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THE EARLY DEVELOPMENT OF THE SYNTHESIZER AND ITS IMPACT ON CONTEMPORARY POPULAR MUSIC: A RESEARCH SKETCH

Abstract: The synthesizer played a central role in Western popular music of the 1960s, 1970s, and well into the 1980s, especially in so-called progressive rock and synth pop. And yet, there is still no book-length study of its impact on and meanings in this repertory. This text is a discussion of the main issues that such a study would have to address, along with a brief historical survey of the emergence and early development of the synthesizer.

Keywords: synthesizer, progressive rock, synth pop, analogue, digital, gender, masculinity

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At the moment of this writing, an end to the terrible year of 2020 is finally coming into view, soon to consign it to the past. One must hope that it will be followed there by the awful pandemic it brought us, whose long-awaited departure may be in sight with the simultaneous development of several promising vaccines. With that in mind, we should perhaps let go of 2020 and instead look forward to 2021, which will, among other things, mark a small jubilee in the domain of popular music: 55 years since Dr Robert (Bob) A. Moog of Trumansburg, New York, and Donald Buchla of San Francisco, California, released to the market the “Modular Moog Synthesizer” and the “Buchla Music Box Series 100”, the world’s first two synthesizers that were advertised as such, in 1966.¹ Their instruments and, soon enough, other synthesizers designed, produced, and marketed by their fast-multiplying competitors such as ARP, EMS, and others quickly found a way into contemporary music, avant-garde and popular alike, changing both, especially the latter, for good. “Within 10 years”, writes Mark Jenkins, “it was a staple element of all types of popular and experimental music”.² The synthesizer was a genuinely new instrument, only superficially akin to the piano and organ by virtue of using the keyboard as a source of input and sometimes, most notably in Buchla’s famous designs, dispensing with it altogether. In the judgement of Trevor Pinch and Frank Trocco, the authors of *Analog Days*, in my mind the best history of the analogue synthesizer yet written, the advent of the synthesizer was “one of those rarest of moments in our musical culture, when something genuinely new comes into being [...] the only innovation that can stand alongside the electric guitar as a great new instrument of the age of electricity”.³

And yet, surprisingly little scholarly prose has been written on its impact on and meanings in popular music, where it has been a mainstay ever since its inception in the 1960s and all the way to the present. An invaluable source of information and very well written in an amusing and captivating style, Pinch and Trocco’s *Analog Days* is a cultural and technological history of the synthesizer, offering a wealth of information on the technological and cultural evolution of the instrument in an easily accessible and fun style, but not so much on the music that was made with its help, since the authors,

¹ Trevor Pinch and Frank Trocco, *Analog Days: The Invention and Impact of the Moog Synthesizer*, Cambridge, MA, Harvard University Press, 2004, 41 and 53.

² Mark Jenkins, *Analog Synthesizers: Understanding, Performing, Buying from the Legacy of Moog to Software Synthesis*, New York, Routledge, 2020, xii.

³ Pinch & Trocco, op. cit., 6–7.

after all, are not musicologists. Other notable histories of and handbooks on the synthesizer, such as Brian Shepard's *Refining Sound*, Peter Manning's *Electronic and Computer Music*, Nicolas Collins's *Handmade Electronic Music*, Mark Vail's *The Synthesizer*, and Mark Jenkins's *Analog Synthesizers*, are either much more technically focused on the instrument's inner workings or on its use in avant-garde music.⁴ Histories of Western popular music since the 1960s, when the synthesizer came to the fore, such as Edward Macan's pioneering study of progressive rock, *Rocking the Classics*, Paul Hegarty and Martin Halliwell's *Progressive Rock since the 1960s*, and David Weigel's *The Rise and Fall of Prog Rock*, while not lacking, offer a similar picture, inasmuch as the synthesizer and its impact and meanings are typically mentioned only in passing and seldom receive more thorough-going treatment as a topic in its own right.⁵ In this regard, one notable exception is Theo Cateforis's *Are We Not New Wave? Modern Pop at the Turn of the 1980s*, which at least features a separate chapter on the synthesizer's role in American and British New Wave music and its various offshoots of the 1980s, including synth pop and the so-called New Romantics.⁶ This music, Cateforis writes, "came to be identified by its modern synthesized instrumentation, as evidenced by the names under which it frequently circulated: electropop, synthpop, and technopop".⁷

But when it comes to the so-called progressive rock (or prog rock, largely synonymous with art rock) of the late 1960s and 70s, although it was "the first style of popular music to exploit synthesizers in a systematic way", with bands such as Yes and Emerson, Lake, and Palmer "largely responsible for intro-

⁴ Peter Manning, *Electronic and Computer Music*, Oxford, Oxford University Press, 2004; Nicolas Collins, *Handmade Electronic Music: The Art of Hardware Hacking*, New York, Routledge, 2009; Brian K. Shepard, *Refining Sound: A Practical Guide to Synthesis and Synthesizers*, Oxford, Oxford University Press, 2013; Mark Vail, *The Synthesizer: A Comprehensive Guide to Understanding, Programming, Playing, and Recording the Ultimate Instrument*, Oxford, Oxford University Press, 2014; Jenkins, op. cit.

⁵ Edward Macan, *Rocking the Classics: English Progressive Rock and the Counterculture*, Oxford, Oxford University Press, 1997; Paul Hegarty and Martin Halliwell, *Beyond and Before: Progressive Rock since the 1960s*, New York: Continuum, 2011; David Weigel, *The Show That Never Ends: The Rise and Fall of Prog Rock*, New York, W. W. Norton & Co., 2017.

⁶ Theo Cateforis, "Roll Over Guitar Heroes, Synthesizers Are Here...", in: *Are We Not New Wave? Modern Pop at the Turn of the 1980s*, Ann Arbor, University of Michigan Press, 2011, 151–181.

⁷ *Ibid.*, 62.

ducing synthesizers into the mainstream of contemporary popular music”,⁸ the synthesizer, its role and meanings in this music, has yet to receive the scholarly attention it deserves. This is perhaps all the more surprising given that progressive rock has received much more treatment than the styles that followed it in the late 1970s and 80s, most probably due to its artistic aspirations, manifest in adopting some of the forms, structures, and timbres of Western canonized (or classical, for want of a better term) music, such as the sonata, multi-track suites, and harpsichord and other ‘exotic’ sounds.

While no journal article, including this one, could fill this gap in the scholarly literature on Western popular music since the 1960s, what this paper can do is offer an outline of the most salient topics and issues regarding the development, impact, and meanings of the synthesizer in so-called progressive rock and synth pop, as the two styles in Western popular music where the instrument played the most central role, in order to lay the groundwork, one hopes, for more comprehensive studies to come.

A long list of precursors to the synthesizer could be drawn; most sources mention the 1940s machines of Harald Bode and Hugh LeCaine.⁹ But the first commercial synthesizers – the first synthesizers “as we know them” – were constructed in the 1960s by Donald Buchla in the San Francisco Bay Area and Robert Moog, a doctoral student of physics at Cornell University, working out of a storefront shop in Trumansburg, New York. Already at that early stage, at the very inception of the instrument, Buchla and Moog, independently from each other, arrived at fundamentally different results. The differences in their respective designs exerted a far-reaching influence on the technological development of the synthesizer for decades to come, as well as on its usage in music; they also reflected Moog and Buchla’s different cultural and ideological backgrounds.

All of that is part of the story and will be told later on. Right now, I shall stick to the technological common ground between Buchla and Moog’s pioneering models. In most basic terms,¹⁰ a synthesizer is called that because it *synthesizes*, brings together, a number of electronic circuits; the current run-

⁸ Macan, op. cit., 50 and 63.

⁹ See, for instance, Thom Holmes, *Electronic and Experimental Music: Technology, Music, and Culture*, New York, Routledge, 2008, 58–59, 141–42, 160, 165–72, 208, 222; Pinch & Trocco, op. cit., 42, 46; and Manning, op. cit., 102.

¹⁰ For (much) more detailed explanations, see any of the following: Collins, op. cit.; Jenkins, op. cit.; Shepard, op. cit.; and Vail, op. cit.

ning through these circuits is the (electronic) sound we hear, whose frequency – pitch – is manipulated by means of voltage control. This, of course, applies to analogue synthesizers only, not to the digital machines most of us are more familiar with today: there is analogy between voltage and pitch, in other words, there is a direct link between the current and the sound, much as in between the strings and body of an acoustic guitar and the fingers of the guitarist; nothing gets translated into zeros and ones and then into sound – and this too, as we shall see, would come to affect the cultural meanings attached to the synthesizer and its usage.

But here the common ground between Moog and Buchla ends. The main difference between their respective designs concerned the input or, more precisely in technical terms, voltage control input: Moog's instruments featured keyboards; Buchla's did not, but touch-sensitive pads instead. Beyond that, sound could be further modified by turning knobs and plugging and unplugging patch cords, whereby different modules and oscillators, generating sound waves, could be patched up to obtain a wide variety of timbres and control other sound parameters. In Moog's as well as in Buchla's instruments, voltage, fluctuating in a sine wave, necessarily corresponded in a one-to-one relation to the sound wave. Early on, Moog standardized his machines on a one-volt-per-octave basis; this was but an obvious step, enforced by Moog's choice of the classical keyboard for his input – the one-volt-per-octave standard was a necessity if the instrument was to be equally tempered.

For Donald Buchla, by contrast, equal temperament was not a priority at all – most of his instruments did not feature keyboards anyway, so they did not need to be well-tempered. This effectively sealed the commercial fate of Buchla's invention and, conversely, ensured Moog's supremacy throughout the 1960s. This is why today Moog, not Buchla, “is the best known of the synthesizer pioneers”,¹¹ why “Moog's synthesizer became *the* synthesizer” and not Buchla's “Music Box”,¹² which “never experienced the runaway popularity that Moog enjoyed”.¹³ For, although not a musician himself but an engineer, Moog made it his priority to design his instruments so as to meet musicians' practical needs,¹⁴ which included shrewdly tapping into already established norms of music-making – all one needed to play a Moog was a bit of key-

¹¹ Pinch & Trocco, op. cit., 7.

¹² Ibid., 315.

¹³ Holmes, op. cit., 224.

¹⁴ Ibid., 208.

board skills and, admittedly, a lot more skills in electronic engineering and imagination to experiment with patch cords in synthesising different timbres. In other words, Moog tapped into the long-established hegemony of the keyboard in Western music-music, not only in popular music, but also in music teaching and composition, popular and classical alike, which one could trace back to at least the 18th century, if not even before. As a scientist from a relatively conservative background, Moog was uninterested in 1960s avant-garde experimentation with redefining music – his aim was to fashion an optimally user-friendly new instrument.

By contrast, Buchla identified not only as an engineer, but also as an avant-garde composer. “Mass appeal was not Buchla’s goal”.¹⁵ He was very much part of San Francisco’s countercultural scene; his collaborators included the avant-garde composers Ramon Sender and Morton Subotnick and, through the San Francisco Tape Center, such notables as John Cage, David Tudor, Terry Riley, Steve Reich, even Karlheinz Stockhausen. Unlike Moog, Buchla was not interested in user-friendliness: his aim was to perfect a radically new instrument and composing device, in line with his and his collaborators’ avant-garde agenda. He “was committed to his vision of doing something completely new. He felt that going the keyboard route was reverting to an older technology”.¹⁶ His “whole design philosophy was to get away from the constraints of the standard keyboard”.¹⁷ The keyboard then, with its baggage of equal temperament, just seemed insufficiently radical and unnecessarily stifling. Buchla’s agenda cost him the wide appeal of Moog’s instruments that the “Buchla Music Box” never reached; but then again, wide appeal was never high on Buchla’s agenda anyway.

However, this is not to say that Buchla’s machine did not make forays into the popular music scene. In 1966 Subotnick and Ken Kesey, author of *One Flew over the Cuckoo’s Nest*, the novel behind Miloš Forman’s famous film, organized the Trips Festival, a large ‘acid test’, in other words a public gathering devoted to enjoying music, light shows, and LSD, which was still legal in the United States at the time. Buchla took part in that event by supplying one of his instruments, which made strong impressions on two important psychedelic rock bands who were likewise in attendance: The Grateful Dead

¹⁵ Pinch & Trocco, op. cit., 44.

¹⁶ Ibid., 43–44.

¹⁷ Ibid., 44.

and Jefferson Airplane.¹⁸ As a result of this encounter, their bassist Phil Lesh, who had studied with Luciano Berio, the Italian avant-garde composer, at Mills College in Oakland, California, recruited their first keyboardist, Tim Constanten, who had in turn studied with Stockhausen, and the result of his membership in The Grateful Dead were two important late-1960s albums, *Anthem to the Sun* and *Aoxomoxoa*, both of which featured Buchla's instruments.

But the Buchla Box never really took off on the popular music market and anyway, it was not intended for that market. Moog's instruments, on the other hand, were commercially much more successful. Commercial success, however, did not come at once and the credit in that regard certainly cannot go to Robert Moog only. It was the musician Paul Beaver, Moog's West Coast representative, and his friend Bernie Krause who introduced the Moog to the pop market.¹⁹ They produced *The Zodiac Cosmic Sounds*, an effective mixture of adventurous orchestration, intriguing poetry, and psychedelic sound effects and went with it to the Monterey Festival in 1967. The Festival was attended by a number of contemporary stars, including Jefferson Airplane, Janis Joplin, Ravi Shankar, Jimi Hendrix, and The Who. Beaver and Krause's performance made a strong impression on many of these bands and, as a result, the Moog took off in earnest: soon, it could be heard on releases by The Beach Boys, The Doors, The Byrds, Neil Young, Frank Zappa, Van Morrison, even on *Abbey Road*, The Beatles' final album.

Beaver and Krause thus accomplished a lot in terms of popularizing the Moog on the pop market, but an even more valuable contribution came from a somewhat unexpected direction: the New York City-based composer Walter (at the time; now Wendy) Carlos. During the 1960s Carlos was enrolled in the M.A. in Composition programme at Columbia University, but was making little headway, chiefly due to his lack of interest in serialism. However, the Columbia professor of composition Vladimir Ussachevsky allowed him to use the Princeton-Columbia electronic studio in the evenings, which Carlos used to experiment with its state-of-the-art equipment. The result was *Switched-On Bach* (1968), a set of Bach synthesizer arrangements and the only album of classical music to go platinum. Today, there is near consensus in scholarship – a rare thing – about the huge impact this album made on contempo-

¹⁸ For more information about this event, see Pinch & Trocco, op. cit., 94–97.

¹⁹ For more on Beaver and Krause and their role in the success of Moog's instruments, see Pinch & Trocco, op. cit., 107–30.

rary music, popular and avant-garde alike. Shepard thus writes that “it helped establish the electronic synthesizer as a legitimate musical instrument, introducing its sound to millions of new listeners”,²⁰ while Pinch and Trocco assert that it “changed the face of pop, rock, and classical music”, allowing “a whole new audience to experience the rush of the sixties without having to smoke dope, engage in radical politics, or listen to loud rock music”.²¹ Even Manning, not exactly a fan of Carlos, somewhat grudgingly admits that the album had a huge impact.²² Working with her producer Rachel Elkind, Carlos went on to produce a number of follow-up albums including *The Well-Tempered Synthesizer* and *Switched-On Brandenburgs*, with similar success.

But as far as popular music and especially progressive rock are concerned, the credit for popularizing the synthesizer must go to Rick Wakeman and Keith Emerson of the English “progrock” bands Yes and Emerson, Lake, and Palmer. They were some of the first “rock synthesizer virtuosi”.²³ “Keith Emerson, Rick Wakeman, and the like did for the keyboard what Jimi Hendrix did for the guitar. They turned it from a background piece of furniture into an instrument where the rock keyboardist could become a soloist and center of attention on a par with the guitarist.”²⁴ Wakeman was a “a virtuoso performer with a formidable working knowledge of the analog equipment at his disposal”.²⁵ Uninterested in using his Moog to imitate the sound of traditional instruments, Wakeman instead capitalized on the Moog’s potential for creating entirely new timbres, thus arriving at a highly individualized keyboard aesthetic, his “ornate, classically derived playing style also seemed to bring the best out of the instrument”.²⁶ But it was Emerson who became the first “keyboard hero”. Already a proficient keyboardist, Emerson had been using the Hammond organ for some time, when he encountered the Moog on Carlos’s *Switched-On Bach*. Like many others before him, he was captivated by the instrument’s unique sounds and soon after incorporated it into

²⁰ Shepard, op. cit., 17.

²¹ Pinch and Trocco, op. cit., 131 and 316.

²² Manning, op. cit.: “The response of the popular market at this time was without precedent, resulting in sales of these records that quickly surpassed the entire market worldwide for conventional interpretations of the works of Bach”, p. 171.

²³ Shepard, op. cit., ix.

²⁴ Pinch & Trocco, op. cit., 200.

²⁵ Macan, op. cit., 45.

²⁶ Ibid., 147.

his band. Although it took him awhile to adjust to the Moog's monophonic keyboard – polyphonic synthesizers were introduced only around 1975 – Emerson quickly came to epitomize the new instrument and the brand of masculinity that went along with it. Indeed, with him the “idea of the ‘keyboard hero’ was born”.²⁷ A “keyboard hero with a monster gleaming piece of technology”,²⁸ Emerson was not beneath adding empty, otherwise useless modules to his “Monster Moog” for instilling his fans with greater awe, but this arguably made Emerson, Lake, and Palmer stars on the global popular music stage for years to come.

If Carlos had helped legitimize the synthesizer in avant-garde music circles, Emerson made the critical breakthrough in the domain of popular music. Widely worshipped and emulated by his fans and would-be successors as the first “keyboard hero”,²⁹ he made the synthesizer look ‘cool’ and desirable. An important ingredient in this process was Moog's addition of “the ribbon controller”, which facilitated playing *glissando* and, much more importantly, especially for Emerson, allowed keyboardists to leave their previously passivized, sedentary positions behind large modules and strut up and down the stage – provided the cables were long enough – wielding their ribbon boards like guitars. And, as is well known at least since the pioneering days of Elvis Presley and Chuck Berry, on the rock ‘n’ roll stage guitarists had long been wielding their instruments like unmistakable tokens of masculinity, too. Thus Emerson's use of the ribbon controller, which Moog had invented originally for The Beach Boys around 1965, helped legitimize the synthesizer as a valid instrument of masculine, phallic display: the seeming passivity, culturally associated with femininity, of the keyboardist seated behind heavy machinery, had been supplanted by Emerson's (and others') hyperactive phallic show. “By, in effect, turning the ribbon controller into a guitar”, Pinch and Trocco assert, “Emerson and his audience (mainly made up of young men) were reproducing all the cultural and gender symbolism that the guitar as ‘technophallus’ in rock music evokes”.³⁰ But Cateforis's description of Emerson's onstage shenanigans with his ribbon-controlled Moog deserves quoting in full:

²⁷ Pinch & Trocco, op. cit., 202.

²⁸ Ibid., 210.

²⁹ Ibid., 248–49: “Young rockers could see for themselves the effect Keith Emerson was having on his audience, and they too wanted to become ‘keyboard heroes’”.

³⁰ Pinch & Trocco, op. cit., 63.

Rather than surrounding himself with keyboards, Emerson separated them into two sides. He would then situate himself between the two keyboard banks so that he could play them simultaneously with his unobstructed body and bare, open shirt torso facing out toward the audience. Emerson's most celebrated gimmick, however, involved the use of the Moog's remote controlled pitch modification device called the 'ribbon controller', which allowed him to *play* the synthesizer while wandering about the stage. The ribbon controller was a slender three-foot-long device that was used most often to create sliding pitch effects, but in Emerson's hands it became a suggestive phallic stage prop. As he stroked the ribbon controller and slid it repeatedly between his thighs, he reimagined the keyboardist on a level with the cock rock superstars of the day.³¹

Perhaps even more importantly, "Emerson was the first rock keyboardist of note to grapple, quite literally, with the problematic relationship between the performer's body and the stationary design of his instruments", developing a reputation for a stage show "filled with astonishing physical feats, whereby he asserted his dominance and control over the instrument", going as far as to stick knives into it.³² Of course, commercial manufacturers of synthesizers quickly spotted an opportunity to increase their profits and acted on it:

Keyboard manufacturers were sensitive to these concerns and soon began marketing custom-designed portable models so that synthesizer players could exert a degree of bodily control over their instruments. Inevitably, the genesis of the strap-on synthesizer encouraged the same masculine posturing and array of hip-grinding phallic poses that electric guitarists had been doing with their instruments for years.³³

In the domain of 1960s guitar heroes, a famous equivalent would be Jimi Hendrix's violent treatment of his instruments, which he often smashed into pieces and even burned onstage. But, returning to the keyboard, this was hardly new: in the domain of popular music, Jerry Lee Lewis had sought to break free from his passivized position at the keyboard by playing his piano with his feet, while over a century earlier, in the domain of classical music (although at the time the term did not apply), Franz Liszt used to demonstrate his masculine 'dominance and control' over his feminized and feminizing instrument by literally breaking its wooden frame with his mighty chords,

³¹ Cateforis, op. cit., 158.

³² Ibid.

³³ Ibid.

until the advent of sturdier steel-frame designs made such exploits impossible, even for Liszt.³⁴ As Richard Leppert and many other musicologists have shown, myself included, the keyboard, invariably gendered feminine, had long served as an arena for spectacular displays of normative, that is, violent masculinity.³⁵ Emerson's 'heroics' were thus only the latest episode in that long saga.

It has been reported that in one instance Emerson went a little too far: the cords had reached their limit and Emerson's ribbon controller eventually got disconnected from the modules, whereby his playing, of course, went silent. In Pinch and Trocco's summary of the event, "Running around with a big electronic phallus in live performance is not always easy"; indeed.³⁶ To paraphrase Judith Butler, on that occasion hypermasculinity staged its own failure, as it were. Be that as it may, it was probably Emerson who made the biggest stride in legitimizing the synthesizer as a valid instrument on the rock stage. With his monophonic keyboard solos, such as the one in "The Lucky Man", an early hit, Emerson was able to stand out from the rest of the band, the first keyboardist to achieve such prominence. Interestingly enough, with the invention and marketing of the polyphonic synthesizer in the mid 1970s the keyboard reverted to providing harmonic accompaniment and once again relinquished the centre-stage to the guitar.

Moog and Emerson finally crowned the legitimization of the synthesizer in popular music with the "Minimoog", the first commercially viable portable synthesizer, in 1969. A "killer synthesizer",³⁷ "the all-time classic analog synthesizer",³⁸ and "the most popular and widely used synthesizer of all time",³⁹ the Minimoog was the first synthesizer that those of us born in the 1980s and later might instantly recognize as such: gone were the messy patch cords and the hardwiring was all hidden behind its user-friendly interface. The in-

³⁴ I have written about this at length in "Feminine Charms and Honorary Masculinization/De-feminization: Gender and the Critical Reception of the *Virtuose*, 1815–1848" in this journal, 46, II, 2015, 23–38.

³⁵ Richard Leppert, *The Sight of Sound: Music, Representation, and the History of the Body*, Berkeley, University of California Press, 1993. For a more detailed discussion and bibliography, see Chapter IV in my *The Virtuoso as Subject: The Reception of Instrumental Virtuosity, c. 1815–c. 1850*, Newcastle-upon-Tyne, Cambridge Scholars Publishers, 2016.

³⁶ Pinch & Trocco, op. cit., 63.

³⁷ Ibid., 233.

³⁸ Jenkins, op. cit., 55.

³⁹ Holmes, op. cit., 220.

terface still featured a rack of knobs, which, apart from the keyboard, were the only means of input and sound manipulation left to the keyboardist. But with visible patch cords and hardwiring, gone, too, were the times of radical timbral experimentation: even before the invention of the Minimoog, Paul Beaver and Bernie Krause, still working with modular synthesizers, had already noticed a crystallization of timbres down to around 30 sounds, from the near-infinity that the modular Moog could accommodate. The arrival of the Minimoog, whose timbral capabilities were even narrower, only accelerated this process: yet again, it would seem, commercialization and commodification acted to circumscribe artistic innovation.

If anything, that trend only intensified in the following decade, the 1970s, which brought, among other things, the digital synthesizer.⁴⁰ The digital machines, however, took over only in the 1980s, with the imposition of the MIDI standard in the early 1980s, which gradually enabled musicians to connect various pieces of equipment that before would have been incompatible. Of course, other analogue machines were being developed throughout the 1970s, alongside digital synthesizers, such as ARP 2500 with its stable tuning that facilitated more reliable live performance than the Minimoog had done, or London Electronic Music Studio's Sinthi 100, arguably the largest modular synthesizer in history, which the EMS could not initially sell to anyone, or their highly affordable but technologically inferior VCS-3.⁴¹ But the future lay in digital. Like their analogue predecessors, these instruments, such as Yamaha's DX-7,⁴² the first commercially successful digital synthesizer, could be used to synthesize new timbres; but they also came with a pre-fabricated selection of sounds so few keyboardists could be bothered with sonic experimentation. In Pinch and Trocco's assessment, "The complexities of programming, compared with the ease of use of the factory pre-set sounds, meant that users of the synth either no longer wanted to or were unable to explore and find new sounds."⁴³ Soon, the synth accessories industry emerged, with companies selling additional sets of timbres on CD ROMs and other portable

⁴⁰ For detailed information on digital synthesizers, see Manning, *op. cit.*, 179–362 and Holmes, *op. cit.*, 249–70.

⁴¹ For more information on these manufacturers and models, see Pinch & Trocco, *op. cit.*, 257–301 and Jenkins, *op. cit.*, 60–68.

⁴² For more on Yamaha and other important Japanese manufacturers, such as Korg, Roland, and Casio, see Manning, *op. cit.*, 264–80.

⁴³ Pinch & Trocco, *op. cit.*, 317.

memory carriers – it was a logical continuation of the commodification process that Beaver and Krause had noticed a decade before.

With the instruments, of course, the music changed as well. A number of authors, such as Macan and Manning, note a decline across the board: from the loss of timbral diversity described above to that of virtuosity and a wholesale drop in the quality of instrumental performance, especially live.⁴⁴ But the most profound musical change was the advent of synth pop, a new genre that emerged in Europe around 1977 and thrived there as well as in North America well into the 1980s. Most notably represented by a number of British acts, such as Eurythmics, Depeche Mode, New Order, Gary Numan, and The Human League, this music featured clear melodic lines played mostly if not exclusively on synthesizers and 'clean', that is angular, rigid rhythms with no swing, often generated by drum machines. Vocal delivery – usually the only unsynthesized, 'natural' layer in the music – was pointedly anti-romantic, cold, and dehumanized, despite the genre's alternative – although not entirely homologous but certainly improbable – label of "New Romantics". Perhaps as a reaction to the pretensions, artistic and otherwise, of progressive rock on the one hand and, on the other, the sheer bodily excess of punk, detachment and dehumanization were the overall markers of this new style and they did not stop at the music: there was a concomitant focus on the machine, the robot, the asexual, dehumanized android in the visual and performing personae of many synth pop artists.

Arguably one of the most striking examples of this was Gary Numan, a British synth-pop star and former punk guitarist who made his band dispense with acoustic instruments and go all-synth. Numan's greatest hit was "Cars" (1979), which he performed from a specially designed 'spacemobile', thereby enhancing his "android" appeal. As Cateforis notes, an important factor in this was Numan and other synth-pop stars' renunciation of the "excessive and sexualized associations that both the guitar and the keyboard had accrued over the course of the 1970s",⁴⁵ in other words, the normative (and violent) model of hyper-masculinity performed by Emerson and other keyboard and guitar heroes of progrock and cock rock alike. I might add to that, in line with Judith Butler of *Gender Trouble* and especially *Bodies That Matter*, that dispensing with normative sexuality, that is, a gender identity recognizable as belonging to one of the two 'normal' or, rather, normative genders, inevitably

⁴⁴ See Macan, op. cit., 191–92 and Manning, op. cit., 132 and 175.

⁴⁵ Cateforis, op. cit., 159.

means blurring one's human identity as well, in the eyes of most beholders. Perhaps that was another reason why Numan was such a "polarizing figure", inspiring "a vociferous and often antagonistic critical reception".⁴⁶ As I have written at length elsewhere, it certainly shaped the reception of Klaus Nomi, a tragically short-lived Cabaret-cum-Kabuki inspired German oddity on New York's New Wave scene around 1980.⁴⁷

As a matter of fact, this German connection had always been definitive of synth pop, in more ways than one. Many performers flirted with Nazi or fascist imagery in their stage acts, most notably David Bowie during the days of his collaboration with Brian Eno. Moreover, the initial impulse, in terms of both musical and visual styles, had come from the German all-synthesizer electronic band Kraftwerk, who combined – synthesized – progressive rock and 1970s synth pop in their early hit "Autobahn". Kraftwerk, who in the 1960s had purchased a modular Moog synthesizer, also experimented with 1930s visual imagery, sometimes causing consternation. Another important *Krautrock* band in this context was Tangerine Dream.⁴⁸ British and American neo-glam practitioners of synth pop – the "New Romantics" – then took up this visual and musical style and a new genre was born.

In all of that, the synthesizer played a crucial role: it was the sonic and visual carrier and marker of dehumanization, the musical backbone of synth pop. Furthermore, the digital synthesizer was seen not only as the carrier of sonic dehumanization in synth pop, but also as somehow dehumanized itself when compared to its analogue predecessor. The nostalgia for the direct link between the keyboardist and the sound that was supposedly possible in analogue synthesizers, due to the analogy between voltage and pitch, has been the underlying tenor of the more recent analogue revival. "The analog days are here again with a vengeance", Pinch and Trocco assert; "Although we live in the digital age, there is something enduring (not to say endearing) about analog synthesizers. Today, an analog revival – a return to 'knobs and wire' – is in full swing".⁴⁹ One finds similar sentiments in other authors as well; furthermore, it must be said that the very appearance of so many book-length

⁴⁶ Ibid., 166.

⁴⁷ Žarko Cvejić, "Do You Nomi? Klaus Nomi and the Politics of (Non)identification", *Women and Music* 13, 2009, 66–75.

⁴⁸ For more on Kraftwerk and Tangerine Dream, see Macan, op. cit., 142; Pinch & Trocco, op. cit., 305; and Cateforis, op. cit., 163.

⁴⁹ Pinch & Trocco, op. cit., 317 and 323.

studies, histories, manuals, and the like on *analogue* synthesizers, including works cited in this paper, are another testament to this nostalgia. Also, the same nostalgia may be detected in statements by many famous keyboardists, such as Brian Eno. It is as though the technological counterpart to the musical and visual detachment of synth pop could be found in the detachment between the digital keyboardist and the final sonic result, imposed by the interference of digitization.

Is it perhaps the metaphysics of presence that we are mourning here, that is, its manifestation in the cultural-technological domain of the synthesizer? For, in the testimonies of a number of famous keyboardists from the analogue era, one feels a sense of direct attachment to the machine, as in Suzanne Ciani's 'love affair' with her Buchla Box, or Malcolm Cecil and Bob Margouleff's cyborg symbiosis with their modular Moog.⁵⁰ These artists apparently felt a direct, physical, *symbolic* link to their instruments, much like a violinist feels to her strings and bow; for them, their analogue synthesizers were not just instruments or machines, but arguably extensions of their own bodies, through which they could also establish a direct connection with their music. Such sentiments are hard to come by in the digital era, in the 'sober' grey world of the 1980s and beyond, and it might be fruitful to rationalize their absence in terms of the wholesale mass-cultural anxiety of the alienation supposedly inflicted upon us by machines, of which the *Terminator* and *Matrix* film series might be the most salient cinematic examples.

These days, digital synthesizers are mass-produced by mighty multinational corporations such as Yamaha, Korg, and Roland and gone are the times of Robert Moog's Trumansburg manufacture. Moog's company had been bought out over 40 years ago and moved to Williamsville outside Buffalo, New York, where it eventually went under; today, the building that housed Moog's workshop on Trumansburg's Main Street does not even bear a plaque or anything to distinguish it as the birthplace of the synthesizer. But vintage and replica Minimoogs are still sought after and routinely sell for more than most cutting-edge digital synthesizers. Is this nostalgia? Or is it melancholia? For, in its own day, the Moog had to fight the same anxieties and prejudices – it was even banned from pop music for awhile⁵¹ – that later greeted the digital synthesizer from some conservative circles. We can never retrieve the 'authentic' sound of the analogue synthesizer: the sound is, of course, empir-

⁵⁰ Ibid., 155–86.

⁵¹ See Pinch & Trocco, op. cit., 148–49.

ically the same, but we cannot hear it that way, because we can only perceive it against the background of digitization and other technological and musical developments that have intervened between the early 1960s and our own time. There is, then, no possibility of return, of an unproblematic homecoming; there is nothing to retrieve, only mourn an object that is lost forever. Of course, we may indulge in the sounds of vintage and replica analogue synthesizers, but we can only enjoy them as new cultural objects, redefined by our ever-changing cultural circumstances, not as artefacts retrieved or reclaimed from the past.

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Summary

The synthesizer, as a novel and incredibly versatile instrument, especially in terms of timbre, played a central role in Western popular music of the 1960s, 1970s, and well into the 1980s, especially in so-called progressive rock and synth pop and other offshoots of post-punk new wave. However, although there is a relatively large number of book-length studies, histories, handbooks, and the like on the synthesizer, analogue and digital alike, and on the music, especially progressive rock, written by musicologists and non-musicologists alike, there is still no book-length study of the synthesizer's impact on and meanings in this repertory. The text offers a historical survey of the emergence and early development of analogue and digital synthesizers, from Robert Moog's and Donald Buchla's pioneering designs of the 1960s, some of their main competitors' analogue designs of the 1960s and 1970s, up to the mass-produced commercial digital synthesizers of the 1980s, manufactured by the likes of Yamaha, Roland, Korg, Casio, and other multinational corporations. It then proceeds to discuss some of the salient issues regarding these various instruments' impact on and meaning in 1960s progressive rock and 1970s and 1980s synth pop, most notably their role in the performance and staging of normative hyper-masculinity in progressive rock by figures such as Keith Emerson of Emerson, Lake, and Palmer and the renunciation of such a model of masculinity accompanied by a wholesale air of detachment and dehumanization in 1970s and 1980s synth-pop acts such as Gary Numan.