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Sonic Imaginaries: How Hugh Davies and David Van Koevering Performed Electronic Music's Future

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> I dream of instruments obedient to my thought and which with their contribution of a whole new world of unsuspected sounds, will lend themselves to the exigencies of my inner rhythm. (Edgard Varèse, in Varèse and Wen-chung 1966: 11)
>
> This book is dedicated to every composer, musician, and engineer who dreams of music that has never been heard. May the voices of those who speak in these pages serve as inspiration and encouragement to you all. (Thom Holmes, in Holmes 2002: v)

"The origins of electronic music lie in the creative imagination," claims musicologist Andrew Hugill (2007: 7). The imagination is often cast by composers and musicologists as the origin of new developments in music such as instruments, genres, or even technological regimes (see also Théberge 1997; Chadabe 1997; Grimshaw-Aagaard, Walther-Hansen, and Knakkergaard 2019). By promulgating the notion that musical futures are somehow "dreamed up" by the visionary composer, musician, or engineer, such accounts detach the imagination from developments in the sociomaterial world. The above quotation from the famous composer Edgard Varèse is included in many accounts of electronic music's history and development (for example, Holland et al. 2019; Holmes 2016; Sanden 2013; Risset 1991; Campbell 1986). Yet, such accounts tend not to explore in detail how this imaginary was embedded within the sociomaterial contexts in which Varèse himself operated. Instead, they cast Varèse's imagination as a putative source of inspiration for engineers who "realised" his vision some decades later, as if creativity happens in the mind alone, precedes and is separate from actions in the real world. Popular accounts of the development of electronic music (e.g., Stubbs 2018) also point to the imagination as the sole generative source of developments.

The field of science and technology studies (STS), on the other hand, stresses materiality, networks, users, and institutions as the key *explanans* in the origin of new musical developments and instruments (Pinch and Trocco 2002; Pinch and Bijsterveld 2012; Hennion 2015). Sound studies has also placed emphasis on material practices, skills, and audile techniques (Bijsterveld 2019). In his introductory chapter to *The Sound Studies Reader* (2012), Jonathan Sterne lays stress upon the concept of "sonic imagination." But this is more a call to scholars to attend to the auditory world than a comprehensive analysis of how the sonic imagination is taken up by actors in particular auditory worlds under study. The material turn has also resonated in musicology in recent years, with approaches increasingly emphasizing networks, materiality, and the lived infrastructure of musical worlds (Piekut 2011; Bates 2012; Novati and Dack 2012; Lesaffre and Jacobs 2013; Tazelaar 2013; Weium and Boon 2013; Patteson 2016; Born and Barry 2019). These accounts place more analytical focus on the material world itself than on how actors' imaginations are embedded within material culture.

In this chapter, we attempt to bring together the imaginative and material dimensions of actors' practices via the notion prevalent today in STS and cultural theory of an "imaginary" (Castoriadis 1987; Tovar-Restrepo 2012). The concept of "sociotechnical imaginaries" was introduced into STS by Jasanoff and Kim (2009) and has since been used by others as a way of exploring the nature and role of future-envisioning in a wide range of sociotechnical domains including energy policy (Sovacool 2011; Jasanoff and Kim 2013), genetics (Meloni and Testa 2014), and economics (Beckert 2016). Jasanoff and Kim themselves use the concept as a way of pointing to desired and shared scientific and technological futures. They write: "[Sociotechnical imaginaries are] collectively held, institutionally stabilized, and publicly performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology" (Jasanoff and Kim 2015: 322). The sonic aspect of imaginaries has importantly been stressed

by musicologist Louise Meintjes (2003: 221–237), who documents music producers' attempts to invoke a sonic imaginary of Africa through the use of specific sounds, by historian of radio Susan Douglas (2004), who outlines the imagined sonic world constructed collectively by radio listeners through sound and the demise of this imagination with the development of TV, by anthropologist Tom Rice (2013), who explores how sound accrues particular meanings within the hospital environment, and by media historian Michael Bull (2020), who highlights the potency of siren sounds as part of the auditory imagination. It is this sonic aspect that we think is the key to bringing together musicology and STS. We develop the notion of a "sonic imaginary," which is a way of imagining and bringing forth a shared sonic world or experience grounded in technology, institutions, and networks. In a sonic imaginary, sound itself has sociomaterial agency and makes a crucial difference in how worlds are enacted. As our account demonstrates, individuals must perform their sonic imaginaries in their ongoing engagements with the sociomaterial world. Echoing Morus (2015: 188), we highlight how imaginaries are "constructed out of and around material culture". Rather than imaginaries finding their expression in preconceived ideas (hylomorphism), here we treat the imaginary as an emergent phenomenon from the material world (as argued in the case of "making" by anthropologist Tim Ingold [2013: 20–21]).

We examine in this chapter the sonic imaginaries of two neglected experimental and electronic music pioneers, Hugh Davies (1943–2005) and David Van Koevering (1940–2018). Davies studied music at Oxford University and became assistant to the avant-garde composer Karlheinz Stockhausen before going on to a multifaceted career which included instrument building, improvised performance, and musicology. David Van Koevering was a preacher and novelty instrument performer and showman who went on to almost single-handedly develop the market and means of selling the first commercial electronic music synthesizers in retail

music stores, eventually becoming the director of marketing and vice president of Moog Music. Both Davies and Van Koevering began their careers at a time when electronic music was a studio-bound, tape-based activity. Sounds would be recorded on tape, transformed by manipulating the tape (e.g., playing it backwards or at different speeds), and arranged into compositions by cutting the tape into pieces and sticking these together in the desired order using adhesive splicing tape. It was a time-consuming process that took place entirely offstage. Both Davies and Van Koevering envisioned a future in which electronic music would become a live onstage activity rather than an offstage studio pursuit. In doing so, they had to reimagine what a musical instrument could or should be. Davies developed the notion that anything could become a musical instrument and that performers could build an instrument that unleashed their personal musical creativity, rather than using a standard one. Part of Davies's legacy lies in the burgeoning DIY, circuit-bending and instrument-making and performing nexuses that are part of the contemporary electronic music scene (Mooney 2015b). Van Koevering took a newly developed instrument, the Minimoog synthesizer, and developed the notion that any keyboardist could use it, thus taking the synthesizer out of the realm of electronic music studios where it had previously found its home, into the world of popular musical culture. Van Koevering is increasingly recognized as having given birth to the retail synthesizer industry with his marketing of the Minimoog, which became the precursor to the multiple portable keyboard synthesizers with built-in sounds that dominate today's retail synthesizer market.

We have divided the material that follows into three sections. First, we trace the inception of Davies's and Van Koevering's sonic imaginaries as they encounter the then rapidly developing world of electronic music. We call this phase *incipiency*. It is the beginnings of the imaginary through experiences of inspiration and/or exposure to problems that seem to demand

solutions. We then go on to see how these imaginaries developed and materialized over a period of time when Davies and Van Koevering were exploring and experimenting with different sociotechnical arrangements and trying out possibilities. We call this stage the *labile* phase of an imaginary. Finally, we discuss how imaginaries stabilize in what we call the *stabilization* phase. Exploratory experimentation here gives way to a mature formulation of the imaginary, sometimes evidenced by post hoc rationalizations or articulations. In Davies's and Van Koevering's cases, their sonic imaginaries provided templates for the future form of electronic music whereby key elements such as composition, the role of instruments and performers, and the organization of a new industry took shape (see Théberge 1997).

Incipient Phase: Davies's Sonic Imaginary

> Many of the most important developments in my work have come about by following my instincts and only later rationalising about what I had done. (Hugh Davies, in Davies 1997: 14)

Hugh Davies's sonic imaginary entered its incipiency in the early 1960s, when he first encountered the sound-world of experimental electronic music. It was Daphne Oram (1925–2003), composer, inventor, and founding studio manager of the BBC Radiophonic Workshop, who was responsible for introducing Davies to that sound-world. In 1962, while a student of music at Oxford University, Davies attended a lecture by Oram in London. He subsequently attended Oram's Tower Folly studio in Kent, where he received tuition and produced his first electronic music on magnetic tape. Davies saw great potential in the new sounds and compositional approaches of electronic music, "especially in combination with instruments" and in "its influence on vocal and instrumental music," he wrote in 1963 (15). Davies's own tape pieces, however, were few in number and rather rudimentary in technique. His *Suite* (1963), based on his music for an Oxford University theatre production, although sonically inventive, was rather clumsily executed. Davies's early tape pieces give the impression of a young artist

struggling against the grain of cumbersome techniques to find an appropriate mode of creative expression.[1]

In November 1964, Davies traveled to Germany to work as a personal assistant for Karlheinz Stockhausen, where his imaginary took a different turn. Upon arrival in Cologne, Davies found Stockhausen rehearsing with his ensemble. The piece they were playing was *Mikrophonie I* (1964), Stockhausen's latest composition, in which the players strike and scrape the surface of a tam-tam (a Chinese gong) and transform the sounds electronically to create new timbres. As well as being sonically distinctive, *Mikrophonie I* involves unconventional musical resources and performance techniques. The players use "nonmusical" everyday objects to excite the surface of the tam-tam. The piece also features a distinctive approach to ensemble performance, in which the six players function cooperatively as a single sound-producing unit: two players interact with the tam-tam, two capture the sounds with handheld microphones, and two operate the electronic equipment to transform the sounds captured by the microphones.

Davies's imagination was immediately piqued by the novel sound-world of *Mikrophonie I* and by the possibilities inherent in this new approach to ensemble music-making using equipment normally found in an electronic music studio. In his diary (excerpts of which were later published in the journal *Composer*), he wrote:

> The sounds no longer seem strange or at times crude; their microstructure becomes more alive when one gets to know the sounds better… I listen to the tape [Stockhausen] made in his garden with Jaap Spek [a member of Stockhausen's ensemble] in August, using a plastic egg-timer, glass and shoe to "excite" the tam-tam… [E]ven on this tape there is a very rich and wide range of timbres. During the rehearsals I find that I am beginning to know what sounds and sound characteristics Stockhausen will prefer. I am particularly interested by the sounds produced by the *Massagegerät* (hand held vibro-massaging machine) and the plastic propeller, both of which are electrically powered. (Davies 1968b: 9)

[1] The three movements of Davies's *Suite* may be heard via the British Library's 'Sounds' website: https://sounds.bl.uk/Classical-music/Hugh-Davies-experimental-music.

Davies encountered other new sounds and performance techniques during his time in Cologne. He witnessed Max Neuhaus creating sustained and complex timbres by resonating cymbals with electroacoustic feedback. He experienced four-channel, quadrophonic sound playback for the first time. He performed another of Stockhausen's compositions, *Mixtur*, in which he transformed the familiar sounds of orchestral instruments into unfamiliar, rasping, metallic timbres using a piece of electronic equipment called a ring modulator. On a return visit to London, he attended a performance of John Cage's *Variations V* (1965) by Cage himself, David Tudor, and the Merce Cunningham Dance Company. In the piece, the dancers handled items fitted with contact microphones, which amplified the normally inaudible sounds of their interactions with these objects.

The sounds, techniques, and performance practices that Davies encountered during his time as Stockhausen's assistant were practically unheard of in Britain in the mid-1960s. "When will we be able to do this in England?" Davies wrote in his diary, envisioning a future in which he would one day be able to make music in this way himself (Davies 1968b: 10).

As a member of Stockhausen's ensemble, Davies became close friends with Jaap Spek, a talented musician, engineer, and Stockhausen's (somewhat begrudging) electronics guru. When Davies left Cologne, in November 1966, he and Spek remained in touch. Davies traveled to Paris and then to Trumansburg, in upstate New York, where he joined a project with Robert Moog to catalogue all the electronic music compositions in existence globally (Mooney 2015a). This was a significant activity for the gestation of his sonic imaginary, because it gave him an unprecedented overview of the latest developments in the field. Importantly, it highlighted the emergence of live electronic music (Davies 1968a, v). It served to

validate both his dissatisfaction with the contemporary electronic music scene and his intuitions that the future for electronic music lay on stage rather than in the studio.[2] The letters Davies and Spek exchanged during this period provide some insight into their shared dissatisfaction with the stagnant electronic music scene in Europe, and the urgency with which they felt it necessary to pursue new creative directions. "Paris is dead! Europe is dead!" Spek declared in a letter to Davies (Spek 1967b), speaking elsewhere of a "crisis in Cologne" (Spek 1967a). "I see very dark about the future of the WDR studio [the Studio für elektronische Musik des Westdeutschen Rundfunks, where Stockhausen was artistic director]," he confided to Davies in his slightly broken English (Spek 1967c). "The future of our work we must concentrate on" (Spek 1967b).

Davies and Spek were convinced that the possibilities of magnetic tape as the dominant medium of electronic music were exhausted, and that the future of electronic music lay, not in the tape-based studio, but live on stage. One of the themes of their correspondence was the extent to which the creative agency of the performer was being augmented, and the traditional authority of the composer eroded, as a result of the use of electronic sound manipulation equipment in live performance. As Davies explained, this was because "most pieces in this category exist only in performance, the scores having no direct relationship with the sound results" (Davies 1967). As far as Davies and Spek were concerned, this meant that the "equipment-performers" ought to be given some of the compositional credit. "I know that a certain person won't like this!" Davies remarked. He was, of course, referring to Stockhausen, the implication being that the composer would be reluctant to concede any authorial credit to his performers.

Another implication of the shift from studio to stage that Davies and Spek called for was that it would alter the very nature of composition itself. In a tape-based studio, the composer

[2] The results of this project were published in 1968 under the title *Répertoire International des Musiques Électroacoustiques/International Electronic Music Catalog* (Davies 1968a).

is able to micromanage every last sonic and compositional detail, manipulating the controls of studio hardware "out of time" until precisely the desired sound is achieved, and assembling a composition by cutting and splicing the tape with fraction-of-a-millimeter precision. In live performance with electronic hardware, the responsibility for manipulating the controls rests with the performer (who may or may not be the composer), and the composer has only indirect control over the final sounding results. Thus, in the future, Davies and Spek imagined, composers would not concern themselves with specifying the precise details of individual sounds. Rather, they would focus on describing the generative routines and procedures by which sounds would be created and manipulated electronically in live performance. As Spek put it to Davies, "Processes have to be composed, *instead of* static 'beautiful' *things*" (Spek 1967a, emphasis in original).

Incipient Phase: Van Koevering's Sonic Imaginary

David Van Koevering was the son of an early TV evangelist by the same name based in Florida, , who brought people to God by a novelty musical instrument show. "Little David," as he was known, took over his father's show and geared it up to tell a more secular story of the history of music. He was in demand in schools. As he puts it, "I would start the assembly, a 40-minute program of the history of music with hand bells, unusual instruments…all the way to the Theremin at the end of the show."[3] The design for the Theremin came from a magazine article by synthesizer pioneer Robert Moog, and thus when he read a back-page ad in a music educators' journal placed by Moog inviting people to visit his factory to see his new synthesizers, Van Koevering saw an opportunity. He wanted to use the newly introduced Moog modular synthesizer as part of his show. From conversations he had had with well-known US

[3] All quotes from David Van Koevering come from an interview conducted by Trevor Pinch and Frank Trocco, January 20, 1999, in Los Angeles.

electronic music composers, Otto Luening and Vladimir Ussachevsky, he knew that the predominant use of synthesizers took place in studios But his novelty instrument show was all about live performance. On his arrival at the Moog factory in Trumansburg in the fall of 1967, he quizzed Moog's studio musicians and engineers (Moog himself was away in Europe) about the potential of the Moog for live performance, "and these guys just laughed me right out of the room. This is not a performance instrument, no presets, monophonic, no programmability…"

Setting up sounds with the patch cords was a laborious process, but Van Koevering was nothing if not determined:

> I told them...I think I can perform on this thing, I'm a novelty artist man. I've played unusual bells and glass harmonica, and all kinds of spinning discs…musical rocks [from Kentucky] that I tuned, told the history of sound and could not imagine the history of sound being complete without talking about this powerful tool that was a moldable lump of clay for the timing of a sound event—the synthesizer…and I told them I wanted one.

The wider social imaginary was not yet ready for the synthesizer as a performance instrument, but in dealing with this wider imaginary, Van Koevering was forced to articulate what gave him confidence that it could be a performance instrument. There was his own experience as a novelty instrument performer—if he could perform on Kentucky rocks, he could perform on a Moog synthesizer. But also, by conceiving of the new instrument as a "moldable lump of clay for the timing of a sound event," he was placing the new instrument in the wider context of what a musical instrument is and could be. His own performance practice and type of show (novelty instruments telling a story about the history of sound) provided a unique solution to use the Moog for live performance.

In the inception phase of a sonic imaginary, it is important not only to solve problems but also to receive validation and inspiration from others. This came about for Van Koevering when he finally met Robert Moog:

> A few months later I'm out on Long Island working at a school…and this young curly-haired guy stepped up to me, stuck his hand out, this tall slender guy said, "Hi, I'm Bob

> Moog, I listened to your show and I think you do a good job with this stuff. I want to talk about getting a synthesizer into your show."

Further validation came later that same day when Moog invited Van Koevering to attend one of the first ever life performances of the Moog synthesizer given by Gershon Kingsley's Moog Quartet at Carnegie Hall:

> It was a wonderful show. To me it confirmed my wild dream that this was a performance instrument... It was really that night that confirmed everything…. So Bob and I…drove back to Ithaca, Trumansburg in my van. And I spent a weekend in his home, met his family, met his staff, they talked me through the thing…and it all locked in for me. I mean it was the convergence of energy…we don't have a good word for what creativity is.

Van Koevering clearly felt that this encounter was crucial for his vision of the Moog as a performance instrument. He referred to it as a moment of "creativity." In describing that moment thirty years later, he got very emotional:

> It's going to get emotional. We don't have a term to describe the moment of conscious awareness. I saw something. I saw performers using the Moog, the power of the sound, the sonic energy [voice breaking], and I believed that it could become common and I imagined it as powerful as the electric guitar amp to the first guys that ever played this thing that amplified through vacuum tubes, what they must have felt in the limits and the distortion, the problems that were imposed, but they found a way to take all the limits and use them sonically and musically.

Van Koevering compares the sonic energy of the Moog to the electric guitar, which, of course, went on to transform popular music (Waksman 1999). It was, as he describes it, still an "unknown" source of sonic energy.

> So this [the modular Moog] was hardly a traditional instrument in the known sonic energy. It was an unknown sonic energy, and that was what I realized was powerful. And I believed that…I saw something.

Although steeped in visionary rhetoric, Van Koevering's imaginary for the future of electronic music as live performance is still grounded in the material history of musical instrument innovation and specifically the electric guitar and the new sonic energy it gave. There are also sociomaterial circumstances that helped cement his vision: the happenstance meeting with Robert Moog, Moog's own enthusiasm for incorporating a modular Moog into Van Koevering's show, the Carnegie Hall concert where he saw for himself the live power of the

Moog in the hands of a skillful synthesist (Gershon Kingsley),[4] and lastly, the long drive up to Trumansburg and meeting with Moog's staff. It is these sociomaterial circumstances that helped form Van Koevering's sonic imaginary and allowed it to ferment.

Labile Phase: Davies's Sonic Imaginary

Davies returned to England in 1967 with a particular sonic imaginary in mind: a radical new form of music-making where hitherto unsuspected sound-worlds would be explored by "playing" live on stage the equipment found in a tape-based electronic music studio. This new music would challenge the centuries-old hierarchical divide between composer and performer, and indeed the very notion of the composer as musical authority. It would replace this old model with a more collective form of music-making, appropriate to the technology and politics of the era. "Composer-performers" would share equal creative ownership of the musical product; musical forms, rather than being thought of as fixed entities described in every sonic detail by a composer ahead of time, would instead be conceived of as *emergent phenomena*, arising through the act of performance itself. Finally, the role of the composer would be radically reimagined: the composer would define the process rather than the product. At first Davies referred to this new practice as "electronic music without tape," to distinguish it from the (then) dominant approach to making electronic music (Bayle and Davies 1966). Only later did he settle on what is now the more widely accepted term, "live electronic music" (Davies 1968a).

The problem Davies faced on his return to England was that he lacked any of the material resources necessary to bring this sonic imaginary into existence: he was no longer a member of Stockhausen's ensemble, and he no longer had access to the electronic apparatus of the WDR. His imaginary—seeded by the sound-worlds, performance techniques, and cooperative

[4] Kingsley went on to fame with Hot Butter for his ubiquitous Moog hit "Popcorn."

ways of musicking he'd encountered in Cologne—was the filter through which he evaluated the potential of resources around him. Thus, Davies became a pioneer of the live electronic medium. "When I first began working in live electronic music in England in the summer of 1967," he wrote, "I was the only musician in the country to do so" (Davies 1970).

Davies's first task was to obtain the necessary instruments and equipment. He already owned a small, battery-powered Uher A-121 mixing console, but specialized studio hardware of the kind that Stockhausen had used was well beyond his financial means, and appropriate and affordable alternatives were simply not available. Portable electronic synthesizers, such as the EMS VCS3 and Minimoog, would soon be able to perform some of the functions that Davies had in mind, but these did not become widely available until later—partly thanks to David Van Koevering.

With no obvious material solution at hand, Davies took his sonic imaginary in a new direction. He started to explore the potential in the everyday objects around him. He began to assemble small sound-producing devices from readily available items: plastic combs held in place with bulldog clips, metal springs stretched across an empty tea leaf tin (see Figure 1), a collection of burnt-out glass valves mounted in a block of wood. He fitted these objects with contact microphones, sourced cheaply via the Radio Shack mail-order catalogue, to amplify the delicate sounds that these objects produced when excited by the hands or with small implements (Davies 1970, 1997). Davies's sonic imaginary of a new form of live performance allowed him to appreciate the potential of these simple everyday materials *as musical instruments*. From such exploration would come the creation of a new, DIY approach to musical instrumentation.[5]

[5] For a fuller discussion of some of Davies's self-built instruments, see Mooney (2017).

Figure 1. One of Davies's early self-built instruments, comprising contact microphone and metal springs stretched across a wooden bridge attached to a metal tin. Reproduced with kind permission of the British Library.

Davies's self-built instruments may have been ingenious, but more expensive equipment acquisitions would clearly require institutional sponsorship. Davies had previously offered his services to set up an electronic music studio at the Guildhall School of Music and Drama, hoping to use the institutional budget to acquire the equipment he needed, but this led nowhere (Davies 1966). He eventually succeeded in securing a small budget from the Adult Studies Department at Goldsmiths College, London, to set up a studio there. Thus the Goldsmiths' Electronic Music Workshop (EMW) was born. From the outset, Davies conceived of the EMW as a space for instrument building and live electronic music-making (Davies 1968c, 1977), and specifically chose the word "workshop" over the more common term "studio" to connote this. That he chose to do so against the prevailing trend of tape-based studios illustrates the strength of conviction with which Davies pursued his vision for the future of electronic music. Although the budget was small, it enabled him to purchase all of the basic equipment that he needed to stage concerts of live electronic music: three tape recorders, a Quad II/22 amplifier, loudspeakers, another Uher mixer (like the one he already owned), one air microphone, two contact microphones, and a Heathkit sine/square-wave generator (Davies 1977; Gilby 1987).

Another issue that Davies faced upon his return to England was that he lacked a network of like-minded musicians to share ideas and perform with. He was thus missing a crucial component of the sociomaterial framework in which his sonic imaginary might further develop. As a first step towards remedying this, in the summer of 1967, he formed a live electronics duo with Richard Orton ~~(1940–2013)~~, a young composer whom he had met on a lecturing engagement in Cambridge the previous year. Davies recalls:

> During the summer I stayed for a few days with the composer Richard Orton, who was then living in Cambridge, and we produced 2 improvisations, using instruments such as described above, shortwave radios, amplified fireguard and toy piano, and so on. Listening to them now, there is still much of interest in these recordings. (Davies 1970)

Later that year, Davies became concerts organizer for the Covent Garden Arts Lab, an arts organization in London's Central West End. Here, he formed the Arts Lab Ensemble, a group that included Davies, Orton, and a shifting cast of other experimental and avant-garde musicians who frequented the Lab. The group was short-lived, but it provided Davies with a new sociomaterial arrangement through which to further explore his sonic imaginary. In March 1968, the ensemble performed two new compositions by Davies: *Quintet* (Davies 1971) and *Interfaces* (see Mooney, Green, and Williams forthcoming; Mooney 2016a, 2016b). In *Quintet*, four of the performers produce electroacoustic feedback by moving microphones around in front of loudspeakers, while the fifth player controls the levels of amplification and the routings of microphones to loudspeakers. In *Interfaces*, four players produce sounds using Davies's self-built instruments (described previously) while the other two players transform those sounds electronically. Davies's program note describes the piece as follows:

> The title refers to the combination and contrast of the sounds on four tape tracks with each other and with the live sounds produced by the four performers, as well as to the varied use of modulating, mixing and switching devices (including a 4-channel photocell divider); it also applies to the interpretations of the four performers, who have been chosen for their very different musical backgrounds: Alec Hill is a nuclear physicist working with computers, a clarinetist and self-taught composer/David Lumsdaine is an established composer/John Mitchell is a former jazz bass player and pianist, now more involved in improvisation and electronic music/Stephen Trowell is a bank clerk with a wide knowledge of contemporary music, and lacks any regular musical training. (Park Lane Group and Society for the Promotion of New Music 1968)

Both compositions encapsulate Davies's imaginary of a collective, live, electronic music: he was experimenting with electronic configurations where the players were coupled together as a single electroacoustic sound-producing/manipulating unit, and where the sonic details of the music, rather than being fully prescribed in advance by the composer, were instead conceived of as an emergent phenomenon, the collective responsibility of the performers live on stage,

and (as per Davies's program note) a function of each performer's unique interpretation of the moment-to-moment musical situation.

In the late 1960s, Davies joined two further ensembles: Gentle Fire (1968–75) and Music Improvisation Company (MIC, 1969–71). Both became central in materializing, incubating, and further developing the collective ensemble ethos and DIY approach to instrumentation that characterized Davies's sonic imaginary. The members of MIC were pioneers of free improvisation, a form of spontaneous music-making underpinned by a self-conscious avoidance of stylistic conventions or genre tropes. Gentle Fire, on the other hand, specialized in performing what might be described as semi-improvised composed music, that is, pieces that afford the performers a considerable degree of creative autonomy in deciding how the composer's prescriptions are interpreted or executed.

Davies played his self-built instruments in both ensembles, a situation that enabled him to explore the full range of their capabilities and limitations. This, in turn, fueled his instrument-building practice, as he modified and adapted his instruments and invented new ones to extend the range of techniques and timbres at his disposal. Through an iterative process of instrument building and improvisation, he built up a unique collection of self-built instruments, which he assembled on a tabletop during performances (see Figure 2) (Toop 1974; Davies 1997). The ensembles, in other words, provided a sociomaterial framework for the development of his instrument-building practice. In this way, a distinctive DIY approach to instrumentation developed out of Davies's attempts to materialize his imaginary of a new and novel sound-world explored through a collective form of live electronic music.

Figure 2. Davies's Solo Performance Table, including a number of his found and self-built instruments. Reproduced with kind permission of the British Library.

While MIC specialized in improvisation, with Gentle Fire, Davies pursued a different approach to the transfer of creative responsibility from the individual composer to the ensemble of performers. Beginning in 1970, the group devised six *Group Compositions*. These were not improvisations, since they all included materials that had been prepared in advance, nor were they "single-authored" compositions. Rather, in composing these pieces, the members of Gentle Fire collectively shared the compositional responsibility. They did so in three different ways: by writing scores for each other (*Group Compositions II*, 1971, and *V*, 1972), by collectively building unusual musical instruments (*III* and *IV*, both 1971), and by designing electronic sound transformation systems (*I*, 1970 and *VI*, 1972) which, in turn, shaped the way the music emerged in performance in particular ways (*Music in Our Time* 1973; Davies 2001). The point of the *Group Compositions* was that they reflected the musical identity of the *collective* of composers, which was distinct from the musical identity that would have resulted from a composition produced by any individual member of the group. As Michael Robinson, one of the members of Gentle Fire, put it:

> I think all of them [the *Group Compositions*] have made an environment in which our own group musical personality has a chance to resonate, which is impossible for any one of us to do in a piece. It makes something resonate which a single [solo-composed] piece, or improvisation, or anything like that, has never really seemed to be able to do. (*Music in Our Time* 1973)

In realizing their *Group Compositions*, Gentle Fire were performing Davies's sonic imaginary of a collective, live electronic music (Mooney 2016c). This was a radical way of composing at the time; again, Davies was pioneering new sociomaterial approaches to music-making.

Another sociomaterial arrangement, through which Davies developed his imaginary, was the instrument-building workshop. He staged his first such workshop in 1969 and developed the format in the years that followed (Davies 2002f). The content of Davies's instrument-building workshops varied according to the age and experience of the participants, the quality of the facilities, and the amount of time available. In his simplest workshops, he would

demonstrate and allow participants to play his own instruments, as well as simple acoustic instruments made from found materials like acorns, balloons, and drinking straws. In more ambitious workshops, he would guide participants through the process of building their own musical instruments, either from materials that he would provide (such as bamboo) or from other locally available materials (such as those gathered at a nearby scrap yard). Time permitting, the workshops would culminate in a group improvisation with self-built instruments or, in the case of Davies's most ambitious workshops, the creation of a more sophisticated group composition, which the participants would then perform (Davies 2002g). One such piece, titled "Jigamaree," was composed by Davies "and a group of about fifteen children aged between eight and thirteen, and played by them on instruments they had built during a week of workshops" staged as part of a music festival in Bonn, Germany, in 1977 (Davies 2002c).

It was through his involvement in group composition activities, with Gentle Fire and with the participants of his instrument-building workshops, that Davies explored and developed his imaginary of a collective music, freed from the authoritarian grip of a single, individual composer. His aim, as he would later reflect, was to "reduce the overall dictatorial control traditionally assumed by the serious composer, in favour of increasing involvement of performers, amateurs and children" (Davies 2002e).

Labile Phase: Van Koevering's Sonic Imaginary

The materialization of Van Koevering's sonic imaginary now enters an experimental period of twists and turns where in hindsight he takes what might appear to be several blind alleys. But as we shall see, these experiments with what the live Moog could be are crucial for enabling his final mature imaginary.

In 1968, having finally acquired a modular Moog, Van Koevering was soon incorporating it into his show. He was still a young man at the time (age 28), and his business of novelty instrument shows in schools was quite lucrative. He soon expanded the audience for these shows in a manner that befits the classic American itinerant showman and salesman he was to become—he started to perform in Taco Bell restaurants! He was a business acquaintance of Glen Bell, the founder of Taco Bell. At the time, Glen Bell was trying to spread his highly successful chain restaurant franchise from the American Southwest to the Southeast. Van Koevering was covering a lot of territory and meeting many young and eager potential consumers of tacos—namely schoolkids. After his show, he would hand out coupons for free tacos. Furthermore, twice a week Van Koevering himself would play a concert in the local Taco Bell (see Figure 3).

Figure 3. Voucher for Taco Bell Restaurant.

The plan was to link two ideas: a new eating experience and a new sonic experience. This today sounds unlikely, but the Hammond organ and the Telharmonium (Weidenaar 1995) were both first introduced as novelty instruments to be enjoyed in public spaces. It is not that far-fetched to conceive of the Moog in this way. No one knew what the Moog could or would be used for, and Tacos had never tasted so good!

The tie-in with Glen Bell also proved to be important for Van Koevering's next venture as he took his sonic imaginary in a new direction. Bell owned a casino on a man-made island (Tierra Verde) off the coast of St Petersburg, Florida. Van Koevering read a newspaper article about this disused casino:

> And I saw something that I could only imagine… Something happened to me. I saw a room. I saw this huge ceiling, I saw this glass dome at the top, and I realized that the room existed, that I'd seen it in a newspaper story about an island off from St. Petersburg, Florida, called Tierra Verde.

His idea was to perform Moog musical spectaculars in this location. He called the new venue the "Island of Electronicus." As he describes it:

> I could see a show, it was in me, it was all over me. I saw speakers hanging on all the beams, I saw big X-Y controllers that could control the sound, you could roll that sound around the room… I had two of those…

It is notable that Van Koevering runs together his vision from his imagination ("I saw speakers") with what eventually happens when he develops the Island venue ("I had two of these"). This slide in usage nicely makes the point that an imaginary takes on a material form. The reconstruction of his imaginary years later is tempered by what actually happened. But in a way, that is the point: imaginaries are never purely in the imagination and always entail a dialectic with the wider social material reality.

Van Koevering persuaded Glen Bell to lease him the venue. He refurbished it, and eventually put on three shows a night there.[6] The Island of Electronicus, with a huge spotlight shining on its dome into the St. Petersburg fog, was a sort of spaced out "Age of Aquarius," 1960s-style "happening." There was a light show and a mixture of recited speech and live Moog performances, laced with recordings by notable Moog artists of the day (Beaver and Krause, Dick Hyman, Rick Powell, Wendy Carlos, and Gershon Kingsley). He ultimately employed a couple of other musicians who helped him set up the unique sounds he used. The audience would sit or lie on pillows on the floor. He ran radio ads for the venue, which stressed the Moog as a kind of "technological sublime" (Nye 1996)—a type of spiritual experience which the sound of the Moog could produce.

The mixture of space and sound was the key to bringing about this sonic imaginary for the Moog:

> We had a killer show, lights and automata. And we'd start a motorcycle up--you'd hear a Minimoog act like a motorcycle… And you'd get his motorcycle going around the room... Now, we did this with two Minimoogs—a four-cylinder sports car would start its engine...it would go the other way around the room… And a horrendous crash would happen…over the stage... And the audience would go nuts. They'd stand and they'd cheer and they'd clap, and it was an awesome, awesome sonic sound effect event. A sonic picture, we'd painted a picture with synthesizers.

[6] The entrance fee was three dollars. During the day, he used the Moog gear to make electronic jingles for radio stations.

As well as sound effects, the show would transition into what he calls "serious music": tracks by the Beatles and other popular Moog artists of the day, such as Beaver and Krause's "Into a Wild Sanctuary." This cult Moog album had special effects created on the Moog: the sounds of nature, such as the sound of the wind or crickets, and the "silence" of sunrise. Part of Van Koevering's original spiel for the show gives a flavor of the type of spiritual reverie he was seeking. As the lights dimmed, a voice over the PA would announce:

> Tonight we take you one step closer. All the sounds you've ever heard are like a second. The Moog is an eternity… Tonight we witness the dawn of the new enlightenment… Seclude yourself now and let the music sweep you away and into the dawn. Seek to become newly aware of yourself, the world of nature around you, the people near you. And if you feel it, express yourself. (Pinch and Trocco 2002: 242)

Van Koevering's sonic imaginary for the Moog has now expanded beyond simply a performance instrument. He conceived of the Moog as being able to unlock the new age utopia associated with the Age of Aquarius. Listening to the Moog could produce a kind of spiritual enlightenment that engenders feelings of "love and peace."[7] No alcohol was served at the venue, but many in the audience were high on the psychedelic drugs which at that time were becoming a routine part of the culture. In a way, Van Koevering was offering a version of the famous San Francisco 1966 Trips festival, where the idea had been to emulate psychedelic experiences using the technology of sound and light (Pinch and Trocco 2002; Turner 2010).

Van Koevering did not continue to pursue this particular imaginary of Moog live performance beyond the Island of Electronicus. A rather different project emerged from his experiences at the Island: the idea that musicians could use the newly developed Minimoog for live performance. In a way, this was returning him to his original sonic imaginary of the Moog as a live musical instrument akin to the electric guitar and amplifier. The key to this new materi-

[7] "Love and Peace" was emblazoned as a backdrop to the "happening" stage.

alization of his sonic imaginary were two happenstance events: the development of the Minimoog, which became available during the year he ran the Island of Electronicus, and the arrangement of the stage at the Island, which allowed audience members to sit in the pit and actually jam along live with the Moog show.

Figure 4. Moog at the Island of Electronicus.

The Minimoog was invented in late 1969, and six of the portable synths were ordered by Van Koevering. Moog himself had come to Florida to open the very first show at the Island (see Figure 4). As well as using the Minimoogs as part of his show, he installed two in the stage pits for use by the audience. He discovered that musicians visiting the Island were just itching to make Moog sounds themselves:

> Rock groups would come and sit in the pit…and you could get into that seat and you could put headsets on and you could play your Minimoog along with the show…and these kids were good, some of these kids were great, and I could patch them to the sound system, and…a spotlight would come on over the kid, over that pit, and you could hear the kid play along with us.

A key materialization of Van Koevering's sonic imaginary was now being enabled. His earlier vision of the Moog as a live performance instrument akin to the electric guitar could only come to full fruition if a suitable synthesizer was available and could be used by musicians. The newly available Minimoog, unlike the Modular Moog, at a retail price of about $1,500, was an affordable instrument that could be bought by regular jobbing musicians. Fifteen hundred dollars was still a lot for an individual musician to pay (it cost in 1970 prices about the same as a rock van), but with a loan agreement it was affordable. Furthermore the instrument, with its unique flip-up front panel and built-in keyboard, was portable. Lastly, it was, unlike the modular Moog, a fairly stable instrument that allowed musicians to quickly set up and repeat sounds by adjusting knobs and switches.

But would ordinary musicians be able to perform with it? With its forty-four knobs and switches, the Minimoog could still be a pretty intimidating instrument. Van Koevering, of course, was well aware that he himself could perform with the Moog. His father had trained him from an early age to play anything. He also knew that highly trained musicians such as the Gershon Kingsley Moog Quartet could perform with the modular Moog. But could regular jobbing keyboard musicians learn to play the instrument, and could it become part of a wide range of musical genres? Seeing and listening to members of rock bands play the Minimoogs in the pit at the Island was an inspiration:

> I needed to ignite that happening of creativity inside, that's locked inside of a keyboard artist, I knew it was there, and I knew I could unlock it. I could unlock it. It had happened to me, it had happened to these artists that I had on stage.

The keyboardists who came to the Island demonstrated their desire to play the new instrument. The materialization of Van Koevering's sonic imaginary was now in place. This marks a key transition from the labile to the stabilization phase. With the Moog production line geared up to produce Minimoogs (Pinch and Trocco 2002) and eight more Minimoogs being offered to Van Koevering, he made what he came to regard as the most important decision of his life. After one year of the successful Island of Electronicus venture, he closed the venue. He was going to go on the road to bring the Minimoog to a wider audience:

> One afternoon Bob Moog called me and said, "I now have—and I forget the number—eight more synthesizers for you, Minimoogs," …and the day they showed up I stood up on the stage…I made the announcement: "You have just experienced the last Island of Electronicus show." And somebody from the audience says, "Well, what are you going to do?" And I said, "I'm taking the Minimoogs on the road and I'm going to establish a dealer network." And my wife thought I was absolutely insane. I'm sure Bob Moog didn't believe they would sell… You can't sell this in a music store.

Van Koevering's depiction of this bold move, to abandon his successful Island of Electronicus venture and sell Minimoogs, is accompanied by a rhetoric of how difficult he envisaged this to be. It seems that overcoming opposition was a necessary part of his motivation. Earlier, he encounteredthe same opposition from the Moog company to his use of the modular Moog for live performance. In a way, this perceived opposition can be seen as having helped

him sustain his imaginary. The world had to be won over to his way of looking at it; there was work to be done; the wider social imaginary had to be changed.

The engineers who designed the Minimoog had little clue to what the instrument could be used for. Jim Scott, one of the lead engineers on the Minimoog project, recalled:

> Nobody was going to buy these things…so what are we doing this for? And none of us really knew the market very well, none of us. We were a bunch of engineers, right, theorizing about what the world out there wanted to buy. (Pinch and Trocco 2002: 220)

Bob Moog himself had conceived of the Minimoog as an instrument that session musicians might find useful to take to studio gigs, but couldn't see a wider market for the instrument. The engineers in Trumansburg were as surprised as anyone by what Van Koevering was doing. As Jim Scott put it, "All of a sudden we'd get an order from Van Koevering for a hundred or so of these things, whoa!" (Pinch and Trocco 2002: 250).

Stabilization Phase: Davies's Sonic Imaginary

Davies's sonic imaginary began to stabilize in the early 1970s. This is reflected in the fact that he began to articulate it in his writings with increasing frequency around that time. Some of these writings took the form of predictions for the future of electronic music—predictions which, in time, would prove to be prescient. First, he anticipated that electronic music techniques would quickly be assimilated into live performance, and second, that these techniques would be adopted in such a wide variety of musical styles and contexts that a separate category of "electronic music" would eventually be rendered essentially meaningless. He made these points in 1972, in a text titled "Future Developments in Electronic Music":

> Extrapolating from the present state of contemporary music, two things are clear for future developments: the first step will be one of regarding electronic music as a performance-oriented medium like vocal and instrumental music, with prerecorded tapes used only in special situations where the results required cannot be produced live in performance, but must be prepared in advance in a studio. The second will be the relegation of "electronic music" to a convenient subdivision of the whole range of music for such things as publishers' catalogues, where it will join "piano music," "chamber music," "orchestral music" and so on. (Davies 2002b)

For Davies, these predictions were, of course, already part of the lived reality of his ensemble work, "waiting," he observed, "for the majority of musicians and listeners to realize that they exist." This emphasizes the point that imaginaries are not dreamed up ex nihilo, but rather are grounded in material culture and practical, lived experience (Morus 2015).

A further articulation of Davies's imaginary is that he described what might be thought of as a "postelectronic" sound-world, whereby timbres originally introduced to music via electronic means would become an accepted part of the wider musical vernacular and would find their way into a wide variety of nonelectronic, as well as electronically mediated, musical genres. Again, this was already part of Davies's lived experience, as reflected in his comments on the development of performance practice in live electronic music:

> The recent growth of small groups of composer-performers involving an integral usage of electronic equipment has been primarily responsible for these developments. With such groups a general tendency has been to start out by assembling a substantial amount of personally-owned [sic.] equipment for sound modification as well as for amplification, and then to find that the way in which the performers produce sound on their instruments becomes increasingly closer to the sounds previously obtained by using transformation equipment. The result is that it is no longer of interest to anyone apart from the actual performers as to whether the sounds are produced by means of electronic transformation, by the amplification of actions which produce little acoustic volume, or (usually in a smaller room) with no use of electronic equipment at all. (Davies 2002b)

Sound plays a key role here: it is the mechanism of players imitating (on their acoustic instruments) the timbres produced electronically by Davies that is driving the development of a new postelectronic sound-world. That the characteristic timbres of electronic music would go on to insinuate themselves into (acoustic) instrumental music is evident in, for example, the "spectral music" of the 1970s and the *musique concrète instrumentale* of Helmut Lachenmann, to name just a couple of instances. In Davies's own practice, this development became manifest in his diminishing use, from the early 1970s onwards, of electronic sound transformation technology as an adjunct to his self-built instruments. This was because Davies increasingly found that he was able to produce the same "electronic" sounds without electronic signal processing, using amplified everyday objects alone. He soon began to pursue this as an intentional design

feature of his self-built instruments (Mooney 2017) and came to take pride in the fact that he could explore the extended sound-world of electronic music by such humble means, with no reliance on expensive electronic apparatus or the use of complicated extended performance techniques:

> This feedback influence of the type of sounds introduced originally by taped electronic music is further substantiated by an increasing interest among the musicians involved in live electronic music in constructing new, usually amplified instruments whose sounds range from ones associated with conventional instruments to those of electronic music. These sounds are, furthermore, "natural" to the instruments, as opposed to some of the techniques used to produce equivalent sounds with conventional instruments, such as singing at the same time as blowing into a wind instrument, playing inside a piano, and "small" sounds which become audible only when amplified. (Davies 2002b)

Through his DIY instrument-building practice, Davies came to see the potential of instrument building as a mode of musical expression. Over time, this developed into a deeply felt conviction that everybody should seek to discover—and if necessary build—the instrument most appropriate to their own unique, innate musicality, instead of accepting preexisting instruments by default. "The choice, conscious or subconscious, of one's own musical instrument is a very personal one," he wrote, "[but] it is often obscured for children by the limited range of instruments that can be bought fairly cheaply or borrowed at any particular time from their school or local education centre" (Davies 2002g, 90). In the 1990s, Davies reflected on his workshop activities as follows:

> Over the years, from my occasional workshops and other musical contacts with children and students, I have come to believe that every person has their ideal musical instrument. Some people discover what it is earlier or later in their lives, but many never do, especially in Western cultures. As a result, such people often claim that they are completely unmusical. I am sure that this is rarely, if ever, the case. It may generally be true within the framework of Western music, both classical and popular, given the very small proportion of the total range of musical instruments currently played across the whole planet that are employed in it—and are thus generally accepted in our culture as being the only valid ones. But, like its instruments, Western music covers only a small area of the total possibilities. (Davies 2002g, 90)

For Davies, the conventional Western instrumentarium was something he considered to be rather restrictive. In the early 1970s, he began to associate with like-minded experimental

instrument-builders and sound sculptors such as David Toop, Max Eastley, and Paul Burwell—artists who, like Harry Partch before them, rejected Western classical music's claims to aesthetic superiority and sought to explore, by building new instruments, the sonic and musical territories that Western art-music had neglected (Partch [1948] 1974). He wrote:

> Western composed music, especially since the 19th century, has concentrated on instruments that can be played more loudly in larger halls, blend well with each other, produce every semitone within a substantial pitch range with equal ease and timbre, and so on. Today's newly invented instruments are concerned with a reinvestigation of all the possibilities that were excluded…, all of which can be found in non-Western musics (and indeed in some Western folk musics). These include unusual tunings…, capabilities for pitch-bending, glissandi, graduated noise colours, richer and more expressive timbres (more beautiful in some instances, more forcefully ugly in others), slow timbre changes, long sustained sounds and the spatial positioning and movement of sounds in the performance space. (Davies 2002d)

Davies rejected the concept of a single, standardized musical instrumentarium, whereby a relatively small number of instruments is used to play a wide range of musical styles. Instead, Davies imagined an alternative musical world populated by a radically more diverse and numerous proliferation of instruments, each different from the next, each occupying its own unique niche of a richly variegated musical sound-world. Such instruments, Davies believed, were infinitely more interesting and characterful than the stuffy, "all-purpose" instruments of Western classical music. He declared:

> [A]bove all, these are instruments with more distinct "personalities," both sonic and visual; happily accepting their limitations when compared with the versatility of orchestral instruments (think how many different musical styles the piano is used in), because that all-purpose versatility can only result from a comparative blandness of sound. (Davies 2002d: 32)

Davies foresaw a cooperative, egalitarian musical world in which everybody would be able to express their individual musicality through the building and collective playing of instruments. He articulated this aspect of his stabilized imaginary in the form of a list of aims for his instrument-building workshops with children:

> With such a project my aims are:
> - for musically trained children to experience musical possibilities beyond practising and playing traditional Western music on traditional instruments

- for children who are **not** musically trained nonetheless to find a way into music, if they wish, whether with traditional instruments or in another way, and to encourage their fantasies, unfettered as they are by "knowing how music should be"
- for all the children, whether musical or not, to have the opportunity to collaborate in playing music together, with the particular pride that comes from each of them performing on a self-invented or self-built instrument
- for all children, especially in countries where the standard of living is fairly high, to realise that the riches of our planet do not need to be consumed and thrown away so quickly
- finally for the children to learn to work with each other peacefully and willingly, and to understand that the normal competitiveness, so much preferred in our lives today, is not essential; and for them to enjoy themselves. (Davies 2002f)

As Davies's imaginary stabilized, he reflected upon the processes through which he had developed his practice—a practice which bore so little resemblance to any previously established approach to music-making: "Many of the most important developments in my work have come about by following my instincts and only later rationalising about what I had done" (Davies 1997: 14). "I have always found it more stimulating to let my own development be shaped by whatever comes my way in terms of work opportunities, rather than by planning and seeking out only those things which I feel are appropriate or might be useful" (Davies 2002h). The path that Davies ended up taking was not preconceived, then. Rather, it consisted in harnessing the potential of contingent circumstances. This is not to say that Davies allowed his practice to be shaped by just *any* opportunity that came his way. Rather, he became adept in choosing to pursue particular opportunities that he intuitively understood as being useful to the materialization of his imaginary, and passing up others that he intuited would be less useful. "The inventor accumulates experience in assessing the suitability of certain materials and the unsuitability of others," Davies wrote (Davies 1981: 153–54). This serves as a good analogy for how Davies approached the development of his practice in general. For Davies, creativity was not an in-the-head activity, but a practical process of interacting with materials. As Roberts has noted:

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

> strongly that all that he does should be allowed to happen in what he describes as a natural, organic way. (Roberts 1977: 11)

Davies was well aware that the transfer of Second World War electronic sound technologies into the musical domain had ushered in a new musical language and sound-world, and equally aware that the technologies themselves—tape recorders, signal generators, filters, etc.—had not been designed for this purpose. He thus directed a great deal of his creative energy toward imagining a new instrumentarium, purpose-built for and perfectly suited to this new musical sound-world. He also predicted that synthesizers—very much an emergent technology in the late 1960s—might one day be able to fulfill this task, but for the time being he saw these as being ill-suited for live performance:

> Historically it is not surprising that new instruments are invented at such a time when a new era of musical language as come into existence, appropriate to the range of musical expression (tuning, timbres, etc.) of that era; and electronic music synthesizers, which (better known) might be considered to qualify for this role, have so far only begun to progress beyond being collections of devices initially developed for non-musical functions, and still need to evolve towards their potential sophistication in terms of sufficiently flexible, performance-oriented design and layout, in order for musicians to be able to achieve results with them that are comparable to those already achieved by cheaper and far less elaborate instruments [such as Davies's self-built instruments]. (Davies 2002b)

The transformation of the synthesizer from an expensive, room-sized, studio-bound collection of boxes whose ergonomics were rooted in wartime broadcast and telecommunications equipment, to a portable, integrated instrument suited to the real-time demands of live musical performance, is if course the subject of our Van Koevering case study. Davies, however, was never a fan of synthesizers. He continued to develop his idiosyncratic DIY approach throughout the 1980s and '90s—an approach that began to look decidedly passé as the digital craze took hold. Davies was obstinate. His writings in the digitally obsessed 1990s betrayed a rather embittered tone:

> The use of advanced computer-based equipment is, of course, no guarantee of musical quality or sophistication. I [recently] heard two works, created with the latest technology, which reminded me of nothing so much as an early computer-generated tape piece and

> the simplest of live electronic transformation techniques…. Some computer music specialists seem to view low-level electrical technology as quaint and folkloric, yet do not reject the more old-fashioned established conventional instruments. (Davies 1992: 504)

There is no doubt that Davies faced opposition, even ridicule, for his tenacious adherence to what others saw as a hopelessly outdated approach using technologies that had long been rendered "obsolete." The wider social imaginary at this time was dominated by the digital paradigm, and rather than seeing the deeper sociomaterial implications of Davies's imaginary, most observers focused instead on the technological surface, that is, the seemingly old-fashioned hardware that he used. If anything, this opposition seems to have strengthened Davies's resolve and commitment to his imaginary.

Gradually, as the tide started to turn on the digital era in the early 2000s, the wider social imaginary began to come around to some of the ideas that Davies had proposed, and Davies is now recognized among connoisseurs as having been a quiet pioneer of free improvisation (Bailey 1993) and hardware hacking (Collins 2009). His egalitarian ethos and DIY approach to instrument building resonate with contemporary DIY music-maker cultures like circuit-bending and live coding, which, like Davies's practice, are collectively oriented, live electronic, (semi)improvised musical practices "in which the performer him or herself builds the apparatus (whether physical or code-based) through which the music is mediated" (Mooney 2015b). What Davies's sonic imaginary portended was a new template for musical subcultures: live as opposed to studio-bound, collective as opposed to composer-oriented, electronic at least in their sound-worlds if not their material means, and finding their expression not only in the playing of the music, but also in the building of the instruments from readily available materials.

Davies' circuitous journey from aspiring avant-garde composer to instrument maker, improviser, and workshop facilitator was not a typical musical career trajectory in the early 1970s, but it anticipated a modus operandi that would become increasingly common in the age of laptop computers. By combining the roles of "craftsperson: musical instrument builder

or electronic designer (hardware or software)…composer [and] performer or interpreter" (Davies 2002a), Davies provided the template for many of today's DIY music-makers.

Stabilization Phase: Van Koevering's Sonic Imaginary

Van Koevering's sonic imaginary for the Moog as a live musical instrument to be played by any musician now became stabilized. He was able to persuade multiple musicians to take up the instrument in live performance and at the same time set up a retail sales network to sell synthesizers to these musicians. It was a process that was adopted by the wider industry and eventually led him to become head of marketing and a vice president of the Moog company.

His plan was to buy Minimoogs at discount directly from the Moog factory and then persuade local music stores to stock them and sell them to musicians. The synthesizers cost about $1,000 each from the Moog factory, and they would retail at about $1,500. This new venture would require significant capital. Van Koevering found a partner to provide the capital: Les Trubey, who owned a large keyboard store, Central Music, in St. Petersburg, Florida. They set up a company, VAKO Instruments. The plan was to start locally in the Florida area and establish a network of dealers who, as the customer base expanded, would be shipped synthesizers from St. Petersburg. Van Koevering saw his role as going out on the road to establish this dealer network.

Synthesizers had never before been sold this way. Retail music stores did not stock them, and Moog sold and marketed his gear as high-end audio gear that could be ordered directly from him. He did have a salesman in New York, Walter Sear, and Paul Beaver and Bernie Krause acted as his representatives on the West Coast, but these salesmen took individual orders, which were sent back to the Moog factory to be filled. Moog did not yet attend large trade

shows such as NAMM, where he could have set up a dealer network. He demonstrated his latest gear at the biannual Audio Engineers Society, which did have a commercial wing but which was for specialists in high-end audio gear, not general music store retailers.

There was already local interest amongst rock musicians who had been out to the Island to play the Minimoog. As Van Koevering tells it, "They'd heard about it out at the Island. They'd come out there and they'd gotten indoctrinated. They knew this was a powerful musical expression." Van Koevering frames the next part of his venture on the road as a classic traveling salesman's story:

> I told my wife, "I'll be back when the Minimoogs are gone." And I piled all the Minimoogs in the trunk in the back seat of this Cadillac and I'd go to the first city…Gainesville, Florida… In those days where there was a strong music store, Lippo Music…. I go to Buster Lipham, tell him the story of what Les Trubey's doing, and he laughs at me. He says, "You want me to sell that thing?"

It is a constant refrain of Van Koevering that he has been thrown out of more music stores than he would care to mention. He picks up the story:

> And there had never been a store in the world that had sold a synthesizer. And he literally laughed at me. And he said, "If you can prove to me that musicians will do this…" I could do anything with the synthesizer…but no one else could, the musician couldn't, the store guy couldn't. And he had a guy in there by the name of Bob Turner, who played in a rock band, and Bob Turner saw me demo that thing. And he said, "I'd love to play that in my rock band," and I shoved it across the table at him, I said, "Well, then, do it." And he said, "I can't afford to buy it." I said, "Who said buy? I said do. You put this in your rock band and you start playing this thing in Gainesville."

Turner went on to become a sales rep for Van Koevering. In the above quote, Van Koevering is talking about what was to become the essence of his sales strategy. He would loan musicians the instrument, the musicians and their audience would fall in love with it, and then Van Koevering would take them back to the store and persuade them to buy the instrument and if necessary even arrange for a loan. In this way, he would demonstrate to the store owner the demand for the instrument.

A key part of Van Koevering's sonic imaginary of live performance was that the users of this new instrument would not necessarily be part of the electronic music world. His vision

was that any musician could play the synthesizer. He was particularly interested in jazz and rock performers (and later country) who already played keyboards and might be encountering an electronic instrument for the first time. That it wouldn't necessarily be electronic musicians who took up the Minimoog became clear from his next city, Jacksonville. In the music department at Jacksonville University there was a well-known electronic music composer, Bill Hoskins, who used the modular Moog synthesizer in his studio.

> So I went to Bill and I said, "Who from the local jazz or rock musicians had been in your music department?" "Nobody, we don't train musicians." "Well, who are these electronic composers that you're working with?" He said, "Well, they're electronic composers and they do avant-garde music and they do tape manipulation and they've used the synthesizer." I said, "You don't have any jazz musicians doing this in the clubs?" "No."

It was clear that the sort of users Van Koevering was after were not to be found hanging around electronic music studios. Indeed, this was a typical reaction that Van Koevering encountered from academic electronic music studios who thought of the Minimoog as a "toy" because it was much more restrictive in the sorts of sounds it could make compared with the larger and more flexible modular systems they were familiar with. Van Koevering had to track down other sorts of musicians in the clubs where they worked.

> I'd go out to the clubs. I'd set a synthesizer on top of their Fender Rhodes or on top of the Hammond B3 and they didn't know what it was, and they'd hit it with a chord and nothing would happen. And if you didn't treat just one note correctly you'd have a messed-up note.

Van Koevering realized that in order for the musicians he encountered to use the Minimoog, he would have to teach them how to play it. He found himself instructing them in the fundamentals of analog synthesis. Here his background as a novelty musical performer proved useful. His father had taught him to play new instruments by attaching little slivers of colored tape to the instruments to indicate where to position his hands. Now Van Koevering used this same technique to teach the musicians to reproduce sounds:

> And I carried rolls of tape in my pockets, colored tape…and I would create a sound that he liked, and we'd put red slivers on all the forty-four knobs and switch positions that meant all to red is sound red, and all the yellows are sound yellow, and all the blues are

> sound blue…and those were the presets. But on the way from one preset to the other, anything you find that's musical, play it, experiment, create a song for the sound, create a mood with the Hammond or the Fender Rhodes to accompany this melody line. And I was teaching them synthesis, and they'd get it.

With this colored sticky tape, Van Koevering had come up with an early version of what later became known as "patch charts" or "sound charts," the tear-off sheets or charts for individual sounds to be made on the synthesizer.

The sound charts became standard, eventually being reproduced in the Minimoog manual. He was, in effect, teaching musicians how to make rudimentary "presets." Menus of presets later became a standard feature for digital synthesizers, enabling the operator to reproduce any particular preprogrammed or preset sound at the push of a button or click of a mouse. Furthermore, by instructing the musician to explore and "experiment" with "anything from one preset to the other," Van Koevering was also keeping alive the exploratory aesthetic of analog synthesis whereby musicians could come up with their own sonic discoveries.

Van Koevering was acutely aware of the sonic energy of the piercing monophonic soloing capability the Minimoog possessed. Part of his sonic imaginary, which goes back to his first vision of the sonic energy the Moog could unleash as being like the electric guitar, was that the keyboardist in a rock band could become a virtuoso performer to rival the electric guitarist:

> It [the Minimoog] gave new energy to the group. Now, you've got to remember, the rock guitarist was the superstar, and the Minimoog could make, because of its sonic energy, it could make the keyboard guy a superstar—he now had something powerful. His Hammond was powerful, and his Fender Rhodes was powerful, but not like the guitar. But a monophonic, piercing electronic sound coming out of four or five amplified speakers, or amplified speaker stacks, could give him some energy and he could compete with the guitar, and he wanted to do that.

Having trained the musician to use the Minimoog and persuaded the musician of its sonic energy, Van Koevering still faced the problem that the instrument cost comparatively a lot of money. As a salesman, he knew there were myriad different ways to sell something (Pinch 2005):

> So I experimented with many ways to sell. There are as many ways to sell as there were sounds in the synthesizer… I worked out a formula that's really funny. I'd go in when they had three sets… I'd find those guys. They could borrow money through the signature of their girlfriend's mother, or they could get a loan on their girlfriend's car… And you had to figure out the guy that had a potential of borrowing the money.

After working out the person who might be able to get a loan, Van Koevering made his next move:

> I'd tell him, "I'll come in and work all afternoon…setting up these colors and teaching you to get sounds that fit with the gig…" And I put stickers from the mailbox, letters I stuck the name M-O-O-G on the back of the walnut cabinet so everybody knew what to call it… And I would make sure that in the first set…that he'd say, "How do you like the Moog?" He had to ask that question. If he didn't ask that question, he couldn't borrow it.

This call-and-response conditioning routine, which must be one of the oldest in showmanship, was nevertheless effective. The distinctive name Moog no doubt helped. Van Koevering then pulled his masterstroke: he in effect silenced the instrument by pulling out the slow-blow fuse for the second set! Now the musician was bereft as the manager and audience demanded the Moog be played. The manager would get upset, blaming the musician for not being able to operate the Moog. Van Koevering would sometimes just sit outside the venue in his car reading a book before returning for the third set. Now with the slow-blow fuse reinstalled, the Minimoog could be heard again in its full glory. Although Van Koevering sometimes had to face down angry managers and musicians, the effect of silencing the Moog for a set was dramatic. It further reinforced the need for the musician to have a Minimoog. Van Koevering was prepared for what followed next:

> And the next day, or that night, I would say to the kid, "You ought to have this." "Oh, I know, I've got to have this." "Well, I can't do it again, this is it. You get your loan together, and here's how you could do this. You go to your girlfriend, you go to her mother, and you get a loan from a signature at a loan company, you call me, I'm staying at this hotel, you do that today"—it's 1:00 in the morning, 2:00 in the morning—and I would have been to the loan company before, and I would have had the loan papers and I got them all for the person to sign, and they'd go in and I'd get three or four of these kids doing this in a city. There's hundreds of cities that I've done this in. I did this until we had a Moog network selling Moog synthesizers coast to coast. I did this all over the country.

By experimenting with his sales technique, Van Koevering had found a way to successfully get synthesizers sold in retail music stores, where they have been to this day. He found that all sorts of musicians were potential Minimoog customers:

> The simple thing that we found, there were musicians of every type, not just rock, that bought Minimoogs. We had country musicians that used them very efficiently, very effectively. The big bulk of them was rock and roll, the garage bands, the local bands, the wannabes, the regional bands that were working regularly and making a living at their work.

Selling synthesizers in retail music stores was not, of course, the achievement of one person alone. Other companies, such as ARP, were introducing portable synthesizers, and they too had success in getting retail music stores to stock them.[8] Furthermore, the success of the Moog as a live musical instrument in rock music was clear to all when keyboard virtuosos such as Keith Emerson and Rick Wakeman started using the Modular Moog and Minimoog in live performance within the context of progressive rock. Van Koevering would find sales peaked in the cities where these musicians toured. He also plied the stores with copies of the well-known Moog LPs these artists were recording. His success was such that eventually the Moog company, under new ownership and newly moved to Buffalo, employed him directly as its head of marketing, and Van Koevering was able through trade shows such as NAMM and the Frankfurt music MESSE to establish a dealer network not only in the United States but also in many other countries. He saw his new mission as "bringing the synthesizer to the world." Portable keyboard synthesizers throughout the 1970s and 1980s became cheaper and cheaper and were soon being used in all genres of music. Synths such as those made by Casio were soon to lurk in every kid's bedroom.

Van Koevering's sonic imaginary for the synthesizer as a similar instrument to the electric guitar that any musician could play was not the only sonic imaginary at play. Out on the West Coast was Paul Beaver, with a rather different conception for the Minimoog. With Bernie

[8] Van Koevering, with his usual salesman bluster, claims that ARP reps were following him around!

Krause, he was Moog's West Coast modular sales rep and a pioneering Moog musician himself. Van Koevering had the utmost respect for Paul Beaver, who like himself could play anything, and also had a business in Hollywood where he rented out and played every conceivable electrical and electronic instrument for use in movies. Van Koevering describes it like this:

> [Paul Beaver] thought that taking the studio system and doing workshops for their composers and for their musicians was the way to grow the performer from the academic world, and I knew better. You had to grow the performer from the world the performer is in, he's there, he's already alive and well in rock and roll, and in jazz and in country music.

Van Koevering had to bring the bad news to Paul Beaver that he could not be a dealer for the Minimoog. Van Koevering felt that the "academic" electronic music studios route was too narrow. His imaginary for the Moog was to unlock the creative energy in any and every musician no matter what their background was or the genre of music. Bob Moog himself was still wedded to the studio-bound conception of electronic music, but by this stage his company was being run by a venture capitalist who quickly grasped the importance of the wider market.

David Van Koevering is best known as a marketer and salesman, and is generally credited with having developed the market for the first electronic music synthesizer sold in retail music stores. To describe Van Koevering as a mere marketer or salesman is, however, to understate his importance. Salespeople and marketers are neglected figures (Pinch and Clark 1986; Clark and Pinch 1988, 2014; Darr and Pinch 2013). When recast as socially skilled and adept people who must persuade other social actors of the merits of a product or worldview, they become key figures in how desires and fantasies are made manifest and translated into new social relationships and imaginaries. They often play a crucial role in the introduction of new technologies where users have to be persuaded of the merits of an unusual and perhaps never-before-used device. For instance, new electrical appliances were often introduced into the United States via a "hard sell" routine more reminiscent of pitchmen than the seemingly invisible salesperson found in today's appliance stores (Zunz 1990).

Van Koevering, who went on to found his own company making digital web-linked interactive pianos, is still very much unknown outside of a small group of Moog aficionados. His achievement is not that of a composer or technological innovator—he operated in the liminal sonic space between what users wanted and desired and what was musically and technologically possible. His long journey from novelty instrument performer to vice president of Moog followed different twists and turns. His sonic imaginary was constantly tempered and shaped by the reality of the wider social imaginary and what is socially and materially possible. Without the socioeconomic and material details, such as the loan agreements, the pits on the Island of Electronicus, and the slivers of colored tape, he could not have brought his imaginary to fruition. His sonic imaginary was enabled by the social and material world he found. There is no doubt that in his case he met with success beyond his wildest dreams. The sound of the synthesizer, from being something that only a very few people could experience in the late 1960s, became part of the wider culture, and he played a key role in that achievement.

Conclusion

Although in some ways very different from each other, the sonic imaginaries of Davies and Van Koevering both became key parts of the wider social imaginary of the world of electronic music. Davies's conception of self-built instruments as an expression of musical personality provided a blueprint for today's DIY/DIT music cultures of contemporary hardware hacking, free improvisation, and live coding. Van Koevering's notion of synthesizers playable and available to all sorts of musicians became the model for how the commercial electronic music synthesizer industry was organized. This does not mean to say that the commercial wings of the industry and the hardware hacking DIY ethos are mutually exclusive. Musicians, being musicians, soon found ways of hacking commercial synthesizers, and with the analog revival

old instruments such as the Minimoog became sources of sonic experimentation for many musicians in search of its fabled analog sound.

One difference between Davies and Van Koevering is that Van Koevering used psychological language to express his imaginary. He talked in the interview we conducted about what he "saw" in his "imagination," while the material we have on Davies, drawn from his diaries, writings, and archival documents, expresses his imaginary in more circumspect terms, painting a picture of his "intuition" and the material circumstances in which his imaginary gestated. Van Koevering, relating events thirty years after they occurred, also expressed these material circumstances, running together what he "saw" with what he actually did. We should remember also that Van Koevering was a marketer/salesman/entrepreneur who spent his life in the world of commercial synthesizers and was used to making grand gestures as a way to convince an audience. Davies, on the other hand, was an Oxford-trained musicologist and academic who relished factual veracity (he was known as a stickler for detail) and the presentation of externally verifiable evidence. Part of the difference in emphasis we have encountered lies in the different methodologies we have employed: interviewing after the fact versus access to archives and academic publications. Yet we can see even in documents from the time, such as Van Koevering's spiel at the Island of Electronicus, that he preferred the preacher's rap to the academic cap that Davies liked to don. Although they were stylistically and rhetorically very different, both Davies's and Van Koevering's endeavors constituted sonic imaginaries through which they "performed" the future of electronic music to their respective audiences. The different paths they chose were not merely opportunistic or arbitrary: they were guided not only by what was socially and materially possible but also by their firmly held visions or intuitions of possible futures for the field.

Although we have described the evolution of Davies's and Van Koevering's sonic imaginaries in terms of three distinct phases (incipient, labile, and stabilization), there are of course

overlaps and reiterations. For instance, during the stabilization phase, Van Koevering was still experimenting with sales techniques as to what might work in bringing the Minimoog to a wider audience. In Davies's case, his instrument-building practice stabilized somewhat earlier than the group composition / collective music-making aspect of his imaginary. As we emphasized earlier, we think the strength of the sonic imaginaries concept for both STS and musicology lies in its bringing together sociomaterial practices with the imaginative dimension. Looking at how an imaginary develops is a useful way of examining how practices develop over time, how the multiple threads of an imaginary may overlap, take blind turns, and so on, in a way that is difficult to register when looking at end products such as compositions or instruments. It is a way of showing that acts of imagination, invention, and creativity are not, in fact, instantaneous epiphanies that happen in the heads of visionary individuals—as often implied in historical accounts—but are lived sociomaterial processes. For STS, the concept of sonic imaginaries provides a way to give agency to sound without falling into the trap of giving sound ontological status independent from human actors. Sound always mediates human practices, and it is these entanglements that are captured by a term such as a sonic imaginary. Sound itself shaped the imaginaries of Van Koevering and Davies. We think that the concept of sonic imaginaries has potential beyond the two case studies we have presented. It is a way of drawing attention to paths not taken and marginalized or overlooked figures in the history of electronic music as well as a means to register the fact that projects can be important even if they never reach full realization. By dispelling the notion that the imagination is the sole source of creativity, we not only challenge the conception of the author or composer as the sole originator of creative works, but also draw attention to activities, practices, and actors that constitute the imagining process in the sociomaterial worlds in which they operate.

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