows every duplicate to be an identical clone of its original, making replication simple. Digital networks have dissolved the distinction between replication and mass dissemination. Indeed the 'clonability' of digital data makes concepts of copy and original extremely problematic. As material of all sorts (especially music, text and images) is freely copied between users and as collaborative work via networks becomes increasingly prevalent, the identification of 'authorship' also becomes more difficult, and new conceptions of intellectual property emerge. One of the musicians who was very early to recognise the limits of existing laws (and the limits of current debate) in dealing with the authorship and ownership problems opened up by sampling technology was the Canadian, John Oswald. Oswald coined the unfortunate term 'plunderphonics' to refer to his music which is constructed totally from samples of pre-existing work. He gave this title to his first CD but, predictably, the links between the word 'plunder' and the concept of piracy made his claims – that the work was about the appropriation and changing of meaning – difficult to support in court and most of the 1000 copies of the CD were destroyed. A typically provocative example of Oswald's work, *Z*, is 18 seconds long and

consists entirely of samples between 200 milliseconds and 1 second in length taken from a CD by New York saxophonist John Zorn. (There are 35 samples and 47 events.) As the Zorn CD is itself a series of highly condensed versions of Ornette Coleman jazz compositions, one can regard the work as consisting of nested levels of reinterpretation.

The issue of ownership, of territory, of intellectual property has been intimately bound up with the technologies of representation and repetition available. Until the advent of electronic means of reproduction, timbre had remained an unencodable (unnotatable) area of music and remained therefore in some way outside the constraints on ownership and reuse which applied to pitch and rhythm. When notation allowed the reproduction, storage and dissemination of pitch and rhythm, composers and others were quick to impose legal restrictions so that the concept of authorship might be protected. As sampling provides a means of reproducing, storing and disseminating timbre, ethical as well as aesthetic questions come into play. Is it *theft* to use sound from another person, time, society, genre? Does the ease with which material can be 'lifted' from one context, and reused elsewhere in either transformed or identical state, and the general currency of this practice, make it socially – rather than legally – right to do so? What happens to notions of intellectual property in such a situation? Is it *authentic* to use sound from another person, time, society or genre? What about questions of artistic integrity? Should the same constraints apply to reuse of a timbre as when reusing a melody or a rhythm? It is just as possible to reuse material from one's own, as from another's work. Is this a different issue? When does the work become public property or common culture? What are the limits of 'the work' in a culture of transformation?

Naturally these are issues which are particularly pertinent to (but by no means limited to) music, as sampling culture – the culture of recontextualisation – is equally evident in other art forms.

Tradition and innovation

Any discussion of tradition and innovation clearly relates closely to the problematising of authority and to the notions of culture discussed above. Such considerations have a particular poignancy for those currently involved in composing. The ethos of modernism was one of perpetual innovation, of reinventing the whole history of the practice of composition in every work. Paradoxically one of the results of this was a profound respect for history, the artefacts of which were regarded with awkward reverence. Despite modernism's rejection of the past – its

positivistic language and ideology, its faith in progress and perfectibility – much of its associated ideology remained unchanged from the romantic era. This was evident in the role and status of the artist (especially the composer) who was invested with an almost divine right to determine the meaning and importance of his own output. Electroacoustic composition, by confining the composer to the studio and concerning itself essentially with material and formal innovation, can be seen as an archetypal modernist pursuit. This impression is heightened by aspects of the early history of the medium, where the legitimating strategy was clearly that of scientific enquiry, with the laboratory providing the model for the studio and a compositional methodology based on 'the experiment' in which technicians perform operations on the composer's behalf.

Postmodernism, if it has any unambiguously identifiable character, is marked by a rejection of innovation as its guiding principle and by the substitution of recontextualisation. As critics from McLuhan (1964) to Kittler (1990) have pointed out, changes in the nature and structure of our communications technologies fundamentally alter the meanings of what is transmitted by, for example, determining the context of reception or by selecting certain material as significant and thus preventing 'viewing outside the frame'. It is no longer innovation in material but the context in which that material is used or experienced that determines what it might mean. In linguistic terms this is a shift in focus from the signified to the signifier. As a result, the artefacts of the past reappear in new permutations and all historical periods are regarded as potential contemporary material. New methods of dissemination – CD, video, DAT, television, the Internet – tend to stress this simultaneous availability of times and cultures while also drawing attention to the principle of recontextualisation: Madonna in a Cathedral, William Byrd on an aeroplane, Sarajevo in your sitting room.

The modern tendency to regard tradition as a series of historical objects and as the antithesis of innovation is a predominantly eurocentric phenomenon, which fails to acknowledge that traditions, to have continuing social currency, tend to change constantly. A contrasting Japanese attitude towards history and tradition is best exemplified by the case of a national shrine – a fourteenth century Buddhist temple – which is completely rebuilt from new materials every two years, and in which the tradition is regarded as residing not in the object itself but in the continuing knowledge of appropriate materials and building techniques. This more complex relationship between tradition and innovation, evident in many cultures, is beginning to reinform western mainstream practices.

The constructed nature of memory – the manner in which traditions are constructed after the event – has also become more evident within a culture increasingly in thrall to spurious notions of 'heritage'.

Investigations into the relationship between tradition and innovation are paralleled by those into the relationship between history and fiction. Here the insight from poststructuralist critical theory – that history and fiction are not as different, not as mutually exclusive as we might have imagined – is useful. It encourages acknowledgement that history is constructed from a series of individual accounts, partial viewpoints, each with its own quota of elaboration or untruth, and that our access to it is always mediated through such narratives and texts. The (paradoxically) historical nature of fiction which, being written at a particular historical and cultural point, inevitably encodes whatever collective thought processes are current within that context and grows from the concerns and language of that moment, is also evident.

Sampling as a technique is paradigmatic of the uneasy relation between tradition and innovation, incorporating the archival instinct of the former and the speculative and exploratory impulse of the latter. Sampling can be regarded as the ultimate time-manipulation tool, the ultimate musical tool of repetition and therefore of recontextualisation. It allows the manipulation of temporally specific sound data or musical information at every level from the micro-sonic to the historical. Although this might also be regarded as true for earlier recording technologies, it is the immediacy with which specific data can be addressed or manipulated in the digital domain and the flexibility of controlling strategies and transformational procedures available which make the shift from analogue recording to digital sampling culturally and musically significant. Sampling allows, in Attali's terms, 'an extremely effective exploration of the past, at a time when the present no longer answers to everyone's needs' (Attali, 1985, p. 100).

Some of the ethical issues relating to sampling and reuse of material can be addressed in relation to this insight. One of the arguments against sampling or reusing historical (even recent historical) material is that it is in some way inevitably inauthentic to do so. Such arguments are usually predicated on the primacy of the composer's original intention and are intent upon the disclosure of the original experience. This is an argument which also surfaces within the performance of instrumental music, most notably with regard to authentic performance practices which purport to recreate the experience of, for example, an eighteenth century concerto. A reasoned response is that such attempts both do and do not recreate an 'authentic' experience. There is an analogy here between the early music debate and the acousmatic/

sampling debate. In acousmatic (purely acoustic) terms it is quite clear that using harpsichords, gut-strung violins and baroque flutes in an appropriate acoustic will generate a sound which is closer to that of the eighteenth-century than modern instruments are capable of doing. But other variables such as social context (the context in which the work is heard and understood), the imagination, knowledge and cultural associations of the audience are as pervasive as the purely acoustic. However authentic the spectral quality of the performance, listening to Vivaldi on a walkman in an aeroplane is an experience which speaks primarily of the late twentieth century, and impulses to 'authenticity' in performance can thus be read as much as aspects of late twentieth-century tendencies to professional specialisation in music as of sensitivity to original historical context. To continue the analogy in terms of a 'sampling culture': as audience control over listening context becomes so great that it effectively establishes an interaction with the compositional process, there is no reason why the varied experiences, interests and capacities for imagining new meaning should any longer be the privilege of the composer. As the audience is now, by definition, almost completely unpredictable in its experience, perhaps those who continue to compose as specialists are justified in leaving traces of other genres, other pieces, other meaning systems within their work in order to allow the audience a broader imaginative scope.

Arguments about regard for tradition and chronological continuity are particularly difficult to sustain when it is realised that even those recordings which seem most obviously to be accurate and continuous documents of a single performance, such as major orchestral recordings, are constructed from multiple short fragments; and that the famous 'three tenors' recording, which accompanied the 1994 World Cup in Italy, is believed to have been assembled from tapes made by the three men at different times in different countries.

Other concepts of tradition and authenticity sidestep the notion of authorial intention and substitute a notion of public property in which particularly well-known or well-loved musical production is regarded as subject to common cultural ownership and therefore proscribed from alteration or reuse. Such arguments are by no means restricted to 'art' musics and heated debate about the ethics of re-mastering classic jazz tracks for CD, re-mixing Rolling Stones and Frank Zappa recordings and reusing the voices of Dolly Parton and Michael Jackson occupies many pages of recent fringe-academic publications (Colli, 1994; Cutler, 1994; Gans, 1995; Oswald, 1987).

Finally, the notion of authorial intention is in itself difficult to pin down. Theoretical separations between 'poietic' and 'esthesic'

interpretation (Nattiez, 1990) are not verified by experience in the altogether messier world of practice. Composition is always a play between intention and chance, the final form of a work often contingent upon a series of not essentially music-related pressures. As Chris Cutler observes: 'All "originals" are already palimpsests, reworkings and revisions – it is only that the "works-in-progress", sketches and versions under revision don't usually see the light of day, and so "don't exist" for the consuming public' (Cutler, 1994, p. 49).

Whatever an individual composer's position on artistic integrity, one has to accept as an artist that an audience will always construct hundreds of different possible readings from even the most simple piece of electroacoustic music. Different aspects will be regarded as prominent or significant by different people. So the composer, too, should retain the right to rework, to reinterpret his or her own material, to remix or recompose it.[15]

Signs and representation

Much can be extrapolated from the above remarks about how something – a word, a sound, a picture, a sign of any kind – can be said to mean something. Meaning obviously has something to do with tradition, consensus or some other external legitimating authority, forming a set of guidelines against which individually varying interpretations can align. But these external authorities can be increasingly open to challenge (Lyotard, 1986; Rorty, 1989). What results is an increasingly slippery relation between words (or other signs) and things; an increasing acknowledgement that we *choose* to make things significant, rather than uncovering some inherent meaning. Our familiarity with the symbolic languages used in computing, in which the relation between the symbol and the 'meaning' is wholly arbitrary, has enhanced this sense of the contingent nature of languages. As a result of such insights *mapping* has emerged as a crucial skill, indicative of an epistemological shift from serial to non-linear modes of thought and as a concept worthy of serious study (Wood and Taylor, 1993). As computers allow any input data to be interpreted as a control function, a signal, a series of parametric values, software has emerged which begins to address the notion of such universal interconnection. Symbolic Composer[16] was developed as an engine to allow certain types of mathematical description (Brownian motion, Lorenz attractors, Mandelbrot fractals, etc.) to be easily utilised in musical applications, and has subsequently broadened in scope to allow the interpretation of data in almost any form.

Max[17] allows the construction of individually tailored interfaces from graphic objects which represent blocks of machine code. On a more metaphoric level, the concept of mapping has become an essential aspect of recent compositional practice. As the concept becomes more widespread, however, the significance of merely being able to map one set of information onto another, as in some early stochastic works by Xenakis or more recent American 'computer music', becomes reduced and transfers instead to the skill or appropriateness of the mapping.

As an example of ingenuity in mapping, Ron Kuivila's *Der Schnueffelstaat* (composed in 1991) is a characterful instance which also serves to indicate how a work can investigate a particular structuring principle – in this case the Foucauldian notion of surveillance. Based on the image of a swarm of bees, the work's title translates as 'noisy state' and is taken from the name of a protest committee formed in Switzerland in response to government surveillance of the artistic community:

> A video camera is suspended over the [performance] area to provide a bird's eye view. The image is sent to a computer where it is digitised and analysed. The computer also redisplays the image as a moderate resolution … video projection. Superimposed on this video are 'bees' represented by little Swiss flags. These … sense and follow movement. They also notice one another and exhibit a kind of 'swarming' behaviour. In the absence of any movement, the flags fly around randomly in ever increasing patterns looking for change. If they cannot find anything moving they will eventually fall dormant. Each 'bee' generates a sound via a MIDI controlled synthesiser.[18]

In addition to involvement with systems of coding and signifying, composers are constantly involved in semiotic research at the interpretative level too,[19] investigating the unpredictable and undetermined way in which the meaning of something is decided partly by its 'author' and partly by its 'readers'.[20]

Composers are increasingly aware that even the most acousmatic of works is at some level mediated by language. Our tendency to analyse in linguistic terms foregrounds language-mediated aspects of a work for the listener. When some of the sounds are indexical or even documentary the link with verbal coding systems is nearer the surface. Åke Parmerud's *Les Objets Obscurs* (Parmerud, 1994), realised in the studios of the GRM in 1991, focuses on the question of whether or not the sounds in an acousmatic work are intended to be indexical (in other words to refer to a specific identifiable activity or object) by turning the whole process into a sophisticated game which is explicitly tied to the linguistic. The piece takes the form of four riddles – poetic conceits

spoken in French – which refer obscurely to particular objects the identity of which the audience is invited to guess. Each spoken riddle leads into its sonic equivalent in which the disguised sound object forms the answer to both the spoken and the musical riddle. The final riddle is the subject in which the audience has been engaged and is revealed at the end to be music itself.

This conscious multi-level play with music's ability to refer to specifics, to relate to spoken language and other meaning-making codes and simultaneously to be pure acoustic fact, seems to be one of the richer directions in which electroacoustic music is currently moving.

Economics

Underpinning all of the above shifts is the reality of new economic constraint, which for the arts (and arts education) has primarily meant a move away from subsidy towards mixed economy. Academic electroacoustic music is just beginning to adapt to the culture of the market. Increased competition between institutions for students and resources with funding structured around student numbers, research profiles, spurious 'quality assessments' and performance indicators, could potentially lead to aesthetic constraint, as electroacoustic music is particularly resource and time intensive and therefore 'inefficient'. Outside universities, changes in state subsidy for the arts have aggravated the sense that certain practices are legitimate and valued (because they are funded), whereas others are culturally valueless, and electroacoustic music is beginning to lose out here.[21] Because commercial backing is generally only available for the uncontentious, a preoccupation with 'tradition' and 'heritage' has been reinforced at the expense of 'risk' and 'innovation'.

Many electroacoustic artists function either in an economic subculture or through loose ties with the education system, beyond the reach of conventional arts funding structures. In the UK, government policy has substantially undermined this subculture by increasing the level of income required for subsistence and simultaneously closing loopholes which enabled non-earning artists to survive. This is less true in many mainland European countries, which protect such activity on the basis that it would be counterproductive to polarise a motivated, intelligent and articulate faction.

An additional, more positive, factor is that mass-production techniques have driven down the cost of new technologies to the point of widespread accessibility. This promotes a radical reconfiguring of the political economy of electroacoustic music and of electronics in music

making. A consideration of this shift in terms of the emergence of a 'sampling culture' follows below. An example of this phenomenon in the visual arts which parallels the 'street' use of samplers is the Pixelvision craze in the USA, in which film and video makers have begun to make work using a low definition Fisher-Price 'toy' video camera because of the surreal qualities of image transformation produced.

A political economy of electroacoustic music and of electronics in music making

The shift from acousmatic electroacoustic music to what I have referred to as 'sampling culture' can be read as a shift in the position of the central locus of electroacoustic activity – from a specialised economy in which production took place in the music academy, the university studio, the research establishment, to a mixed economy in which the above are a productive subset but which now includes the thousands of bedrooms and converted garages equipped with samplers and DAT machines, as well as the clubland DJs and independent radio producers with their 'scratch' aesthetic and openness to the reuse of *any* material. This shift in no way invalidates the more rarefied work which continues to be produced, but it does fundamentally alter its potential meaning. In a situation where techniques and technologies appear on the street simultaneously with their arrival in the research studio, academic electroacoustic music will no longer be able to trade on novelty or mere technical innovation.

Such a shift from specialised to general use is an historical commonplace for human tools. The point here is that the specialised/non-specialised distinction has become effectively blurred, as has the distinction between 'creative' and 'disseminative' technologies. The sampler is paradigmatic here but the CD player, too, can now be a powerful instrument of performance and of context shift, as well as a high quality source of sampled 'material'. Technologies of mass dissemination have begun to blur in function with technologies of conventional instrumentality, the sampler having long replaced other keyboards as the instrument of choice alongside the electric guitar. Sampling can be regarded, then, as representing an important step in the re-empowerment of 'listeners' as composers, both in the sense that new configurations of familiar sounds encourage 'listening again' and in the more profound sense that sampling blurs the distinction between technologies of production and reproduction and therefore between composer and listener.

Those composers newly enfranchised by the profusion of inexpensive digital tools have reacted to the broadened technical scope offered by

increased dynamic range and spectral clarity not by embracing wholesale the aesthetic values of the acousmatic specialist (although these have also clearly not been completely rejected), but by bringing into play *additional* aesthetic criteria, such as the continuum of available resolution from distorted to clear reproduction, from (deliberately) reduced dynamic or spectral range to 'professional' clarity. These can be regarded as introducing additional potential expressivity into music involving electronic technology. The inspiration for this is not meekly aesthetic but is often expressly political in motivation – a critique of the technological determinism which is seen as associated with some aspects of academic electroacoustic music. A recurrent conviction is that old and 'restrictive' technologies need not inhibit expressive possibility – that the most significant aesthetic constraints are those of imagination rather than technology, which is the ideology informing for example Philip Jeck's performances with multiple *Dansette* record players.[22] Equally significant is the notion that 'cutting-edge' music does not need to rely on the practical resources and powerful legitimating logic of the institution.

This latter point is taken up by Gregory Whitehead, in a critique of radio as an art form in which he addresses the functioning of electroacoustic music within the social domain and specifically within the domain of the listener:

> the investigation of radio has disappeared into the investigation of *sound*, the wireless body stripped and redressed to provide a broadcast identity for the nebulous permutations of diverse *ars acustica*.

and adds, more pertinently:

> These are *musique concrète*, noise art, sound poetry, soundscapes, and the like. The equation of radio art with the simple act of broadcasting such diverse audio productions has been particularly true in Europe, where many state broadcasting systems have established experimental units from time to time. Since these units operate without any pressure to establish a vital relationship to an audience, it is not surprising that thinking through the *problem* of the listener has for the most part remained well outside the province of such experiments (Whitehead, 1992, p. 253 and footnote, pp. 262–3).

This seems to strike at the core of acousmatic music's development as a practice, identifying privileged institutional position, insulation from market forces, and scant regard for audiences (with the exception of the composer and *coterie*) as key constitutive elements.

Environment

Finally, a broad contextual shift which may ultimately emerge as the most urgent is seen in the gradually increasing awareness of environmental imperatives. Composers from otherwise quite different ideological perspectives are seen to be showing interest in what might be regarded as sustainable or environmentally ethical practice. A broad shift in attitude towards ecological sensitivity is evident among the young, particularly among schoolchildren, and this shared ground between artists and young people may yet prove a significant factor in revitalising aesthetic education and research.

Responses to environmental and ecological contexts have brought together artists with shared concerns in a manner likely to enhance the communication between different practices. One practical response among electroacoustic composers has been to immerse themselves and their work within the landscape, rather than framing it within a contrived display or performance context such as a gallery, concert hall or theatre. (Was it Cage who said that Western art lost its way when it moved indoors?) This has been one of many radical approaches taken by R. Murray Schafer and his followers, who have developed the concept of 'acoustic ecology' and the related notions of 'soundscape', 'sound pollution' and 'the hi-fi environment' which reflect this concern to increase the dynamic range of acoustic experience (Schafer, 1977). Some of Murray Schafer's work seems to parallel that of contemporary environmental installations by British visual artists Andy Goldsworthy and Richard Long, one particular composition making use of the different coefficients of sound transmission of damp and dry air above a lake in Canada to effect real-time treatment of a trombone ensemble. Perhaps uncoincidentally, Canada has produced a considerable number of electroacoustic composers whose work has drawn attention to landscape and the environment through a relatively untreated documentary style recording, in which the presence of the composer as sound gatherer is quite explicit.[23] Artists working with installation have become much more concerned to investigate the relationship between sonic and social space.[24] In some cases, this has embraced a specific political agenda involving sound and recording being used to enable a particular community to reflect upon itself and its relationship with its environment.[25] Other trends encourage spectacle and theatricality as an explicit strategy, linking new 'precise' digital technology to old 'imprecise' mechanical systems.[26] A further, more spurious, ecological argument has been that it is more responsible to reuse old sounds than to generate new ones, and several sampling

composers use this notion of 'recycling' as a justification for their use of other people's material.[27]

Summary

The complex changes described above impact on individuals, communities and the relationship between the two in a manner that is not totally predictable. What is clear is that electroacoustic music as a practice is dependent upon contexts beyond the merely acoustic, and that as these contexts change it is likely to respond. As with other arts practices this response may vary from a protective reifying of certain activities as 'core', to an inclusive and speculative tendency intent on formulating new types of practice. This multiplicity is likely to be more aesthetically healthy and to provide a greater argument for continuing support for such music than if only one of these possibilities were to be pursued. Activity involving other media is likely to become less peripheral and certainly to become more compelling, but the idea that it will become dominant and somehow undermine acousmatic music seems irrational. Such activity is far more likely to become one of many equal 'others', of at least equal accessibility, and with different concerns.

The extremes of the two tendencies characterised above are inherently problematic. The protectionist (acousmatic) tendency fails to acknowledge that changes of context, even if 'outside' the discipline, reconstitute the way things within it are generally understood or interpreted (as did the photograph for the visual culture in which painting operates). The 'new practices' faction fail to acknowledge the gradual and evolutionary nature of human responses, even to stimuli which have themselves changed quite rapidly, and the amount of acquaintance time necessary for communities to develop new strategies for interpreting and finding significance in such stimuli. The middle ground – those caught within the discipline of electroacoustic music but struggling to escape its confines and those whose strategy has been to force a collision between new possibilities and acknowledged skills – has so far provided most of the evidence for aesthetic optimism.

Innovations at the edge of a practice are often the result of enthusiastic inclusiveness resulting in a creative misunderstanding or reinterpretation of aspects of an unfamiliar discipline or technique, but the gradual nature of the movement towards new practice which results is often conspicuously more successful than more radical attempts to integrate work across or between disciplines. The immense broadening of activity under the umbrella of composition during the late twentieth

century probably justifies its description, in imitation of a similar consideration of sculpture (Krauss, 1985), as operating within an 'expanded field'. As a result, perhaps electroacoustic music is simply becoming less distinct as an activity from other forms of musical activity, whether these be instrumental music which shares acousmatic principles (such as much of Helmut Lachenmann's work which is referred to in Germany as *musique concrète instrumentale*, or some of the works of Boulez, for example *Répons* and *Mémoriale: explosante-fixe*); an increased concern with microtonal construction and the harmonic series (evident in the work of an instrumental composer like James Dillon, but also in electroacoustic music); or the blurring of distinctions between the 'serious' and the 'popular' in many areas – the fact that some ambient music sounds like an impoverished form of electroacoustic music.

Much current electroacoustic music can be read as an attempt to come to terms with the new contexts outlined in this chapter, but the practice of composition changes not only in response to 'external' criteria but also in response to pressures from within the activity itself. It is characteristic of many artists that they are driven by the need to test the limits of their medium, to break out of the conceptual constraints which they perceive as characterising the field in which they work, and electroacoustic composers are no exception. Of course, not all of the attempts are good. But even the failures are instructive. Perhaps, to paraphrase Norbert Bolz's (1994) observations about the book, cited earlier, purely acousmatic electroacoustic music is simply no longer up to the complexity of our contemporary social realities.

Notes

1. The concept of acousmatic culture is understood as revolving around Pierre Schaeffer's notions (Schaeffer, 1966), elaborated by Michel Chion (Chion, 1983; 1991), of *l'écoute reduite* (*reduced listening*) and *l'objet sonore* (*the sound object*).
2. Much in the manner predicted by Attali (1985).
3. 'We took a Japanese film and took away the soundtrack, then we made it into a comedy, so there were people running round killing people, and it was a comedy.' (Woody Allen in an unidentified radio interview.)
4. Netherlands Design Institute/*Mediamatic* 'Doors of Perception' Conference, Amsterdam, 30–31 October 1993.
5. Speaking at South West Arts/Bath College of Higher Education 'Symposium on Interdisciplinarity in the Arts', Corsham Court, 12–13 March 1993.
6. 'World of Music and Dance'.
7. A movement of *fantastischer Realismus* emerged for example in Vienna.

8. 'I developed an imaginary singing style, with its own melisma, its own ornamental identity, the identity of a chanting "tradition" that I invented. The computer is also part of this imaginary style. The vocal sounds it manipulates and the new timbres it creates are articulated and "performed" in a way that is consistent with the chanting style of the singer.' (from the composer's CD note (Viñao, 1994).)
9. Of course the notion of cliché is itself indicative of the prevalence of the notion of *avoidance* of traces of technical construction, and of the inadequately thought-through relationship between electroacoustic 'tradition' (such as it is) and innovation.
10. Tom Wallace: *andRain* (electroacoustic music, University of East Anglia, 1994, unpublished).
11. Produced at Bangor University, Wales 1994.
12. Other examples include Tricky and the more mainstream Massive Attack.
13. Portishead: 'Strangers', from the CD *Dummy* (Portishead, 1994).
14. Paradoxically, Laurie Anderson, one of the most self-consciously experimental artists in the 'popular' domain, has been less interested in the potential of production techniques, concentrating on experiment in performance, which has resulted in rather conventional documentation of her work.
15. This is an issue that has particularly preoccupied me in my own work; for example *Drift* (1991), *Unearthing* (1993), *AfterImage* (1993) (unpublished).
16. Symbolic Composer is a Lisp-based algorithmic composing environment produced by Tonality Systems of Amsterdam.
17. Max is an object-oriented programming language developed at IRCAM by Miller Puckette and produced by Opcode Systems Inc.
18. Composer's programme note, STEIM, Amsterdam, 1993.
19. At what Nattiez (1990) would call the 'esthesic' level.
20. In relation to my own work this investigation can be regarded as an increasing concern to make polysemic works: works which allow or even encourage differences in reading.
21. In Britain the Arts Council's Electroacoustic Music Bursary scheme was discontinued in 1994 and, despite numerous rumoured capital projects funded from National Lottery or Millenium Fund sources, there is now no UK state support for independent electroacoustic composers beyond (infrequent) commissions of single works.
22. Philip Jeck, who trained as a visual artist, has been working with turntables in live performance and installation since the early 1980s. His 1993 audio-visual collaboration, *Vinyl Requiem*, made use of 180 Dansettes stacked and whitewashed to form a huge projection screen, and was premièred in London and Ghent.
23. For example Claude Schryer's *Les oiseaux de Bullion* and Christian Calon's *Temps incertains*. The composer is also present in an explicit, if less 'environmental', manner in Hildegard Westerkamp's *Breathing Room* and Dan Lander's *I'm Looking at My Hand*. All four works feature on the CD *Électro clips: 25 three minute electroacoustic snapshots* (Montréal, 1990).
24. For example Miroslav Rogala (Poland), Mathias Fuchs (Austria).
25. For example Gregg Wagstaff (Scotland).
26. For example Matt Heckert (USA).

27. Suzi Gablik's *The Reenchantment of Art* (Gablik, 1991) is one attempt to identify recent increased interest in the relationship between arts and environment as a coherent tendency. This looks, among other things, at Joseph Beuys whose performance stressed the shamanistic and obsessive aspects of arts making, irrespective of the constraints of concepts of 'the discipline'. Similar concerns were evident in the *Arte Povera* movement in the 1960s, notably in the work of Jannis Kounellis, and in the 'Poor Theatre' or 'Third Theatre' (by analogy with 'Third World') of Grotowski (Grotowski, 1968) and Eugenio Barba (Barba, 1979).

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