Introduction

Looking for a definition

Sonic art is a new art form, or rather, forms. As we shall see, it can encompass a wide range of activities, perhaps wider than almost any other art form. It is an unusual case, based upon a medium that has traditionally been regarded as inferior and subservient to other creative or expressive forms. To many composers, sound is simply a means whereby ideas of musical structure and harmony may be expressed: it has little intrinsic value. Likewise to many filmmakers, sound is merely an adjunct to plot and photography and has only a supportive role. However, times have changed and sound now asserts itself as a viable medium in its own right. It can no longer be relegated to a subordinate role, and now demands to be seen as one amongst equals: as a new and distinct medium and potential art form.

Finding the definition of a newly emerged art form is rarely an easy process. There are a number of reasons for this. Firstly, the form itself is often unclear: its advocates usually know where the central focus of the subject lies, but its borders – the points at which it contacts and overlaps other more established forms – are often far harder to define. Secondly, our new form may encounter resistance to the idea of its own very existence. This can come from a number of sources and for a number of reasons.

Often, the new form originates elsewhere, grows as part of a more established one and, after acquiring an identity of its own, now demands to be recognised independently. The parent genre is often reluctant to let its offspring go its own way, maybe believing that the child is not yet grown up enough to survive the rough-and-tumble of the outside world. Perhaps we should be fair to this point of view; in the case of sonic art, some would say that the child is still a rather difficult adolescent and so the parent's view is understandable even if, from the inside, we believe it to be misguided. Less sympathetic outsiders may take this view further by simply dismissing the fledgling genre as an immature sub-set of something larger and better recognised and by saying that it has no real identity of its own.

Sonic art has encountered all these problems and more besides. The

epiphanous moment when the English composer, Trevor Wishart, declared 'Electroacoustic Music is dead – long live Sonic Art'[1] over-simplifies the issue by appearing to suggest that sonic art is simply the offspring of a highly specialised musical activity. In itself, this may be true but his statement tells only a small fraction of the whole story. Sonic art covers a huge range of creative activities, many of which have absolutely nothing to do with music save that, like music, the audience experiences the finished work by hearing it. In some respects it would be perfectly reasonable for our difficult child to round upon its parent (music) and to reverse the argument: all music is sonic art but (as we shall see later) not all sonic art is music! (See Simon Emmerson's comment on p.64.)

These then are just some of the difficulties that we encounter in trying to define what we mean by 'sonic art' or 'sound design'. We can at least make a convenient distinction between these two subjects, however, since we have the existing and well-understood distinctions between visual art and visual design to guide us, and the fact that our work is in a different medium, makes relatively little difference here (see also p.38). To define sonic art in general is, unfortunately, a far less tractable issue. How, for example, can we distinguish between a 'conventional' artwork that happens to make a sound and a work of sound art, and will such a distinction be broadly applicable? I suggested earlier that we might be able to define the centre of our new subject but, since it comes from so many diverse disciplines, it seems to me that sonic art has not one but many centres. So can we give a useful answer at all?

Perhaps the best way to find out about our unruly adolescent is to observe what he does, study the company that he keeps and find out about his background, his parents and siblings. One of the most exciting things about sonic art is the huge size and diversity of the family: from fine art to performance, from film to interactive installations, from poetry to sculpture and, of course, not forgetting music, all these can be part of the multicultural society that is sonic art.

1. Wishart, T. (1996) 'Die elektroakustische Musik ist tot – lang lebe Sonic Art' in *Positionen* (No.29) pp.7–9 (tr. Gisela Nauck).

What forms can sonic art take?

When we encounter a piece of sonic art, we may find ourselves in front of one of many types of work. Some will be highly interactive and possibly extremely technology-intensive whereas others will be relatively simple and, in a very broad sense, static. However physically static it may be, sound art cannot by its very nature be passive; with rare exceptions it must actively emit sound or at least have sound (which is itself active by definition) as its conceptual basis. Its active emission of sound can, as we shall see later, create problems in the presentation of the work, but it remains an inescapable aspect of the medium and this distinguishes it in some measure from more traditional art forms.

So does it follow that any artwork that has sound as its main 'outcome' will, by definition, be a work of sound art? There are many possible ways in which we can examine this problem and they lead to a variety of conclusions. My personal preference is to take the view that we should define the work by its intentions and by the conceptual thinking that informs it. Thus a work that seeks to communicate with its audience through sound or be informed by ideas that are based upon sound would be a work of sonic art; by contrast, a work that happens to make sounds as a by-product of another activity (as many kinetic works do) or that has no conceptual reference to sound would not.

This is, of course, a very simple definition and has many potential flaws but will hopefully provide us with a useful starting point from which to consider the context in which the presentation of our work takes place. Most importantly, it begins the process of understanding the way in which an audience will experience and comprehend a type of work that may be, in some ways, physically familiar but which is conceptually new and different from other forms.

No single work can hope to provide a comprehensive and detailed approach to a subject that is so diverse and that has so many facets. In this book, we set out to introduce enquiring readers to the subjects of sonic arts and sound design, to show some of the activities that they embrace and, hopefully, to kindle an interest in these new and exciting areas.

Unlike many academic (and even artistic) subjects, there is no fixed 'syllabus' for our work. It will become apparent to readers that, while the centre of our subject is clear, its edges are less well defined: sonic art spills over into fine art, music, performance, ecology and many other areas. This means that what you have in your hands is not a textbook in the conventional sense; rather it could be thought of as a catalogue of ideas or a menu of possibilities. Above all, it is an invitation to enter and become part of a new and exciting world – one that *you* can help to define.

Origins and Developments

The relationship between art and technology is a fascinating and many-sided one. For some, the technology merely provides the tools with which to create the art while, for others, it suggests new possibilities and even provides the fundamental inspiration that drives and informs the entire creative process. Most works of sonic art use technologies to a greater or lesser extent although, as we shall see, the widely held presumption that this whole art form is critically dependent upon high technology (and computers in particular) is far from being universally true. What is certain, however, is that the evolution of sonic art as a distinct form has been very closely linked to the development of audio technologies and, in the following section, we will begin to explore this evolving relationship.

A Historical Perspective

Introduction

No one knows with any certainty when man became consciously aware of the significance of sound and, more importantly, of the possibility of controlling and using it for other than purely practical purposes. The cupping of the hand behind the ear to focus a distant sound is a gesture so old as to be more-or-less instinctive. It is only a small step from this idea to that of placing the hands in a horn-like form in front of the mouth in order to help project the voice. Here, for the first time, we see a deliberate attempt to influence the sounds that we make and hear. In these instances, the purpose is simple vocal communication but there is substantial evidence to suggest that ancient man used technology to control sound and that he did so for quite complex purposes. We can certainly assume that cultures much older than ours were aware of at least some of the ways in which they could control sound. Indeed, we can still find long-established and specialised forms of vocal communication in remote and mountainous regions.[1]

Sound without electricity

Round about the time of the last Ice Age, the first recognisable musical instruments started to appear and people began to make use of the acoustic properties of particular spaces and places. Early instruments seem to have been predominantly based upon natural objects such as conch shells and hollow bones. Several researchers[2] have also noted that cave paintings are often to be found in locations where the local acoustics have unusual qualities, and this has led to speculation that these places may have been venues for early forms of multimedia events.[3] Howard Rheingold[4] goes further and suggests that the combination of cave paintings, unusual acoustics, costume and other practices such as fasting, sleep deprivation, etc. may have been combined to create a low-technology form of virtual reality that could be used as part of rituals, initiation rites and so forth. Whether or not these practices could be considered as 'art' is debatable, but we may reasonably think of them as applied art at least and possibly, therefore, a form of design. The question to be considered here is the extent to which our ancestors were aware of how a particular acoustic quality was created and how it could be manipulated. History, unfortunately, is silent on this issue and we must look to later cultures before we begin to see strong evidence of deliberate design of acoustics and, hence, of sound.

We don't have far to look: the Ancient Greeks were undoubtedly well aware of how to control acoustics and the almost miraculous sonic qualities of their open air theatres testify to their skills. Architecture, however, was by no means the whole story: the Greeks (and later the Romans) also made extensive use of masks that contained horn-like structures or resonating cavities that served to reinforce and project the voice.

The Romans took Greek sound technologies a stage further and provided quite extensive sound systems in many of their theatres. These, of course, were nothing like the sound systems that we would recognise today since even the best Roman technology could not amplify a sound. What it could do, however, was to make the most of the volume available by using resonators (large vases partially filled with water) or by placing actors in front of a membrane that was tightly stretched over a recess in the back wall of the stage. By the first century BC these, and other sound-controlling procedures, were well-established parts of theatre design by architects such as Marcus Vitruvius Pollo. According to Bruce Smith '...a Vitruvian theatre could be played by actors as if it were a musical instrument.'[5] What we see here is the first clear evidence of deliberate sound design in the theatre.

Sound design remained the property of architects for almost the whole of the following millennium. There were some notable exceptions, however, such as the use of surround sound in the composition of works by (amongst others) Monteverdi. Here, composers would write music that was designed to be performed in particular churches with musicians and singers placed, not on stage, but in various locations around the building. Not only did this lend a spatial element to the performance but it also allowed for different musical parts to be accompanied by more or less reverberation: choices more normally exercised in our times by record producers and sound engineers (see also pp.78–79). This is not to suggest, however, that there was a lack of awareness of the potential of sound as an expressive medium in its own right, but rather, the technologies that were needed to allow it to develop simply did not yet exist. For example, in his speculative but prescient 1626 work *New Atlantis*,[6] the English philosopher Francis Bacon describes facilities that not only resemble a modern recording studio but also anticipate the type of work undertaken in the most advanced computer graphics houses:

We have also soundhouses, where we practise and demonstrate all sounds and their generation. We have harmony which you have not of quarter sounds and lesser slides of sounds. Divers instruments of music likewise to you unknown, some sweeter than any you have; with bells and rings that are dainty and sweet.

We represent small sounds as great and deep, likewise great sounds extenuate and sharp; we make divers tremblings and warblings of sounds, which in their original are entire. We represent and imitate all articulate sounds and letters, and the voices and notes of beasts and birds.

We have certain helps which, set to ear, do further the hearing greatly; we have also divers strange and artificial echoes, reflecting the voice many times, and, as it were, tossing it; and some that give back the voice louder than it came, some shriller and some deeper; yea, some rendering the voice, differing in the letters or articulate sound from that they receive. We have all means to convey sounds in trunks and pipes, in strange lines and distances.

1. For example the Silbo language of the Canaries uses whistling to communicate over long distances in these mountainous islands.

2. Devereux, P. (2003) *Stone Age Soundtracks*. London: Vega (Chrysalis).
Waller, Steven J., *Rock Art Acoustics* website <www.geocities.com/capecanaveral/9461/> accessed 05/02/06.

3. *New Scientist* (28 Nov 1992) quoted in Toop, D. (1995) *Ocean of Sound*. London: Serpent's Tail.

4. Rheingold, H. (1991) *Virtual Reality*. London: Penguin.

5. Smith, B.R. (1999) *The Acoustic World of Early Modern England*. Chicago, IL: University of Chicago Press.

6. Bacon, F. (1626) *New Atlantis*.

The Art of Noises

Perhaps one of the most significant developments in sound art and design used relatively simple mechanical technologies: the importance, however, was not so much the technology as the ideas that it expressed. The work of the Futurists, an Italian art movement of the early 1900s, included one of the most famous documents in sonic art: the *Art of Noises*[7] manifesto of 1913.

Written in the form of a letter from the painter Luigi Russolo to the composer Francesco Pratella, it puts forward the idea that there should be no barriers (or even distinctions) between sounds that have musical or instrumental origins and those that come from the street, from industry or even from warfare. Russolo suggests that all these sound sources should be incorporated into the creation of a new form of music. Interestingly, Russolo does not suggest a new form of art that is based upon sound: what he proposes is simply an extension of existing practices in music (this is an argument that continues to the present day). Sonic art, it seems, is still some way in the future but at least the idea of using non-musical sounds in art has begun to be established and this was acknowledged many years later in the name of one of the first pop bands of the 1980s to make extensive use of sampling technology: Trevor Horn's The Art of Noise.[8]

In 1913, however, there was no usable technology that would allow the incorporation of real-world sounds into musical performances – clearly a gramophone would be inaudible over the sound of an orchestra – so Russolo created a series of machines known as *Intonarumori* or Noise Intoners,[9] each dedicated to the production of particular types of noises and being given splendidly expressive Italian names such as *Ululator* – the howler, *Crepitatori* – the cracker and *Stropicciatore* – the rubber. These instruments saw limited service in a number of concerts but, sadly, none have survived in their original form.

The *Intonarumori* were revolutionary only in the sense that they, and the *Art of Noises* manifesto, argued the case for sound in the broadest sense to be considered in the way normally reserved for music and composers, instruments and the performers that create it.

They were not themselves particularly groundbreaking technologies that opened up new creative possibilities, but they did argue the case for sound to be something considered in its own right and, by so doing, laid the foundation for what later became the disciplines of sonic art and sound design.

7. See opposite.

8. English record producer Trevor Horn created The Art of Noise (sic) as part of his own record label, ZTT, itself an allusion to another Futurist work, *Bombardamento*, a Futurist sound poem of 1914 by Filippo Tommaso Marinetti, in which the phrase 'Zang Tumb Tumb' supposedly represented the sounds of a battle that took place at Adrianopolis in 1912.

9. Excellent audio examples of these instruments can be found at <www.theremivox.com/filemanager/list/12/> accessed 04/02/06.

'INDEED, ONE COULD SAY THAT BY THE LATE 1980S THE AGE OF COMPUTER MUSIC WAS OVER BECAUSE EVERYTHING WAS COMPUTER MUSIC.'

JOEL CHADABE, 'ELECTRIC SOUND'

RADIOPHONICS

Originally defined as sound designed specifically for radio broadcasting, the term has now taken on a broader range of meanings. These include the general area of acousmatics (sound that is heard without reference to its visual origin), narrative (such as radio drama) and some overlapping aspects of soundscape work. Pioneered (in terms of public awareness) in the early 1960s by the BBC Radiophonic Workshop in London, this area now stretches significantly beyond broadcasting to include some forms of electroacoustic work, especially those with a narrative element.

The impact of electronics

Serious sound design and, subsequently, sonic art had to await the advent of recording and, more particularly, of electronics following the First World War. The recording process itself is widely acknowledged to have been invented in 1877 by Thomas Edison. However, there is some evidence for earlier dates including a charming – if improbable – tale told by the late Hugh Davies: the door of a Chinese temple had a stylus attached to it which, as the door closed, tracked along a groove in the floor. This groove apparently carried a recording which politely thanked the visitor for closing the door![10]

Early 'acoustic' recording systems were functional but offered only limited scope as creative tools: they could record and play back but, apart from speeding up and slowing down the sound, they could do very little else. The advent of electronics transformed this situation. The microphone replaced the mechanical horn and recordings were now cut electrically. This immediately opened up a huge range of possibilities: the outputs of multiple microphones could be combined, the signals that they created could be

processed in all manner of ways and even simple multi-tracking became possible. These technologies joined with the advent of the radio station (KDKA in Pittsburgh USA in 1920) and talking pictures (*The Jazz Singer* in 1927) and, between them, provided the tools for an explosion of creative possibilities in sound art and design. The ultimate tool, however, was the tape recorder, which made its public debut at the Berlin Radio Fair in 1935. Until the widespread adoption of the computer as a means of recording and transforming sound in the latter years of the twentieth century, this remained the primary resource for creative activities in sound.

However, not all sonic art or sound design activities required the tape recorder. An early example of radiophonic art was the 1938 radio dramatisation of H.G. Wells' book *The War of the Worlds*. This caused widespread panic throughout the United States as a result of its remarkable realism. Material created in a small radio studio was carefully crafted to create the illusion of live location reporting of an alien invasion. The technologies used were simple by modern standards but the impact was dramatic and the widespread assumption that what was heard was 'real' rather than a studio production, only served to demonstrate the relationship between radio and its audience. In doing this, it established at least one important component of the foundations of radiophonics: the believability of radio.

The director of this project, Orson Welles, was also a film director and, unusually for the time, made creative use of sound in his movies. Notably, in his 1941 film *Citizen Kane*, he employs a hollow, echoing acoustic in a scene where the main character bemoans the emptiness of his world and, elsewhere, uses several layers of sound simultaneously. Welles continued to develop this interest in film sound in later works such as *The Magnificent Ambersons*. Although limited from the perspective of contemporary, effects-laden productions, we see here the beginnings of specifically and creatively designed film sound; a significant step forward from simple recording of dialogue, sound effects and music that had been the norm in film production.

10. Davies, H. (1996) 'A History of sampling', in *Organised Sound*, Vol.1.

Electroacoustic music

Elsewhere, other artists and composers were undertaking sound-based work. In France, Pierre Schaeffer, a radio engineer, began to experiment with recording as a way of treating sounds and assembling them into new forms. Initially, despite their limitations, Schaeffer used disk recorders and players in his work – a clear precursor of the modern experimental DJ techniques used by artists such as Janek Schaefer, Christian Marclay and others. These experiments led to a classic work, *Étude aux chemins de fer*, which took location recordings of trains and treated and combined them into a work that, although clearly composed, was by no means music in the conventional sense. Schaeffer went on to work with tape recorders, including specially built machines such as the 'Phonogene', which allowed tape recordings to be played using a keyboard. This was one of the several ancestors of the modern sampler and, for the first time, allowed non-musical sound sources to be treated in the same way as conventional instruments. However, treating real-world sounds as if they were musical instruments was by no means the only, or indeed the most interesting, approach to working with abstract sound.[11]

The specialised machinery developed by Schaeffer and others for handling 'real' sounds was paralleled by developments in the creation of sound by electronic means – what we now refer to as sound synthesis. The early works of composers such as Karlheinz Stockhausen used equipment from electronics laboratories to generate and transform sounds from scratch and to assemble them into finished compositions. This approach was known as elektronische Musik.

At this time (the 1950s and early 1960s), synthesisers had yet to be invented and so anyone wanting to work with electronic sounds had to build their own equipment. One of the most notable such inventors was Raymond Scott. A composer who specialised in music for advertising, Scott quickly spotted the ear-catching commercial potential of electronically generated sound and, using the extraordinary variety of equipment that he created through his company, Manhattan Research, became widely known for original and creative sound design for radio and television advertising.[12]

An interesting hybrid between the work of Scott and more abstract forms came in the activities of the BBC Radiophonic Workshop. This facility, opened in 1958, was initially developed to meet the demands of makers of radio dramas for special effects but became a substantial organisation in its own right, creating a wide range of specialised musical and other material including, in 1963, the famous theme from the television series *Doctor Who* (created by Delia Derbyshire and Ron Grainer) and a radio version of Douglas Adams' work *The Hitchhiker's Guide to the Galaxy* in 1978. The Radiophonic Workshop contributed very substantially to the development of an experimental tradition in electroacoustic music in the UK and, up until its closure in 1998, was a significant focus for composers and engineers and other practitioners. It is also important to note that, insofar as much of the work of the Radiophonic Workshop was commissioned to be included in radio and television programmes, it could quite appropriately be regarded (in many cases, at least) as being more sound design than sound art.

The appearance of the commercial synthesiser in the mid-1960s provided a substantial catalyst for new developments. The synthesiser came to public awareness

11. Interestingly, Schaeffer called his work 'Musique Concrète' meaning that the 'music' was to be derived from 'concrete' (i.e. real) sources rather than 'Musique Abstraite' which was his term for the conventional process of composition followed by performance and (possibly) recording.

12. Excellent audio examples of Raymond Scott's work can be found at <www.raymondscott.com> and on the double CD set *Manhattan Research Inc.*

'WHAT I LIKE ABOUT THE UNTIDY MESS OF COMMUNICATIONS PRODUCED BY THE NEW TECHNOLOGIES IS THAT NOTHING IS PRESCRIBED, NOTHING IS COMPLETE AND ABOVE ALL THERE IS NO PRETENCE. EVERYTHING IS WILD, EXPERIMENTAL, PRECARIOUS...'

MICHEL JAFFRENNOU, 'DIGITAL AND VIDEO ART'

ELECTRONIC MUSIC

Later referred to as 'electroacoustic music'. Based upon the theoretical researches of Robert Beyer, Herbert Eimert, Werner Meyer-Eppler and others and originating in the works of (amongst others) Pierre Schaeffer and Karlheinz Stockhausen, this subject includes the composition and realisation of musical works using sound sources that are wholly or partly electronic in origin and, increasingly, sounds derived from 'real world' sources that are subsequently treated by a range of electronic processes. Originally based around the use of synthesisers (and their forerunners) and tape recorders, the work is increasingly undertaken using the digital processes available in modern computer systems. Some of these are highly sophisticated and often experimental procedures such as phase vocoding, granulation and convolution. Technical sophistication is often paralleled by advanced compositional forms and procedures including algorithmic and chance processes as well as by more traditional approaches such as serialism. It is the subject of extensive and detailed scholarship and is predominantly (although by no means exclusively) carried out under the aegis of academic institutions.

'TECHNOLOGY PRECEDES ARTISTIC INVENTION (AS MUCH AS WE ARTISTS WOULD LIKE TO THINK IT'S THE OTHER WAY AROUND!). FIRST CAME THE ELECTRIC GUITAR AND THEN CAME ROCK AND ROLL.'

JOHN ADAMS, 'AUDIO CULTURE'

SOUNDSCAPING

A soundscape can be said to be the audible equivalent of a landscape. Put simply, it is a representation of a place or environment through what can be heard rather than what can be seen. Like their photographic equivalents, soundscapes can be realistic and so be directly representational or they can use modifications of (and additions to) the original sounds to create a more subjective sound picture, rather like using a lens to change perspective or a filter to alter colour. Closely related to some aspects of acoustic ecology, the concept of the soundscape emerged in the late 1960s in the form of the World Soundscape Project. Led by R. Murray Schafer and Barry Truax, this research group first documented their own locality through audio recordings in *The Vancouver Soundscape* (1973) and went on to make extensive documentary recordings in Canada and Europe. Soundscaping is not only a documentary medium but is also used as a compositional form by practitioners such as Hildegard Westerkamp.

through the musical work of Walter (later Wendy) Carlos and his 1968 release *Switched-on Bach*, which featured classic Bach orchestral works performed exclusively on a Moog synthesiser. A number of similarly inspired works appeared, notably by Isao Tomita who created lush synthesised renditions of works by Claude Debussy, Holst, Mussorgsky, Ravel and Stravinsky. These works and the generally enthusiastic adoption of synthesisers by rock and pop musicians brought new sonic textures to conventional musical forms but, with a few exceptions, did little to expand beyond their confines.

A conspicuous exception to this convention was Carlos' 1972 work *Sonic Seasonings*, which could only very loosely be described as 'music' and was perhaps one of the first widely distributed soundscape-inspired works. It exploited synthesised sound, field recordings of wildlife and made significant use of technical processes more often found in academic electroacoustic works. *Sonic Seasonings* and works like it began to open up a broader range of possibilities for exploration and creation with sound and by no means were all of these conventionally musical in form.

It is hard to escape the conclusion that the development of technology had a good deal to do with the development of sound

works. In the field of commercial recording, driven by the huge revenues of record companies and performers, technical development in the 1960s and 70s was, to say the least, explosive. Studios were transformed into resources, which, for the first time, met the specification of 'Sound Houses' as described by Francis Bacon.[13] Despite the remarkable power of these systems, their cost placed them beyond the reach of most people and they maintained this position until relatively recently.

The emergence of the personal computer changed all this. From the 1980s, computers began to become smaller and more affordable. From room-sized giants operated by multinational companies, they quickly shrank in both size and cost while increasing rapidly in power and performance. Soon it became possible for private individuals to have in their homes computers vastly more powerful than those used to control the first moon landing in 1969. It was not long before at least some of these began to be used for musical and other sound-based activities. Initially, a good deal of external equipment was required and many found the complexity of this daunting. However, developments continued and by the mid-1990s it had become possible for almost anyone to use computers to generate, record, manipulate and transform sound in ways limited only by their imagination.

Summary

Thus it became possible for anyone with a modest budget to equip themselves to work with sound as a creative and expressive medium and by the turn of the century an explosion of such works had begun. Much of this work remained in conventional – mainly musical – forms but a significant proportion began to move into areas that had previously been restricted to 'academic' electroacoustic practice (see also 'Sound Diffusion' pp.132–139). A substantial shift in thinking about sound had begun and it was through this shift that sonic art started to become visible as a distinct creative area. However, largely unknown to these new artists, there was already a substantial amount of creative work and scholarship just waiting to be discovered.

13. Bacon, F. (1626) *New Atlantis*

A New Form Emerges

Introduction

As we have seen, in the post-war period technical possibilities began to develop at a dramatic rate and so did the thinking of practitioners of sonic art and sound design. These titles were not in use at the time: most creators of this type of work were still referred to as composers, engineers or editors and their work was discussed in appropriate terms. This is perhaps not surprising since many of them came from traditional musical backgrounds and had only opted to work in new and developing areas after a 'conventional' training. It follows that a good deal of the work that was created quite rightly belongs under the title of 'music'. Equally, however, an increasing amount of work simply did not fit in this category and artists sometimes found themselves in an increasingly problematic situation as a result.

Edgard Varèse

One notable example was the work created by French composer Edgard Varèse for the 1958 Brussels Expo (the Brussels Universal Exhibition – the first post-war World Fair, taking the theme 'A World View – A New Humanism'). His *Poeme Électronique* was, in many respects, something that we would regard nowadays as an installation work or indeed a work of sonic art rather than a piece of music. It used up to 425 loudspeakers distributed around the Le Corbusier-designed Phillips Pavilion and also included film and slide projections and lighting effects. The sounds were both concrete and electronic in origin and were processed using a range of techniques, many of them developed from the work of Pierre Schaeffer. Critics usually discuss this work in musical terms but this is clearly only part of the story since Varèse himself expressed at least as strong an interest in sound itself as he did in music and, in any event, sound was just one component amongst several that made up the work as a whole.

'IT CONSISTED OF MOVING COLOURED LIGHTS, IMAGES PROJECTED ON THE WALLS OF THE PAVILION, AND MUSIC. THE MUSIC WAS DISTRIBUTED BY 425 LOUDSPEAKERS; THERE WERE TWENTY AMPLIFIER COMBINATIONS. IT WAS RECORDED ON A THREE-TRACK MAGNETIC TAPE THAT COULD BE VARIED IN INTENSITY AND QUALITY. THE LOUDSPEAKERS WERE MOUNTED IN GROUPS AND IN WHAT IS CALLED 'SOUND ROUTES' TO ACHIEVE VARIOUS EFFECTS SUCH AS THAT OF THE MUSIC RUNNING AROUND THE PAVILION, AS WELL AS COMING FROM DIFFERENT DIRECTIONS, REVERBERATIONS ETC. FOR THE FIRST TIME, I HEARD MY MUSIC LITERALLY PROJECTED INTO SPACE.'

EDGARD VARÈSE, DESCRIBING 'POEME ÉLECTRONIQUE'

Developments in music and art

Steve Reich is normally regarded as a composer who specialises in the musical form known as 'minimalism'. This relies, in part, on repetition and is now a well-established style. Some of Reich's early works, however, are clearly not music in the conventional sense. His tape pieces *Come Out* (1966) and *It's Gonna Rain* (1965) use the spoken word exclusively. They are also entirely dependent upon a technical process: the slightly out-of-sync repeating of two similar tape loops and their interaction. Apart from the repetition – which creates a rhythmic structure – these works can hardly be regarded as being musical in any meaningful sense. We hear the words repeated over and over and we hear the subtle ways in which they interact with each other and how these interactions change. We also experience the odd feeling that when a word is repeated many times it slowly loses any meaning. After a few minutes, we have no sense that rain is imminent: instead we're hearing a shifting pattern of sounds that happens to be made from words. Should we regard this as a very extended form of music or, since it depends upon a technical process, is it something else altogether? The problem here is that Reich is traditionally regarded as being a composer. Composers are expected by most people to compose music and, unless they take up painting or sculpture as a hobby, composers are not expected to create art.

A number of composers had by now expanded the scope of their work beyond the accepted boundaries of composition and performance and some of their work could clearly no longer be simply described as 'music' in the conventional sense. Nor could much of it be covered by the rather cautious term 'experimental music'. One of the main problems was that much of this new work had crossed into other subject areas that were informed by different theories and traditions. Practitioners who were normally thought of as being fine artists encountered much the same problem. However, this group had something of an advantage since, at this time, contemporary art as a whole was in a state of flux and new forms emerged almost daily.

For these artists and their public, the idea of the work taking a new form was far more acceptable than was the case for composers who found themselves in a similar situation. It seems that 'art' thinking was, in some respects, more flexible and accommodating than 'music' thinking and was prepared to accept the idea that art could be made from (or with) sound that stepped outside the conventions of music. The musical 'establishment' was, it seems, rather less flexible in this respect and tended to insist that a work be described in musical, rather than abstract terms, or those used within art in general. This is not to suggest that the art establishment welcomed our fledgling subject as enthusiastically as its musical opposite number had rejected it. One of the issues for many people was the use of technologies and processes that could not be undertaken without them. We have only to consider the techniques of painting and sculpture to realise that the idea that art could be created through the means of technology was not new. However, the nature of some of the technologies that were beginning to be used was wholly different to what had gone before and, for many people, something about this situation simply did not sit comfortably.

In the early 1960s, a number of artists became interested in 'high' technology: sound and video recording systems. This was coupled with the development of a number of new approaches to art, including the idea of interaction between the viewer and the work. Clearly, when one looks at a painting and it stimulates a response, there is a degree of interaction but this process does not affect the picture itself so we have only a very

limited form of interactivity. The idea that the work could respond to and even be controlled by the viewer was a radical one and opened up questions regarding the relationships between artist, artwork and audience. Similarly, art movements such as the UK group Fluxus began to explore the idea of performance as art. Add to this the emergence of readily available technologies and a time of turbulent social change and new forms and practices in art became more-or-less inevitable.

Throughout this period, art experimented with film, video and sound – indeed any medium that became available. The work of established artists such as Nam June Paik crossed over many technologies and forms of practice but still remained fairly and squarely under the overall heading of 'art'. Even when the technological aspects of the work became broadly accepted, the work retained all the traditional qualities of art: the theories that informed it, the places in which it was exhibited, the way in which critics regarded it and so on were all those that had been associated with traditional forms. Add to this the idea that we could be looking at a wholly new art form and it becomes easy to understand why sonic art has had such a difficult birth and why it still struggles to be truly independent and widely accepted.

'I USE TECHNOLOGY IN ORDER TO HATE IT MORE PROPERLY. I MAKE TECHNOLOGY LOOK RIDICULOUS.'

NAM JUNE PAIK, 'DIGITAL AND VIDEO ART'

EXPERIMENTAL MUSIC

Experimental music is almost impossible to define since what is experimental today can become commonplace tomorrow. For example, in 1975, Brian Eno created a highly experimental work called *Discreet Music* (see p.39 and pp.78–79). This became the basis for what is now known as ambient music and, in so doing, ceased to be regarded as experimental. Similarly, in the 1960s, Steve Reich created works (such as *Come Out* and *It's Gonna Rain*) using looped sounds – much current popular electronic music is now substantially based upon looped material. Experimental music is perhaps more usefully defined as an approach to composition and performance that uses unconventional techniques. These may take the form of aleatory processes, in which decisions normally taken by the composer are taken by other means such as the laws of mathematical chance or algorithmic processes.

John Cage

One of the figures that looms largest in the evolution of sonic art is that of John Cage. Following studies with composer Arnold Schoenberg and artist Marcel Duchamp, it was perhaps inevitable that his work would follow an unconventional path. Cage's art often used chance and ranged freely across many media. He composed music (conventional and otherwise), collaborated with choreographer Merce Cunningham, wrote, painted and created early multimedia events such as *Variations V* (1965) in which a sound system devised by Cage and sound engineer Billy Klüver interacted with dancers and visual components, including films and video images by Nam June Paik. A significant recognition of the amazingly diverse nature of his work came in the form of the award in 1986 of a very unusual title – Doctor of All the Arts – by the California Institute of Arts.

Despite the extraordinary breadth of his works, Cage remained devoted to sound in all its aspects from his controversial composition *4'33"* (1952) in which a 'silence' lasting four minutes and 33 seconds is created (or 'performed') to works for multiple tape recorders (*Williams Mix* – 1952/3)[14] and his radical view that the artist should allow sounds to speak for themselves.[15] Despite the fact that he continued to refer to much of his work as being 'music', by such works and statements, Cage effectively created the idea that sound by itself could communicate and, perhaps more importantly (for us at least), that it could be the basis for a distinct art form. These statements are easily made but Cage's work did much to substantiate them and force sceptics to take the idea seriously: such works included his early *Sonatas and Interludes for Prepared Piano* (1946–48). In these works, Cage insists that we pay at least as much attention to sound itself as to more conventionally musical considerations like harmony or melody. Although always willing to use technology,[16] on this occasion Cage reverts to a far simpler approach, transforming the sound of that most quintessentially 'musical' of instruments – the piano. He achieves this by inserting objects (washers, screws, pieces of rubber etc.) at precise positions between the strings of the piano, removing much of the 'piano-ness' from the instrument and turning it into something altogether different: an unknown instrument whose interest lies at least as much in its unusual sound as in the music that it plays. Perhaps this is a subtle shift in emphasis but equally one that allows us to focus upon music as something that relies upon sound for its expression rather than the other way round.

Of course, no single individual is ever wholly responsible for the emergence of a new art form and it would be quite wrong

CHANCE

Chance, as we might use the word, is perhaps a somewhat misleading term since its application to both sonic and visual arts can lead to highly structured and deterministic results. Chance music is otherwise known as aleatory music and may use a range of processes to determine aspects of structure and content that are normally defined directly by the composer. Decisions and choices may be made by mathematical, graphical or statistical methods (amongst others) and, in some instances, may involve the use of computer systems to define structure and content from a set of given rules or algorithms. Notable users of chance have included John Cage, Pierre Boulez and Iannis Xenakis.

Summary

to suggest that sonic art was the invention of John Cage, Edgard Varèse, Steve Reich or any other single artist. What these pioneers did, however, was to establish, in their very different ways, the belief that sound by itself could be art: the very specific ways in which music organises sound are not always wholly necessary and, as Cage suggested, given the opportunity, sound can speak for itself.

Given the substance of its foundations, it is perhaps hard to understand why it took so long for sonic art to emerge from the shadow of its ancestors. There are a number of possible reasons for this but one major factor is almost certainly the technologies that are often involved. Although (as we shall see later) not all sonic art relies upon high technologies, such methods do tend to be widely used. For as long as these remained relatively exclusive there was little possibility that the work that they made possible would be at all commonplace and therefore that it could be widely accepted.

The sampler, and later the computer, together with the related technologies of the DJ were to change all that. By making the creation of works of sonic art a less elite activity, works began to be created in greater numbers and in a diversity of forms. A new generation of artists now looked for sources and references, theories and ideas upon which to base themselves and their work. Looking back a short time showed little more than the traditional and academic practices of electroacoustic music and fine art. Looking back a whole generation brought to light the work of Cage, Reich, Varèse, Schaeffer and others. Looking back further still, Russolo's *Art of Noises* manifesto (see pp.22–23) was rediscovered, connections were recognised and the emergence of sonic arts as a form in its own right was on the way.

14. Commenting on his score, Cage explains: 'This is a score (192 pages) for making music on magnetic tape. Each page has two systems comprising eight lines each. These eight lines are eight tracks of tape and they are pictured full-size so that the score constitutes a pattern for the cutting of tape and its splicing. All recorded sounds are placed in six categories ... Approximately 600 recordings are necessary to make a version of this piece. The composing means were chance operations derived from the I-Ching.'
Cage, J. (1962) *Werkverzeichnis*. New York: Edition Peters.

15. '... giving up control so that sounds can be sounds ...' Cage, J. (1961) *Silence*. Middletown: CT: Wesleyan University Press.

16. Interestingly, in his 1937 essay *The Future of Music: Credo* Cage makes a statement that seems closely to reflect Bacon's *Sound Houses*: '... Before this happens, centers of experimental music must be established. In these centers, the new materials, oscillators, turntables, generators, means for amplifying small sounds, film phonographs etc., available for use. Composers at work using twentieth-century means for making music. Performances of results. Organisation of sound for extra-musical purposes (theatre, dance, radio, film).'
Quoted in Cox, C & Warner, D. (eds) (2004) *Audio Culture: Readings in Modern Music*. New York: Continuum.