Hugh Davies's Self-Built Instruments and their relation to Present-Day Electronic and Digital Instrument-Building Practices:

Towards Common Themes

Dr James Mooney (j.r.mooney@leeds.ac.uk)
University of Leeds

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Abstract

The first part of this essay describes some of Hugh Davies's self-built instruments, focusing on their material characteristics and playing techniques. The context in which Davies's instrument-building practice developed is outlined, and four themes that characterise his work are proposed: economy, materiality, community, and environment. The second part of the essay focuses on present-day electronic and digital instrument-building practices. A number of practitioners whose work has been directly influenced by Davies are discussed. Finally, some more speculative suggestions are made concerning how Davies's practice might indirectly be connected—in terms of three of the themes mentioned previously—to the present-day practice of live-coding. This essay describes research in progress, and as such does not present any concrete conclusions. The research is being carried out as part of an AHRC-funded project in partnership with The Science Museum. For further information see http://hughdaviesproject.wordpress.com.[1]

Introduction

Hugh Davies (1943-2005) was an instrument-builder, researcher, composer, performer, and pedagogue. He made very significant contributions to the development of electroacoustic music as a discipline—in both practical and epistemological[2] ways—and yet the details of his work, and the full extent of his innovations, are not as widely recognised as they ought to be. In terms of Davies's instrument-building practice, there are a few writers who allude to his status as an innovator, but they tend to stop short of explaining the precise details of his innovations, and how, where, and to whom, exactly, these innovations might have been influential.

Keith Potter (a close colleague of Davies for many years at Goldsmiths, University of London) suggests that Davies's work 'prefigured present laptop culture' and influenced 'a younger generation':

> [I]n the 21st century, it seems that Hugh Davies's innovatory, do-it-yourself, lo-fi approach—which in several respects prefigured present laptop culture—is finding favour with a younger

[1] James Mooney, 'Hugh Davies Project', 2015 <https://hughdaviesproject.wordpress.com/> [accessed 17 March 2015].
[2] James Mooney, 'Hugh Davies's Electronic Music Documentation 1961–1968', *Organised Sound*, 20 (2015), 111–21 <http://dx.doi.org/10.1017/S1355771814000521>.

> generation to whom this remarkable and iconoclastic innovator now appears as a significant father figure.[3]

Potter does not specify precisely *how* Davies's work prefigured laptop culture (or indeed which particular laptop culture it prefigured), nor does he specify whom that younger generation actually comprises. Similarly, Nicolas Collins, in his book on hardware hacking, identifies Davies as one of the earliest pioneers of the genre of 'piezo music':

> In the aftermath of Cage's 'Cartridge Music' many sound artists sought affordable techniques for amplifying mechanical vibration and microscopic sounds. Since the mid-1970s the proliferation of 'Piezo Disks' in beeping appliances has effectively put contact mikes within reach of anyone with a soldering iron… [T]he disks have insinuated themselves into surprisingly diverse corners of our recorded soundscape, and have given rise to a genre of 'Piezo Music.' Hugh Davies (1943–2004) (UK) and Richard Lerman (USA) were two of the earliest innovators. Davies began inventing piezo-amplified instruments in the 1970s…[4]

Collins, however, does not give any indication of the precise nature of Davies's contributions to the genre of piezo music. (There are also a couple of factual errors in the preceding quotation: Davies died in 2005, not 2004, and he began inventing piezo-amplified instruments in the 1960s, not the 1970s. In addition, the implication that John Cage was Davies's primary influence is questionable since, in his own writings, Davies makes it very clear that his instrument-building practice developed out of his experience of working as personal assistant to Karlheinz Stockhausen in the mid-1960s.[5])

Davies built over a hundred instruments in his lifetime, only a few of which will be discussed here.

Shozyg

In a video available online, Davies can be seen and heard playing the first of his solo self-built instruments, the Shozyg.[6] It was built in 1968, and it consisted of a collection of fretsaw blades, a ball-bearing, a spring, and two contact microphones that fed a stereo output. Those objects were mounted inside the cover of a book with its pages removed, which happened to be an encyclopaedia covering the alphabetic range of topics from SHO to ZYG; this is where the name of the instrument came from. The Shozyg was designed to be played with the fingers or, as seen in the video referenced previously, with the aid of accessories. (In the video Davies appears to be using a small screwdriver.) In the instructions that were published when the instrument was built Davies mentioned the possible use of a number of different accessories that could be used to play the Shozyg: 'needle files, small screwdrivers, matchsticks, combs, small electric motors, small brushes, coins, keys, etc.'[7] One of the functions of this instrument was to amplify tiny sounds that would otherwise not be heard; to magnify a microscopic sound-world.

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[3] Keith Potter, 'Hugh Davies: Iconoclastic Innovator in Electronic Music', *The Independent*, 7 January 2005 <http://www.gold.ac.uk/ems/hugh-davies-obituary/> [accessed 7 November 2013].

[4] Nicolas Collins, *Handmade Electronic Music: The Art of Hardware Hacking*, 2 edition (New York: Routledge, 2009), p. 41.

[5] Hugh Davies, 'Invented Instruments and Improvisation', *Avant: Jazz, Improvised and Contemporary Classical Music*, Spring 1997, pp. 12–15.

[6] Martin Klapper, *Visiting Hugh Davies*, Other Sounds (London: TVF, 1991), I <https://www.youtube.com/watch?v=wPT9A0IsGgs> [accessed 12 March 2015].

[7] Hugh Davies, 'Shozyg', 1968, Hugh Davies Collection, Box 'HDW 1', The British Library, Music Collections.

Springboards

Beginning in 1970, Davies built a dozen instruments that he referred to as Springboards. These were instruments in which 'a number of springs (from two upwards) are mounted on a wooden board, and treated rather like strings'.[8] The springs were 12 cm in length or longer (when unstretched) and were amplified, usually using magnetic pickups.

My Spring Collection

Coiled springs of various types were one of Davies's main sound sources, in fact, and he used fifty of them in an instrument that he referred to as 'My Spring Collection' (1975). My Spring Collection featured '50 different unmounted springs which [could] be placed on or held across […] four pickups'.[9] The pickups each had a separate volume control, so that Davies could produce stereo effects by routing the outputs to two different channels.

Concert Aeolian Harp

Another one of Davies's instruments was the Concert Aeolian Harp, which was first built in 1972. This instrument consisted of a collection of 'thin fretsaw blades […] mounted in a holder […] [which were] blown on by the human breath as well as played with a variety of miniature implements such as a feather and a single hair from a violin bow.'[10]

Multi-Shozyg

The final instrument I will mention is the Multi-Shozyg (1990-2). This was really a collection of individual amplified instruments that Davies developed over time, which were arranged together and performed from a table-top, such that the entire collection functioned almost like a single instrument.[11]

Context

It is worth saying a few words about the context in which Davies's instrument-building practice first developed. From 1964 to 66 Davies was personal assistant to the avant-garde composer Karlheinz Stockhausen. During that time—amongst other things—he performed in Stockhausen's first 'live electronic' work *Mikrophonie I*.[12] *Mikrophonie I* is a piece that involves using microphones to amplify and transform the sounds of a large tam-tam gong, which is played using a range of different beaters and other accessories. As Davies himself acknowledged,[13] it was this experience that provided the starting point for his own instruments, which were of course comparable in both materials and techniques.

After working with Stockhausen Davies was in three different performing ensembles in the late 1960s and early 70s. Music Improvisation Company and Naked Software were both improvisation ensembles, the former somewhat jazz oriented, the latter less idiomatically-driven. Gentle Fire, on the other hand, specialised in performing compositions rather than improvisations *per se*. Specifically, they specialised in the performance of indeterminate scores by avant-garde composers, including Cage, Brown, Grosskopf, Wolff, and others.

[8] Davies, 'Invented Instruments and Improvisation'.
[9] Davies, 'Invented Instruments and Improvisation'.
[10] Davies, 'Invented Instruments and Improvisation', p. 13.
[11] Davies, 'Invented Instruments and Improvisation', p. 13.
[12] Hugh Davies, 'Working with Stockhausen', *Composer*, 27 (1968), 8–11.
[13] Davies, 'Invented Instruments and Improvisation', p. 12.

Gentle Fire also performed a number of its own *Group Compositions*, which were compositions written collectively by all the members of the group.[14] From the 1970s onwards Davies regularly worked with various other instrument-builders, notably Max Eastley, David Toop, and Hans-Karsten Raecke.

Davies's instrument-building practice, in other words, developed within several over-lapping contexts, including avant-garde art music, jazz, improvisation, and of course the broader context of instrument-building itself (see Figure 1). Davies's practice both shaped, and was shaped by, these overlapping contexts.

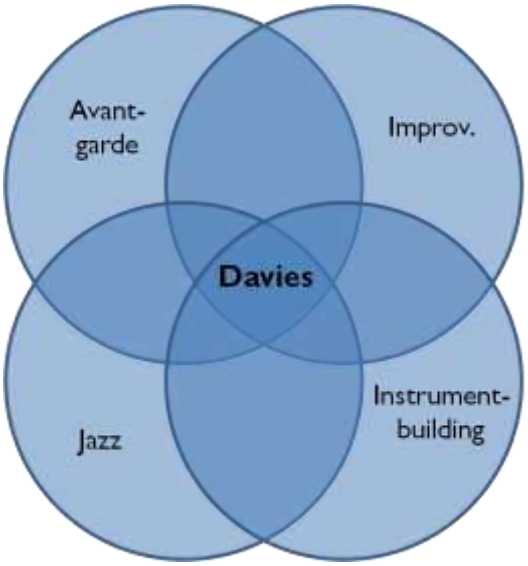

Figure 1. Some of the overlapping contexts in which Davies's instrument-building practice took place.

Davies's Ethos or 'Style'

Like anybody, Davies's attitudes and beliefs changed over time. However, in terms of the ethos underlying Davies's instrument-building practice, several persistent recurring themes are apparent. These are: economy, materiality, community, and the environment.

Economy

Davies's instruments were economical in the sense that they were quite minimalistic, and used found, recycled, or cheaply available objects as their constituent materials. There was also a certain economy in the playing style, where minimal—economical—resources were maximally exploited to yield the most diverse range of possible musical results attainable. In the text accompanying the Shozyg, Davies talked about exploring 'the whole range of possibilities in the instrument within the maximum degrees of variation'.[15]

Materiality

Davies's approach to playing his instruments was to let the materials speak for themselves:

[14] Hugh Davies, 'Gentle Fire: An Early Approach to Live Electronic Music', *Leonardo Music Journal*, 11 (2001), 53–60; Simon Emmerson, 'Live Electronic Music in Britain: Three Case Studies', *Contemporary Music Review*, 6 (1991), 179–95 <http://dx.doi.org/10.1080/07494469100640191>.
[15] Davies, 'Shozyg'.

> When he talks about his work it is noticeable that Davies constantly uses phrases like "the instrument tells me what to do", [or] "the materials show me how it should be."[16]

Materiality was central to Davies's practice, then, in the sense that the material properties of the instruments were allowed to shape the music as it unfolds in performance.

Community

There was also an open, community-spirited ethos underlying Davies's practice. He ran instrument-building workshops with children, for instance, where the idea was that anybody could participate, regardless of background, and without the need for formal musical training. He also frequently exhibited his instruments in art galleries, where members of the public were encouraged to interact with them. For Davies, music, as an activity, was supposed to be inclusive, collaborative rather than competitive, and non-hierarchical. There is a sense that he wanted as many people as possible to become involved in music-making, and he structured his activities around this credo.

Environment

Davies was also an environmentalist, and this is reflected in many aspects of his creative output and professional practice. His compositional work often took its inspiration from nature and the natural world, and he held parallel interests in field recording as well as advocating the building of acoustic parks in cities. Recycling and repurposing were prominent characteristics of his instrument-building practice, and one of the stated aims of his workshops was to encourage participants 'to realise that the riches of our planet do not need to be consumed and thrown away so quickly.'[17]

Luke Patterson and Lee Fowler

In terms of present-day electronic instrument-building and performance practice, the work of Lee Patterson and Luke Fowler is similar to Davies's work in a number of ways. Patterson and Fowler briefly explain their practice in a video that is available online.[18] Here, they are talking about a performance they did as part of an exhibition of self-built instruments, not by Hugh Davies, but by Tony Conrad, who is from the same generation as Davies but based in the United States. Some parallels with Davies's work ought to become apparent upon watching the video; these are summarised below.

For Hugh Davies

Another project that more directly acknowledges the influence of Hugh Davies is a CD entitled, tellingly enough, *For Hugh Davies*, which was released by the independent record label Another Timbre in 2008.[19] For this project three performers—Adam Bohman, Lee Patterson (whom we have already encountered in the video referenced previously) and Mark Wastell—improvised alongside recordings of Hugh Davies performances made in the 1970s (and one made in the late 1960s). The result was, in effect, a quartet comprising Hugh

[16] David Roberts, 'Hugh Davies: Instrument Maker', *Contact*, 17 (1977), 8–13 (p. 11).
[17] Hugh Davies, *Sounds Heard: A Potpourri of Environmental Projects and Documentation, Projects with Children, Simple Musical Instruments, Sound Installations, Verbal Scores, and Historical Perspectives* (Chelmsford: Soundworld Publishers, 2002), p. 96.
[18] Luke Fowler and Lee Patterson, 'Performance for Invented Acoustical Tools and Synthesis', *Vimeo*, 2014 <https://vimeo.com/114857629> [accessed 3 March 2015].
[19] Hugh Davies and others, *For Hugh Davies* (Sheffield: Another Timbre, 2008).

Davies (recorded) and three other live musicians. In the notes that accompany that CD, it is noted that these are musicians that have been 'deeply influenced' by Davies's work... all of whom cite Davies as a formative influence'.[20]

Similarities to Davies's Practice

So what specifically are some of the points of similarity? Here, will combine observations both from the *For Hugh Davies* CD, and from Patterson and Fowler's comments from the video cited previously. Very briefly, there are similarities in methodology, in the specific materials used to build instruments, in the methods of playing, and in musical language.

Lee Patterson's practice in particular is based on the amplification of very quiet sounds and—as he said in the video—on the 'instrumentalisation' of those sounds. He builds his own instruments from every-day or found objects, and favours some of the same materials as Davies, such as springs and contact microphones. Some of the methods of playing are similar too, such as blowing, which was a method used by Davies for playing his Aeolian Harp. The use of a table top filled with amplified objects—again, as seen in the video—is another characteristic that resembles Davies's work, being similar to his Multi-Shozyg. Patterson also mentioned in the video that he and Fowler have parallel interests in field recording, which was also one of Davies's interests, in line with his environmental concerns.

Another, slightly more oblique way in which Davies's influence is felt in this project, is stylistic, and it manifests itself in what Evan Parker—Davies's band-mate in Music Improvisation Company—described as 'the several "layers" approach to improvising'.[21] This approach, Parker says, developed rapidly after Davies joined the Music Improvisation Company, whereas before the musical dialogue between the players had been more in the style of 'ping-pong'; a statement by one player, followed by a statement from another, then a statement by another, and so on. It is fitting, then, that the For Hugh Davies project should feature as one of its component parts a recording of Davies, which—by the simple fact of being a fixed recording—must necessarily operate as an independent 'layer' in the musical fabric, rather than as part of a reciprocal dialogue between performers.

Live Coding

Live coding refers to the practice of using computer programming languages in a live performance, to generate or manipulate music, or visuals, in real-time. In the following three sections I discuss some speculative connections between Davies's practice and the present-day practice of live coding, based upon three of the themes that I described previously as being central to Davies's practice.

Materiality

According to the digital musician and musicologist Thor Magnusson, computer code and programming languages can be thought of as having 'material' characteristics.[22] In live coding, these material characteristics define the ways in which the music unfolds over time,

[20] Another Timbre, 'For Hugh Davies', *Another Timbre*, 2008 <http://www.anothertimbre.com/forhughdavies.html> [accessed 7 November 2012].
[21] Derek Bailey, *Improvisation: Its Nature and Practice in Music*, new ed. (New York: Da Capo, 1993), p. 94.
[22] Thor Magnusson, 'The Materiality of Code || Code as Literature' (presented at the Musical Materialities conference, Sussex, 2014).

in a comparable way to how the physical materials are allowed to determine how musical events unfold when Davies's instruments are played.

Economy

There is also a sense in which live coding must be economical. The computer code that determines the sound generation and musical structuring has to be typed out in real time as the performance proceeds.[23] For this reason, economical code that can nonetheless yield a diverse range of musical results is desirable, and in this respect the practice of live-coding could be thought of as getting the maximum musical potential out of the minimum lines of code. This is similar to Davies's maximal exploitation of found or recycled objects.

Community

In live coding one gets the impression of a democratic community in which hierarchical relationships are broken down in favour of more inclusive, collaborative working methods:

> Live coding is inclusive and accessible to all. Many live coding environments can be downloaded and used for free, with documentation and examples to get you started and friendly on-line communities to help when you get problems.[24]

That openness and inclusivity of approach seems similar in spirit to Davies's instrument-building workshops.

Video Projection

Another point of similarity between live-coding and Davies's practice is in the use of video-projection in performances. In concerts of live-coded music, it is common practice to video-project the computer screen so that audience members can see how the code being typed relates to changes in the music.[25] As a comparable antecedent to this, Davies used to video-project images of his hands when playing his self-built instruments, 'enabling the audience to make a clearer connection between what they see and what they hear'.[26]

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[23] Andrew Sorensen and Andrew Brown, 'Aa-Cell in Practice: An Approach to Musical Live Coding', in *Proceedings of the International Computer Music Conference*, 2007 <http://impromptu.moso.com.au/extras/aa-cell-icmc07.pdf> [accessed 28 January 2015].

[24] TOPLAP, 'About', *TOPLAP: The Home of Live Coding*, 2011 <http://toplap.org/about/> [accessed 12 March 2015].

[25] Sorensen and Brown.

[26] Davies, 'Invented Instruments and Improvisation', p. 13.

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