

Curatorial > PROBES

In this section, RWM continues its line of programmes devoted to exploring the complex map of sound art from different points of view, organised into curatorial series.

Curated by Chris Cutler, **PROBES** takes Marshall McLuhan's conceptual contrapositions as a starting point to analyse and expose the search for a new sonic language made urgent after the collapse of tonality in the twentieth century. The series looks at the many probes and experiments that were launched in the last century in search of new musical resources, and a new aesthetic; for ways to make music adequate to a world transformed by disorientating technologies.

Curated by Chris Cutler

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At the start of the seventies, Chris Cutler co-founded The Ottawa Music Company – a 22-piece Rock composer's orchestra – before joining British experimental group Henry Cow, with whom he toured, recorded and worked in dance and theatre projects for the next eight years. Subsequently he co-founded a series of mixed national groups: Art Bears, News from Babel, Cassiber, The (ec) Nudes, p53 and The Science Group, and was a permanent member of American bands Pere Ubu, Hail and The Wooden Birds. Outside a succession of special projects for stage, theatre, film and radio he still works consistently in successive projects with Fred Frith, Zeena Parkins, Jon Rose, Tim Hodgkinson, David Thomas, Peter Blegvad, Daan Vandewalle, Ikue Mori, Lotte Anker, Stevan Tickmayer, Annie Gosfield and spectralists Iancu Dumitrescu and Ana Maria Avram. He is a permanent member of The Bad Boys (Cage, Stockhausen, Fluxus &c.) The Artaud Beats and The Artbears Songbook, and turns up with the usual suspects in all the usual improvising contexts. As a soloist he has toured the world with his extended, electrified, kit.

Adjacent projects include commissioned works for radio, various live movie soundtracks, *Signe de Trois* for surround-sound projection, the daily year-long soundscape series *Out of the Blue Radio* for Resonance FM, and p53 for Orchestra and Soloists.

He also founded and runs the independent label ReR Megacorp and the art distribution service Gallery and Academic and is author of the theoretical collection *File Under Popular* – as well as of numerous articles and papers published in 16 languages. www.ccutler.com/ccutler

PROBES #35

In the late nineteenth century two facts conspired to change the face of music: the collapse of common-practice tonality (which overturned the certainties underpinning the world of art music), and the invention of a revolutionary new form of memory, sound recording (which redefined and greatly empowered the world of popular music). A tidal wave of probes and experiments into new musical resources and new organisational practices ploughed through both disciplines, bringing parts of each onto shared terrain before rolling on to underpin a new aesthetics able to follow sound and its manipulations beyond the narrow confines of 'music'. This series tries analytically to trace and explain these developments, and to show how, and why, both musical and post-musical genres take the forms they do. In **PROBES #35** we examine the quiet electronic revolution ushered in by the Hammond organ and excavate traces of the visionary but short-lived *Novachord* – a polyphonic synthesiser born a quarter-century ahead of its time, which briefly flared – and then disappeared.

01. Transcript. Studio version

[Gregorio Paniagua, 'Anakrousis', 1978]

Launched in 1935 by Laurens Hammond and John Hanert, the Hammond organ was a fully polyphonic instrument. It had two keyboards and a set of bass pedals, and it used tone-wheel technology to generate five octaves of pure sine waves that could be combined in real time to create an impressive range of complex timbres. If this sounds familiar, perhaps it's because it reminds you of the Telharmonium, which we met back in **PROBES #33**, because, to all intents and purposes, the Hammond was essentially a miniaturised version of that visionary invention – only now reduced from 182 *thousand* kilograms to a mere 190 – thanks, almost entirely to the invention of the thermionic valve. The assembly of fundamentals and harmonics to create different timbres was controlled in the Hammond with a set of flat metal drawbars – not unlike organ stops – that were pulled in and out to determine the specific amount of each component of a tone that went into the sum.¹ One drawbar regulated the fundamental and the rest controlled the octaves, harmonics and subharmonics that lay above and below it – and since each element could be controlled separately, a more or less infinite range of different timbres could be created, meaning that performers could design their own sounds on the fly – unless they chose to use one of the many presets that gave automated access to sets of fixed drawbar combinations.²

The Hammond was the first of all the electronic instruments to date that was immediately accepted into the heart of mass musical practice, not only in the churches for which it was initially designed, but in any situation that called for an organ. And it was quickly adapted for home use in a smaller version called the spinet – as well as finding a home in jazz and popular music – where musicians quickly began to explore its less imitative and conventional possibilities. Although Fats Waller was its most famous early adopter, the woman who earned instant fame – and the sobriquet "first lady of the Hammond organ" – was – the, I have to say, slightly spooky – Ethel Smith. By not mistaking the Hammond for a conventional organ, she helped popularise it as a viable vehicle for popular music. Her most famous hit, 'Tico Tico', recorded in 1944, sold a million copies.³ And here she is, a little later in the same year playing it on screen in George Sidney's 'Bathing Beauty'.

[Ethel Smith, 'Tico Tico' (excerpts), 1944]

However, it was not Ethel but Jimmy Smith who gave the Hammond real credibility as a jazz instrument – and who went on to influence many of the players that came after – as well as laying the ground for some of the great rock organists of the sixties and seventies. Here he is, early in his career, defining the form with 'What Is This Thing Called Love?', taken from the 1957 LP



[Ethel Smith. Source: <http://mujeresinstrumentistas.blogspot.com/2008/10/ethel-smith-rgano.html/>]

Confirmation, with Lou Donaldson, Art Blakey and Kenny Burrell. All the bass parts here are also by Jimmy, played on the Hammond's pedals.

[Jimmy Smith, 'What Is This Thing Called Love?' (excerpts), 1957]

Jimmy is also famous – amongst organists at least – for his signature drawbar setting, launched after his move to Verve records in 1962, in which the lowest three drawbars – the sub fundamental, the sub third and the fundamental itself – are pulled out all the way with the rest remaining completely closed.⁴ Here it is on his interpretation of Elmer Bernstein's 'Walk on the Wild Side'.

[Jimmy Smith, 'Walk on the Wild Side' (excerpt), 1962]

If this all sounds familiar, it's because Jimmy Smith made it so. These excerpts also show the way his playing style evolved. On the first example he's still phrasing more like a saxophonist; in the second he's well into a soloing style that is derived from the organ itself – listen to that stuttering sound in the middle, which combines the Hammond's percussion tabs – which add a short high-pitched chime to the front of each note –, the unintentional but useful key click that sounds when the key makes contact with the busbar and Smith's rapid three-finger trilling on a single key. Ten years later, he was still defining new blends of instrument and feel in this proto-funk edition of his regular band. This is from a live recording made at the Bombay Bicycle Club in Los Angeles, in 1972.

[Jimmy Smith, 'Root Down (Live)' (excerpts), 1972]

Smith's main influence, though, wasn't in the field of jazz – where organists were rare – but on a generation of young sixties rock musicians who were busy absorbing all the languages they could find into their own – and who collectively gave a voice to the Hammond for which it seemed in retrospect to have been born. Here, for instance, is the great Brian Auger playing his version of Gabriel Fauré's 'Pavane', in 1971. Indulge me here. I'll just add a little of the original at the end for your listening pleasure.

[Brian Auger, 'Pavane' (excerpts), 1971]

[Gabriel Fauré, 'Pavane', 1887 played by the Philadelphia Orchestra]

And here's Miles Davis mixing that post-rock sensibility with a kind of post-jazz aesthetic in one of his rare, and idiosyncratic, organ outings. This is from 'Rated X', on the LP *Get Up With It*, in 1974.

[Miles Davis, 'Rated X' (excerpt), 1974]

And here's Dave Stewart from Egg probing the outer reaches of the L series, back in 1972.

[Egg, 'Blane Over Camden (Live at the Roundhouse)' (excerpts), 1972]

And finally, here's the definitive Booker T. Jones.

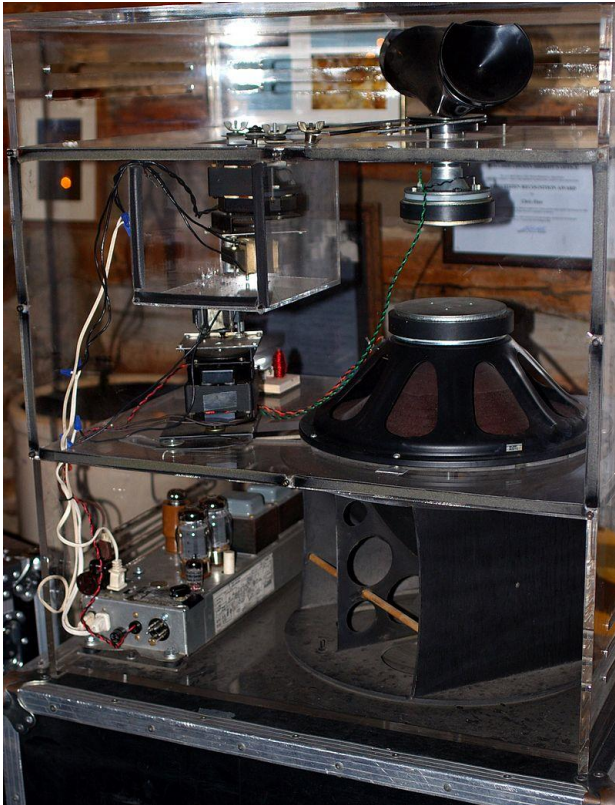
[Booker T. & the M.G.'s 'Green Onions' (excerpt), 1962]

And just because it's exquisite, here's Willie Dixon, Ralph Bass and Sonny Boy Williamson's take on that same riff, which was released the following year with either Lafayette Leake or the Rev William R. Emerson at the Hammond.

[Sonny Boy Williamson, 'Help Me' (excerpts), 1963]

Although ubiquitous in jazz and pop, the Hammond's appearance in classical and contemporary music was almost non-existent – although Stockhausen made interesting use of one in his 1964 'Mikrophonie II', where both organ and voices are run through four ring modulators, transforming the sound of both to create new sonorities by suppressing the input frequencies and allowing their sums and differences to emerge from the modulators.

[Karlheinz Stockhausen, 'Mikrophonie II' (excerpt), 1964/5]



[Leslie Hammond speaker. Photo: De Hustvedt, CC BY-SA 3.0, Source: <https://commons.wikimedia.org/w/index.php?curid=3472626>]

Stockhausen used an L series instrument, but the model that became legend – and which organists still covet – is the 1954 Hammond B3. And it had to be hooked up to a pair of Leslie speakers. Indeed, you can hardly mention the Hammond organ without including the Leslie speaker – although it had nothing to do with the Hammond company itself, indeed Laurens Hammond resisted it, strongly. The Leslie was invented by an American audio engineer, Don Leslie who, after buying himself a Hammond organ, found that he missed that swirly sound organs produce in cathedrals, and set out to replicate it. After a lot of experimentation he came up with what he called the Vibratone. This was a large louvered cabinet with a spinning horn at the top and a loudspeaker mounted below the centre, pointing downwards. At the bottom there was a slowly spinning drum that dispersed the sound to create a kind of doppler effect. For greater complexity, both moving components were rotating at different speeds and the sound was forced to bounce around inside the cabinet before it could exit through the louvers. It sounds like this:

[Leslie]

Leslie tried to sell the idea to Hammond, but Hammond wasn't interested – he even spitefully redesigned the organ-speaker interface so that no-one could attach a Leslie to it.⁵ Don designed a work-around and continued to sell a lot of speakers – because players loved them; so much in fact that he never had to advertise. Absurdly, Hammond continued to harass Leslie, one way or another, over many years – but to absolutely no discernible effect. Organists voted with their ears.⁶

Of course, it was inevitable that, sooner or later, someone would wonder what else a Leslie might be attached to and, in 1964, Brian Wilson, wearing his producer's hat, recorded Paul Petersen's backing vocals through one for 'She Rides With Me'.

[Paul Petersen, 'She Rides With Me', 1964]

More famously, John Lennon did the same thing, and to better effect, two years later. But then, almost everything about this track was an innovation: the tambura and sitar drone structure, Ringo's unvarying and un-rock-like drum riff, the deceptive bass part, the backwards guitar, the layers of tape sounds – and the lyrics that didn't even try to rhyme. Nor can I think of any earlier song on a pop record that had no chord changes at all. Much lauded now, it's worth remembering that at the time most of the critics were dismissive, if not downright rude about this extraordinary song.

[The Beatles, 'Tomorrow Never Knows', 1966]

After that, The Beatles used the Leslie quite a lot, and later it became part of George Harrison's signature sound – you can hear it here, in a cameo appearance George makes in a song he co-wrote with Eric Clapton. I would also nominate this as one of *the great* guitar entries in pop song.

[Cream, 'Badge' (excerpt), 1968]

Although, by all accounts, not really interested in music – and already doing exceptionally good business with his relatively conventional organ – Hammond's next project was truly groundbreaking – and specifically engineered to facilitate the creation of unfamiliar sounds. It was also completely electronic – using valve oscillators, subtractive synthesis, formant filters⁷ divide down octave technology and low frequency oscillation (LFO) vibrato – as well as attack, sustain, decay and release enveloping – in 1939. The tone-wheels were gone. In fact, to all intents and purposes, the Novachord was a polyphonic synthesizer, far in advance of its time. A quarter of a century later, both Robert Moog and ARP would use very similar architectures in their respective poly synthesisers.

[Phil Cirocco, 'First Spooky Sounds']

Although a landmark instrument, the Novachord was a commercial failure. Launched with great fanfare in 1939 at the New York World's Fair – where Ferde Grofé performed daily public concerts with the (again sadly unrecorded) Novachord Orchestra, it was discontinued a mere three years later. Of the



[Vera Lynn. Source: <https://pitchfork.com/news/vera-lynn-singer-of-we'll-meet-again-dead-at-103/>]

thousand built, fewer than 200 survive today, and only a handful of those are in working order. But it was widely used at the time by dance bands and in a variety of popular music settings.

Here's Vera Lynn, for instance, the sweetheart of the forces, accompanied by Arthur Young on the Novachord, in 1939, the year the instrument first appeared.

[Vera Lynn, 'We'll Meet Again' (excerpts), 1939]

And if that sounds a little underwhelming, let's for a moment listen again to a surviving Novachord, recorded in 2007 under modern conditions.

[Phil Cirocco, 'Novachord Improvisation No. 3' (excerpt), 2005]

It's impressive. But here's how most players in the 1940s were using it: this is Collins H. Driggs, who premiered the Novachord at the World's Fair, playing Len Dressel's 'Parade of the Wooden Soldiers', in 1941.

[Colin H. Driggs, 'Parade of the Wooden Soldiers' (excerpt), 1941]

Of course, the technical quality of the older recordings fails to do justice to the richness of the instrument itself – but still, given the unimaginable flexibility and range of possibilities offered by the Novachord – here it is again:

[Phil Cirocco, 'Fingertips' (excerpt), 'Inner Sanctum' (excerpt)]

So it must seem a little strange that it was almost universally used for kitsch and trivia, even if quite imaginative kitsch and trivia.

[George Gershwin, 'The Man I Love', played by the Mexican bandleader Pedro Morquecho (excerpt), 1964]

I think we have to put this down to a *failure of imagination*. Broadly stated, no musical niche yet existed for the compositional possibilities the Novachord offered, and neither was there any existing musical platform for the creative exploration of its radical timbral qualities. At the time, only film composers seemed to grasp what it could do, and even they started modestly: Max Steiner, for instance, in 1939, used one as a kind of sophisticated Wurlitzer for his intermission music for *Gone With the Wind*.

[Max Steiner, 'Intermission Music' (excerpt), 1939]

A year later, Franz Waxman made the uncanny sound of a Novachord the leitmotif for the always-absent Rebecca in Alfred Hitchcock's adaptation of Daphne du Maurier's eponymous novel.

[Franz Waxman, 'Rebecca's Room' (excerpt)]

Although discontinued in 1942, the Novachord continued to be valued well into the sixties by film composers – precisely for its ability to create new timbres.⁸ Ferde Grofé, for instance, who had led the Novachord Orchestra at the World's Fair, made great textural use of one in his score for the clunky 1950 sci-fi film *Rocketship XM*; and here's the redoubtable Jerry Goldsmith using one in his score for *The Invaders*, in 1961⁹.

[Jerry Goldsmith, 'The Invaders' (excerpts), 1961]

And never forget the great Harry Lubin, who used the Novachord a lot – alongside a Trautonium – in his soundtracks for *The Outer Limits*. When this recording was made, in 1964, you can hear that musical thinking was finally catching up with the still underutilised novachordian vocabulary.

[Harry Lubin, 'Demon With a Glass Hand' (excerpt), 1964]₁₀

The Novachord itself may have failed but Hammond could still take the credit for creating a commercial niche in which other electronic instruments would increasingly flourish. A year later, for instance, the Ondioline was eagerly adopted



[Novachord. Photo: Museumsinsulaner. Source: By Hollow Sun at English Wikipedia, CC BY 3.0, <https://commons.wikimedia.org/w/index.php?curid=8863073>]

by musicians in spite of the fact that, technologically, it harked back to the monophonic valve oscillation instruments of the twenties and thirties. Its particular strength, however, was that it knew exactly in which niche it hoped to flourish – and its inventor, the French musician, poet and instrument builder, Georges Jenny – rather like Maurice Martenot before him – had carefully designed and promoted it accordingly.

In the next episode we'll be taking a closer look at the Ondioline and its many modestly charismatic siblings...

- 1 Thom Holmes views the drawbar as an ingenious new interface for an electronic music instrument, adding precision to the selection and combination of sounds and timbres. 'Imagine', he writes, 'how a Hammond would have been controlled without drawbars (using dials, for example)'.
- 2 Dave Stewart pointed out that 'Although drawbar pitches generally ascend from left to right, the second drawbar leapfrogs the third and produces a pitch one octave and a fifth above the fundamental 16' tone. This helps give the Hammond its unique sound; you don't hear the high fifth as a separate pitch, but when added to the fundamental 16' drawbar it creates a pleasing tonal fullness. Beyond that, adding the 8' drawbar gives you the classic Hammond 888 registration (so-called because each drawbar is pulled out to its maximum volume, while the remaining drawbars add increasing degrees of shrillness).
- 3 A version of the Brazilian composer Zequinha de Abreu's 'Tico-Tico no Fuba'.
- 4 'I moved to MGM records. My first big record for them was "Walk on the Wild Side," from the movie of the same name. On this record I used a sole setting of 88 8000 001 on the upper manual on B preset, vibrato off, and percussion on' (Jimmy Smith).
- 5 He also forbade any retailer who stocked the Hammond to also stock Leslie speakers.
- 6 In 1965, Leslie sold his business to CBS, who eventually sold it on to Hammond, in 1980. By this time Hammond had abandoned tone-wheel technology and were using integrated circuits. The new models were not so popular and, in 1985, the company went bankrupt; subsequently, The Suzuki Musical Instrument Corporation acquired both Leslie and Hammond brands and now manufacture digital simulations of the classic organs, including the B3, and copies of the original Leslies.
- 7 Like the Mixturtrautonium.
- 8 Outside the novelty and film communities, however, Hammond's gamble failed. The popular mainstream disliked it – because performers had to be constantly changing settings on the front panel to modify the sound, making it confusing and difficult to play. And at the same time, the art community disliked it because it looked too much like just another keyboard – and they were looking for something more radical.
- 9 From *The Twilight Zone*, series 2, episode 15.
- 10 Series 2, episode 5.

02. Notes

On length and edits.

The purpose of these programmes is to give some practical impression of the probes we discuss. This necessitates for the most part extracting short stretches of music from longer wholes, which, of course, compromises the integrity and disrupts the context inherent in the original works. I have also, on occasion, edited different sections of a longer work together, better to illustrate the points under discussion. So the examples played in the programmes should not be confused with the works themselves. Wherever the word (excerpt) appears after a title in the programme transcript, this indicates that what follows is an illustration, not a composition as it was conceived or intended. If something catches your ear, please do go back to the source.

Notification

If you want to be notified when a new probe goes up, please mail rermegacorp@dial.pipex.com with subject: Probe Me.

03. Acknowledgments

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*Author of *Electronic and Experimental Music*, Routledge 2008 (3rd Edition) and curator of Noise and Annotations: www.thornholmes.com



[Ondoline. Source:<https://funjdiaz.net/museo/ficha.php?id=104>]

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