

Central Art Archives 25



ERKKI KURENNIEMI

- A Man From The Future

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Foreword

In 2006, Erkki Kurenniemi's vast archives were donated to the Central Art Archives of the Finnish National Gallery. The archives include photographs, videos, diaries and drawings, but also other material, such as old computers and computer technology. The multit talented Kurenniemi (b. 1941) is best known as a pioneer of electronic music, and he has been at the vanguard of media culture from the 1970s to the 2000s.

There have been many people in the history of art and culture who have carefully documented the course of their lives. In many cases, their biographies have continued to exist in a cultural institution. In art research, the traditional, biographical "life and works" point of view to artists and their work was abandoned already in the 1950s. On the other hand, the notion of the inseparability of art and life, cherished in the European avant-garde rhetoric, has produced cases like Erkki Kurenniemi, whose life has ended up as a work of art.

In this respect it is not surprising that the boundary between an artwork and a document is not fixed in art or art exhibitions. In fact, this fuzzy boundary has recently been the topic of several works and exhibitions. This was evident, for instance, in the

dOCUMENTA(13) exhibition organized in Kassel in 2012, where a collection of Erkki Kurenniemi's works and archival material were displayed.

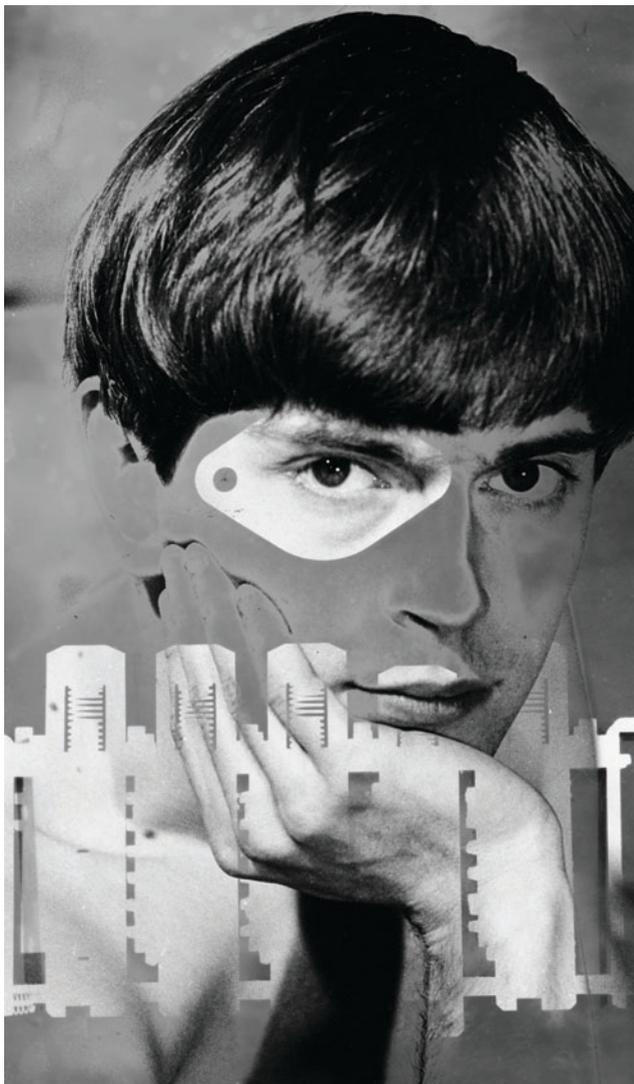
An exhibition on Erkki Kurenniemi will be opened at the Museum of Contemporary Art, Kiasma, on November 1, 2013. The exhibition is accompanied by this publication, which comprises the work of researchers working at the museum and the Central Art Archives, as well as articles by invited researchers. The publication is part of a larger website, which presents a selection of the archival material that was donated to the museum in 2006.

The material can also be accessed at the Finnish National Gallery's website after the conclusion of the exhibition at www.lahteilla.fi/kurenniemi/.

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Riitta Ojanperä
Director of the Central Art Archives
Finnish National Gallery

PART 1



Erkki Kurenniemi. 1960s.

Photo: EKA, CAA, FNG

Following the thread of Erkki Kurenniemi's life

Maritta Mellais

Erkki Johannes Kurenniemi was born in Hämeenlinna, Finland, on the 10th of July, 1941, as the first child of Tauno Kurenniemi (1907–1977) and Marjatta Kurenniemi (1918–2004).

His father, Tauno Kurenniemi, was a Doctor of Philosophy and a mathematician, and he introduced Erkki to mathematics and electrical engineering at a young age. Erkki's mother, Marjatta Kurenniemi, was a children's author. When Erkki was a schoolboy, he showed a talent for mathematics and developed an interest in amateur radio. Later, he also became interested in computers and electronic music. Considering Kurenniemi's later career, a trip to France with his father turned out to be crucial: during their stay they visited the factories of Compagnie des Machines Bull, a manufacturer of computers. The role model of young Kurenniemi, the future developer of Finnish electronic music, was Max Mathews (1926–2011), the American pioneer of computer music (Framework 2/2004).

In 1960, Kurenniemi entered the University of Helsinki, where he studied mathematics, theoretical physics and physics. He worked as a research assistant at the university's radio astronomy station in 1961, as an assistant at the Department of Nuclear Physics in 1962–68, as a researcher at the Research Institute for

Theoretical Physics in 1969–72, and as an invited, unpaid assistant at the Electronic Music Studio of the Department of Musicology in 1962–72. In his article on Kurenniemi's studio, Mikko Ojanen observes that this small studio, which was located in the corner of the professor's office, was progressive even by international standards.

In 1970, Kurenniemi founded a company called Digelius Electronics Finland (1970–76) together with Jouko Kotila and Peter Frisko. The company specialized in the production and marketing of electronic equipment. In his article, Jari Suominen discusses the history of Kurenniemi's construction of musical instruments not only during that period but also before and after the Digelius era. Erkki Kurenniemi is especially well known as an innovator of Finnish electronic music. In his article, Kai Lassfolk discusses the history of Kurenniemi's musical production and locates Kurenniemi within the field of contemporary electronic music.

In 1976–79, Kurenniemi worked as a designer of guiding systems for industrial robots at Oy W. Rosenlew Ab in Pori, and proceeded to work for Nokia Cable Machinery (1980–86), where he was a designer of industrial automation and robotic systems. In 1987–99, he worked as a special designer and design manager at the Finnish Science Center, Heureka, after which he became an independent researcher.

Kurenniemi also took part in actions of two Finnish artists groups Dimensio and Datart, from the early 1970s to the late 1990s.

Erkki Kurenniemi's life has always been about searching for something. He has been an insatiable seeker, who, after solving one question, has always continued to look for new, unsolved ones. Erkki Kurenniemi's archive is the result of his search: the archive presents parts of the life of this incurable seeker from the 1970s to the 2000s through diaries, sound and video recordings, photographs, receipts and personal documents.

Kurenniemi started to document his life at the beginning of the 1970s by making notes of his instrument designs (Kurenniemi's diary, 1970–71). Roughly at the same time he began to take notes of his everyday life. This practice lasted for decades and resulted in over seventy hand-written diaries, which have later been converted to digital form, into an electronic archive. Kurenniemi's archive includes photographs from the early 1950s to the 1990s, sound recordings from the early 1970s and video recordings from the 1980s onward.

But when was it that Erkki Kurenniemi came up with the idea to document his life with such precision that he could later, in the fictive future of 2048, be recreated? Kurenniemi's work revolved around the development of musical instruments until the

mid-1970s, and in 1976 he began working on the development of robotic technology at Oy Rosenlew Ab. By that time, the documentation of his life had extended from written notes and photographs to receipts, bank documents etc. Kurenniemi always paid close attention to the most recent technological literature, and Jyrki Siukonen notes in his article that the idea of rebirth can be traced back to the technological optimism of the 1960s and 1970s, with elements from science fiction. It is possible that Kurenniemi came up with the idea of personal archiving already then.

Kurenniemi had started tinkering with electronic equipment and radios already as a child. As he grew up, he became interested in computers and electronic music, and he consequently started to do research on digital electronics as he constructed his musical instruments. In his article, Jussi Parikka discusses the significance of Kurenniemi's working methods, emphasizing Kurenniemi's ability to connect concreteness and DIY construction with vision.

Susanna Paasonen focuses on Kurenniemi's habit of documenting the intimate side of his life. She points out that Kurenniemi's archival process is so balanced that it reveals facts about him which would typically be hidden within the confines of a personal archive. Paasonen also emphasizes the differences of different recording media when documenting a person's

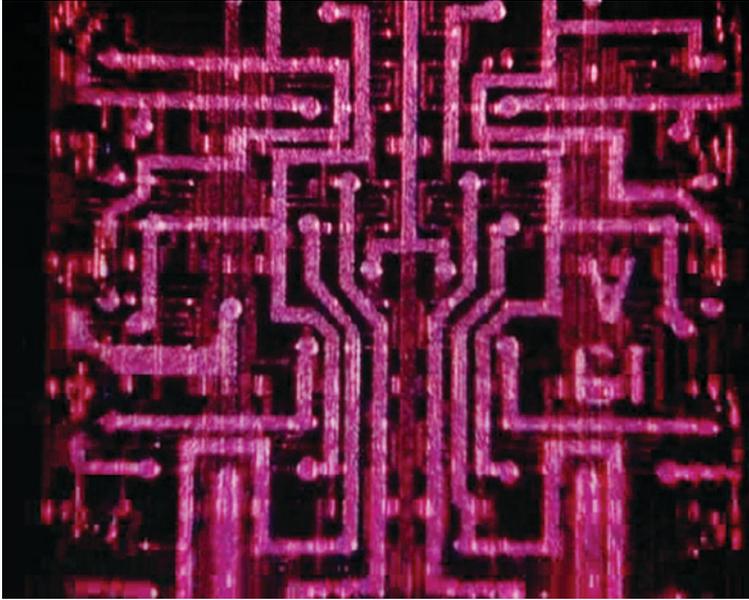
experiences and ponders on the question of whether pleasure can be transferred into future as data.

While we wait for 2048, the year of Kurenniemi's rebirth, his archive lives a life of its own. It will only provide some limited answers to the questions posed by researchers. These answers cannot be predetermined, just like it is not possible to tell which questions will be asked or how the archive is interpreted at any given time. As the ink on the receipts and printouts fade and the floppy disks become unreadable, a public institution continues to do its best to preserve Kurenniemi's vision, an ephemeral art.



Erkki Kurenniemi. 1990s.

Photo: EKA, CAA, FNG



Erkki Kurenniemi: Electronics in The World of Tomorrow, a short film ca. 1964.

A screenshot. Photo: CAA, FNG

DIY Futurology:

Kurenniemi's Signal Based Cosmology

Jussi Parikka

Unlike the history to which it put an end, the media age proceeds in jerks, just like Turing's paper strip. From the Remington via the Turing machine to microelectronics, from mechanization and automatization to the implementation of

a writing that is only cipher, not meaning – one century was enough to transfer the age-old monopoly of writing into the omnipotence of integrated circuits.

– German media theorist Friedrich A. Kittler (1999, 18–19).

In what ways should we consider Erkki Kurenniemi a topic of research for media archaeology? It could work through an excavation of his archives, practices and thoughts as an alternative to the normalized narratives of media art history. Kurenniemi is an example of the non-anglosphere media art pioneers, whose career runs parallel to many of the themes discussed by better known artists, for instance, in the U.S. His trickster-nature and wild interdisciplinarity are a testimony to such histories where media, art, technology and science become entangled: a rather different story from the usually cybernetic-centred American histories, but also oddly familiar in how it remediates narratives and cybermyths. But Kurenniemi is interesting for media archaeological research on the history of media art in other ways too: his practice is a combination of DIY engineering and scientifically fuelled narrativization of the role of high-tech in our globalizing societies. It is in this sense that Kurenniemi is symptomatic of this stance towards art/technology and practice/theory crossings that brand contemporary media art discussions.

A Symptom of Media Change

While waiting for July 10, 2048, Erkki Kurenniemi's 107th anniversary and the date when his *data body* is expected to carry on after the biological body has inevitably failed, let us consider Kurenniemi more as a symptom than a person. This focus on symptoms does not imply a negative connotation of sickness and failure; rather, it means that there is something deeply symptomatic about his artistic and intellectual career, enfolded with the archival fever of his everyday life. In other words, let us also consider him as a *symptomatologist* (Deleuze 1995, 142–143) who, besides being a participant in the emergence of the close ties between art, science and technology, is able to reflect on that in so many ways through his actions. Our culture is about the constant fluctuations between art, science and technology, and it is defined by the variation of such relations.

As an analogy, consider the role of the high court judge Daniel Paul Schreber for the 20th century cultural and media theory. He was not only an example of a clinical illness (schizoid paranoia) that he suffered from but also someone who demonstrated a sense of archival modernity. Schreber's case study became famous through Sigmund Freud and other commentators, but also because of his own writings: *Memoirs of a Nervous Illness* (1955, [1903]). In terms of archival mania, this rather peculiar and very poetic description of his years of mental suffering can

be considered to be very significant to our understanding of what new media technologies were about to do to the world and our lives at the end of 19th century and early 20th century, for instance. For media theorists, such as Friedrich A. Kittler, Schreber became an emblematic figure of the so-called Man, a case study in how modern media technologies are about the meticulous documentation of every possible sphere of life from thoughts to actions. Our ways of living, thinking, memorizing and even hallucinating were conditioned by the technological environment that mediated our relationship to the world, to others and even to ourselves. In Schreber's case, he fantasized about celestial scribes who tracked down and documented his every single thought – like a meticulous recording machine that never misses a beat, a glimpse of a thought or a feeling, or a half-baked idea: it's all there, a substitute of God in the form of a recording, storage and perhaps even an archive. As theorists like Kittler argued, Schreber's writings and hallucinations embodied something rather essential about the modern technical media culture and the position of humans in the emerging sphere of communication.

There is something similar in Kurenniemi, even if he is not mad and his hallucinations are grounded in the contexts of scientific literature and technological practice. His writings can, of course, often be characterized as veering closer to science fiction. His style and writings are part of what we could call the late 20th

century and early 21st century *imaginary of technological culture*: the belief in the powers of technology as revealing a point of singularity of historical proportions. While this is rather central for the belief in progress of the modern technological culture, it also has its theological connotations in Christo-Judean thought: there is a point in history when everything is revolutionized, reaching a singular point, a new beginning. Indeed, one is tempted to see Kurenniemi as an intermediary between Schreber's hallucinations of celestial scribes, angels as careful notetakers, and the microchip revolution, which was supported by Silicon Valley and took the metaphysics of angels to the dimensions of technical media. In an AT&T promotional video from 1980, the narrator William Shatner voices this angelic development of microchips:

There was a time when philosophers argued the question of how many angels might fit on the head of a pin... well today, if we take the liberty of equating angels with transistors, we can make the case for the existence of a modern kind of miracle [...] (AT & T, 1980).

Such miracles, however, are nowadays taken up in the expressions of madness or by technology evangelists. The archival belief is embedded in modern technical media in the sense of non-human materiality that exceeds human materiality: our humanity is saved not by powers of angels of celestial

origins as it used to be, but by machines, as in Steven Spielberg's film *A.I.* (2001). But this belief, part of the imaginary of the digital world, is not restricted to the most recent media culture. Indeed, E. M. Forster traced this desire of immortality in the earlier media technology of printing – here quoted by Marshall McLuhan:

The printing press, then only a century old, had been mistaken for an engine of immortality, and men had hastened to commit to it deeds and passions for the benefit of future ages (McLuhan 2001, 190).

Time and the archive occupy a central place in Kurenniemi's interests and practice. He is a symptom and a symptomatologist of a drive towards both storage and archiving – two terms easily conflated. He marks the passage from the documentation of everyday life in storage and into archival form to the age of integrated circuits that do it for us: the moment of a jerk and a singularity which is seen as the imaginary moment when technology starts to write for us. But we need to pay attention to what we mean by archival and the writing of the archive. Mere storage is nothing unless you have a system – an archival moment when recording turns into something queryable, something searchable based on the logic of the archive. Media filled Kurenniemi's life, and he documented everything he could meticulously: the vast amount of writing, photographs and

moving image would form the basis of a possible future reconstruction of Erkki Kurenniemi, the flesh creature. The data would reproduce his mortal being, including its sexuality, thus functioning in a way in which society tries to in any case: reproducing sexual relations, modes of affect, habits of feeling and embodiment. Kurenniemi's singularity is an imitation of everyday power relations in that it aims to reproduce the flesh in the data, to convey the past generation to the next.

In the archive, there are endless piles of paper and bits of information in fragmented form, reminding of the central archival thinker of the 20th century, Walter Benjamin. For Benjamin, true history is not about linear success stories: it is about fragments. It is a necessary reconstruction and even a reimagining of pasts through its fragments, which forces us to consider any progress story unethical, and to look for another method of thinking about time: history of and from the ruins of the fragments of past lives, recorded, but never reaching, such systematicity or illusion of smoothness that we think our lives consist of. Instead, archival life reveals the jolts and jumps, but also the fact that only archival logic imposes order. The archive is the order, the command (Ernst 2013).

In this text I am pursuing this media-theoretical perspective on Kurenniemi as a symptom/symptomatology. This takes us inside his thinking with machines, which is one of the perspectives I

want to endorse: Kurenniemi is embedded in archival discourse and now an object of fascination for many projects related to media arts, science and archives. However, he is also a media thinker and a *tinkerer*. Erkki Huhtamo (2010) used the portmanteau term “thinkerer” when writing about the work and style of the media archaeological artist Paul Demarinis, and I wonder if there is something similar in Kurenniemi as well. He certainly fits in with the lineage of the various visionaries who were, in a way, mediators, and who escorted us from the imaginary of technologies to their full blown popular cultural status. He is a sort of a McLuhan for the Finns (see Kurenniemi 1971).

Supermegatechnologies of Kurenniemi

One aspect that intrigues me relates to Kurenniemi’s way of moving across dimensions. Perhaps some of his quantum theory interests can be considered a logical part of his intellectual method – which is certainly an eclectic method – but something which I would argue to be a peculiar indication of his manner of working. This refers to his way of being able to maneuver between the concrete worlds of tinkering with electronics and building synthesizers and the cosmological theories of mathematics, sound and physics. Indeed, we need to understand that even if his ideas were of epic visionary scale in their grand claims, his work also includes signal bending and circuitry.

The two poles of Kurenniemi's fascination with machines are sometimes hard to summarize. He is known for his hyperbolic visions of information technology, which are well expressed, for instance, in the article "Supermegatechnologies" in the British journal *_things_* (Kurenniemi 2000). The visions of technology are expressed in terms of their quantitative capacities that boast with a numerology that seems limitless. It is as if Kurenniemi is adapting to the regular discourse of information technology, which has to do with performance capacity as the sole driver of the technological world:

Processor frequencies will soon exceed the gigahertz, RAM memories the gigabyte, and discs approach the terabyte (1000 gigabytes). The speed of local networks will soon be in the region of a gigabit per second (one byte = 8 bits). And nothing is enough, nothing like it. There were 20 years between the mega period and the giga period. The tera (10^{superscript12}) and peta (10¹⁵) periods will arrive in between twenty and eighty years. (Ibid.)

Kurenniemi loves the discourse of visionaries and continues with predictions of ubiquitous futures of information technology, augmented reality, geolocation and other themes that we now, of course, recognize as part of the everyday life. His mind picks up on details from various materials to the energy regimes of

computers, never losing sight of the paradox at the heart of this method: his vision aims at 2048 and to the redundancy of the flesh in the world of intelligent computers to which you can upload yourself, but his everyday understanding is completely embedded in the energy and material investment that our computers need. Computers are not immaterial – Kurenniemi never makes this amateur mistake which was typical of much of the cyber discourse of the 1980s and 1990s.

But Kurenniemi constantly aims for the larger dimensions. Indeed, the title of the journal article, an exhaustible list of ideas, refers to his vision of computers merging with bio- and nanotechnological developments, fulfilling the implicit idea of technologies being organisms. His vision is geared towards connectedness that is a matter of scientific ideas merging in ways that makes it impossible to talk of technologies as disconnected. This is the meaning of supermegatechnology for Kurenniemi, who admits that it is a rather poor term, but one that can be used as a placeholder: we need to account for the future as IBN (info-bio-nano) (instead of IBM one might add): information technologies joining up with bio- and nanotechnologies, or in other words, “material technology + chemistry” (Kurenniemi 2000).

Kurenniemi’s inspirations stem from the science fiction writers of the 1980s and 1990s, such as Greg Bear and Vernor Vinge, and

this is evident in his way of thinking. However, we need to recognize that such ideas were also part of the wider popular culture of the age, which can be argued to herald the emergence of technologies that take processing power in the new millennium to the heart of chemistry and biology, as well as to create new forms of visual culture, such as augmented reality. However, what I want to point out is that there is another archaeological layer to Kurenniemi that can be seen in his tinkering with musical instruments and construction of synthesizers in the 1970s. It is in these fragments that one sees how such visions of grand scale are also contextualized in the work and interests of a circuit bender-hacker. After all, Kurenniemi embodies some Finnish modesty, too; for the American counterparts (and influences), singularity happens earlier: for Vinge, already by the 2030s, for Ray Kurzweil in 2045. Kurenniemi is happy to follow a little later.

Engineering the Analogue/Digital Divide

Erkki Huhtamo (2003) has pointed out the existence of a media archaeological layer in Kurenniemi's *thinking*. It is not, of course, a huge revelation to anyone who knows Kurenniemi's work, but it is something that should not only be considered in terms of Kurenniemi's musical interests. Instead, as Huhtamo points out, Kurenniemi can be viewed as part of the media

archaeology of electronic arts and different interface experiments.

In 1969, Kurenniemi was developing his digital synthesiser Dimi-A. (DS1/11 '73-11-20; trscr 20.3.2000). This was followed by the Dimi-O (O short for “optical organ”), which had a more complex structure: besides an improved interface (you were supposed to be able to control the synthesizer by gestures thanks to a video camera input system), the machine included a graphic representation of the memory on a 32 x 48-pixel sized grid. The grid was to represent time (vertical axis) and the chromatic scale (horizontal). The interface was actually intended to function as an input mechanism for graphic notation, but it became “misused” for gestural interfacing: dancers, pantomime and the conductor’s hand offered an updated version of the Theremin device for the 1970s late hippie generation.

In Kurenniemi’s world and within the technological scene of art and culture, synthesizers were a shortcut to computing. In general, he was keen to contextualize his personal history as part of the emergence of computing, gradually from the 1940s and 1950s bulky mainframes (see also Suominen and Parikka 2010) to the microelectronics’ revolution of the 1960s and especially the 1970s. Like so many others, Kurenniemi was introduced to computers at the university’s physics department. In addition to the institutions in possession of the computational

machines, we need to keep in mind another important context that was important for the wider emergence of technical media culture: music studios. Indeed, in Finland, for instance, it was equally important that the University of Helsinki started building their electronic music studio in the 1960s (Kurenniemi 2001), thus joining the various developments of experimental media culture across Europe.

Kurenniemi's first experience of digital computers came in the 1960s with the "Swedish-made Wegematic 1000, with vacuum tubes, a drum memory, and a thirst for kilowatts of power" (Kurenniemi 2004). However, these first touches also inspired him to start developing his own machines and led to an interest in the internal worlds of machines: the notebooks and fragments containing his writings and fragments about microchips and Phillips logic modules back in the 1960s, for instance (Kurenniemi s.d.). As he writes in his "self-obituary" (Kurenniemi 2004), reading about Buchla and Moog voltage-controlled synthesizers also inspired him to engage in first-hand experimentation. This was a crucial feature for those in his generation that had some contact with computers – usually only professionals in banks and universities – who were gradually getting into circuitry via music machines. And it also resonates with the DIY spirit that was part of the technical media culture both before and after the war: the radio-amateurs of the earlier part of the 20th century (Douglas 1989) met their

match in the burgeoning electronic arts scene of DIY technicians, who often misused the leftovers of the military technologies of World War II (Kittler 1999, 96–97)

But besides entertaining visions of the supremacy of the digital world, Kurenniemi, like so many others, had to work with hybrid machines:

I began developing an integrated analog/digital music studio with combined voltage and digital control. Digital signals were used as triggers or gate signals, and also as square-wave sound. The final musical pieces were still edited the traditional way, by cutting and splicing analog full-track audio tape. (Kurenniemi 2004).

And since the 1970s, this hybrid combo was defined in terms of the first available microchips, controlling the analog synthesizers with oscillators and filters. It was already in this period that Kurenniemi's engineering was informed by an interest in the abstract. The building of synthesizers and the plans regarding associative memory were influenced by Teuvo Kohonen (a famous Finnish researcher of neural networks). And it was not only that Kurenniemi was moving from the analog to the digital in a progressive manner: the later Dimi-T machine was a machine which was intended to register the electrical activity of the brain. The signal produced was an early form of brain-

controlled interfacing, which was used to “modify the pitch of a voltage-controlled oscillator” (Kurenniemi 2004). In fact, Kurenniemi was aware of the earlier experiments in the US in the 1960s, and he was probably thinking of Alvin Lucier’s brain music. Moreover, the famous Midi-S (the sexophone) was very closely tied to the skin-based world of humans – being a kind of a human-machine circuit controlling the sound collectively as well as ideally, sensually. It was something of a sexual revolution turned into technical media: a group sex device that registers and modulates sounds that on a political level were part of the critique of the monogamous bourgeois system.

Similarly, in an interview much later, in the early 2000s, Kurenniemi notes how the development of digital computing opened up a whole range of connections between sound and technology. Indeed, Kurenniemi is perhaps not a media theorist, but he constantly makes observations that resonate with the analytical accounts of scholars in digital aesthetics and media history: in this case, Kurenniemi speaks about how the generalized nature of the computer as a musical instrument has made electronics obsolete. He speaks of it as a historical remnant among other past musical instruments (Kurenniemi 2001). As a matter of fact, what Kurenniemi is producing is not just a macro-level explanation of historical change, and even his grander visions can be traced back to his hands-on practice and the legacy carried over by experimenters engaging directly with

signal processing and circuits. It is a DIY sort of engineering practice as well as a DIY sort of scientific thinking which cannot be contained within the narrow confines of science. Indeed, there is much to be gained from his ideas about media pedagogy as well – at the moment they are mainly implied, but they are nevertheless something we should pay attention to: oscillate wildly in your technological thinking and doing! (Cf. Kurenniemi 2001 for Kurenniemi's notes on why he left the university already in the 1960s). Kurenniemi's notebooks are always a mix of the two poles of this oscillation: inspiration from Edward de Bono's writings concerning the mind mixed with Kurenniemi's meditations on flip-flop circuits and computer architecture (DRY 1974 1.nb).

Kurenniemi's poetics meets with the technical conditions of their survival in the archival sense. Rummaging through his notes that proceed towards 2048, we have to be aware of the signal space in which they take place: the scratch of the microphone recording, leaving traces like the scribes who write down everything in Schreber's hallucination: the recording media sets itself as part of the narrative. We hear words, but we also hear the noise recorded by the microphones. So, we do not focus only on the narrative content but on the signals as well: it is the clicks and signals, blows and microphone noises that also escort the voice and computerized philosophy of Kurenniemi.

(00:00:00) (Click click, radio signal, blows in the microphone five times, click, blow) *One, two, three, puppadadud. Fuck, fuck, fuck, this is sensitive. There we go. (blow) Yeah, a dreaming computer... will be the last human invention. Well not the last one, but... the last invention. Because a dreaming computer will already have dreamt up everything. Prior unconscious. Well, no. Dead computers may only be in two spaces: in an idle loop waiting to be interrupted or in a conscious space receiving and handling external information, printing it. A sleeping computer is not in an idle loop. Yeah, well of course it is, it does ask questions and wakes up when needed but otherwise it dreams. It is organizing its files, optimizing, associating, organizing, thinking, planning. And only when called upon, it interrupts its sleep for a little while to answer a question. (The sound of the microphone being touched, cut) (Kurenniemi C4008-1 1/11)*

Conclusions

By way of conclusion, there is an interesting tension between the way in which Kurenniemi constructs his discursive position and his expertise in technological practices. I want to argue that this is actually characteristic of his wider methodology in general. It is evident in many of his expressions and views, and it is summarized, for instance, in his sweep of how he sees musical

and compositional practices. As Kurenniemi explains in an interview, even after the introduction of the European modernism and avant-garde, composing was still regarded as a concretization of an abstract Idea by the quasi-religious figure of the composer (Kurenniemi 2001). He contrasts this with the field of popular music, which is geared more towards the process of communication and microtechniques in which the music takes place as a relation between people and technologies: for him, the techniques of tape cutting and manual editing are emblematic of the process of how music was entangled as part of life, and in this way the social realm infiltrated the sphere of sound.

This article can also be regarded as a guideline to Kurenniemi's ideas of technology: it is part of various microtechniques that support the wider abstract writings and notes concerning tonal systems, musical spheres and mathematics. The world that starts with the signal and the work of a theorist-engineer-thinkerer is also one of signal bending. Kurenniemi emerges as a figure of both media archaeological significance and theoretical curiosity due to the *analytical weirdness* in his writings, his archives and his DIY technologies.

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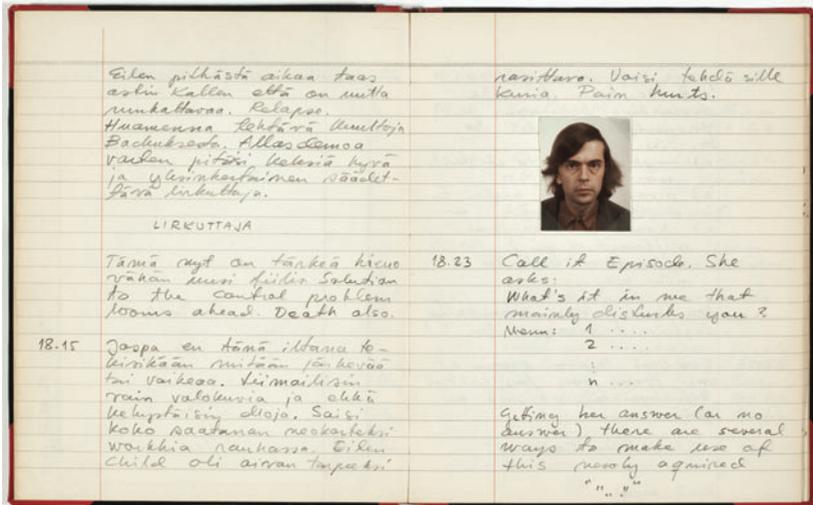
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Videos

AT&T Promotional video, 1980.



Erkki Kurenniemi: Diaries, 1980s.
 EKA, CAA, FNG, photo: Jenni Nurminen

Slimy Traces: Memory, Technology and the Archive

Susanna Paasonen

As I open the notebook, I notice wads of hair that have been glued on several pages. Darkish, slightly curly and falling off the pages, hair is trickling onto the table, my hands and my lap. Having read many of Erkki Kurenniemi's diaries, and having watched numerous hours of his video diaries, I realize that this is pubic hair – either his own hair or a partner's – that he was fond of cutting and shaving. Sitting at a desk at the Central Art Archives of Finnish National Gallery, I ponder on a practical

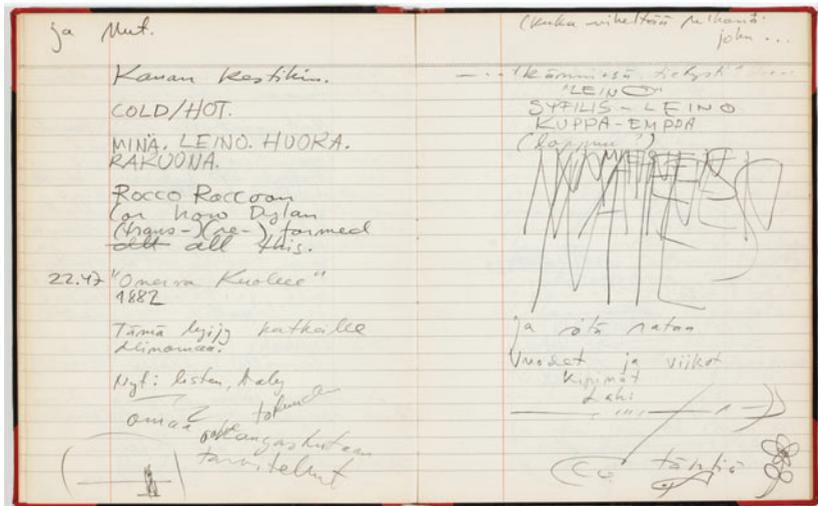
dilemma: how to get the hair off my hands, off the desk and back on the pages of the notebook (titled in bold as a “Very hairy dagbok”) from which it has become unglued. This is, after all, original archival material that should not be lost or tampered with – and certainly something that one should not carry out of the premises on one’s person.

Blowing the hair back between the diary pages, I was palpably struggling with the materiality of the archive: the traces written, drawn, typed, recorded, edited or glued in, organic and inorganic, human and machine, and the different ways in which they matter. In its viscerality, the anecdote is an appropriate point of departure for discussing Kurenniemi’s personal archive since, on the basis of the multimedia diary records, his activities have been driven by three intermeshing key interests or passions: a passion for theory (e.g. the mathematical theory of harmony and the theories of physics), a passion for technology (e.g. the synthesizers he developed from the 1960s to the 1980s, robotics, computing and consumer electronics) and a passion for sensory stimulation (e.g. sex, pornography, alcohol, drugs and combinations thereof), the last one of these regularly taking the front stage. Consequently, any boundaries drawn between art, science, science fiction, pornography and the documentation of everyday life in the diary logs remain porous at best. Conventional divisions and hierarchies of value and importance that are set to separate the highbrow from the lowbrow, or the

theoretically speculative from the manifestly banal, simply do not exist or matter. For Kurenniemi, both theory and carnal pleasures involve potential pleasure, affectation and intensity of experience – they are all about some kind of high.

11/3/1987

$Zeus = ((1\ 1\ 2)(1\ 2\ 2)) = (((1\ 2)(1\ 2))((1\ 1)(3\ 3))((2\ 3)(2\ 3)))$. Will not be solved today. Will probably dream tomorrow night. Please note that I don't want to rush. It'll surely come and I want to play with this pleasure. These are my orgasms. Now I'll go to bed, and since I've already jerked off today, there ought to be enough time.



Erkki Kurenniemi: Diaries, 1980s.
EKA, CAA, FNG, photo: Jenni Nurminen

5/7/1987, 0:07

Only now starting with the Midi [Vin rouge du Midi, one of Kurenniemi's regular affordable wine brands]. Read Lucretius in the afternoon. Watched the porn video I made with X yesterday and after that, the noise on the screen. I could see molecules and particles.

In Kurenniemi's logs, the details of the theories developed, the people encountered, erections and ejaculations achieved, sandwiches and bottles of wine consumed, commutes and travels made, urinations planned and experienced, dope smoked, casual yet systematic observations made of passers-by, and things planned, imagined and remembered, follow one another and overlap, with just occasional asterisks (***) separating one strand of thought from another. Analyses of science fiction narratives merge with remarks on intimate bodily odors while video material of streetscapes intermeshes with home-made porn and candid shots of neighbors going about their everyday lives. There is no Goffmanian backstage to be observed, no simple division intended between the public and the private, the micro and the macro. Details of reading academic journals such as Science and Nature are presented alongside those describing the most recent issues of porn magazines like Penthouse and Razzle; observations on fractal theory and brain research are

provided in the same detail as plans and experiences of shaving pubic hair:

26/12/1977, 00:23

Now I've been in the bathroom for quite a while and shaved off all possible hair, apart from the hair on my head, with an electric razor. The machine grew all hot. My cock hair is all gone, as is my leg hair, and partly even my arm hair. Isn't this truly wonderful. So I thought all along. Still don't know. My ball sacks sting a bit. Now I've reached this low communication chain haaa fuck. Still holding a full glass of wine. Lovely in a way.

14/11/1987, Wed 23:15

How can one be this neurotic. Is this only vertigo or is my consciousness still growing. Is there an afterlife, I mean that magical synergy. Perhaps the whole thing has a simpler, yet entirely surprising, explanation. The root of new science. Mathematical perhaps. The nature of systems. ... Could it only be the kind of collective consciousness that is simply dispersed? There is a current in each. Had a totally new idea when taking a leak! Cell consciousness. That may just about explain all peculiar phenomena, including religion. Even explains AIDS. A photon field.

6/12/1998, Sun

13:53 ... [in English] *** *Consciousness is the process of communication between brain areas. ...*

15:26 [back to Finnish] *Fontana, ham quiche, guests have change, now the third and final cigarette, a beauty came beside me, unfortunately with a blond tough guy, the main thing that she pays attention to. Don't know what kind of route I manage to take, if I should take a crap here.*

The overall horizontality of the archive can be explained through the principles and aims of the documentation, which is premised on the inseparability of perception and consciousness. In accordance with his transhumanist theory, Kurenniemi wanted to record his consciousness for future access (and sharing) by recording the flow of his everyday life: memories, logs and documentations became data to be stored. In order to access this database, the algorithmic structure of one's persona would need to be mapped and relocated, or installed on some computational substrate such as a computer or brain tissue grown from stem cells (Kurenniemi 2001). To a degree, this view – be it a theoretical hypothesis or a futuristic science fiction fantasy – resonates with Henri Bergson's (2007) view of consciousness as inseparable from the sensory experience, and of the immediate data of consciousness as lacking any juxtaposition of events. Rather, for Bergson, consciousness is a multiplicity of horizontal threads and vibrations that resonate according to a particular personal rhythm. This rhythm applies both to perception and to recollection as embodied processes of

different kinds: perception is about affectation with or by external images, memory being a more introspective activity.

“But, if you abolish my consciousness, the material universe subsists exactly as it was; only, since you have removed that particular rhythm of duration which was the condition of my action upon things, these things draw back into themselves; and sensible qualities, without vanishing, are spread and diluted in an incomparably more divided duration. Matter thus resolves itself into numberless vibrations, all linked together in uninterrupted continuity, all bound up with each other, and travelling in every direction like shivers in an immense body.” (Bergson 2007, 276.)

In the Kurenniemi archive, various traces and records can be found that may somehow resonate with those browsing through it, but they can never vibrate as they would in his consciousness, with its particular rhythms, layered histories, interests, desires, fixations and drives (that are fleshy indeed). What can be resurrected from the archive is always a different patchwork creature, or assemblage, strung together from various files and transcripts. Traces and resonances linger on, but they do so at another speed and frequency.

Like any other archive, the Kurenniemi archive has developed through “mutations of connection and disconnection” (Foster

2004, 6), such as constant shifts and transfers of text, images, sound and video, from one media format to another. Kurenniemi's stroke and his ensuing loss of ability to form sentences is the most dramatic and fundamental of these mutations. With the loss of the main curator-archivist, the connections between the different items in the archive have been cut, chronologies have become patchy, and the ties between data and metadata are mostly lacking. The result is a disjointed and excessive assemblage of highly edited works and random flotsam. This is unavoidable since horizontality was Kurenniemi's underlying principle of accumulation: everything is regarded as potential data, from the brands of toilet paper he used to the tickets of events he visited, Christmas cards, business cards, receipts, and advertisements received – all this has been preserved in a lateral manner. The ambition was to save and record both the material traces of his everyday life and the trajectories of his thoughts, desires, fantasies, theoretical speculations and memories.

In *Practicalities*, Marguerite Duras (1990, 45) dryly notes that “[i]f you don't part with anything, if you try to hold back time, you can spend your whole life tidying life up and documenting it”. While Duras connects the meticulous – and ultimately useless – accumulation of mundane objects and records with female domesticity, practices of personal preservation and stowage cut across any simple division of gender. When going on overdrive,

these practices transmute into compulsive hoarding where no objects are discarded and new ones are constantly accumulated. Randy Frost and Gail Steketee (2011, 13–15) associate hoarding with a *psychology of opportunity* where every object, no matter how standard, mundane or broken, is seen as rich in detail and therefore as important, valuable, meaningful and potentially laden with information that will be lost if the objects are given away (Ibid. 27, 30, 138). Were this to happen, hoarders would be disconnected from a part of their past, or even from a part of themselves (Frost and Steketee 2011, 46). As with the Kurenniemi archive, the constant accumulation of matter means that there is never quite enough time to revisit and organize the collections so that they might be put into use: eventually, matter starts to take over. The problem, in sum, is one of inability to archive properly, to discard and to select.

Showing Kurenniemi's oeuvre in a museum context necessitates heavy editing: since permissions cannot be obtained from the people appearing in the videos and photographs, most of them have to be omitted. A large portion – even the majority – of the visual material can be categorized as pornographic. In the video diaries, diary logs and voice diaries, sexual fantasies, memories and acts are perpetually present as an organic element of the recorded everyday life. Attention constantly revolves around, focuses and clusters on the sexual in terms of potential events, fantasies, memories and observations. On the plane of the visual,

pornography – homemade porn, porn images harvested online, from films, television and magazines – abounds. Since such material cannot be shown when the archive is presented publicly, the image of the whole grows decidedly warped and distorted. The archive becomes a different creature that is void of much of the fleshiness and minute attention to the sexual, the embodied and the pornographic that characterizes – and in fact animates – his logs.

27/5/2000, Sat

1:22 *Porn is on full speed, I'm drawing another slice [Kurenniemi is watching free porn on television]. Will there be anal? Now the man ejaculates on the woman's breasts, nipples are erect, post-sucking. But this is American narrative porn.*

1:29 ... *I get an erection. I take off my pants and check the windows (all were dark when I last looked) ... Fuck, I left the REC function on. Well at least caught all those almost-piss-bits. End of scene, worth taking. The real estate agent has rather luscious tits. ... The Koivistos [a former presidential couple living on the same street] can now see in here and watch my wanking. Hope Tellervo has a good zoom camera ... I watched tapes [private VHS recordings] that were at least from the beginning of 1989. The first bit was so well organized that I dare not touch it although the best bits are probably there. But the unmarked ones must be watched first so that indexing will be as complete as possible even if they are left unfinished. So, I will next choose from the 1990s shelf.*

If perception, memory and consciousness are all considered matters of particular rhythm and intensity, then the diary logs make evident the pivotal role of the libido in and for Kurenniemi's particular rhythm, for his way of being. Before digital video cameras became affordable, Kurenniemi shot on VHS in a more selective manner. Due to the selection processes, the tapes are rich in pornography that remains, throughout his personal records, an area of particularly intense interest. The large volume of porn clips, photos and textual accounts is revealing of the way his interest and focus constantly zoom in on the sexual and the particularities of human bodies.

Material media

Ultimately, the archive raises the elusive question of what makes life life. Is life a matter of biography, the sum of perceptions translating as consciousness, or a more elusive intensity, "a current", as Kurenniemi himself put it? It could also be asked what makes an archive an archive, considering the possible hoarding tendencies addressed above. Kurenniemi himself would probably call it a database, a more or less organized collection of data not to be used for studying the life and times of Erkki Kurenniemi but for accessing – and indeed living – his perceptions and consciousness. Here, the storage media is granted an ideal transparency as a means to an end.

At the same time, the affordances and tactile materiality of the storage formats deployed are highly particular, and their form and content impossible to decouple. A typed diary in PDF format allows for easy access and searchability. Reading the same hand-written diary – same in the sense of containing the same textual “data” – affords an additional exploration into texture, style and temporality. The backs of the diaries are stained by tobacco smoke, some of their covers have been worn from use, some are decorated with drawings or splashes of color, and others are otherwise marked. Inside the diaries, drawings, lists, graphs, photographs, receipts, clippings and bits of paper – as well as genital hair – are glued in to accompany the logs. Some of the diaries involve a multimodal, collage-like aesthetic while others remain more straightforward textual exercises. Kurenniemi’s handwriting alters according to the situation and the amount of intoxicants used, ranging from neat composition to large, restless scribble.

Despite the volume of these mundane records, years of notes are missing. Tapes breaking down during digitization have also generated some archival gaps while, on a more fundamental level, the affordances of different storage media condition and dictate what can be seen and heard of the archive. In the case of the voice diaries recorded on C-tape, noise and information (Kurenniemi’s own voice, radio shows, music and ambient

sounds) are often impossible to separate. The soundscape grows noisy and fuzzy, and it is difficult for the listener to decide what to focus on and listen to. The 8 mm and 16 mm films are silent (with soundtracks added later), some videos shot with mobile phones have very poor image quality and sound resolution, and videotapes come with considerable noise to the degree that the “data” of image and sound may be barely accessible. In other words, the balance and ratio between the signal and noise is constantly unsteady and the processes of mediation far from smooth.

Media theorist Friedrich Kittler (1999, xl) argues that what “remains of people is what media can store and communicate.” Furthermore, what “counts are not the messages or the content with which they equip so-called souls for the duration of a technological era, but rather ... their circuits, the very schematism of perceptibility” (Kittler 1999, xl–xli). Kittler argues for the primacy of media and their specificities beyond any personal recordings or impressions. What matters for Kittler is not the photographs, films, texts or data inasmuch as that which different media render perceptible. Such a hierarchy of importance appears irrelevant in the context of the Kurenniemi archive. On the one hand, the specific circuits and perceptibility of media matter – for they condition what remains. On the other hand, the scenes, scenarios, moments, dialogues, monologues, fragments, objects and people conveyed in the recordings are of

equal importance. The style, feel and modality of the archive owe equally to both form and content: both are crucial to how the recordings reverberate in our acts of sensing and making sense.

On one level, Kurenniemi positioned himself as a masterful designer, builder and operator of technology. On another level, the relationship was manifestly a prosthetic one. As prosthetic, externalized memory reserves, the material particularities and affordances of storage media limit and constrain what he would later recall of the past (cf. Lury 1998). Acts of recording and re-watching the recordings involved the simultaneous externalization and internalization of perception and memory as conditioned by the affordances of storage media. And on yet another level, Kurenniemi defined humans, himself included, as organic slime machines, the memory functions of which are interchangeable, and bound to be fused with, the technological.

In addition to its main function of data preservation, the archive has offered the technology for recollection and a source of enjoyment: Kurenniemi details a constant revisiting of earlier diary inserts, reworking and editing them, transferring them to different formats, masturbating to and watching video recordings alone and together with others, going through archives of still images, digitizing and manipulating them on his computer:

21/2/1988, Sun 23:43

It's been a pretty good Sunday ... I preached the virtues of Hypercard and started to shoot X without a tape in the camera. Managed to create a joyous "Draculina" pile where X strips for about 30 frames. This morning as we woke up she said that she should've had a garter belt as an accessory. Got rid of my impotence by a degree.

10/7/2000, Mon

0:06 *Well the day changed. Good luck. Empty head, probably need to get high and start editing some old stuff. ...*

1:03 *March 1999 pre-edited, all there and date headlines. Now the laborious part begins, going through it, the tagging and the transfer, at least when it comes to sex. Now ATV [a television channel showing free night time porn] on, despite everything.*

3/5/2001, 00:03

X found out that we'll get our own videos on VHS. Y shouldn't have told X. An intense weekend again. Didn't finish going through the photos from today, X asked for a break. But she stayed the night, lovely ... Now a bit of reading of dendrites or Vámos or some magazine.

Recording mundane events and revisiting them seems to add to the overall intensity of experience: paraphrasing Bergson, it is not only the images and bodies of the external world that affect

Kurenniemi, but also the acts of recording and reconfiguring images, as well as watching recorded images of his own body and those of others. Affective feedback loops form, accumulate and center especially on sex – and pornography – as the topics which Kurenniemi most carefully tagged, edited, saved and revisited. Yet he also describes the act of connecting a computer to a network as “small heat”, a moment of intensity similar to the moments spent working on theoretical dilemmas. As different as such actions may seem, they all involve an intensity of experience resulting in an affective rush, or at least in the potentiality of one. It is the more or less playful quest for affective rushes and sensory highs that characterizes the flow of the diary logs.

Differences of kind

In the video diaries, passers-by on the street are seen to react to Kurenniemi’s camera, hence transforming the urban landscape he is recording into mediated and reflexive spaces; dialogues are enacted just as much for his camera as for himself; and diaries read aloud and sexual scenarios recorded on camera become performative actions, as the mundane flow of everyday life is set for, seen and revisited through the lens of the camera. The perceptions and observations that Kurenniemi recorded in order to reproduce his consciousness are media-saturated and inseparable from the technologies used to record them. The

possibility and pleasure of recording and of capturing these moments obviously intensified both his sensation and perception. It is therefore something of an understatement to note that the practices of documentation had an impact on how Kurenniemi experienced his everyday life – just as “what is no longer archived in the same way is no longer lived in the same way” (Derrida 1996, 18).

In the sexual activities performed for, and recorded in, the video diaries, Kurenniemi’s partners display their body parts for the camera to zoom in on, and Kurenniemi recurrently asks them to face the camera – or a monitor attached to it – rather than to have eye contact with him. This produces a kind of doubling of the sensory experience where attention and presence is constantly split between the physical act of sex and the static “objective” perspective of the camera. Temporality is similarly split between the present tense and the future tense of a replay. The present is always folding into the future, the revisited and the re-edited. The camera is very much an active agent in the network of actors – and the dynamics of desire – comprising the scene.

Autobiography 3.fm file, chapter 2: A letter addressed to X
31/1/1990, 1:29 ... *Now I'm making my life into a tape, "Video Verité Totale", so that when I bought a camcorder after you left, I got an idea to shoot everything 24/7. That would be boring and for*

the moment too expensive but the idea is realizable. For now I've even used the principle in a deconstructive manner, I won't see people who are allergic to camcorders. Like this Y from Pori. Z is all game but she's found a way to tease me: when the tape ends, she joyously spreads her cunt, and only then. This is what relationships degenerate to, or how would one take it because of our genes. ... The camera is more important than you or me since it constantly makes imperishable history of both of us. We feel "the wing of history" touching us and go crazy.

26/8/2000

23:55 Yeah fuck, nothing works. So I've lost some PAL component from the system. Must take care of that next. Fooling around in Paris is actually deadly. I'm too drunk. I'm shown there with my shaft painted red. Ah, I can make a beautiful stereo or at least a macro of the urinary opening. Could do it now but prefer to do it more easily in connection to a larger project. Gould's playing sometimes grabs me in a paralyzing way. Perhaps I'll close the camera. Video struck back and I'm getting Freudian. In fact my anus and shaved balls make quite fine visuals. X is good. But now I need to come up with some other form of fun ... Women have left me, even these last resorts. Fine, I'll watch online porn then.

As Jacques Derrida argues, an archive is stored for the future but engaged with the ever shifting present, with specific aims and purposes in mind (Derrida 1996, 68). As Kurenniemi revisited,

edited and made comments on his diary notes, reflexivity extended back and forth in time, both towards the past self and future potentiality; both to reflections of finitude (of his own life) and immortality (of his virtual, algorithmic life). The camera, more than any other medium, lies at the heart of this split temporality as the instant generator of historical records that will linger on to be relived. The year 2048, as the locus of both Kurenniemi's transhumanist project (when his consciousness is to be available in machine form) and of the science fiction narratives he imagined and composed throughout the years, remains the end point of the archive's explicit futurity. As a site of fantasy and theoretical speculation, the year 2048 is the moment when machines will forever revisit earlier memories and records made by humans in fleshy form.

Archives are defined and driven by the dynamics of forgetting and extinction. The futurity of the archive is conditioned by nothingness and death, just as accumulation and preservation of the archive assumes the threat of effacement and eradication. Or, as Derrida puts it, “[t]here would indeed be no archive desire without the radical finitude, without the possibility of a forgetfulness” (Derrida 1996, 19). Kurenniemi's “archive fever” is fuelled by such awareness of imminent loss. His processes of accumulation and storage of everyday events were a means of warding off erasure and the limits of human existence – their

temporality is geared simultaneously towards both annihilation and eternal life (in 2048, and after).

Rooting for a machine future, Kurenniemi remained firmly fascinated by the slimy machinations and dense materiality of the human sensorium. There is, then, an obvious and tenuous tension between the detailed fleshiness of the logs and the idea of uploading them into machine-readable format that is to be used by future machines, cybernetic or cloned human organisms. For what sense would a machine make of the acts and sensations accounted? How would they translate into data?

7/8/1989, Fri 00:41

Now as I'm writing this I'm wondering if this could be the phenomenon of "ringing" [in English]. Too trivial in any case. Then X asked me if my orgasms have changed. I couldn't answer. Before I started licking, and early on when licking, my cock was erect but then became flaccid. This is, however, an old phenomenon and didn't fool X. After a moment's rest she started licking and soon moved to a better position between my legs and performed fellatio flawlessly. I didn't try to prolong or speed up. I watched X's head and lips on my shaft and wondered if I'm excited by looking or by the action potentialities coming from my cock. Both are somehow "unnatural" but perhaps only "culturally". Can't be bothered to clarify now. When X is sucking, orgasm shapes up altogether differently than when jerking off. (01:17) I start shaking all over and

even my breath starts to cramp. And when it comes, it comes a little too soon, then one notices the desire to hold back a little and to elevate, modulate the intensity higher. As if one gave up a little.

3/8/1987, 23:27

Ykä [a male neighbor] jerked off standing. Now I'm naked too. He's a southpaw, jerked off with his left hand and took the spunk in his right palm. Now turned off the lights. One and a half centiliters [of wine] in the glass that will be the last one. Tomorrow at nine, coffee to celebrate the return from the holidays so... I'm writing "The World of Sound."

Considering the inseparability of sensing and making sense, and the particularities of the human sensorium, I argue that such accounts would poorly translate as data to be processed by artificial intelligence. While processes of storing and accessing memory are common to human bodies and intelligent machines, the forms of memory in question are hardly the same. In fact they are radically distinct. As Jean-François Lyotard (1991, 15) points out, human thought "doesn't work with units of information (bits), but with intuitive, hypothetical configurations": it "isn't just focused, but lateral too" – much like the archive in question. For Lyotard, the complexity of human thought and cognition are inseparable from the carnal specificities of human embodiment. Similarly, a camera sees differently than the human eye, and a microphone records

sounds differently than the human ear hears them. A human sees and hears without knowingly looking or listening, but equally fails to see and hear as her attention constantly shifts, oscillates and reorganizes. Contrary to the contingency of the human sensoria, cameras and microphones steadily record the audiovisual in the confines of their technological make-up and configuration without moments of heightened attention or intensity (unless the operator of the camera zooms in or angles the microphone accordingly). Accessing video footage of an event is, then, a fundamentally different experience from accessing a particular person's perception of the same event. Paraphrasing Bergson, these are differences of kind, rather than ones of degree.

Kurenniemi's archive is ironic in the sense that this fundamental tension, or incongruity, between the human and the machine forms of memory and perception is always present. Consequently, the key point of the diary logs is not merely the rhythm of Kurenniemi's consciousness, perception and memory or the possibilities of reproducing it in algorithmic form. Rather, the diaries make evident how this rhythm meshes in with, and is reconfigured by the affordances, modalities and tempos of different storage media and – following Lyotard – by the inhuman modes of memory that differ in their materiality, organization and access from the human ones. As these rhythms and materialities – both human and nonhuman – resonated in

the acts of recording and performing the everyday life, the rhythm of Kurenniemi's consciousness also oscillated and changed. The precise rhythm of his consciousness would indeed be hard to tear apart from the technological networks and prostheses that it constantly moved with.

In the diaries, the fantasy of an uploaded consciousness that would keep revisiting the times past for all eternity is much less pronounced than the pleasures that Kurenniemi enjoyed in his archival practice: the rhythms, intensities and tempos of recording, editing and revisiting. Here, the joys of theory and defecation are cut out of the same fabric of embodied practice, of potential affectation, intensity, experimentation and play. Living, again, becomes an archival practice of ambiguous temporality that is driven by a quest of affectation and where the past and the future constantly fold into the present. Despite Kurenniemi's transhumanist fantasy of overcoming the slime-based human embodiment, these slimy traces nevertheless remain the key focus of the archive that records his life.

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Risto Jarva: Ruusujen aika, 1969

Dead Computers Tell No Tales – Remarks on the Futures behind Kurenniemi’s 2048 Resurrection

Jyrki Siukonen

Could a machine think? – Could it be in pain? – Well, is the human body to be called such a machine? It surely comes as close as possible to being such a machine.

Wittgenstein (1984, §359)

“Erkki Kurenniemi is a mathematician, nuclear physicist, expert in digital technologies, inventor, filmmaker, and pioneer of electronic music,” writes Lars Bang Larsen in the *dOKUMENTA 13* guidebook, and he seems to be serious (*dOCUMENTA (13) – Das Begleitbuch / The Guidebook – Katalog / Catalog 3/3 2012*, 218.). I can presume that he is not unwittingly exaggerating Kurenniemi’s credentials or being misled by other people. It is therefore difficult to avoid the feeling that, in their enthusiasm, some of those who have found Kurenniemi only recently have not only praised him as a one-man super reactor but also turned him into a half-fictitious being. The aim of this article, then, is to look for firmer ground and study Kurenniemi’s activities in a more critical light. Since his major achievements as an inventor and experimentalist have been discussed elsewhere, I will concentrate my attention on other things. Is Erkki Kurenniemi a nuclear physicist? What does that make me? A spaceman, no doubt. For the moment, let us just stick to the fact that he studied at the University Helsinki and received his bachelor’s degree in sciences in the crazy year of 1968. Eighty years later he wishes to be born again. Who am I to say no.

Man with a Novel Character

For an archaeologist digging up history, a long forgotten rubbish heap may be a treasure trove. As historical beings, however, we

usually hope to leave behind signs of accomplishments that are more refined than garbage bags. Erkki Kurenniemi's project for the year 2048 falls somewhere in between these two extremes. The idea of recording the everyday life of a person in preparation of his later rebirth via a computer is not altogether improbable in science fiction literature. This is something we should keep in mind, for originally Kurenniemi's project was nothing more than a series of failed attempts to write a novel. He crystallizes it all in his diary on the first of July 1989: "Today I have once again started the novel 2048, yet again for nothing. I just uncorked the second bottle of wine" (Diary 1 July 1989, EKA).

As the literary critic Matti Savolainen has remarked, science fiction literature is not, and aims not to be, science but fiction using the backcloth and paraphernalia of science or pseudo-science (Savolainen 1987, 183). In Kurenniemi's case, there is, I believe, reason to emphasize the last five words. Much that appears technical in his texts belongs to that pseudo-scientific paraphernalia. The novel, or text for short, also contains more mundane diary material, but the work never proceeds, perhaps because writing a novel is hard work in general and requires some planning as well as discipline, but mainly because Kurenniemi has little to tell. This acute problem can always be postponed to the future, however, while the next wine bottle can only be opened here and now. At the end of the day the

belletristic motive makes room for other half-sober activities. By leaving his unrealised literary attempt, whatever the reasons behind its failure may be, to the future and to the computer to come, Kurenniemi gives weak artificial respiration to a dream that was always more narcissistic than scientific.

It seems to me that what lies at the heart of the project 2048 is not so much a vision of the coming technological progress as it is Kurenniemi's idea that all that has been saved of his life could be turned into literature, i.e. meaningful writing. In his email correspondence with the author Leena Krohn in 2003 he still muses: "And yet, my notes on small pieces of paper may contain a wealth of information about my world, down to my handwriting, if all that material is analysed with a programme, say, a million times more efficient compared to what we presently have" (Email to Krohn 31 January 2003, EKA). The main point here is not whether Kurenniemi himself could have concentrated harder and worked enough to produce textual material that deserves future attention, but that a computer should be able to interpret and reveal his often rather dispirited and fragmentary notes as something more than trifles, in other words, turn second-hand information into first-rate thoughts.

The collection of documents from the life of Kurenniemi, now resting on the shelves of museum archivists, contains material where the wish of one's recreation goes hand in hand with the

most trivial details of life. As you can see, my feelings about this whole endeavour are openly mixed. On the one hand, it brings to mind the decision of the composer John Cage, whom I admire, to give his correspondence to the Northwestern University according to their wishes – on the condition that junk mail is also taken in and catalogued. Cage’s gesture is in line with his artistic view according to which all sounds are equally remarkable, even those of humble or non-artistic origin. On the other hand, I find no artistic line of any kind at the heart of Kurenniemi’s project, only a monotonous thought of the continuance of individuality even after death. In principle, this is nothing new, for the self-centred wish to deposit one’s everyday life, and with it a kind of comprehension of life, to all those who are interested comes close to writing (or blogging) a diary for publication. To make it readable, however, requires almost the same virtues as writing a novel: something to say and skill to say it.

These are things that rarely surface in Kurenniemi’s diary notes. The result is usually fragmentary theoretical jargon or data about daily food, drink and sex. Kurenniemi is not big on reflection, or on poetry. There is yet another problem, and it relates to the rather concrete way Kurenniemi had to record himself and his life at the time. I cannot help thinking that my mobile phone, my credit card and my supermarket customer card register most of my activities far more accurately and with much

less effort than all the bags of receipts he has saved for the 2048. With the help of social media one can take care of the rest. Be it for better or worse, things have progressed by leaps and bounds in the recent years. But who is really interested in this enormous accumulation of material when every attempt towards individuality looks more or less the same?

Reconstruction of Self

At the end of the 1960s, Erkki Kurenniemi created sound effects for the Finnish science fiction film *Time of Roses* (*Ruusujen aika*, 1969), directed by Risto Jarva. Kurenniemi's contribution is rather small and consists mostly of fictional sounds of computers, automatic doors and telephones. In other words, he produced a collection of various conventional beeps and humming sounds, which helped the filmmakers to underline the feeling of a technologically progressive future. *Time of Roses* tells a story of Arto Lappalainen, a Finnish historian living in 2012, whose aim is to reconstruct the life of an ordinary person from the past, the shop assistant and striptease dancer Saara Turunen, who has died in 1976. Lappalainen interviews people and makes use of archive material, but he has also found a striking lookalike to act as Saara, one Kisse Haavisto, an engineer from the Kuortane nuclear power plant. The film's idea of recreating the mind and the world of a deceased person points to the same direction as Erkki Kurenniemi's dream for

2048. In the middle of the film, however, Lappalainen and Haavisto find themselves discussing the problem which arises with the ever-increasing amount of information and its processing.

– Should you have lived in the 19th century, all that would remain of you would be a portrait at most. As for Saara Turunen, we have newspaper clippings, films ... and lots of archive information. And there will be even more about us. But how do you think this will help a researcher?

– Do you mean that it is difficult to tell false information from true information?

– It is more difficult to interpret large amounts of information than small amounts. (Ruusujen aika 1969, 59'58")

Even if computer programmes of the future would be a million times more effective than the old ones, as Kurenniemi argues, and capable of interpreting all the neural nuances currently concealed in his own handwriting, there remains the question of the meaningful use of such high-fidelity reading. What exactly would we achieve with it? Or, more precisely, who would even bother when there are much more exciting things to do? We have just passed the future pictured in *Time of Roses*, but the year 2048 is still far enough to conclude, if we want, that everything will be multiplied, and improved, by a factor of a million. Some things we will certainly see, for not all of us can

resist the possibility to tinker with the human DNA. Whether that will help us to understand something about the world closing in around us is another matter. As for myself, I hardly know anything about computers, but I have learned to read old books, and it is in the field of artificial intelligence where books seem to age fast but mature slowly.

Browsing through a locally printed work on artificial intelligence from 1989, I noticed how the author expressed his excitement about a project called CYC, which, he says, “aims to transfer an encyclopaedia’s worth of basic knowledge about the world into a machine within the next decade, and thus make it understand what takes place in the world. Even today we have around us all that which in ten years’ time will shine with novelty” (Heinämaa and Tuomi 1989, 264). The mentioned project has now dragged on for a quarter of a century, but no major breakthroughs have been made in making machines understand what goes on in the world. Instead, we, supposedly non-machines, have bought programmes and gadgets, generation after generation, only to see them lose their shine and novelty sooner than expected. In this respect, things have really multiplied by a million. But the essence of computers and software is not that they can help us clarify or organize our old thoughts effectively. On the contrary, every new application creates new kinds of functions and needs and generates collective excitement which seems to confuse our judgement just as much as it leaves us enchanted. If the concept

of a paperless office proved to be a goldmine for manufacturers of printer paper, what can we expect from more adventurous ideas?

Future in My Pocket

Erkki Kurenniemi deserves to be called a visionary when it comes to digital technology. One of his most accurate predictions is the sixth paragraph of his article *Message is Massage* from 1971. There he predicts the coming of an all-in-one personal device which will link together most of our implements and media: computer, television, phone and videophone, radio, audio and video recorder, editing table, book, magazine, newspaper, library, school, post office, bank, electric organ, answering machine, walkie-talkie, cinema, theatre, typewriter, calculator, calendar, notebook, clock, camera, microscope, telescope, work place, entertainment, human relations, photo album, museum, art exhibition (Kurenniemi 1971, 36).

Kurenniemi says nothing about the size of this universal device, however, and it is unlikely that in 1971 even he could have imagined carrying all this in his pocket. In the future of *Time of Roses*, the personal machine was still as big as a writing desk. In real life it would take Kurenniemi another three years before he could buy his first hand-held electronic calculator with an LCD

display (Diary 28 December 1974, EKA). In 1974, this simple machine, brought to the market by Sharp, cost over 400 future Euros but could only add, subtract, multiply or divide; more complicated work still had to be done with a slide rule. In those days, future seemed to loom much closer than it actually was – earlier in *Message is Massage* Kurenniemi introduced the idea of a “pocket computer” with a video camera and a small display. This would be the tool of an artist in 1983, he writes. To miss the mark with some twenty or thirty years is common in this line of business, where hopefulness always prevails. The vision itself, however, has proved to be surprisingly accurate.

What Kurenniemi envisioned in his 1971 article (or, rather, an incoherent collection of fragments) belongs to a greater mass of futurological writing which was popular at the time. I will only mention two books: *The Year 2000 – A Framework for Speculation on the Next Thirty-Three Years* by Kahn and Wiener (1967), and its smaller Finnish counterpart *Suomi vuonna 2000 (Finland in Year 2000)* by Haikara (ed.) from 1970. Both books offer a broader view of future society and therefore discuss gadgets in less detail than Kurenniemi. Trends are the same, however, and Kurenniemi hardly stands out as a lonely prophet; much of what he says has always been gathered from printed sources. Through his active working age he was a fervent reader, who followed different strands of scientific facts and speculations (as well as science fiction) in English. It was this substantial input that often

kept him two steps ahead of his colleagues in Finland, artists in particular.

The sources used by Kahn and Wiener were highly optimistic about the future development of computers. Accordingly, the authors stated that by the year 2000, computers are likely to match, simulate, or even surpass some of man's most "human-like" intellectual abilities, including perhaps some of his aesthetic and creative capacities (Kahn and Wiener 1967, 89). The year 2000 was loaded with exhilarating magic and promise, but as the turn of the century approached, disappointments started to pile up. Space flights, especially, seemed to flop beyond imagination, at least when seen from the perspective of the late 1960s, when the mission to Moon and the film *2001: A Space Odyssey* (1968) showed the way to go. Perhaps my bitterness grows from the fact that I never had the chance to become the spaceman I wanted to be. After that it was simply a matter of taste whether *The Sims*, first released in February 2000, was merely simulating or actually surpassing our intellectual capacities. Computers broke new boundaries, of course, but the way they actually changed our world was something Kahn and Wiener had not foretold in 1967. What they instead concluded in their prognosis appears now all the more interesting: "If it turns out that they [computers] cannot duplicate or exceed certain characteristically human capabilities that will be one of the most important discoveries of the twentieth century" (Ibid.). How

unfortunate and sad that the Nobel committee failed to notice this in 2000.

Three decades earlier Kurenniemi had had his finger on the pulse, and in his 1971 description of the future personal device the words “entertainment” and “human relations” now stand out. It is mostly in these areas that our “human-like” abilities have found their new computer-based homeland. Instead of reaching for higher intellectual goals, much of the calculating power of machines is spent on keeping us busy with games, music, films, self-promotion, chat, gossip and pornography. The last topic was also shyly touched upon in *Time of Roses* where Saara Turunen, the average historical person to be recreated, led a double life. The historian Arto Lappalainen interviews an old man who knew Saara back in the 1970s.

– Yes, she enjoyed filming and I filmed her a little [takes a film reel out of his pocket] ... here are some ... but only confidentially, now that you are researching her.

– But of course, of course.

Later Lappalainen watches the films and comments to his colleague:

– Old creep. With this material we could still blackmail him if we wanted.

- *We can't use these, can we?*
- *Of course we can ... truth always comes first. (Ruusunen aika 1969, 39'40")*

After Death

At the beginning of his book *Confessions* Jean-Jacques Rousseau writes that by telling everything about this life he has entered a performance beyond compare. In the next breath he confesses being charmed by his own uniqueness: "I am not made like anyone I have been acquainted with, perhaps like no one in existence" (Rousseau, Jean-Jacques [1782] 2004). The hypothetical Computer-Kurenniemi of 2048 might utter something similar; after all, he would be a unique realisation of the old Warholian slogan "I want to be a machine". But there is a twist, if not two, in this tale. For how can a computer that passes the Turing test be aware of being a machine at all? Kurenniemi and others like him seem to think that it would in fact cease to be a machine and instead take a step up the evolutionary ladder and become a new kind of life form. Very well, but if it really is a new kind of reasoning entity with more calculating power than we have, why on earth would it like to have anything to do with Kurenniemi's pedestrian notes and memories? What should it do with his bottles of cheap wine, joints, schnitzels and hunger for sex, with all that not-so-intellectual everyday life that poignantly tells about the realities of our limited bodily

existence? What should it make of Kurenniemi's brainchild, the *Graph Field Theory*, which is just as deep as staring at the screen of an old tube television at close range while completely stoned.

Keeping in mind that I know nothing about computers, it seems to me that the 2048-project could survive only as long as the computer remains a torpid machine, a machine that runs a programme rather than writes them. One possible resurrection of Kurenniemi would then be a shabby exhibit in the corner table of the museum cafe, a creaking computer that could be turned on for special occasions, like an old hippie waking up in his slow orbit to a sound of a familiar song. "There exist, of course, artists who are facing the future, those who feel being part of a process that genuinely serves progress. The mistake may then be that they identify themselves with a future that they know all too little about," wrote Marika Hausen in 1970 in the book *Suomi vuonna 2000 (Finland in Year 2000)* (Hausen 1970, 125). Hers is not a lofty vision of the age of computers but something that still, after forty years, makes a good prediction.

The arch of time (from past to future and back) takes an unexpected bow in Helsinki in the autumn of 2013. Parallel to the opening of the Kurenniemi exhibition in Kiasma, yet quite accidentally, the Finnish translation of Thomas Pynchon's famous novel *Gravity's Rainbow* is published. The book first came out in 1973, and Erkki Kurenniemi read it in the following

autumn. He must have been one of the very few Finns who had the book in their hands at that time. Kurenniemi's input was always impressive; the Finnish academia started to take notice of Pynchon only two decades later (it appears that the earliest Finnish article on Pynchon is from 1992).

Gravity's Rainbow was never an easy read and finding one's way through those 760 pages of wildly overgrown textual shrubbery is an achievement in itself, even though Kurenniemi has nothing to say about the book's subject matter in his diary (Diary 24 November 1974, EKA). Holding the book now in my hand, I come to think that perhaps it was only the opening quotation from Werner von Braun that etched itself into his memory for further use:

Nature does not know extinction; all it knows is transformation. Everything science has taught me, and continues to teach me, strengthens my belief in the continuity of our spiritual existence after death. (Pynchon 1973, 1.)

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Films

Ruusujen aika 1969, Original script by Risto Jarva, Jaakko Pakkasvirta and Peter von Bagh. Directed by Risto Jarva. Filminor. 1'48".

electronic music compositions, film music and sound effects, material tapes intended for other composers and instrument test tapes. Some of Kurenniemi's tapes have been lost, including the work *Slice* (s.a.). Other pieces of music may still lie hidden in his tape archive. He continued to make music even after the mid-1970s, although far less intensively.

As mentioned in Mika Taanila's liner notes on the CD *Äänityksiä / Recordings* (2002), Kurenniemi regarded his music as "mere equipment tests" and considered himself an instrument maker rather than a composer. Hence, one might assume that his music holds primarily technological and, from today's perspective, historic value. However, the vast recent interest in his music, demonstrated by several new record releases, cannot be explained by technological intrigue alone. It shows that Kurenniemi's music does possess genuine artistic value. Part of the value – and charm – of his music arises from the interaction between man and technology, and that technology directs towards, or at least presents a possibility for, a certain kind of musical expression. This brings out analogies with the way music is made today. Being a maker of electronic instruments, Kurenniemi was not a passive consumer of technology. In particular, his interest in digital electronics affected his music in ways that anticipated modern digitally produced music, especially electronic popular music.

Ojanen and Lassfolk (2012) point out that most of Kurenniemi's recordings lack any form of documentation or even proper markings on the master tapes apart from tape speed, the name of the piece or tape and a numeric ID code, the key to which perhaps remains to be discovered in his archive. This imposes considerable challenges for research. The aim of this article is not to find definitive answers to the question of which specific pieces of equipment were used to create the recordings, and not even in which studio the pieces were completed. Some remarks are nevertheless made based on secondary sources (written documents or interview statements) or the analysis of the sound material.

Kurenniemi's music has already been discussed in several texts both in Finnish and English. Kalev Tiits (1990a; 1990b) presented an overview of Kurenniemi's work at the University studio and an analysis of selected musical works. Important ground research was done by Jukka Ruohomäki in the 1990s. His manuscript on the history of Finnish electronic music is still unpublished, but he has kindly provided his work to be used as reference material by other researchers. Kuljuntausta's massive books on the early years of Finnish electronic music both in Finnish (2002) and English (2008) discuss Kurenniemi's work extensively. A previous article of mine presents an analysis of the sonic characteristics of Kurenniemi's music (Lassfolk 2012). Ojanen and Lassfolk (2012) discuss the relationship between

Kurenniemi's musical recording and his instruments and the concept of "a musical work". The focus of this article is on Kurenniemi's musical style and how his technological activities and orientation is reflected in his music.

Kurenniemi's music has been published both on CD, vinyl record and C cassette. Most publications date from this century, which shows an increasing interest in his music. Two compilation albums, the CD *Äänityksiä / Recordings 1963–1973*, edited by Mika Taanila (2002), and the double vinyl *Rules*, edited by Mikko Ojanen (2012), present a comprehensive collection of both his "official" compositions and recordings which were originally less formal and have, through the record releases, become treated as musical works.

Kurenniemi's music can be roughly divided to synthetic works, instrument tests and demonstrations, and tape collages. The boundaries of these categories are vague. For example, synthesized sounds are used in his tape collages. Conversely, acoustic sound material appears commonly in his primarily synthetic works. Even his instrument test tapes are not purely technical demonstrations without musical thought or form. This text does not aim to cover all of Kurenniemi's musical output. The time frame ranges from 1963 to 1975, which covers his most productive period in music making, but not all pieces from this period are described. The work *On-Off*, although already

discussed in several texts, cannot be left out from an article that attempts to describe Kurenniemi's musical style. Other works discussed below were selected from published recordings, especially the *Äänityksiä* and *Rules* albums.

On-Off

From 1963 to the mid-1970s, Kurenniemi made most of his music at the Department of Musicology, University of Helsinki, but he also worked occasionally in temporary electronic music setups of the Finnish Broadcasting Company, YLE. For example, *Saharan uni* was prepared at the recording studio of Kulttuuritalo in Helsinki (Helsinki Hall of Culture).

On-Off (1963) was the first musical work made in the newly built studio at the Department of Musicology, University of Helsinki. The history and technology of the studio is described in Mikko Ojanen's article in this publication. *On-Off* is also one of Kurenniemi's best-known compositions. It has been released on two CD's as well as on the *Rules* double vinyl album. *On-Off* is also heard on an early scene of Mika Taanila's documentary film *The Future Is Not What It Used To Be (Tulevaisuus ei ole entisensä 2002)* as the soundtrack of Kurenniemi's experimental silent film *Winterreise* (1963). The name *On-Off* itself was adopted by Petri Kuljuntausta as the title of his book on Finnish electronic music. Kuljuntausta also describes the contemporary reactions to the

early concert performances of the piece (Kuljuntausta 2002, 389–391).

There are significant differences between the published versions of *On-Off*. The version published on both the supplement CD of Kuljuntausta's book *On/Off* and on the *Äänityksiä / Recordings 1963–1973* CD has very little dynamic variation during its entire 13-minute span. The *Rules* album release, however, digitized directly from the original master tape and released with minimal post-processing, has not only much wider dynamic alteration but also significantly different overall sound.

The 13-minute piece is an intensive wall of noise and distortion. According to several sources, including Tiits (1990a, 48) and Kuljuntausta (2002, 389), Kurenniemi got the inspiration for the piece from the noise of a power plant generator hall. The actual sound source of the piece has been debated (see Ojanen and Lassfolk 2012). What is generally accepted and in coherence with Kurenniemi's working style in general is that the piece was completed as a real-time performance in the studio. In a later interview, Kurenniemi mentioned a spring reverb unit, tape echo and manual tape stretching as the primary means of sound processing (Ruohomäki s.a.). The electronically overdriven and mechanically excited spring reverb device is indeed a central sonic element. This treatment causes the reverb springs to

vibrate at their natural resonant frequency, yielding a distinctive “splashy” metallic sound.

The piece opens with a distorted guitar-riff-like sound gesture and quickly develops into a massive but dynamically varying noise texture, which is constantly overlaid by equally intensive, even aggressive sound gestures, many of which clearly originated from the spring reverb. Even after *On-Off*, the spring reverb remained part of Kurenniemi’s signature sound, although in a more subtle and conventional role. Other gestures include metallic-sounding noise bursts and synthetic-like glissandos.

With its massive wall of noise and distortion, *On-Off* can be regarded as an early representative of noise music. However, noise and distortion were not novel effects even at the time of its completion. Distortion had been used by electric guitarists – either on purpose or out of necessity – from the days of Charlie Christian in the late 1930s. In electronic music, Karlheinz Stockhausen used an old Telefunken V 41 preamplifier as a distortion unit on the tape part of his 1960 work *Kontakte* (Stockhausen 2008, 2). Noise, in turn, had been a fundamental element of both German elektronische Musik since the 1950s and French musique concrète since the 1940s. A characteristic feature in Kurenniemi’s piece was that he pushed the technology to its limits by heavily overloading the signal path and even physically banging the equipment. One could imagine that the

real-time realization of the piece resembled the concert performances of Jimi Hendrix or The Who of the mid-to-late 1960s (perhaps without the theatrical aspect) more than the meticulous mixing and tape editing processes of Stockhausen in the Cologne studio. Indeed, Kurenniemi later said that *On-Off* was created partly as a protest or rebellion against academic electronic music (Ojanen and Lassfolk 2012; Ruohomäki s.a.). Indeed, its sonic and musical expression have more in common with later popular music genres, such as noise, or even heavy metal, than with the early 1960s electronic music.

Even though *On-Off* may be the best-known of Kurenniemi's musical works, and even a visionary one in some respects, it gives a narrow view of his musical thinking in general. The piece can rather be thought of as a prelude to even more visionary endeavors. In fact, the binary connotations of the title were an implication of Kurenniemi's interest in digital electronics, which characterized almost all of his musical activity from that point on.

Film Music and Instrument Test Tapes

Kurenniemi collaborated with composer Henrik Otto Donner in many projects, one of which was the sound track for Eino Ruutsalo's experimental short film *Hyppy* (Jump, 1964). Although the sound track was credited to both Donner and Kurenniemi,

the sound material was created solely by Kurenniemi (Ojanen and Lassfolk 2012) with his new sound generator, which later gained the name Integrated Synthesizer (see Ojanen et al. 2007; Suominen 2013).

The original sound material tape was released on the Rules album as Music for the Film *Hyppy* (1964, 6'38"). The tape consists of consecutive repetitive sequences of varying lengths and tempos, generated in real time with the programmable synthesizer. The main musical theme of the film, an intensive up-tempo sequence, appears at ca. 3'47" to 5'25". This is followed by another similar up-tempo passage. For present-day listeners, it is easy to associate the sequences with the hypnotic rhythm patterns of the 1970s and 1980s synthesizer pop, or perhaps even more closely with modern techno.

While the *Hyppy* tape was created as material for a film soundtrack, it can also be grouped together with Kurenniemi's instrument test tapes *Antropoidien tanssi* (1968) and *Improvisaatio* (1969). Although the pieces were made with different instruments (*Hyppy* with the Integrated Synthesizer, *Antropoidien tanssi* with Andromatic, and *Improvisaatio* with Dico), they are similar in their musical style and expression, especially the use of repetition.

Antropoidien tanssi (The Dance of Antropoids) was one of the few of Kurenniemi's compositions which were released on record during his active music making period. It was first published on the Perspectives '68 – Music in Finland (1968, Love Records LRLP 4; Ojanen and Lassfolk 2012, 5; *Tulevaisuus ei ole entisensä* 2002). Sometime after, part of the piece was released as *Dance of the Anthropoids* on the album *Tombstone Valentine* (1970, Love Records LRLP 19) of the Finnish progressive rock group Wigwam. As a consequence, it is also one of Kurenniemi's best-known musical pieces.

The piece can be divided into three passages (Ojanen and Lassfolk 2012, 5–6). The first passage starts with a constant up-tempo beat. A pounding on-beat bass-drum-like sound evokes associations with modern techno music. The beat continues for 40 seconds and is followed by a variation section with breaks and wild tempo changes. At ca. 1' begins a new sequence, this time a slow-tempo polyrhythmic "waltz". Towards the end of the piece, the waltz becomes more up-tempo and finally develops into a metrically irregular ending section with synthetic sound gestures augmenting the repetitive base sequence. Even though *Antropoidien tanssi* is an instrument test, it is not a purely improvised real-time performance. This is indicated both by the sharp changes in the spectrogram of the piece caused by obvious tape edits and the sudden appearance of a recorded human voice in between the last two passages of the piece

(ibid.). The passages themselves, however, show a similar spontaneous and improvisational touch as *On-Off* or the later *Improvisaatio*.

Improvisaatio (Improvisation) is, as the name suggests, a real-time performance with the Dico synthesizer recorded in a demonstration session at the Finnish Broadcasting Company. The piece was released on the *Äänityksiä* CD and thus gained the status of a musical work (see Ojanen and Lassfolk 2012). The recording is monophonic despite the two-channel output capability of the instrument. This was probably due to the recording equipment available at the time and the fact that all radio and TV broadcasting in Finland was still monophonic. Even though *Improvisaatio* is an instrument demonstration, it can be listened to as a purely musical performance. The piece begins with a static repeating sequence demonstrating the 12-step programmable memory of the instrument. The sequence is altered “on-the-fly”, as Kurenniemi changes the Dico digital parameter values, literally bit by bit. The general musical form is similar to that of *Antropoidien tanssi*: a repetitive introduction sequence, a break, followed by an alternate sequence, and finally a “development” or “jam” section with tempo speedup that results in an intensive climax.

The test and demonstration tapes made with the DIMI-A synthesizer are more complex and carefully prepared than those

made with the earlier instruments. This applies especially to *Inventio-Outventio*, prepared in collaboration with Jukka Ruohomäki, and originally released on the A side of a vinyl single DIMI is born as part of the marketing efforts for the synthesizer. DIMI-A allowed more elaborate programming, which was demonstrated by the two-part work based on Johan Sebastian Bach's *Invention 13* in A minor, BWV 784.

The first part, *Inventio* is an arrangement of Bach's two-voice piece for DIMI-A. The piece was programmed to DIMI-A's memory in parts. Each part was recorded to analog tape and the parts were joined by tape editing. However, Bach's score was not followed to the letter. The first deviation is a missing note – intentional or not – which disrupts the piece's metric structure. Towards the end, exaggerated tempo changes (a typical Kurenniemi gesture) and heavy vibrato further disturb the typical constant pulse of Bach's music. The two-voice piece was very well suited for demonstrating the programmability of the equally two-voice instrument. Furthermore, its two-channel signal output is demonstrated by dividing the voices to individual outputs and assigning them to the left and right stereo channels, respectively.

Outventio, the second part of the piece is a complete departure from Bach's score even though a Bach-like metric 4:4 1/16th note pulse does reappear on a couple of occasions. The piece is,

however, mostly non-metric. The general atmosphere is wild and playful. A heavily modulated human-voice-like sound appears occasionally as a demonstration of the instrument's ability to process external audio signals.

DIMI-A did not lend itself to spontaneous improvisation as easily as its predecessors. Even the tempo changes in *Inventio-Outventio* appear to be preprogrammed as they progress in steps rather than continuously (for more on the usability of DIMI-A, see Ojanen et al. 2007, 63).

Synthetic and Quasi-Synthetic Tape Works

Saharan uni, *Hana* and *?Death* are among Kurenniemi's more musically ambitious works. According to their sonic content, they can be classified as either synthetic or quasi-synthetic. Here, the term quasi-synthetic refers to a sonic result which sounds synthetic, but the actual sound source is unidentifiable and may be either acoustic or electronic. In synthetic music the sound source can be clearly identified from the sound material, or it may be verified from an external source.

Saharan uni (1967), prepared in collaboration with sound engineer Kari Hakala, is one of Kurenniemi's most refined works. Kurenniemi and Hakala made several versions of the piece, the best known being *Saharan uni I*. *Saharan uni* contains

Kurenniemi's typical musical gestures, including ostinato passages and glissandi. Most of the sound material is probably generated with the Integrated Synthesizer, recorded and mixed with a 4-track tape machine. Sonically, however, the piece differs from most of Kurenniemi's other works, especially the strongly reverberated *Saharan uni I*. The obvious use of the recording studio's smooth-sounding reverb unit distinguishes the overall sound from the typical spring reverb "splash" in many of Kurenniemi's other recordings. Moreover, the general mood is uncharacteristically calm and melodic. *Shararan uni II* is mixed more sparsely, and reverberation is used more sparingly. The tape splices in the master tape of *Saharan uni I* indicate that the two pieces are not just different mixes of the same multitrack tape but distinct versions.

One could speculate whether or not the Kulttuuritalo's broadcasting quality equipment directed not only sonic but also musical expression toward a smooth and "sophisticated" direction. Both versions of *Saharan uni* show premeditated musical expression and use of technology. The Integrated Synthesizer is treated with tape echo, reverberation and filtering, and sounds considerably smoother than in *Hyppy*. Repetitive sequences, however, reveal the obvious primary sound source of the piece.

In *Hana*, the sound source is even more obscure. The two main sonic elements of the piece are a relatively static drone sound and a set of sound gestures probably generated by magnetic tape stretching and tape echo. Both *Saharan uni* and *Hana* form a balanced musical arc without, for example, impulsive tempo speedups. An interesting common gesture is the sound of manipulated human speech at the very end of both pieces.

?Death (1972–1975) is a tape music piece of mostly synthetic material. Kurenniemi made three versions of the piece, each shorter than the previous one. The last and shortest version, *?Death 3*, was released on the *Rules* album. *?Death 3* starts as a playful dialogue between two synthetic sound signals divided to the left and right channels, respectively. The interplay is interrupted with excerpts from human voice narration in French and Finnish. Finally, *?Death* develops into a mixture of different sounds ending in a tonal cadenza.

At the time of the realization of *?Death*, Kurenniemi's studio was equipped with high-quality two-track tape recorders and a VCS-3 synthesizer in addition to his own instruments. As a consequence, the piece presents a multitude of sound sources, including conventional analog-like sound synthesis (probably VCS-3), organ-like sounds (probably DIMI-O) and Kurenniemi's typical iterative passages (probably DIMI-A), although this time in relatively short sections. The piece is also edited more

elaborately than his instrument test tapes. *Death 3* is one of Kurenniemi's more ambitious works, reminiscent of Saharan Uni in many regards (this is perhaps also indicated by the number of its versions).

Preludi (1970) is another synthetic work with a typical two-layer sonic structure. There, a static synthesizer ostinato is layered with a sound generator signal with a slowly varying pitch. A synthesized repetitive sequence is one of Kurenniemi's musical trademarks. In *Preludi*, the slow movement of the sound generator gives the sequence an emphasized role.

Tape Collages

Virsi (1970) and *Mix Master Universe* (1973) represent Kurenniemi's use of the tape collage technique. Both pieces contain both synthetic and acoustic sound material. Both unprocessed and processed sound materials are used, tape speedup being the primary means of processing.

Virsi consists of more than 20 sound clips of human speech, recorded music, television sounds and synthesized sounds. The length of the clips ranges from less than a second to ca. 2,5 minutes. Clips are joined consecutively without obvious crossfades. Although the piece is recorded in stereo, nearly all of the clips are monophonic.

Mix Master Universe was created collaboratively by Kurenniemi and Jukka Ruohomäki. As in *Virsi*, part of the sound material was gathered from the tape library of the Department of Musicology. The splicing technique is more elaborate and less abrupt between clips. The piece also contains long passages of synthetic sound material, most of which were probably made specifically for the piece. Three numbered versions of the piece were prepared by editing the same sound material. *Mix Master 2* was released on the *Äänityksiä* CD and *Virsi* on *Rules*.

Kurenniemi's Musical Style

Kurenniemi's musical style is an interesting mixture of impulsiveness and systematic development. The impulsive aspect is explicitly presented in his individual recordings through tempo speedups, sudden interruptions and a general improvisational or ad hoc style of musical decision making. On the other hand, he systematically applies his technological skills first in the form of musical repetition and later through more advanced musical programming.

Other typical features can also be pointed out. Many of his pieces are based on the contrast or dialogue between two sonic elements: in *On-Off*, the static background hum and the overlaying gestures, and in *Preludi*, the synthesizer ostinato and

the slowly moving oscillator sound. In both *Outventio* and *Death*, the dialogue is between two synthesizer voices which are divided to the left and right stereo channels.

Repetition or ostinato is one of the most distinctive individual features of Kurenniemi's style. Instead of tape loops typical to electronic music, Kurenniemi favored programmable digital logic and iteration, a technique also known as sequencing in modern music production terminology. Kurenniemi's early musical instruments were simple enough to be programmed in real time, making it possible to make changes to the sequence on the fly. Ostinato sequences appear in nearly all of his synthetic recordings, including *Hyppy*, *Saharan uni*, *Antropoidien tanssi*, *Preludi*, *Outventio*, and *Mix Master Universe*. However, *Inventio-Outventio* also demonstrates more complex musical programming.

Improvisaatio is a particularly good example of sequencing on the fly – to which the one-voice Dico synthesizer lent itself particularly well. On the other hand, the piece also shows the impulsive side of Kurenniemi. He pushes the tempo up to its limits until the subsequent notes of the one-voice instrument merge into a distorted harmony. Even in his instrument test and demonstration tapes, Kurenniemi did not restrict himself to a “proper” or “tidy” way of using the equipment. His playfulness is present even in the Bach arrangement of *Inventio*.

It is difficult to place Kurenniemi in any specific musical genre. As a composer, he did not belong to any of the major schools of electro-acoustic music. Despite his interest in mathematics and later research in harmonies and tuning systems, he did not systematically apply the serial composition method of the Cologne school of elektronische Musik. Indeed, even when using acoustic sound material in his tape collages, he did not strive towards the abstracted *objet sonore* concept of the Paris school of Musique concrète (see also Tiits 1990b, 49). Instead, Kurenniemi used the various technological means and sonic elements independently of both the traditional academic compositional conventions and the avant-garde schools.

In terms of musical expression, Kurenniemi is perhaps closer to some of the Milan R.A.I. studio composers. Luciano Berio's electro-acoustic work *Visage* (1961) in particular shares the intensive flow and drive towards a tensional climax with many of Kurenniemi's pieces, including *On-Off*, *Improvisaatio* and *Antropoidien tanssi*. However, these analogies are likely coincidental, and there are more dissimilarities than similarities in the style of the two composers. Better points of comparison could be found among the composers of the San Francisco Tape Music Center (see Bernstein 2008), such as the early tape music works of Pauline Oliveros. As with Kurenniemi, her use of the

studio as an instrument led, intentionally or not, towards a somewhat similar intensive improvisational approach.

Kurenniemi could perhaps be best compared with other technologically-oriented music makers and studio builders such as Louis and Bebe Barron or Raymond Scott in the US, or Daphne Oram or Peter Zinovieff in the UK. However, Kurenniemi did much of his work within an academic institution which provided some, albeit comparatively modest, financial backing for the studio facility.

A Musical Visionary

Erkki Kurenniemi has rightfully been called a visionary (see e.g. Huhtamo 2003). In the field of music, he is best recognized as a pioneer of digital technology. Since his ambitions lay more in electronics design than in musical composition, and considering the casual manner of his music making, it would seem rather daring to call him also a musical visionary.

However, Kurenniemi's statement in Aki Oura's documentary film *Kahdeksan tahtia tietokoneelle* (*Eight Bars for the Computer*) shows that he was quite conscious of how computers were going to change the way music would be made in times to come:

I would think that the clearest distinctive feature that this kind of computer music will have is that compositions will lose their individuality. Maybe this kind of future computer composer can be compared to an industrial designer, or better yet, a fashion designer.

*(Kahdeksan tahtia tietokoneelle, 1967; The excerpt is also shown in Taanila's film *The Future Is Not What It Used To Be*, 2002)*

Here, Kurenniemi is referring to a computer program by researcher Markku Nurminen, which was made to generate Finnish tangos in the style of Toivo Kärki. However, while talking, Kurenniemi simultaneously played his Integrated Synthesizer in his typical casual and humoristic manner, thus emphasizing his words with an example of live musical programming.

This text has discussed some similarities between Kurenniemi's recordings and modern music making. In addition to techno, sonic and stylistic resemblances to video game music might also be pointed out as well as modern electronic experimental music. One could argue that these features are only superficial, or that the similarities, however obvious, are the result of pure chance. On the other hand, Kurenniemi was able to use similar technology to modern day music makers – which he developed quite consciously and systematically. Given his spontaneous way

of working, it is not surprising that he used his equipment in a similar manner to many modern day musicians.

In addition to the above similarities or indirect influences, one might also ask to which extent Kurenniemi has been a direct influence for modern music makers. This is a relevant question at least in the scope of the Finnish electronic music scene. After all, many of the active Kurenniemi researchers, such as Kuljuntausta, Ojanen and Suominen, are also performing musicians. Furthermore, Kurenniemi's return to music as a live performer in the early 2000s made the link with the younger generation of music makers even more evident.



Erkki Kurenniemi visits the University studio in 2002.

Photo: Kai Lassfolk

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Erkki Kurenniemi's electronic music studio

Mikko Ojanen

Introduction

According to a well-known story, Erkki Kurenniemi was invited to build an electronic music studio for the Department of Musicology in the University of Helsinki as an unpaid voluntary assistant at some point during the academic year 1961–62. This and other details on the foundation and the early years of the university studio have been discussed several times in the academic literature (e.g. Tiits 1990, Kuljuntausta 2002, 194–199; Ojanen and Suominen 2005, 16–20). In this text I will not only revise these prior studies but also look deeper into the following questions: a) what was the concept of the studio in the 1960s, b) on what grounds did Kurenniemi start to work on the design of the university studio, c) what were the principles that guided Kurenniemi's studio design plans, and d) how did these initial plans manifest in the following years. This study focuses on the period when Kurenniemi was active at the university – although it should be pointed out that there is no exact date when he left the university studio, and his collaboration with his successor, composer Jukka Ruohomäki, and the other composers and artists in the field of electroacoustic music remained vivid until the early 1980s.

In this text I refer to the Electronic music studio of the University of Helsinki as the university studio or Kurenniemi's studio, for the studio was built and maintained by Kurenniemi, and he was practically the only one capable of using it. Consequently, it was natural that he acted as a collaborator or an assistant for the composers and artists using the studio. It is noteworthy that this is often presented as a peculiar feature of Kurenniemi's studio even though having an assistant or a dedicated sound engineer executing the actual tasks was a standard procedure in the studios of the 1950s and 1960s.

The factual content of this article relies heavily on the research of Tiits (1990), Ruohomäki ([s.a.]), Kuljuntausta (2002; 2008) and Ojanen and Suominen (2005). The concepts and theoretical pondering concerning the development and change of technology, on the other hand, have been adopted from the social construction of technology as discussed in many writings by Trevor Pinch and Wiebe Bijker as well as from the opposing framework of technological systems as described by Thomas P. Hughes (e.g. Pinch and Wieber 1987; Hughes 1994). For the sake of readability, I will not include the aforementioned references after each sentence. Instead, I encourage the reader to consult these texts whenever they wish to assess my line of argumentation.

Description and definition of a music studio

Usually, music studios are associated with a physical space consisting of at least two acoustically treated and soundproofed rooms – a recording room and a control room. Furthermore, studios are associated with music technology of some sort – physical machinery or software. Even the significance of the social interaction of its users, the relevant groups linked to its operation and development, and the roles of the different agents operating in this physical space, have been recently studied by academic writers (see e.g. Pinch and Trocco 2002). There are even some authors who have taken a somewhat deterministic stance to the research and suggest that the studio itself should be considered as an active agent in the music and record production processes (see Bates 2012).

Studios for sound recording and production can be roughly divided in two categories – commercial and experimental studios. By commercial, I refer to a facility which is developed for and focuses on audio recording and production purposes, whereas an experimental studio concentrates on sound design and the composition of experimental and electroacoustic music. Few studios can be categorized as purely one or the other, and at some point of their existence most studios have served both purposes. Nevertheless, the aforementioned division provides us with a good starting point to understand the operations of the music studio more thoroughly.

The other significant factor that can be used to define studios is their affiliations to a host organization, such as a broadcasting or record company. In some cases, the host organization even dictates the operations of the studio at the level of artistic substance. Studios that have a strong connection to their host organization are more likely to have a strong aesthetic agenda. Furthermore, other details, such as whether the studio is public or private, a large construction or a small home studio, define their operation and their contexts of use in an essential way.

Studios are distinct mainly because of their unique sound. This is due to the variety of the instruments the studio is equipped with, and in some cases the acoustic features of the studio space. The development and distribution of technology alters these sound ideals and should lead to a diverse palette of studios. However, as Schedel for example, has noticed, this has not happened, and according to her experience electronic music sounds similar all around the world (Schedel 2007, 26–28). She hopes that hardware hacking and DIY aesthetics, which have been revitalized in the last 20 years, would remedy the situation. Kurenniemi is an excellent example of these activities already from some 50 years ago.

New means of manipulating sound and the development of studio technology

Our present associations of the music studio have not existed in the same form in the history of sound recording and reproduction. Our understanding has changed as the technology and its use and abuse has changed. Probably the first futuristic vision of an experimental studio was outlined by Francis Bacon in his *New Atlantis* (1623) in which he described the future “sound-houses, where we practise and demonstrate all sounds and their generation. We have harmonies which you have not, of quarter-sounds, and lesser slides of sounds” (Bacon 2010, 59). It would take another 250 years for the sound recording technology to actually manifest. The ability to record sound made it possible to store, transfer, study (more thoroughly), play back and repeat unique performances as well as to manipulate sounds. Furthermore, after the invention of the gramophone, the last 150 years of human history have been audible for the first time in the cultural existence of man (for a thorough study of several aspects regarding these notions, see e.g. Sterne 2003; Katz 2010).

As the sound recording and production technology developed and became an instrument of artistic creativity, the following changes gradually took place. First, a new instrument and a new

means of musical expression were formed. Second, new composition methods were developed based on a close interaction with the machinery and the listening of the direct sonic output of the musical instruments. Furthermore, this new way of working in interaction with the instruments shifted the composer's focus from laying out the predetermined plan or score of a work to the immediate process of aesthetic decision making – in some cases even in real-time. With the new technology, composing without any formal training became possible. Furthermore, with computers and synthesizers, the composers were able to produce sounds without being a virtuoso of a traditional instrument. However, a new kind of virtuosity has gradually emerged from the use of this new technology, and in this respect it may be questionable to study new music technology in an entirely different way from the traditional instruments.

Moreover, with the new technology different processes could be automated, and the focus of the composer's work can be seen to shift from writing the actual music to conducting the technology which produced the music. In a way, the composer's role changed from an author to "an audience to the results", as described by Brian Eno (Cope 1991, 5).

It also seems that the composition and music production processes have changed from linear to cyclic. Whereas in the early days the music production process was based on recording

the well-rehearsed performance, nowadays it is more the rule than the exception that composers and producers return to a previous task of the production process over and over again during production – even editing the player’s mistakes and tuning the instruments afterwards.

These new means of manipulating sound and the development of the music studio can in part be seen as preconditions for the development of electroacoustic music, but also coinciding with this development – especially in the tradition of *musique concrète*.

Thanks to the development of technology and electronic components, instruments and studio technology have become smaller in size and, due to mass production, cheaper. As a result of this change, music production has democratized and studios have become much more accessible. The shrinkage of the studio technology has moved the studio into laptops and other mobile devices, and due to the rapid development of networks, the studio can be interpreted to manifest even as a virtual non-space collective music production facility over the internet (see Théberge 2004). All of these trends can already be seen in Kurenniemi’s visions, as we will see in the following.

Early electronic music studios in Finland

Electronic music studios were founded throughout Europe mainly under public broadcasting companies or university departments. According to the canon of studies on the electronic music, the first seminal studios are considered to be the ones in Paris, Cologne and Milan. Fortunately, recent research has also acknowledged other studios – even those with a minor or a vague input to the cultural heritage of electroacoustic music as well as studios outside Europe and North America (for more information on the history of electronic music studios see e.g. Manning 2013, Holmes 2012, Niebur 2010, Schedel 2007, Wiggen 1972). Regarding the early situation in Europe, Holmes (2012, 92–93), for example, lists nineteen studios, although he leaves the situation in Finland without mention. Davies (1967), by contrast, did acknowledge the existence of the university studio in Helsinki. Seventeen of the studio constructions mentioned by Holmes are approximately five to ten years prior to Kurenniemi's studio design and construction, while two coincide with it.

Electroacoustic music is considered to have arrived in Finland fairly late, although some experiments were made as early as at the end of the 1950s. In the Finnish Broadcasting Company, YLE, the first experiments to build an electronic music studio were

made at the turn of the 1960s, but these constructions were always temporary and lasted only for few months. Usually, the studio was constructed with an aim to carry out a certain project by a composer, who dismantled the studio after the work was completed. The first Finnish experiments to compose electronic music were made by Martti Vuorenjuuri and Bengt Johansson. Vuorenjuuri's radiophonic adaptation of Huxley's *Brave New World* (1958) was an hour-long study of the techniques of concrete music, whereas Johansson's *Three electronic etudes* (1960) was the first composition consisting of purely electronic sounds. The most serious efforts to build the studio in YLE were by Reijo Jyrkiäinen, who composed such works as *Sounds I & II* and *Idiopostic I* in his temporary studio in 1963. Although regular experimental activity, such as radiophonic seminars within YLE, started at around the mid-60s, and YLE's sound effect archive Tehosto was founded already in the late 1950s, the first permanent studio premises were only built in 1973 (See Sirén 1976, 52–53; Kuljuntausta 2008, 88–101; 132–140; 176–184; 263–271).

In the early 1960s, the construction of two parallel studio premises – Jyrkiäinen in YLE and Kurenniemi in the university – attracted attention, and some composers and artists became concerned of the situation. It was argued that instead of building two mediocre studios, all the available resources could be focused on the construction of a single, excellent studio (see e.g.

Donner in Kuljuntausta 2002, 188). The avant-garde and experimental music scene in Helsinki was small, and it is unlikely that there was a communication breakdown between the few people working in the field. It is more likely that the parallel studio projects reflect the status of electronic music in Finland at the time. In effect, only a handful of people were interested in this new art form, while the organizations which would have had the necessary resources were not (for a collection of the contemporary discussion and references to the primary material, see Kuljuntausta 2002, 303–335).

The experimental productions of the time were small underground projects in which money was not involved. Practically all of these projects were realized outside of YLE. One of the active figures in the field was the visual artist and experimental film director Eino Ruutsalo, who commissioned soundtracks for his films from Henrik Otto Donner and Kurenniemi. The music and soundtracks were made in several different studios. At least the soundtracks for the films *Kaksi kanaa* (1963) and *Hyppy* (1965) were made in the university studio. For editing the soundtracks, Ruutsalo had a bunker studio in the center of Helsinki at Iso Roobertinkatu. The musician Kaarlo Kaartinen, who frequently played in Ruutsalo's projects, also had a modest studio facility called Cinevox. Donner had access to an even more professional recording studio, Elektrovox, owned by Akkuteollisuus Ltd., which was also used

by Toivo Kärki and other leading names of the Finnish popular music scene.

Donner has explained why he worked in the different studios at the time. For him, the university studio was a place to conduct more experimental and unconventional projects, which could not be realized in YLE. At that time, YLE did not have a studio dedicated for experimentation, and the work had to be done in Tehosto or in the radio theater. The university studio provided a freer and more open environment for working without a strictly predetermined plan or an official project (Donner 2013).

The technology of the university studio and Kurenniemi's studio design plans

In our earlier studies we divided the construction of the university studio roughly into three phases (Ojanen and Suominen 2005, 18–20). In the first phase, the studio consisted of three Telefunken M24 reel-to-reel tape recorders purchased by Seppo Heikinheimo, who was a student of musicology. Kurenniemi completed the instrumentation in 1962 with a spring reverb unit, a ring modulator, a four-channel mixer board, a filter and a few oscillators built from an assembly kit. In the spring of 1963, he also bought a Studer C37 professional tape recorder. With the first studio set-up, Donner completed the soundtrack for the film *Kaksi kanaa* and tape music for his live

works *Ideogramme I* and *II*, and Erkki Salmenhaara made his first electronic work *White Label*. The first surviving composition from the university studio, the electronic tape piece *On-Off*, was completed in January 1963 by Kurenniemi. After building the first temporary studio set-up, Kurenniemi started to follow his ambitious studio design plans, which had already been in preparation for two years (Salmenhaara 1963, 55–56; Davies 1967).

Departing from his contemporaries, Kurenniemi envisioned the studio as an integrated whole of studio equipment and an automated music production facility, where sound production and control signals would be based on digital logic. The idea of automated music production and the vision of a digital music machine appear in Kurenniemi's sympathetically named first composition *On-Off*. Naturally, at this point only the name of the work refers to automated music production and digital logic, while the composition method was a live, real-time improvisation with the studio equipment on a master tape (for more information on Kurenniemi's music, see Lassfolk 2013 in this publication).

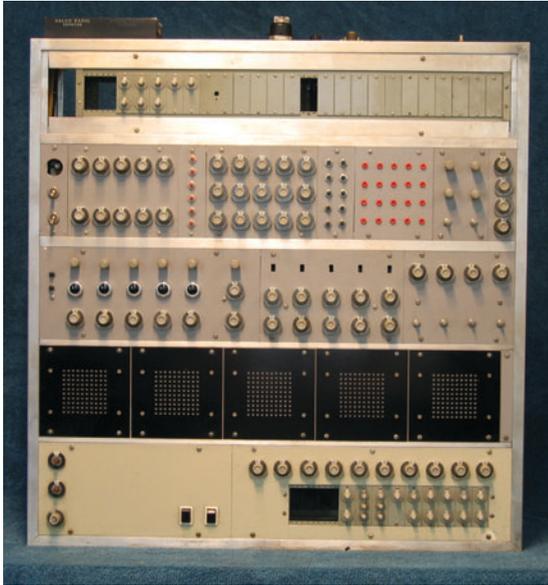
At this time Kurenniemi was aware of the technology and layout of the studios in Paris and Cologne. However, he did not want to follow the design trends of the central European studios, which were entirely based on analog electronics, for his experience as a computer programmer in the Department of Nuclear Physics

convinced him that “the future would be digital” (Kurenniemi 2004). This trend guided also the initial design of Elektronmusikstudion EMS in Stockholm Sweden (see Wiggen 1972).

Kurenniemi was also interested in algorithmic composition and wanted to build a machine capable of producing preprogrammed music with a flick of a switch. According to Essl (2007, 107), for example, “an algorithm can be defined as a predetermined set of instructions for solving a specific problem in a limited number of steps”. Algorithmic music has a long history dating back to Pythagoras and the Jewish Kabbalah, but algorithmic composition only became popular with the development of computers (*ibid.*; for more information on algorithmic composition, see e.g. Essl 2007; Jacob 1996).

Kurenniemi was also inspired by the RCA’s digitally controlled synthesizer, which was designed by Harry F. Olson and Herbert Belar already in the early 1950s. The design of Olson and Belar’s synthesizer was based on the mathematical theory of communication by Claude E. Shannon, and they were convinced that music could be generated mathematically (Baer 2011).

The first manifestation of Kurenniemi's integrated and automated music machine is the three-piece studio instrument, which at first did not have a name, but years later it was called the Integrated Synthesizer (see Suominen 2013 in this publication). The first version of the sound generator unit was completed in the fall of 1964, and with this newly built instrument Kurenniemi and Ruutsalo recorded the sound material for the experimental film *Hyppy* on the night following the instrument's completion (Ruutsalo/ERA 2000, 88). Later, the instrument was presented at Kurenniemi's seminar on algorithmic music, an event at the Jyväskylän kesä festival in 1965, and three years later in Sähkö-shokki-ilta (Electric Shock Evening), a happening organized by Ruutsalo in the Amos Anderson museum in early February, 1968 (Sähkö-shokki-ilta programme).



Integrated Synthesizer: Generator Unit (1964–1968)

Photo: Mikko Ojanen

In the second phase university studio was built around the Integrated Synthesizer, and it can be heard, for instance, in *Aloha Arita* (1965–66) by the Swedish composers Ralph Lundsten and Leo Nilsson, and in the two-piece composition *Saharan uni* (1967) by Kurenniemi and Kari Hakala, although this stereophonic work, which was the first of its kind in Finland, was mixed with the four tracker at the Alppi studio in Kulttuuritalo. The newly released recording from the rehearsals of *Sähköshokki-ilta* (8/2/1968) consists of long passages of Kurenniemi's improvisations and testing of the Integrated Synthesizer's generator unit (*Sähköshokki-ilta*, Ekstro Records, ekstro-099).

Compared with the RCA synthesizer, for example, the advantages of Kurenniemi's instrument included its compact size (although it weighed 20 kg and covered an area of one square meter) and its capability to produce rhythm patterns, melodies and harmonies in real time. The RCA Mark II synthesizer measured over two by six meters and weighed about three tons. It also had to be programmed with punched paper tape (Baer 2011; Holmes 2012; 176–190).

In the June of 1968, Kurenniemi took part in the International Convention of Experimental Centres of Electronic Music in Florence, Italy, where he presented his music terminal plans. The terminal computers were intended to allow a remote connection to a main frame located at the university. With a small fee people could contact the university computer and produce music. This would also have required some sort of digital to analog converters, which Kurenniemi was designing at the time (Zaffiri 2007). The actual terminal computers or converters were never built, but the idea re-emerged later in the digital mixer and patch bay unit DIMIX (1972). Kurenniemi's music terminal clearly anticipated the network studio as described by Théberge (2004).

The second phase of the studio and the Integrated Synthesizer remained in use until the late 1960s, although the exact date when the setup was re-arranged is unknown. Composer Jukka Ruohomäki, who started working in the university studio during

the academic year 1968–1969, does not remember the Integrated Synthesizer being used (Ruohomäki 2004). By the 1972, in the third phase, all instruments were connected to DIMIX.

Studio location	Years	Maintained by
Porthania, 6th floor	1961–	Kurenniemi (Heikinheimo)
Porthania cellar	1963 early spring–	Kurenniemi
Vironkatu 1, 1st studio	1967 spring–	Kurenniemi
Vironkatu 1, 2nd studio	1968/69–	Kurenniemi, Ruohomäki
Vironkatu 1, 3rd studio	1971/72–	Kurenniemi, Ruohomäki
Vironkatu 1, 4th studio	1974/75–	Ruohomäki
Vironkatu 7	1981–	Bentley
Vironkatu 1, floor 1B	1984–	Ruohomäki, Lassfolk, Laine, Tiits
Topelia	2013–	Lassfolk

Table1. The university studio locations.

Although Kurenniemi built the university studio and maintained it in different physical spaces (see table 1), it can be argued that Kurenniemi's actual studio design was repeatedly manifested in his musical instruments, for they are all music machines capable of producing the automated musical sequences in real time, with or without the immediate intervention of a composer. In this respect, it is questionable if the university studio as a physical space with its instruments equals Kurenniemi's conception of a studio. Furthermore, it can even be argued that the studio as a physical space was irrelevant to Kurenniemi. This distinction can be seen when he left the studio, which became maintained by his successor, Jukka Ruohomäki. Some of the instruments remained in use, but the overall layout of the studio was rearranged closer to a traditional tape music studio. Furthermore, archive documents, such as Kurenniemi's diaries (DIMI-päiväkirja 1971–1972), a promotional description of his digital instruments (Kurenniemi 1973) and marketing letters (Kurenniemi letters), show that the central idea of his ponderings in the 1970s still had to do with the integrated, automated and modular studio entirety – ultimately designed as DIMI-U (U standing for universal), a complete studio system which could have been custom-compiled from different sound and processing modules according to the customer's needs. The resemblance to the modern DAW-based studio, which is custom-compiled from different plug-ins and software instruments by its user, is notable. However, DIMI-U units were never built (for more,

updated information of Kurenniemi's instruments, see Suominen 2013 in this publication).



Vironkatu 1, 3rd studio 1971. Photo: Martti Brandt



Vironkatu 1, 3rd studio 1973. EKA, CAA, FNG



Vironkatu 1, 3rd studio 1973. EKA, CAA, FNG



Vironkatu 1, 3rd studio 1973. EKA, CAA, FNG

Social construction of Kurenniemi's studio

Although Kurenniemi designed and built the studio and the first instruments on his own, his innovations could not have flourished without the social community he was part of. First, and importantly, the foundation of the university studio was in the hands of several people. During his school years in the late 1950s, he had an experimental studio in his school's organ balcony together with his class mates Erkki Salmenhaara and Ilkka Oramo. The trio borrowed demonstration equipment from the physics class and, being a radio amateur, Kurenniemi was capable of handling the equipment. Kurenniemi recalls that they had a wire recorder at their disposal. Unfortunately, no recordings survive from these experiments (Kurenniemi 2004).

The above story has been told many times, and it is also connected to Erik Tawaststjerna, a newly appointed Professor of Musicology, who wanted to follow the modern trends and founded an electronic music studio at the Department of Musicology. Whether the idea of founding the studio initially came from Tawaststjerna or from the young students of musicology – Salmenhaara, Oramo and Heikinheimo – remains unclear, but it is likely that a good word was put in for Kurenniemi's old class mates when it was discussed who would be suitable for executing the design and the construction of the university studio. According to Donner (2013), Tawaststjerna could see one's potential abilities, and in a way lay the ground

for this potential to emerge and develop. This happened with Kurenniemi as well. Although he did not receive any salary for the work, he had the full support of Tawaststjerna and was free to design the studio according to his plans (Kurenniemi 2004; Donner 2013).

Donner, who was Kurenniemi's close collaborator, traveled throughout Europe several times during the first years of the 1960s. Within a short period, Donner visited and worked at the electronic music studio in Bilthoven, Siemens's computer-based studio, and at the Theater of Nations in Paris with Terry Riley, who was very interested in tape loop techniques. He also worked frequently in the YLE studio for the radio theater, the Elektrovox studio and in the studios of Ruutsalo and Kaartinen that were already mentioned. Although Kurenniemi never visited the central European studios, Donner's diverse experiences of studio technology were at his disposal. During the early design, Kurenniemi and Donner formed a powerful team (Salmenhaara 1963, 55), and in this sense it seems that Donner also had a crucial part in the studio plans. However, Donner has clarified this relationship by describing that he had a utilitarian approach to electronic instruments. He did not want to know how the instrument produced the sounds, but he had a clear vision of what sounds he was interested in. The interaction between Kurenniemi and Donner was intensive. Kurenniemi

experimented with the instruments, and Donner commented on the sonic output (Donner 2013).

This kind of social interaction remained important to Kurenniemi. During the Digelius years (1970–1976; a company founded by Kurenniemi together with Peter Frisk and Jouko Kotila to build electronic musical instruments), Kurenniemi was in close collaboration, for example, with Jukka Ruohomäki, Hannu Viitasalo and several others working for Digelius. Throughout his career, Kurenniemi also interacted closely with several composers who commissioned instruments from him, such as M.A. Numminen, Ralph Lundsten and Osmo Lindeman. He was also inspired by and an inspiration for fellow visionaries, such as Knut Wiggen (a head of Elektronmusikstudion EMS in Stockholm during 1964–1976), Manfred L. Eaton (conference in Florence 1968 and in later correspondence; Eaton is the author of Bio-Music, which influenced some of Kurenniemi's instrument design) and Arild Boman (used Kurenniemi's instruments in the University of Oslo and met Kurenniemi several times in the 1970s), just to mention a few names Kurenniemi was in contact and collaboration with in the 1960s and 1970s.

Conclusions

Kurenniemi is considered as a significant visionary in the field of electroacoustic music in Finland. His work set the stage for the first 15 years of Finnish electroacoustic music. For example, according to Ruohomäki ([s.a.], EH22/1) Finland would have been a developing country of electronic music without Kurenniemi's work as a designer of electronic instruments and studio technology. In the 1960s, the technology was not available, and Kurenniemi had to design his instruments from scratch by combining the potential of contemporary electronic components and the literature of recent technological developments, and by brainstorming with his close collaborators.

Scholars often describe the development of technology as a series of subsequent events (e.g. Théberge 2004, 760). These consecutive events are possible only if certain preconditions, ideas, inventions and innovations are first fulfilled or realized. Considering the situation in which Kurenniemi was envisioning his future studio, we can regard him as an agent fulfilling these preconditions, not waiting them to be fulfilled. On the other hand, considering Kurenniemi's plans to build a computer network for processing musical information over the network, certain preconditions were not fulfilled at the time in Finland. An

interesting detail is that the necessary network technology was already available and in use in the industry. It remains unclear why this early idea of distributed music production system over the network was not realized. Perhaps there were economic issues, or maybe the university administration lacked confidence in Kurenniemi's plans.

Kurenniemi's work is often associated with certain unfinishedness and even failure. Although this is justified and these descriptions outline some aspects of his work perfectly, the whole picture is more complex. Considering the development of the control signal methods, his user interface design and his ideas to build an automated and integrated modular studio entirely, Kurenniemi's work forms a determined and patient design process. Individual "unfinished" projects (a certain instrument, composition etc.) can be interpreted as manifestations of this process at a given moment. Naturally, Kurenniemi's visions were preceded with certain technological innovations, but in many cases, his ideas and design set the ground for later inventions to emerge – or they would have, if his ideas had been distributed more widely at the time.

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Erkki Kurenniemi plays Dimi-A.

Photo: EKA, CAA, FNG

Erkki Kurenniemi's Electronic Music Instruments of the 1960s and 1970s

Jari Suominen

For many, Erkki Kurenniemi is best known as an inventor of electronic music instruments. From 1963 to 1973 he designed and built a set of synthesizers which were experimental both

technically and in the way they were operated. The history, technology and user interfaces of these instruments have recently been studied in several articles (Ojanen et al. 2007; Ojanen and Suominen 2005; Städje 2009, 2012, 2013). This article is a brief and revised overview of Kurenniemi's instruments in the light of current research.

Introduction

When we initially started our research on Kurenniemi's instruments in 2004, it soon became clear that the information about the instruments was often inaccurate and a vague mix of fact and fiction. In our research we wanted to ensure that every piece of information would be as accurate as possible. We feel that Kurenniemi's instruments and their history are interesting enough without unnecessary exaggeration.

The main sources of our research were interviews and existing historical documents from the time the instruments were built, all of which we cross-checked for accuracy. Luckily, most of the instruments are still in working condition, which allowed us to gain first-hand experience on their functions. In many cases, we had to spend hours to go through each knob, jack and metal contact in different combinations by trial and error while reading the schematics of the instruments. The recordings made by using these instruments, when they were actively used, gave us

information that was useful when dating their construction while also revealing features that had stopped working over the years.

From the very beginning, Kurenniemi spent a fair amount of time in documenting the instruments during their design and construction process. The remaining documentation is mostly hand drawn on graph paper or note books, and it consists of sketches, timing charts, schematics, component lists and block diagrams. The original copies are located in both the Electronic Music Studio of the Department of Musicology, University of Helsinki (referred as the university studio in this text), and the Central Art Archives of Finnish National Gallery (CAA, FNG). The schematics are seemingly thorough, but during the renovation of the instruments, minor differences have been observed. It is probable that some of the schematics were made before the actual build, and changes made to the circuits during the actual construction work have not always been updated to the original drafts. Overall, the detail of documentation would allow for building new copies of most of Kurenniemi's instruments.

The design and functionality of these synthesizers have little in common with the digital synthesizers of today. Sound synthesis is mostly done by feeding the audio signal through a network of digital logic circuits. This closely resembles the approach taken by Stanley Lunetta in the 1970s with his CMOS synthesizers,

which are still actively built in the current DIY electronic music community (Lunetta 2013; electro-music.com 2013). None of the Kurenniemi instruments are capable of digital sound synthesis as we understand it today. They are not capable of real time PCM or wavetable synthesis, nor do they have DCOs similar to the synthesizers built during the shift from the analog to the digital (however, Kurenniemi experimented with wavetable synthesis on a 8-bit processor in the early 1970s but found the resolution too low for sound synthesis (Kurenniemi 1978).

Kurenniemi's instruments are filled with digital logic circuits. These are the fundamental building blocks of digital computers. Kurenniemi's vision of the automated composition process manifested itself in all of his instruments (Ojanen 2013). Kurenniemi saw music as a network of logical operations that could be mimiced with digital logic circuit technology. His early synthesizers mixed both voltage-controlled and digital circuits. After finishing *Sähkökvartetti* (Electric Quartet), he focused solely on digital control. The typical configuration which Kurenniemi used in many of his digital instruments had an ultrasonic square wave oscillator which was fed through a frequency division network and then low-pass filtered. In the instruments where the filtering of the sound was automated, the ordinary approach (only DIMI-6000 had digitally controlled VCFs) was simply to gate fixed analog filter circuits on and off; further adjustments were not possible (Documentation of

DIMI-6000; Documentation of Dico; Documentation of Sähkökvartetti).

Today, the extant Kurenniemi instruments are scattered around in five different locations. The largest collection of instruments is found at the premises of the university studio, where the remaining parts of the Integrated Synthesizer, Sähkökvartetti, Dico, DIMI-A, DIMI-6000 and a digital patch bay Dimix are located. The second hot spot is the Andromeda studio, which is located near Stockholm in the Swedish composer Ralph Lundsten's pink villa, Frankenburg. In Andromeda, Andromatic, DIMI-O and DIMI-S are all in active use. Two of the instruments are in museum collections: DIMI-A is stored in the Stockholm Music and Theatre Museum, and DIMI-S is in Helsinki in the Museum of Contemporary Art, Kiasma. DIMI-T was rented to the Department of Psychology of the University of Oslo in the 1970s for an undefined period, and it still remains in their possession.

Integrated Synthesizer

The first instrument Kurenniemi started to build was a complex system that was designed to be the heart of the university studio. Kurenniemi's vision was to create an automated composition system instead of a conventional tape music studio. This system consisted of three separate units: a tone generator unit, a mixer unit and a filter unit. The units consisted of several

modules, and many designs were later adapted to the later instruments built by Kurenniemi. The system never really had a name, and over the years it has been referred to as Sähkö-ääni-kone (Electric sound machine) (*Sähkö-shokki-ilta* 1968) or System 1 (Erkki Kurenniemi's letters, EKA). Later, it has commonly been called Integrated Synthesizer. (Ojanen and Suominen 2005, 18–20.)

The construction of the Integrated Synthesizer started in the 1963–1964 semester and continued until 1968. At that time, Kurenniemi did not have any formal education and only little experience in electronics (Kurenniemi 2004). As is often the case with experimental modular systems, new modules were added throughout the life span of the system, and it was never finished (*Kahdeksan tahtia tietokoneelle* 1967). However, Kurenniemi constructed the core parts of the systems rather quickly, and during the fall of 1964, the instrument was already operational (Ruutsalo 2000, 88). The Integrated Synthesizer was in active use in the late 1960s, but at the beginning of the 1970s it was replaced with other equipment (Ojanen and Suominen 2005, 18–20).

The schematics of the modules designed for the Integrated Synthesizer are found in a red folder which is full of sheets of graph paper. The list of modules is long: distorter, mixer, preamp, analyzer, signal splitter, phase shifter, circulator, cluster

generator, harmony generator, and many others (the documentation of Integrated Synthesizer). Today, only the tone generator unit and the remains of the mixer unit exist. A picture taken at the soirée Sähkö-shokki-ilta (Electric Shock Evening) shows an unidentified rack between Kurenniemi (who is operating the generator unit, which is barely visible in the photo) and Claes Andersson. This could be the lost filter unit of the Integrated Synthesizer, but as this is the only known photograph of this piece of equipment, this cannot be confirmed. The remaining part of the instrument does not have legends, and while the instrument itself is not currently in working condition, it is difficult to track which modules were actually built. The funding for a renovation project of the instrument is pending, and hopefully the Integrated Synthesizer will be restored in the near future.

Sähkökvartetti (Electric Quartet)

Kurenniemi built an instrument called Sähkökvartetti for the Finnish underground artist Mauri Antero Numminen in 1968. The men had met at a party at Claes Andersson's apartment in 1963. They immediately connected, and Kurenniemi ended up helping him to design a voice distortion unit called Laulukone ('the song machine') in 1964. Numminen attempted to make his already distinct yodeling singing style even more unbearable in order to

shake up the jury of a classical singing contest. Laulukone was soon dismantled as the components were desperately needed in the university studio. In 1966, excited about this experiment with electronic music, Numminen and Kurenniemi started to think about an instrument that could be used live with a complete band of musicians. The main idea was to have an electronic group equivalent to a jazz quartet. However, the sound of the machine should be out of this world and able to provoke the masses (Numminen 2006; Ojanen and Suominen 2005, 21).

A more serious design process continued in the fall of 1967 after Numminen had concluded his military service, and the actual build took place in the following spring. Numminen's longtime collaborator Kullervo Aura, who had earlier built Laulukone according to Kurenniemi's instructions, did the hands-on work together with Kurenniemi. In the long soldering sessions Numminen did his best to encourage both of them to stay focused in the work (Numminen 2006; Ojanen and Suominen 2005, 21).

Sähkökvartetti is a “collective” instrument consisting of a main unit (with tone generators and a sequencer) and a set of controllers (Melody machine, Electrical saxophone, Violin machine, Drum machine, filter bank controller and a light sword – a controller for distorting the vocalist's voice). Each controller

controls individual circuitry within the main unit. Effectively, the instrument consists of four synthesizers, a voice distortion unit and a sequencer, which are built together as one instrument. The sequencer is patched with banana cables and may be used to control each button of any controller automatically.

The sequencer of Sähkökvartetti is in itself a revolutionary design. It combines a ten-step shift register sequencer with five and four bit counters. The former matches the design of what we would now call an ordinary analog sequencer, familiar from Buchla and Moog modulators, although in Kurenniemi's case, it only outputs digital trigger signals. Counters may be used to build complex rhythmic patterns when they are used to mute other trigger signals from different outputs of the sequencer. This enables the performer to program automatically transposing melodies or to create long, constantly varying rhythmic beats. Fortunately, it is not rare to see counter circuits in modular systems today. Both circuits are common building blocks of digital computers.

The sound of Sähkökvartetti successfully complements the singing voice of M. A. Numminen. Individual sound sources drift constantly out of tune, and the scales represent a relatively unequal version of the equal temperament. The drum sounds of the drum machine are more reminiscent of African drum

instruments than a Western drum kit. This all adds up to noisy, nasal and highly dissonant wall of sound.

Numminen formed a lineup to perform with the instrument and named the group after it. Sähkökvartetti was booked to perform in The World Festival of Youth and Students in Bulgaria before the instrument was even constructed. The festival took place in July 1968, and the instrument was barely finished in time. Sähkökvartetti was supposed to perform numerous times during the festival. However, after the first performance in front of an audience of 4,000 people, the festival organizers – shocked by the sound of the group – did not allow them to take the stage anymore (Kuljuntausta 2002, 468; Numminen 2006; Ojanen and Suominen 2005, 21).

Sähkökvartetti was notorious for playing only one song in their concerts: “Kaukana väijyy ystäviä”. The instrument was also used during the shows (or events) of Suomen Talvisota (The Winter War of Finland), which was a mixture of a rock group and a performing collective. These performances were often concluded with a short instrumental improvisation played with Sähkökvartetti (Numminen 2006; Kuljuntausta 2002, 468).

Today, Sähkökvartetti is located at the university and is in working order. Its main defects are a missing controller of the

violin machine and some minor malfunctions in the circuitry of the light sword.



Andromatic.

Photo: EKA, CAA, FNG

Andromatic

Soon after finishing Sähkökvartetti in the summer of 1968, Kurenniemi started working on another commissioned instrument, Andromatic (the name of the instrument is a

combination of the name of Lundsten's studio Andromeda and the word automatic (Städje 2012)). The instrument was first used in November 1968 in an exhibition in Gallery Samlaren, Stockholm, where it was used to control the lights installed in Olle Andrin's transparent sculpture. The piece was also exhibited in the Contemporary Crafts Museum in New York the following year. After the exhibitions, it was installed in Lundsten's studio and can be heard on a large number of his recordings (Ojanen and Suominen 2005, 22).

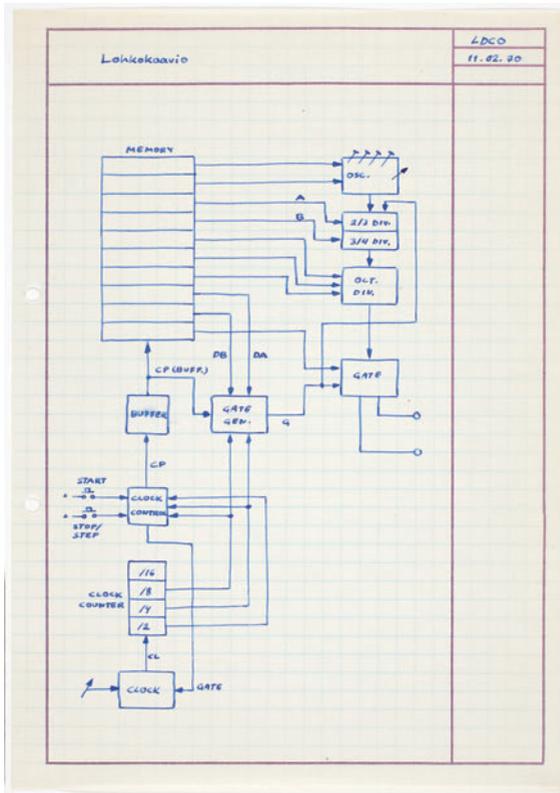
Ralph Lundsten and Kurenniemi met in 1965, and Lundsten soon visited the university studio to prepare material for his compositions. This triggered their collaboration, and eventually six of the Kurenniemi instruments ended up in the Andromeda studio in the course of the following years. Lundsten wanted Kurenniemi to build him a polyphonic synthesizer that was not attached to the standard western scales. Kurenniemi finished the instrument in the fall of 1968 and made a test recording of his own before delivering the instrument to Lundsten. This recording became *Antropoidien tanssi* (*The Dance of the Anthropoids*), which has been released several times, most famously on the album of the Finnish progressive rock band Wigwam (Städje 2002; Ojanen and Suominen 2005, 22).

Andromatic has a 10-stage sequencer, where every stage controls an individual oscillator. The configuration of the

sequencer makes Andromatic unique: the way each stage is connected to the other stages can be changed with a switch. This allows for the use of a stage in either a shift register or a counter mode. If all stages are in the shift register mode, the sequencer functions as a conventional step sequencer. When in counter mode, a long sequence of 1,024 steps is reproduced. The typical way of using the sequencer is to combine stages in each mode, which enables the combination of melodies and harmonies and the creation of somewhat complex generative patterns (Städje 2002). (Documentation of Andromatic.)

Dico

Erkki Kurenniemi started working on a custom synthesizer for composer Osmo Lindeman (1929–1987) at the end of 1968, and the instrument was finished in 1969. Lindeman's input during the design process is not known. The end result was a monophonic synthesizer with a 12-step sequencer. Sequencers were rare items in the 1960s, but what made the sequencer of Dico even more special was the fact that each step was stored in the digital memory as one 10-bit word. Lindeman used Dico as the primary sound generator in his studio for years (Ojanen and Suominen 2005, 23; Riikonen 1978).



Dico, a block diagram.

EKA, CAA, FNG, photo: Jenni Nurminen

From the player’s perspective, Dico is a monophonic synthesizer with a digital sequencer. The idea of the sequencer is based on Kurenniemi’s experience with the early digital computers (Kurenniemi 2004). The state of each sequencer step is represented by 10 light bulbs (the remaining two were left as a “future expansion”). On each step the user can adjust the

diatonic pitch (four bits), octave range (three bits), articulation (two bits) and the output channel (one bit).

The values of the bits of the memory are changed through a matrix of three rows by twelve columns of screw heads. Initially, the idea was only to use two rows of contacts, which would then be grounded with a stylus of some sort. Grounding the upper row will set the pin on, while the lower row sets the pin off. The finished instrument adds a row of grounded screw heads between the rows. This allows one to use a metal brush for connecting the middle row to either the pin above or below it. The metal brush was soon replaced with a piece of electrical wire acting as a stylus. Both the brush and the stylus option are handy for creating fast arpeggios. With a light touch, the player may change the state of random steps when the sequence is edited while the sequencer is running. The 4x4 patch bay of Dico may be used to connect the signal from the oscillator to either an attenuator bank or a band-pass filter bank and further to either of the two main outputs (Documentation of Dico).

The electronic block diagram reveals a setup typical of Kurrenmiemi's instruments (Documentation of Dico). His instruments rarely used voltage-controlled oscillators that were typical of the synthesizers at that time. Instead, they used frequency division, a technology familiar from electric organs (Douglas 1976, 43). During the 1960s, the stability of oscillators

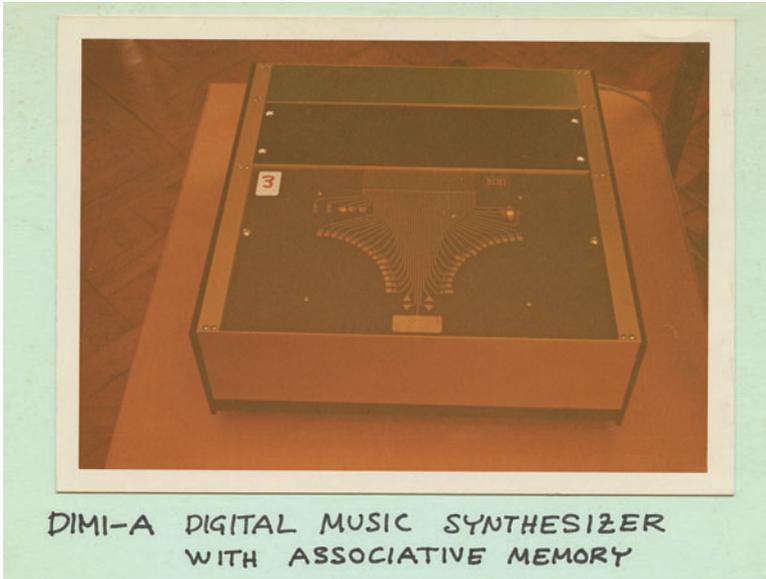
was still a major problem among synthesizer designers (Pinch and Trocco 2002, 226), and frequency division offered a simple way to keep the instrument in tune as it required only one oscillator which does not need to be voltage controlled (the most common electric organ design uses 12 oscillators, one for each note of the scale). The oscillator is tuned above the audible frequency range, and all notes of the synthesizer are made by dividing the frequency with whole numbers. The technique is easiest to implement when the waveform of the signal is a pulse wave, which is why it is the waveform of choice in most of Kurenniemi's instruments. In Dico, Kurenniemi experimented with this technology for the first time and continued to use four oscillators to form intervals above the harmonic scale, which are then connected to a frequency division network. In later designs, only one main oscillator is used (Ojanen and Suominen 2005, 37).

According to recent research, there are several different names for Dico. The schematics from December 1968 to February 1970 use three different names for the instrument (in chronological order): DIGO, DCO and LDCO (Documentation of Dico). At this stage of research, all the known sources from the last century refer to it as DIGO (or Digo) (Riikonen 1978, 32; CV-sketch, EKA). In the 21st century, the instrument has commonly been called Dico. However, it is unclear where this spelling comes from. Taking into account the history of DIMI-A, where the

“official” title gradually shifted from DIMI to DIMI-1, and eventually to DIMI-A in the span of two years (Ojanen and Suominen 2005, 25; Erkki Kurenniemi's letters, EKA), Dico may well have a similar history, as the actual name of the instrument may not have been necessarily important. Another plausible theory is the “broken telephone effect” of interviews (Digo easily transforms to Dico when pronounced by a Finn). However, all the different names are acronyms of the same title: digitally controlled oscillator (the 'L' on LDCO most probably referring to Lindeman himself).

DIMI-A

The layout of the DIMI-A touchpad is an eye-catcher and for many the most noticeable of Kurenniemi's instruments. It was built in 1970 as a research project, the focus of which was to explore the potential applications of digital techniques in producing electroacoustic music. DIMI-A is basically a two voice synthesizer with a sequencer equipped with a digital memory. It was also the first instrument intended for the commercial market. However, the unconventional interface together with unprofessional marketing efforts ensured that the instrument was never mass produced, and only two units were built (Ojanen and Suominen 2005, 25).



DIMI-A DIGITAL MUSIC SYNTHESIZER
WITH ASSOCIATIVE MEMORY

Photo: EKA,CAA, FNG

The first DIMI-A was finished in August, 1970. Kurenniemi had convinced SITRA (The Finnish Innovation Fund) to support him in developing an instrument, which would later become DIMI-O. However, SITRA could not support private persons, and in order to receive the grant, Digelius Electronics was founded in September 1970. DIMI-A then became the first product of Digelius, and before long a 7" promotional single DIMI 1 (DIMI is born) was released. Kurenniemi contacted several institutes abroad to sell DIMI-A, but many of the institutes either found the equal-tempered scale too limiting or had just acquired EMS VCS3, which had just been released to the market. Kurenniemi

attempted to sell DIMI to Peter Zinovieff's EMS and flew to London in December, 1970. Instead of making the sale, Kurenniemi ended up buying a VCS3 for the Department of Musicology (Erkki Kurenniemi's letters, Finnish National Archives). Eventually, one unit was sold to Ralph Lundsten, who used it for a few years but ended up donating it to the collections of Stockholm Music Museum (Musikmuseet, Stockholm Music and Theatre Museum since 2010). The remaining unit is located at the university studio (Lundsten 2004; Ojanen and Suominen 2005, 25).

DIMI-A was designed as a sound generator and filter for studio use, and as such was not intended for live use. It is programmed by touching the metal contacts on its touchpad with two styluses. Parameters are chosen through pads on the left hand side, and the values are entered through the pads on the right. In the digital memory, 100 events may be stored in a score of a maximum of 256 steps. In order to have a score larger than the size of the memory, an associative memory scheme (hence the 'A' in DIMI-A) was used.

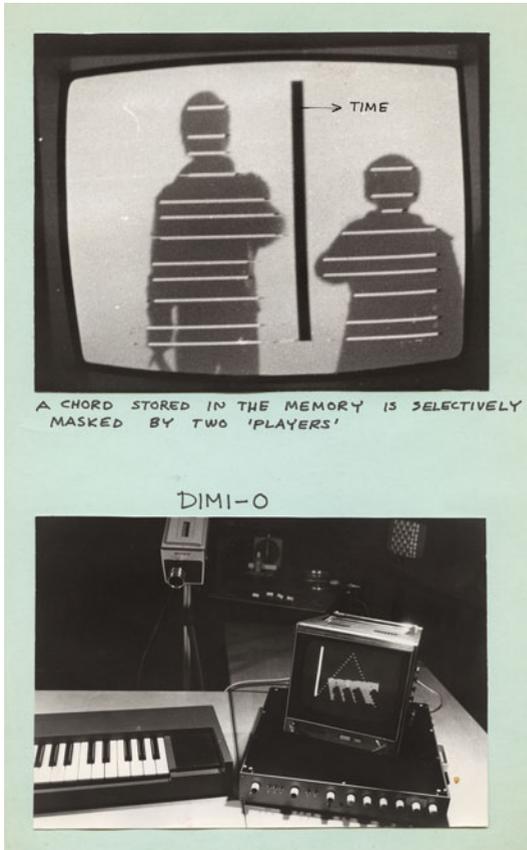


Photo: EKA, CAA, FNG

DIMI-O

With the funding for the prototype of a video-controlled organ secured from Sitra, the Finnish Innovation Fund, the construction of DIMI-O started in the fall of 1970 and was completed in April, 1971. In addition to Kurenniemi, electrical engineer Hannu

Viitasalo played an important role in designing and constructing the instrument. O stands for optical input, a video camera that could be used to alter the memory contents of the digital sequencer in real time. Only one prototype unit was built (Erkki Kurenniemi's letters, EKA; Ojanen and Suominen 2005, 27).

The central unit of DIMI-O includes a 48-note traditional electric organ keyboard and a memory unit with a 32-step sequencer. On the video screen, there is a 32 x 48 grid visualizing the memory contents. On the screen, the 32-step sequence is presented horizontally, and the four-octave key range (i.e. 48 notes) vertically. This fixes the obvious shortcoming of DIMI-A where the contents of the memory could not be viewed at all. On the other hand, DIMI-A is capable of storing multiple parameters in its memory while DIMI-O only stores the information of the playing notes (Ojanen et al. 2007; Städje 2013).

The most experimental feature of DIMI-O is obviously the optical input through video camera. Video image can be combined with the memory contents in real time. The image data is thresholded and then used as ones and zeros. Similarly, the keyboard may be used either to enter the data in memory or to play the instrument in real time (Ojanen et al. 2007; Städje 2013). An article by Städje (2013) contains a more thorough description of DIMI-O.

In September 1971, a demonstration video with a ballet dancer was made by the Finnish National Broadcasting Company YLE, but it was never used. During the following year, DIMI-O was used in an “intermedia” piece “Deal” as well as in psychological experiments at Department of Psychology at the University of Oslo. In Finland, DIMI-O was exhibited in an exhibition by the artist group Elonkorjaajat. Kurenniemi also performed Strauss’s Blue Danube as a soloist for the Oulu Symphony Orchestra. Pleased by the performance, he (humbly!) said that it “sounded like Strauss – but better!” (Kurenniemi 1978). Until the mid-1970s, DIMI-O was mostly kept at the university studio. As the financial situation of Digelius Electronics kept deteriorating, DIMI-O was sold to Lundsten. It quickly became the centerpiece of the Andromeda studio, and Lundsten used it in numerous compositions. As the Andromeda studio has been a popular destination for journalists and TV-teams, DIMI-O has received worldwide exposure over the years – even the members of Led Zeppelin played it during their visit to the studio of television channel TV4 (Lundsten 2006; Ojanen and Suominen 2005, 29).

Dimix

Dimix was a digitally controlled mixing console and patch bay. Only one prototype was built and installed to the university studio in 1972. It remained in active use until the early 1980s (Ojanen and Suominen 2005, 28).

Dimix consists of a central unit and a television monitor. The central unit has a numerical keyboard for entering the patch state of 8 stereo channels. The panel also has sliders for adjusting the volume of the signals fed through it. From the video monitor one could monitor volume levels and observe the current patch state. It was also possible to connect a video camera for monitoring the studio space from the monitoring room, but this feature was not used.

At the moment, the whereabouts of the detailed documentation of Dimix is not known. Currently, Dimix is partly functional: the video circuitry and input channels work. The patch bay itself was built using digital relay chips, many of which have been mechanically stuck to one state after years of being unused, making it impossible to change the current patch.

DIMI-S

DIMI-S could be better defined as a musical toy than a true instrument. Ralph Lundsten had an idea of *kärleksmaskin* (love machine) – an emotional lie detector, a synthesizer that would react to people touching each other, creating a sound that would reflect and affect the overall mood of the players (Ojanen and Suominen 2005, 29; Städje 2009). Kurenniemi's take on

Lundsten's vision is an unconventional, collectively operated polyphonic synthesizer (DIMI-diary 1971–1972).



Photo: EKA, CAA, FNG

The design process of DIMI-S started at the end of 1971. Eventually, Kurenniemi built two versions of DIMI-S. The first version was prepared for the exhibition Pripporama that was held at Pripps brewery in 1972. For the exhibition, Lundsten painted a large scale painting with integrated light bulbs which were connected to the synthesizer. The second version was installed to the Andromeda studio, and its light outputs were

connected to the ceiling lights of Lundsten's villa. The most significant difference between the units is their case. The first DIMI-S had a futuristic case, where its electronics could be viewed through a plastic dome. The case of the second DIMI-S was a flat metal box with a lid made of transparent plastic. After the exhibition was finished, the first DIMI-S returned to the Andromeda studio. In 2007, it was sold to the Finnish Museum of Contemporary Art, Kiasma (Documentation of DIMI-S-02; Kurenniemi's e-mails; Ojanen and Suominen 2005, 29; Städje 2009).

The basic principle of playing the instrument may not be obvious for the players, but it is rather simple. In the basic setup, four people play the synthesizer simultaneously. Each player will hold an electrode (a knob, a handcuff) in their hand through which they will be connected to the electrical circuits of the synthesizer. This allows DIMI-S to detect when players make skin contact with each other.

Four players can form pairs in six ways, and one synthesizer voice has been associated with each of these pairs. When two players are touching, the voice associated with the pair is heard, otherwise it will be muted. Moreover, when skin contact is made, the frequency of two synthesizer voices is changed. Depending on the voice, one of these voices may or may not be the one that is gated. The frequency of each voice is divided by a frequency

divider circuit with a number between one and sixteen. For one voice connected to a single player pair, this divisor number will step down one unit while the other will step up (the value of the divisor is set between 0 and 15). Musically, the divisor circuit chooses one note from an inverted harmonic series. In addition to these functions, two pairs also control the speed of the vibrato of the synthesizer. Players are able to form different pairs concurrently, and consequently all six voices can be audible at the same time. It should be noted that only the information of whether the players touch each other is used. The actual resistance reading between the players has no effect. An article by Städje contains a more thorough description of DIMI-S (Documentation of DIMI-S; Städje 2009).

DIMI-T

DIMI-T (1973) was an attempt to connect a human mind straight to a synthesizer. It was inspired by Manfred L. Eaton (with whom Kurenniemi exchanged letters at the time (Letters of Kurenniemi)) and his concept of biofeedback music. DIMI-T is controlled with the brain waves that are measured through electrodes on the player's earlobes. The synthesizer itself is the simplest one Kurenniemi ever built: the measured brainwaves control the frequency of a single oscillator. To maximize the safety of the player, DIMI-T is not connected to an electrical network in any way: it gets its power from a battery, and sound

is output through an embedded speaker (Documentation of DIMI-T; Kuljuntausta 2002, appended image; Ojanen and Suominen 2005, 30).

DIMI-T functions in the following way. The brain waves measured by electrodes are first amplified. Excessive noise is then filtered out, and only a ~10Hz alpha wave remains. The volume envelope of the alpha wave is constructed and used to control a sine wave oscillator (ICL8083 sine wave generator IC, Documentation of DIMI-T). The instrument is currently under renovation.

DIMI-6000

The Intel 8008 microprocessor was introduced in 1972 (Eilers 2013). The processor had computing power close to the amount of micro controllers used in the currently popular Arduino boards, but in the early 1970s this was something revolutionary. Kurenniemi saw the possibilities of this chip and started to sketch an instrument based on it. This meant halting the design process of DIMI-U, the instrument that should have combined the power of both DIMI-A and DIMI-O. DIMI-6000 was a computer-controlled analog synthesizer with no external interface (Ojanen and Suominen 2005, 30–31), a design that resembles the legendary Commodore 64 computer, but seven

years earlier (*Commodore 64 MicroComputer User Manual* 1984, 88).

The story of DIMI-6000 is tightly linked with the founding of the *Experimental Studio* (Kokeilustudio) of the Finnish National Broadcasting Company, YLE. The studio was founded in 1973, and it needed gear suitable for making electroacoustic music. Kurenniemi started to work on an instrument, and in April 1975 DIMI-6000 was handed over to the studio. Another copy of DIMI-6000 was also made and delivered to the Andromeda studio. However, Lundsten did not find an instrument which was only controlled by programming useful for his purposes and never used it (Ojanen and Suominen 2005, 31; Städje 2009).

DIMI-6000 has eight voltage-controlled modules: four VCOs, two VCFs and two VCAs, all of which can be controlled through software. It also contains four ring modulators. Modules can also be patched together through software (Documentation of DIMI-6000). DIMI-6000 is operated through an ADDS serial terminal. Initially, software called Discord was used, but in 1977 Jukka Ruohomäki wrote a more advanced software called Dismal. It allowed the user to enter a score which the synthesizer would then perform automatically. (Ruohomäki 1977.)

Currently the DIMI-6000 of the Experimental Studio of the Finnish National Broadcasting Company is located in the university studio. Lundsten's DIMI-6000 has been taken to pieces, but one panel still shares a rack with DIMI-O and Andromatic in his studio. Working copies of the Discord or Dismal software are not known to exist.

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Tiivistelmät suomeksi

Erkki Kurenniemen punainen lanka

Maritta Mellais

Erkki Johannes Kurenniemi syntyi 10. heinäkuuta 1941 Hämeenlinnassa, Suomessa. Isä Tauno Kurenniemi (1907-1977) oli filosofian tohtori ja matemaatikko. Äiti Marjatta Kurenniemi (1918-2004) oli lastenkirjailija. Matemaattisesti lahjakas poika Erkki sai jo varhain isänsä opastamana kosketuksen matematiikkaan ja sähköoppiin. Hän aloitti radioiden rakentelun jo koulupoikana, kiinnostuen hieman myöhemmin tietokoneista ja elektronisesta musiikista. Uranvalinnan kannalta merkittävä oli isän kanssa Ranskaan tehty matka, jonka yhteydessä hän pääsi käymään tietokoneita valmistaneen Compagnie des Machines Bullin tehtailla. Yhdysvaltalainen tietokonemusiikin pioneeri Max Mathews (1926-2011) oli esikuvana tulevalle suomalaisen elektronisen musiikin kehittäjälle. (Framework 2/2004)

Kurenniemi opiskeli vuodesta 1960 alkaen Helsingin yliopistossa (HY) matematiikkaa, teoreettista fysiikkaa ja fysiikkaa. Hän toimi tutkimusapulaisena HY:n Radioastronomisella asemalla 1961, assistenttina HY:n ydinfysiikan laitoksella 1962-68, tutkijana teoreettisen fysiikan tutkimuslaitoksella 1969-72 ja kutsuttuna, palkattomana assistenttina HY:n musiikkitieteen laitoksella elektronisen musiikin studiossa 1962-72. Mikko Ojanen toteaa

artikkelissaan Kurenniemen studiosta, kuinka tämä pieni, professorin työhuoneen nurkkaan sijoitettu studio oli kansainvälisessäkin mittakaavassa edistyksellinen. 1970 Kurenniemi perusti yhdessä Jouko Kotilan ja Peter Friskon kanssa Digelius Electronics Finland -yhtiön (1970-76), joka erikoistui elektronisten laitteiden tuottamiseen ja markkinointiin. Jari Suominen avaa artikkelissaan Kurenniemen soitinrakennuksen historiaa, myös ennen ja jälkeen Digeliuksen.

Erkki Kurenniemi tunnetaan kenties parhaiten juuri suomalaisen elektronimusiikin kehittäjänä. Kai Lassfolk piirtää artikkelissaan Kurenniemen musiikillisen tuotannon kaarta ja sijoittaa Kurenniemen aikansa elektronimusiikin kansainväliselle kentälle.

Musiikkivaiheen jälkeen Kurenniemi siirtyi teollisuusrobottien ohjausjärjestelmien suunnittelijaksi Oy W. Rosenlew Ab:n palvelukseen Poriin (1976-79) ja edelleen Nokian Kaapelikoneosaston teollisuusautomaation ja robottijärjestelmien suunnittelijaksi (1980-86). Vuosina 1987-1999 Kurenniemi toimi Tiedekeskus Heurekaan erikoissuunnittelijana ja suunnittelupäällikkönä, jonka jälkeen hän siirtyi vapaaksi tutkijaksi.

Kurenniemi osallistui 1970-luvulta alkaen tietokonepohjaisilla töillään myös kahden taiteilijaryhmän, Dimension ja Datartin toimintaan ja näyttelyihin.

Erkki Kurenniemen punainen lanka on ollut etsiminen. Hän on ollut kyltymätön etsijä, joka ratkaisun löydettyään on jatkanut kulkuaan edelleen ratkaisemattomien kysymysten pariin. Erkki Kurenniemen arkisto on tämän etsinnän summa: arkisto näyttää päiväkirjojen, äänitteiden, videoiden, valokuvien, kuittien, henkilökohtaisten asiakirjojen ynnä muun välityksellä osan tätä kyltymättömän kulkijan tietä, 1970-luvulta 2000-luvulle.

Kurenniemi aloitti elämänsä liittyvien tapahtumien arkistoinnin 1970-luvun alussa kirjoittaen talteen rakentamiensa soitinten kehittelyprosessien kuvaukset (Kurenniemi päiväkirja 1970-71). Lähes samanaikaisesti hän alkoi kirjata ylös elämänsä päivittäisiä tapahtumia. Seurasi vuosikymmeniä kestänyt prosessi, jonka aikana muun muassa täytyi yli seitsemänkymmentä käsinkirjoitettua päiväkirjaa. Ne muuntuivat myöhemmin, tietokoneelle siirrettyinä, sähköiseksi arkistoksi. Kurenniemen arkisto sisältää hänen ottamiaan valokuvia 1950-luvun alusta 1990-luvulle, äänitallenteita 1970-luvun alusta alkaen sekä videotallenteita 1980-luvulta alkaen.

Milloin Erkki Kurenniemellä lopulta syntyi ajatus taltioida oma elämä niin järjestelmällisesti, että hänet olisi myöhemmin,

fiktiivisenä vuonna 2048, mahdollista luoda uudestaan? Kurenniemi työskenteli 1970-luvun puoliväliin saakka musiikkilaitteiden kehittämisen parissa ja siirtyi vuonna 1976 robottiteknologian kehittämistyöhön. Tuolloin kerääminen oli jo laajentunut koskemaan kirjallisten ja kuvallisten muistiinpanojen lisäksi kuitteja, pankkitositteita ym. Kurenniemi seurasi aktiivisesti teknologian alan uusinta kirjallisuutta, ja Jyrki Siukonen toteaaakin artikkelissaan ajatuksen uudelleensyntymisestä heijastelevan aikansa, 1960-70 –lukujen, teknologiauskoa science fictionin värittämässä hengessä. Mahdollisesti Kurenniemen arkistointi-ideakin on alkanut itää jo tuolloin.

Lapsesta saakka sähkölaitteiden ja radionrakennuksen parissa puuhannut Kurenniemi kiinnostui vartuttuaan tietokoneista ja elektronimusiikista ja aloitti digitaalisuuden tutkimisen soitinrakennuksen yhteydessä. Jussi Parikka pohtii artikkelissaan Kurenniemen toimintatapojen merkitystä ja nostaa esille hänen tapansa yhdistää toisiinsa konkretia, tee-se-itse (DIY) –tyyppinen rakentelu ja visiointi.

Susanna Paasonen kirjoittaa artikkelissaan Kurenniemen tavasta tallentaa päiväkirjoihinsa arkensa ja elämänsä intiimejä asioita. Hän toteaa, että Kurenniemen arkiston keräysidean tasapäisyys avaa kohteestaan puolia, jotka useimmissa henkilöarkistoissa on piilotettu. Paasonen korostaa myös eri mediatyyppien eroja

ihmisen kokemusmaailmaa taltioitaessa ja kysyy, onko nautinto siirrettävissä datana tulevaisuuteen.

Näin Kurenniemen arkisto, vuoden 2048 uudelleen syntymää varten koottu, elää sitä odotellessa omaa elämäänsä. Se tarjoaa rajallisia vastauksiaan tutkijoiden esittämiin kysymyksiin. Vastauksia, joita ei voi edeltä käsin määritellä, kuten ei sitäkään, mitä kysyjät haluavat tietää tai miten arkistoa kulloinkin luetaan. Kuittien ja tulosteiden painomusteen hiljalleen haalistuessa ja tietokoneiden levykkeiden sulkeutuessa ikuisiksi ajoiksi, arkistolaitos tekee parhaansa Kurenniemen vision, katoavan taiteen, säilyttämiseksi.

Signaaliteoreettinen kosmologia tekijäkuulttuurissa

Jussi Parikka

Erkki Kurenniemen visiot käsittelevät usein kosmologisia teemoja mutta ovat itsekin kosmologisella otteella kirjoitettuja. Hänen tavoitteensa siirtyä ruumiillisesta olemisesta virtuaaliseen dataruumiiseen heinäkuussa 2048 on ajatus, jonka järjellisyys selittyy ainoastaan suhteessa tieteisfiktioon. Puhe "singulariteetista" juontuu muun muassa Vernor Vingen kirjoituksista sekä yhtä fantastisista Ray Kurzweilin teorioista. Myös Greg Bear on inspiroinut Kurenniemeä: on olemassa muunkinlaisia olemisen muotoja kuin tämä materiaalinen "minä", jolla on kaksi jalkaa, silmät ja korvat.

Tässä mielessä Kurenniemi ei ole pelkästään Erkki Kurenniemi, ihmisolento ja historiallinen hahmo. Hän on myös "oire", mutta ei missään negatiivisessa mielessä. Kurenniemi on oireellinen kiinnostuksensa ja metodinsa kautta ja osana digitaalisen kulttuurin fantasioita. Hänen kiinnostuksensa kohteissa visionääriset, oudot tavat maalata digitaalinen tulevaisuus punoutuvat osaksi konkreettista teknologista ja tieteellistä tietoa ja taitoa.

Mediateoreetikot ovat usein ottaneet johtavien ajatustensa esimerkeiksi omalaatuisia henkilöitä. Saksalainen mediateoreetikko Friedrich Kittler näki tuomari Daniel Paul

Schreberissä – tärkeä hahmo myös Sigmund Freudille ja monelle muulle teoreetikolle ja kirjoittajalle – oireellisen paranoidin skitsofrenian muodon, joka ei ollut pelkkää hallusinaatiota. Kittlerille Schreberin omalaatuiset tavat nähdä maailma olivat tapa hallusinoita myös teknologista muutosta. Maailma oli muuttumassa teknologiseksi: uudet tavat tallentaa, välittää ja prosessoida tietoa olivat muuttamassa ymmärrystämme. Ehkäpä meidän onkin aina siirrettävä huomio omalaatuisiin, joskus jopa marginaalisiin hahmoihin, jotta ymmärrämme paremmin sitä muutosta, minkä keskellä me elämme.

Kurenniemen fantasiat ja teknologiset näkemykset, jotka kiehtovat monia arkistoaajattelijoita ja media-ärkeologeja, eivät kuitenkaan juonnu hallusinaatioista, vaan elämisestä osana tätä teknologista murrosta. Konkreettisten teknologisten innovaatioiden ja käytäntöjen lisäksi viimeistä viittäkymmentä vuotta on leimannut diskursiivinen tapa hahmottaa, mitä teknologinen kulttuuri tarkoittaa. Kurenniemen ajatukset löytävät kaikupohjaa monelta suunnalta: tieteisfiktiosta sellaisiin filosofeihin kuin Walter Benjamin ja nykyisiin mediateoreetikoihin, kuten Wolfgang Ernstiin.

Kiinnostavaa Kurenniemen hahmossa, ajatuksissa ja arkistossa on tapa, jolla hän yhdistää kosmologiset visiot konkreettisiin teknologisiin käytäntöihin. Hänen teknologiset soittimensa DIMI-A, Dimi-O sekä vaikkapa Dimi-S ovat esimerkkejä hänen

taidostaan ymmärtää digitaalinen kulttuuri signaalien kautta. Teknologinen kulttuurimme on eräällä tavalla signaalien manipulointia: jopa taiteellisen luovuuden taustalla on hyvä annos insinööritaitoa ja ymmärrys siitä miten logiikkapiirit toimivat. Kurenniemellä tämä tietotaito kasvoi samassa tahdissa kuin tietokoneet saapuivat Suomeen: Wegematic 1000 oli ensimmäisiä koneita, joita hän pääsi käyttämään. Pian hän siirtyi käyttäjästä myös rakentajaksi. Syntetisaattorit olivat tapa ymmärtää tietokonekulttuuria. Buchlat ja Moogit olivat näyttäneet tavan, jolla signaalien modulaatio ja manipulaatio oli myös uudenlainen käytännöllinen mahdollisuus nähdä maailma: kaikki on signaaleja, jopa oma ruumiillisuutemme.

Yksi Friedrich Kittlerin johtavista ajatuksista oli, että toisen maailmansodan jälkeinen teknologinen kulttuurimme perustui sotateknologioiden väärinkäyttöön. Kittler tarkoitti tällä provosoivalla lausumalla, että suuri osa esimerkiksi musiikki- ja studioteknologioista perustui teknologisiin innovaatioihin, jotka juontuivat sodasta. 1950-luvun avant-garde-kulttuuri, sekä 1960-luvulla syntynyt brittiläinen rock-kulttuuri käyttivät hyväkseen myös erilaisia Saksasta tuotuja teknologioita. Ilman sotaa ei olisi ollut Abbey Roadin studioita eikä "Yellow Submarinea" (laulu, joka omalla tavallaan juontuu tietenkin merisodasta).

Vaikka Suomen tapauksessa tällainen linkki ei ole ehkä yhtä suora, on mielenkiintoista, kuinka Kurenniemen työ resonoi laajempien trendien kanssa. Hänen tapansa työskennellä niin analogisten kuin digitaalisten teknologioiden kanssa osoittaa, miten hänen myöhemmät visionsa dataruumiista eivät ole redusoitavissa pelkkään digitaalisen ihailuun. Kurenniemi oli laajemmin kiinnostunut, kuinka teknologiat pohjustavat maailma-suhdettamme. Hän on tee-se-itse-tyylinen tekijä, mutta myös kiinnostunut tämän ruohonjuuritason suhteesta laajempiin tieteellisiin diskursseihin, kvanttiteoriasta muihin kosmologisiin visioihin. Kurenniemi puhuu tästä teemasta Mika Taanilan haastattelussa, liittäen sen länsimaiseen musiikkidiskurssiin. Kurenniemi muistuttaa, kuinka vielä eurooppalaisen modernisminkin keskellä, osana avant-gardea, säilyi romanttinen ajatus Ideasta ja nerokkaasta Säveltäjästä. Kurenniemi kuitenkin kertoo itse olevansa lähempänä populaarikulttuuria ja sen tekniikoista: kaikki alkaa erilaisista tavoista kommunikoida, sekä ihmisten ja teknologioiden suhteisiin liittyvistä niin sanotuista mikrotekniikoista. Musiikki nivoutuu konkreettisten ja jopa taktiilisten tekniikoiden, kuten nauhan leikkaamisen kautta osaksi elettyä sosiaalisuutta. Jopa Kurenniemelle Idea tuntuu seuraavan konkreettisia arkipäiväisiä teknologioita ja tekniikoita.

Viime vuosien aikana ns. tekijäkulttuuri – Maker Culture – on saanut huomiota ympäri maailmaa. Tekijäkulttuuri viittaa erilaiseen tapaan lähestyä tekemistä, ikään kuin ei-

ammattilaisen perspektiivistä. Se tarkoittaa nikkarointia ja avoimen lähdekoodin ja laitteiston (hardware) perustavaa asemaa, sekä minkä tahansa rakentelua: vaatteiden, autojen, tietokoneiden, lelujen jne.. Kurenniemi sopii tähän kontekstiin erinomaisesti, mutta osoittaa myös, miten paradoksaalinen hahmo hän on. Hänelle tee-se-itse, DIY, on myös tieteellisen tason ohjenuora, hän ei koskaan viihtynyt liian kauaa yliopistolla. Hän on hakkeri niin teknologian kuin tieteenkin suhteen.

Media-ärkeologi Erkki Huhtamo on kirjoittanut taiteilija Paul Demarinista eräänlaisena "thinkerer"-hahmona. Thinkerer on uusiosana, ja yhdistelmä sanoista "thinking" ja "tinkering". Suomeksi voisimme sanoa sen olevan "ajattelijan" ja "nikkaroijan" yhdistelmä. Olisiko Kurenniemi myös tällainen "thinkerer"? Ehkäpä hänen tapansa rakentaa koneita, nikkaroida ja samalla muodostaa koko kosmologinen visionsa osaksi tätä arkipäiväistä taitoa ja käytännön innostusta, on tärkeä hänen oireellisuutensa kannalta. Kurenniemi on monen digitaalisen kulttuurin diskurssin ja käytännön risteyksessä: suuria visioita, mutta myös tekijäkulttuuriin kuuluvaa arkipäiväisyyttä. Hänen tapansa lähestyä maailmaa arkistollisesti on osa tätä arkipäiväisyyttä: huomio keskittyy jokaiseen pienimpäänkin yksityiskohtaan. Pienimmässä yksityiskohdassa, arkipäiväisimmässä tekniikassa, piilee kokonainen universumi.

Limajälkiä: muisti, teknologia ja arkisto

Susanna Paasonen

Erkki Kurenniemen arkistoa selatessa ei voi olla huomaamatta sen aistillista lihallisuutta ja horisontaalisuutta. Paperille ja tietokoneelle kirjoitetut sekä kaseteille puhutut ja videoidut päiväkirjat keskittyvät suurelta osin aistikokemuksiin. Kehollisiin tuntemuksiin ja intensiteetteihin – etenkin seksiin, alkoholiin ja huumeisiin kiinnittyvät kuvaukset, havainnot ja fantasiat limittyvät päiväkirjoissa sujuvasti harmonian matemaattista teoriaa ja fysiikkaa koskeviin pohdintoihin. Taiteen ja tieteen, tieteisfiktioin ja pornografian, yksityisen ja julkisen, banaalin ja ylevän välille usein tehtäviä hierarkkisia eroja tai rajoja ei synny, vaan päiväkirjamerkinnot liittyvät toisiinsa horisontaalisina säikeinä. Teoretisointi ja lihan ilot – päivittäiset hasispiiput, viinipullot ja masturbaatiot – kytkeytyvät nautinnon ja kokemuksen intensiteettiin, jonka etsinnän voi nähdä Kurenniemen arkea kuljettavana punaisena lankana.

Tätä horisontaalisuutta voi osittain selittää Kurenniemen transhumanistisella suunnitelmalla säilöä tietoisuutensa tulevaisuutta varten tallentamalla ja dokumentoimalla arkihavaintonsa mahdollisimman tarkasti. Algoritmista tulevaisuuden elämää visioineen Kurenniemen kiinnostus ja huomio kiinnittyivät kuitenkin tiiviisti ihmisruumiin lihallisuuteen, aistimellisuuteen ja karvoitukseen. Kurenniemen

arkistointiperiaate on lähtökohtaisen horisontaalinen: kaikki on ollut tärkeää mahdollisena datana, on sitten kyse käytetyn wc-paperin merkistä tai ohimennen vastaanotetuista käyntikorteista. Kun kaikkea on kerätty, ei mitään ole tarkalleen ottaen arkistoitu, sillä arkistointi edellyttää valikointia. Kurenniemen päiväkirjojen julkinen esittäminen edellyttää kuratointia, koska suuri osa kuvallisesta aineistosta on pornografista. Kuratoinnin myötä Kurenniemen päiväkirjojen monimuotoinen, samanaikaisesti sekä leikkisä että vakava lihallisuus katoaa helposti näkyvistä.

Kurenniemen tavoitteena ei ole niinkään ollut arkistoida elämänsä kuin tallentaa kokemustaan ja tietoisuuttaan tulevaisuuden epäorgaanista elämää varten. Maailma tallentuu kameralla tai mikrofonilla eri tavalla kuin ihmisisilmin tai -korvin havainnoituna. Ihminen saattaa kuulla, mutta olla kuuntelematta, katsoa mutta olla näkemättä riippuen siitä, mihin hänen huomionsa keskittyy. Ihmishavainto- ja kokemus ovat luonteeltaan kerroksellisia ja epälineaarisia, kun taas videokamera tallentaa objektiivin edessä olevaa maailmaa tasaisesti samoilla säädöillä, mikäli käyttäjä ei muuta sen asetuksia. Kurenniemen arkiston lukija joutuukin pian toteamaan, etteivät pirstaleiset ja eri medioilla tehdyt muistiinpanot, kuvat, äänet, lappuset ja esineet pysty välittämään yksilöllistä tietoisuutta. Käytetyt tallennusmediat eivät toimi läpinäkyvinä työkaluina havaintojen tallentamiseksi

tietoisuudesta toiseen. Niiden erityisyydet ja rajoitukset pikemminkin korostuvat: Kurenniemen videoiden ja c-kasettien heikko tekninen laatu hämärtää informaation ja melun välistä rajaa ja paperilappusille ja päiväkirjojen sivuille tehtyjen muistiinpanojen käsiala elää samaa tahtia kirjoittajan nauttimien alkoholiannosten kanssa. Arkistosta voikin uuttaa esille osittaisia, pirstaleisia ja valikoivia siivuja Kurenniemen arjesta.

Päiväkirjoissaan Kurenniemi kirjoittaa vanhojen merkintöjensä siirtämisestä paperilta sähköiseen muotoon, vanhojen videoiden katselusta ja elämäkerrallisten aineistojen muokkaamisesta. Päiväkirjat korostavatkin muistiinpanemisen, tallentamisen ja arkistoinnin iloja. Kurenniemi taltioi nykyhetkeä tulevaisuutta varten, mutta tallentamisen prosessit vaikuttivat samalla siihen, miten nykyhetki oli koettavissa: arkikokemus on erilainen kameran linssin lävitse katsottuna tai päiväkirjan sivuille suodatettuna kuin vähemmän keskitetysti havainnoituna. Kurenniemen päiväkirjojen nykyhetki kurottautuu sekä menneeseen että tulevaan sekä muisteltuun että tulevaisuutta varten muistettavaan. Vaikka Kurenniemi kirjoittaa tarpeesta ylittää limapohjainen ihmisruumis, juuri ihmisruumiin limaiset jäljet ovat hänen päiväkirjojensa keskeinen liima.

KUOLLEET KONEET EIVÄT LAVERTELE

Huomautuksia tulevaisuuksista Kurenniemen ylösnousemuksen taustalla

Jyrki Siukonen

Voisiko kone ajatella? – Voisiko sillä olla kipuja? – Onko ihmisruumista sitten sanottava tällaiseksi koneeksi? Ainakin se tulee kaikkein lähimmäksi tällaista konetta.

Wittgenstein (1981, 184)

”Erkki Kurenniemi on matemaatikko, ydinfysikko, digitaalisten teknologioiden asiantuntija, keksijä, filmintekijä ja elektronisen musiikin pioneeri”, kirjoittaa Lars Bang Larsen *dOKUMENTA 13* -näyttelyn opaskirjassa ja on ilmeisen tosissaan (*dOCUMENTA (13)* 2012, 218). Arvelen, ettei hän tarkoitushakuisesti suuretele Kurenniemen toimialaa tai ole joutunut toisten harhaanjohtamaksi. Siksi en voi välttyä tunteelta, että Larsenin kaltaiset Kurenniemen löytäjät ovat innossaan korottaneet hänet jonkinlaiseksi yhdenmiehen superreaktoriksi ja luoneet hänestä vähintäänkin puolittain fiktiivisen olennon. Tämän artikkelin tarkoituksena on tavoitella maan pintaa ja tarkastella Kurenniemen toimia aavistuksen kriittisemmässä valossa. Erkki

Kurenniemi on ydinfyysikko? Mikähän minä sitten mahdan olla? Vähintäänkin avaruusmies. Tyytykäämme toistaiseksi siihen, että hän opiskeli Helsingin yliopistossa ja suoritti luonnontieteiden kandidaatin tutkinnon hulluna vuonna 1968.

Kahdeksankymmentä vuotta myöhemmin hän toivoo syntyvänsä uudelleen. Kukapa minä olen sitä kiistämään.

Uuden ajan romaanihenkilö

Historiaa tonkivalle arkeologille entisaikojen tunkio saattaa olla aarreaitta. Historiallisina henkilöinä me kuitenkin yleensä toivomme, että pyrkimystemme merkkeinä jälkeemme jää jotakin roskapusseja ylevämpää. Erkki Kurenniemen projekti vuodelle 2048 sijoittuu jonnekin näiden vaihtoehtojen väliin. Ajatus arkipäivän elämän tallentamisesta ikään kuin aineistoksi tietokoneen muistissa tapahtuvaa uudelleensyntymää varten ei ole aivan tavaton tieteiskirjallisuudessa. Tämä kannattaa pitää mielessä, sillä alunalkaen Kurenniemen projekti on toistuvasti epäonnistunut yritys romaanin kirjoittamiseksi. Päiväkirjassaan 1.7.1989 hän kiteyttää olennaisimman: ”Tänään olen aloittanut taas kerran romaanin 2048 kai taas jälleen turhaan. Aloitin juuri toisen viinipullon.” (Kurenniemi, 1989)

Kuten tutkija Matti Savolainen on todennut, tieteiskirjallisuus ei ole eikä pyri olemaan tiedettä vaan fiktiota, joka käyttää hyväkseen tieteen tai pseudotieteen rekvisiittaa (Savolainen

1987, 183). Kurenniemen kohdalla on syytä painottaa neljää viimeistä sanaa. Paljon hänen puheissaan ja teksteissään on tuota pseudotieteellistä rekvisiittaa. Romaani tai teksti sisältää myös arkisempaa päiväkirjamateriaalia, ja jää kesken ehkä siksi, että romaanin kirjoittaminen ylipäätään on työlästä ja vaatii hieman suunnittelua ja työkuria, mutta ennen muuta koska Kurenniemellä ei ole juuri mitään kerrottavaa. Tämän ongelman voi kuitenkin aina siirtää tulevaisuuteen, viinipulloja taas voi avata vain tässä ja nyt. Kaunokirjallinen ulottuvuus on lopultakin muiden puolitokkuraisten puuhien alle hautautuva haavekuva. Jättämällä monista syistä toteutumattoman kirjallisen hankkeensa tulevaisuuden ja tietokoneen huoleksi Kurenniemi keinohengittää päiväunelmaa, joka aina oli pikemmin narsistinen kuin tieteellinen. Tarkoitan, että 2048-projektin ytimessä ei sittenkään ole visio teknologian kehityksestä vaan Kurenniemen käsitys siitä, että kaikki omasta elämästä talteen kirjoitettu voisi muuttua kirjallisuudeksi, toisin sanoen merkitykselliseksi sisällöksi. Kirjeenvaihdossaan kirjailija Leena Krohnin kanssa 2003 hän vielä uskottelee itselleen: ”Kuitenkin, pienillä paperilapuillakin olevat muistiinpanoni saattavat sisältää paljon informaatiota ajatusmaailmastani, käsialaa myöten, jos se kaikki aineisto analysoidaan ohjelmalla jonka tehokkuus on sanotaan miljoonakertainen nykyiseen tasoon verrattuna.”(Kurenniemi 2003) Nyt ei ole enää kyse siitä, olisiko Kurenniemi edes keskittymällä ja työtä tekemällä onnistunut saamaan aikaiseksi jotakin kirjallisesti kiinnostavaa, vaan siitä että tietokoneen tulisi

kyetä tekemään epäkiinnostavista ja katkonaisista fragmenteista jotakin tyhjänpäiväistä merkittävämpää. Sen tulisi muuttaa toisen käden informaatio ensiluokan ajatuksiksi.

Lopulta taidemuseon arkiston huoleksi päätyneet kokoelmat Kurenniemen oman elämän dokumentteja sisältää materiaalia, johon liitetty toive minän uudelleen konstruomisesta käy käsi kädessä elämän triviaaleimpien yksityiskohtien kanssa. Tähän yritykseen suhtaudun avoimen ristiriitaisesti. Yhtäältä mieleen tulee ihailemani säveltäjä John Cagen ratkaisu tallettaa kirjeenvaihtonsa sitä pyytäneen Northwestern Universityn kokoelmiin – sillä ehdolla, että myös kaikki roskaposti otetaan mukaan ja luetteloidaan. Cagen ele on linjassa hänen taiteellisen näkemyksensä kanssa, jonka mukaan eri äänet ovat yhtä merkittäviä niiden syntytavasta riippumatta. Kurenniemen projektin pohjalta en löydä tällaista taiteellista linjaa, ainoastaan yksitotisen ajatuksen yksilöllisyyden jatkumisesta kuoleman jälkeenkin. Tämä ei sinällään ole uutta, sillä halu tallettaa arkensa ja sen myötä eräänlainen elämänymmärryksensä muistuttaa julkisuutta varten kirjoitetun päiväkirjan tai blogin pitämistä. Ollakseen luettava sellainen kuitenkin kysyy lähes samaa kuin romaanin tekeminen, siis jotakin sanottavaa ja kirjallista sanomisen kykyä. Kurenniemen kirjoituksista en näitä useinkaan löydä – viinipullon avaamisestakin joku Saarikoski tai Palsa kykeni kertomaan mielenkiintoisemmin. Tuloksena on yleensä katkonaista teoreettista jargonia tai dataa arkisesta

syömisestä, juomisesta ja seksistä. Kurenniemi ei ole pohdiskelevaa tai runollista tyyppiä. Toinen ongelma liittyy Kurenniemen perin konkreettiseen tapaan tallentaa itseään. En voi välttyä ajattelemasta, että nykyisin puhelimeni, luottokorttini ja lähikaupan asiakaskorttini rekisteröivät useimmat toimintoni tarkemmin ja vähemmällä vaivalla kuin 2048-hanke. Sosiaalisen median avulla ihminen voi itse huolehtia lopusta. Tässä kehityksessä, olkoon se sitten hyvää tai pahaa, olemme muutamassa vuodessa tehneet todellisen loikan. Mutta ketä oikeastaan kiinnostaa tämä valtavana kasautuva materiaalmäärä, jossa yritykset yksilöllisyyteen muistuttavat enimmäkseen toisiaan?

Minän rekonstruktio

1960-luvun lopulla Erkki Kurenniemi toteutti äänitehosteita Risto Jarvan ohjaamaan tieteiselokuvaan *Ruusujen aika* (1969). Kurenniemen osuus on pieni ja koostuu lähinnä kuvitteellisista tietokoneiden, automaattisten ovien ja hakulaitteiden äänistä, toisin sanoen erilaisista tyypillisistä piippauksista ja hurinoista, joilla elokuvan tekijät pyrkivät alleviivaamaan mielikuvaa teknologisesti kehittyneestä tulevaisuudesta. *Ruusujen aika* kertoo vuoden 2012 historiantutkijasta Arto Lappalaisesta ja hänen pyrkimyksensä rekonstruoida vuonna 1976 kuolleen ”tavallisen ihmisen”, kemikaliokaupan myyjän ja strip-tease

tanssijan Saara Turusen elämä. Lappalainen haastattelee ihmisiä ja käyttää arkistomateriaaleja, mutta lisäksi hän on löytänyt ulkonäöltään Turusta ihmeellisesti muistuttavan Kuortaneen ydinvoimalan insinöörin Kisse Haaviston. Filmin ajatus kuolleen ihmisen uudelleen luomisesta on suunnaltaan samantapainen kuin Kurenniemen haave vuodelle 2048. Esiin nousee kuitenkin jatkuvasti lisääntyvän informaation käsittelyyn liittyvä ongelma. Elokuvan keskivaiheilla Lappalainen ja Haavisto keskustelevat asiasta:

- Jos sinä olisit elänyt 1800-luvulla, sinusta olisi jäljellä korkeintaan joku maalaus. Saara Turusesta sen sijaan on olemassa lehtitietoja, filmejä ... sitä paitsi valtavasti arkistotietoja. Meistä tulee olemaan vielä enemmän. Mutta mitä luulet että se hyödyttää tutkijaa?
- Tarkoitat sä, että on vaikea erottaa vääriä tietoja ja oikeita tietoja?
- Suurta tietomäärää on vielä vaikeampi tulkita kuin pientä. (Ruusujen aika 1969, 59'58")

Vaikka tietokoneohjelmat olisivat tulevaisuudessa teholtaan ”miljoonakertaisia”, kuten Kurenniemi ajattelee, ja saattaisivat tulkita hänen käsialansa vivahteita, niin jäljelle jää kysymys tuon tarkkuusluennan hyödynnettävyydestä. Mitä sillä saataisiin aikaan? Tai pikemminkin, ketä se kiinnostaisi kun tarjolla on paljon jännittävämpiä asioita? Olemme juuri ohittaneet *Ruusujen*

ajan kuvitellen tulevaisuuden, mutta matkaa vuoteen 2048 on vielä riittävästi jotta voimme halutessamme uskoa kaiken miljoonakertaistumiseen. Joitakin asioita tulemme varmasti todistamaan, sillä nyt kun mahdollisuus on olemassa eivät kaikki meistä malta pitää näppejään erossa ihmisen DNA:sta. On kokonaan toinen asia auttaako se meitä millään tavoin ymmärtämään pienenevää maailmaa ympärillämme. Minä en tiedä juuri mitään tietokoneista, mutta olen oppinut lukemaan vanhoja kirjoja. Jotenkin tuntuu siltä, että keinoälyn tapauksessa kirjat vanhenevat ripeämmin kuin ne kypsyvät.

Keinoälyä käsittelevää kotimaista, vuonna 1989 ilmestynyttä kirjaa selatessani huomasin toisen tekijän puhuvan innolla CYC-projektista, jonka tavoitteena on ”seuraavan vuosikymmenen kuluessa siirtää tietosanakirjan verran perustietoa maailmasta koneeseen ja saada se näin ymmärtämään maailman tapahtumia. Meillä on jo nyt ympärillämme kaikki se, mikä kymmenen vuoden kuluttua kiiltää uutuuttaan.” (Heinämaa ja Tuomi 1989, 264). Mainittu projekti on nyt kituuttanut neljännesvuosisadan ikään, mutta maailman tapahtumien ymmärtäminen ei ole sanottavasti edennyt. Sen sijaan me, jotka emme olettavasti ole koneita, olemme ehtineet ostaa ja nähdä monien uutuuttaan kiiltävien ohjelmisto- ja tavarasukupolvien himmenevän ennen aikojaan ja kokonaan sammuvan. Tässä suhteessa asiat ovat todellakin miljoonakertaistuneet. Mutta koneiden ja ohjelmien olemus ei ole se, että ne auttaisivat kirkastamaan ja järjestämään vanhoja ajatuksiamme.

Päinvastoin, jokainen uusi sovellus luo uusia tarpeita ja tekemisen muotoja, tuottaa aktiivisuutta ja kuhinaa, joka hämärtää arviointikykyämme aivan yhtä paljon kuin se lumoo mielikuvitustamme. Jos kerran paperittoman toimiston ajatus osoittautui kultakaivokseksi tulostinpaperin valmistajille, niin mitä meidän tulisi odottaa kunnianhimoisempien oivallusten kohdalla?

Tulevaisuus taskussani

Erkki Kurenniemi ansaitsee visionäärin tittelin kun puhutaan digitaalisesta teknologiasta. Eräs hänen tarkimmista ennustuksistaan näyttäisi olevan kuudes kappale artikkelissa *Message is Massage* vuodelta 1971. Siinä hän manifestoi tulevaa henkilökohtaista laitetta, johon kaikki on pakattu yksiin kuoriin. Laitteessa yhdistyvät useimmat apuvälineemme ja media (tietokone, televisio, puhelin ja videopuhelin, radio, ääni- ja kuvanauhuri, leikkauspöytä, kirja, lehti, sanomalehti, kirjasto, koulu, postitoimisto, pankki, sähköurut, puhelinvastaaja, radiopuhelin, elokuvateatteri, teatteri, kirjoituskone, laskin, kalenteri, muistikirja, kello, kamera, mikroskooppi, teleskooppi, työpaikka, viihde, ihmissuhteet, valokuva-albumi, museo, taidenäyttely) (Kurenniemi 1971, 36-38). Kurenniemi ei puhu mitään tämän laitteen koosta, eikä ole todennäköistä että edes hän olisi 1971 uskonut kantavansa tuota kaikkea taskussaan.

Ruusujen ajan tulevaisuudessa vastaava henkilökohtainen laite oli vielä kirjoituspöydän kokoinen. Todellisessa elämässä Kurenniemen täytyi odottaa vielä kolme vuotta ennen kuin hän saattoi ostaa ensimmäisen kädessä pidettävän ja nestekidenäytöllä varustetun elektronisen laskimensa. (Kurenniemi 1974) Vuonna 1974 tämä yksinkertainen Sharp-merkkinen laite maksoi yli 400 tulevaisuuden euroa, mutta osasi vain laskea yhteen, vähentää, jakaa ja kertoa; kaikki vähänkin monimutkaisempi työ täytyi edelleen tehdä laskutikulla. Noihin aikoihin tulevaisuus näytti leijuvan lähempänä kuin todellisuudessa oli – aiemmin *Message is Massage* -tekstissä Kurenniemi esittää idean ”taskutietokoneesta”, jossa olisi videokamera ja pieni näyttöruutu. Tämä olisi taiteilijan työkalu vuonna 1983, hän kirjoittaa. Kahdenkymmenen tai kolmenkymmenen vuoden virhearvio on yleistä tällä alalla, jossa toiveajattelu on vallitseva olotila. Visio itsessään sen sijaan on osoittautunut hämmästyttävän täsmälliseksi.

Se, mitä Kurenniemi toimitti vuoden 1971 artikkelissaan (itse asiassa pelkkä epäyhtenäinen kokoelma katkelmia) lukeutuu laajempaan futurologisen kirjoittamisen alaan, joka oli yleistä tuohon aikaan. Otan esiin vain kaksi kirjaa: Kahnin ja Wienerin *The Year 2000. A framework for Speculation on the Next Thirty-Three Years* vuodelta 1967 ja sen kolme vuotta myöhemmin ilmestynyt kotimainen vastine, Haikaran toimittama *Suomi vuonna 2000*. Molemmat kirjat tarjoilevat laajemman näkymän tulevaisuuden yhteiskuntaan ja jättävät sen vuoksi laitteiden

pohdinnan vähemmälle kuin Kurenniemi. Trendit ovat kuitenkin täsmälleen samat, eikä Kurenniemi juurikaan vaikuta yksinäiseltä profeetalta; suurin osa siitä mitä hän kirjoittaa on peräisin painetuista lähteistä. Koko aktiivisen työuransa ajan Kurenniemi oli innokas lukija, joka seurasi tieteellisen kehityksen ja spekuloinnin eri uria (kuten myös tieteiskirjallisuutta) englanninkielisistä lähteistä. Tämä huomattava *input* usein piti hänet pari askelta edellä suomalaisia kollegojaan, varsinkin taiteilijoita.

Kahnin ja Wienerin käyttämät lähteet suhtautuivat hyvin optimistisesti tietokoneiden tulevaan kehitykseen. Niinpä kirjoittajat saattoivat julistaa, että vuoteen 2000 mennessä tietokoneet luultavasti tavoittavat, simuloivat tai peräti ohittavat joitakin ihmisen ”ihmismäisimmistä” älyllisistä kyvyistä, mukaan lukien kenties joitakin hänen esteettisistä ja luovista kyvyistään. (Kahn ja Wiener 1967, 89) Vuosiluku 2000 oli ladattu täyteen lupauksia ja jännittävää taikaa, mutta kun vuosituhannen vaihde lähestyi pettymykset alkoivat kasaantua. Etenkin avaruuslentojen kohdalla kaikki tuntui latistuvan odotusten vastaisesti, ainakin kun asiaa katsoi 1960-luvun lopun perspektiivistä, jolloin lento kuuhun ja elokuva *2001 – Avarusseikkailu* tuntuivat viitoittavan tietä. Kenties kitkeryyteni pohjautuu siihen, että en koskaan saanut haluamaani tilaisuutta ryhtyä avaruuslentäjäksi. Sen jälkeen oli pelkkä makuasia, josko helmikuussa 2000 ensi kerran esitelty tietokonepeli *The Sims*

pelkästään simuloi vai peräti ylitti älyllisen kapasiteettimme. Tietokoneet saavuttivat totta kai uusia huippuja, mutta tapa jolla ne tosiasiaassa muuttivat maailmamme oli aivan muuta kuin Kahn ja Wiener olivat kertoneet vuonna 1967. Se, mitä he sen sijaan ennustuksessaan päättelivät on nyt entistäkin kiinnostavampaa: "Mikäli ilmenee, että ne [tietokoneet] eivät kykene kopioimaan tai ylittämään eräitä luonteenomaisesti inhimillisiä kykyjä, tulee se olemaan yksi kahdennenkymmenennen vuosisadan merkittävimpiä löytöjä." (Em.) Kuinka onnetonta ja surullista, ettei Nobel komitea vuonna 2000 huomannut tätä asiaa. Kolme vuosikymmentä aiemmin Kurenniemellä oli ollut sormensa ajan hermolla ja hänen 1971 yleislaitteensa ominaisuuksissa pistävät nyt silmään sanat "viihde" ja "ihmissuhteet". Enimmäkseen juuri näillä alueilla "ihmismäiset" kykymme ovat löytäneet uuden tietokonepohjaisen kotimaansa. Sen sijaan, että pyrittäisiin korkeampiin älyllisiin päämääriin suuri osa tietokoneiden laskuvoimasta käytetään pitämään meidät puuhakkaina pelien, musiikin, filmien, omakehujen, jutuskelun, juoruamisen ja pornografian parissa. Viimeksi mainittua sivuttiin häveliäästi myös *Ruusujen ajassa*, missä Saara Turunen, keskiverto historiallinen henkilö, vietti kaksoiselämää. Historioitsija Arto Lappalainen haastattelee vanhaa miestä, joka tunsu Saaran aikoinaan 1970-luvulla.

- Niin, hän piti filmauksesta ja minä kuvasin häntä vähän [ottaa taskustaan pienen filmikelan] ... tässä on muutama ... mutta luottamuksellisesti, kun te nyt tutkitte häntä.
- Totta kai, totta kai...

Myöhemmin Lappalainen katselee filmejä ja puhuu kollegalleen.

- Vanha hyypiö. Tällä materiaalilla me voisimme vieläkin kiristää häntä jos haluaisimme.
- Ei kai näitä voi käyttää?
- Tietysti voi ... totuus ennen kaikkea. (Ruusujen aika 1969, 39'40")

Kuoleman jälkeen

Kirjansa *Tunnustuksia* alussa Jean-Jacques Rousseau kirjoittaa, että kertomalla kaiken elämästään hän on ryhtynyt tehtävään, joka on vailla esikuvaa. Seuraavassa hengenvedossa hän tunnustaa ihastuneensa omaan ainutlaatuisuuteensa: ”En ole luonnostani samanlainen kuin yksikään ihminen, jonka olen nähnyt; uskallan luulla, etten ole samanlainen kuin yksikään toinen elävä ihminen.” (Rousseau 1965, 7) Kuvitteellinen vuoden 2048 Tietokone-Kurenniemi saattaisi lausua jotakin

samankaltaista, olisihan hän tosiaan ainutkertainen tulema Andy Warholin vanhasta hokemasta ”Haluan olla kone”. Mutta tässä kohdin tarinassa on pari mutkaa. Sillä miten tietokone joka läpäisee Turingin testin voi olla tietoinen siitä, että on kone? Kurenniemi ja muut hänen kaltaisensa tuntuvat ajattelevan, että se lakkaisi olemasta kone ja astuisi sen sijaan askeleen ylemmäs elovuution portaita muodostaen uudenlaisen elämänmuodon. Olkoon siis niin, mutta jos se todella on uudenlainen järjellinen kokonaisuus, jolla on enemmän laskentavoimaa kuin meillä, niin miksi ihmeessä se vähäänkään välittäisi Kurenniemen alkeellisista muistiinpanoista ja muistoista? Mitä sen pitäisi tehdä hänen halvoilla viinipulloillaan, sätkillään, porsaanleikkeillään ja seksin nälällä, kaikella sillä ei-niin-älyllisellä arkielämällä, joka kertoo ruumillisen olemassaolomme surumielisestä todellisuudesta? Mitä sen pitäisi ajatella Kurenniemen hengentuotteesta *Graph Field* –teoriasta, joka on yhtä syvällistä kuin tuijottaa pilvessä nenä kiinni vanhaa putkitelevisiota?

Minusta tuntuu – pitäen mielessä etten tiedä mitään tietokoneista – että 2048-projekti voisi säilyä hengissä vain niin kauan kuin tietokone pysyy horteessa, toisin sanoen koneena joka pyörittää ohjelmaa pikemmin kuin kirjoittaa niitä. Yksi mahdollinen Kurenniemen ylösnousemus saattaisi sitten olla nuhjuinen näyttelyesine museokahvilan nurkkapöydässä, kitisevä tietokone, joka voitaisiin kytkeä päälle erityisissä tilaisuuksissa,

kuin vanha hippi, joka hitaasti havahtuu kiertoradallaan kuullessaan tutun kappaleen soinnut.

”On tietysti myös tulevaisuuteen suuntautuneita taiteilijoita, jotka katsovat olevansa myötävaikuttajia kehitystä todella eteenpäin vievässä prosessissa. Virhe voi tällöin piillä siinä, että he samastuvat tulevaisuuteen, josta he tietävät aivan liian vähän.”, kirjoitti Marika Hausen vuonna 1970 teoksessa *Suomi vuonna 2000*. (Haikara 1970, 125) Hänen visionsa ei ole lennokas kuva tietokonetulevaisuudesta, vaan jotakin joka edelleen, yli neljäkymmentä vuotta myöhemmin kuulostaa hyvältä ennustukselta.

Ajan kaari menneisyydestä tulevaisuuteen (ja takaisin) taipuu yllättäen ja kauniisti Helsingissä syksyllä 2013. Rinnakkain Kurenniemen Kiasman näyttelyn avautumisen kanssa ilmestyy sattumalta suomennos Thomas Pynchonin kuuluisasta romaanista *Gravity's Rainbow*. Alkuteos ilmestyi vuonna 1973 ja Kurenniemi luki sen seuraavana syksynä. Hän lienee yksi harvoja suomalaisia, jotka kirjaan tuolloin tarttuivat. Kotimaisissa kirjallisuuspiireissä Pynchonista alettiin keskustella vasta kaksi vuosikymmentä myöhemmin. (Varhaisin silmiini osunut suomenkielinen artikkeli Pynchonista on vuodelta 1992.) Joka suuntan rönsyilevän 760-sivuinen romaanin loppuunvieminen on jo saavutus sinänsä, vaikka Kurenniemi ei sen sisällöstä mitään päiväkirjalleen toteakaan. (Kurenniemi 1974) Kun nyt

pitelen kirjaa kädessäni pohdin, että ehkä mieleen jääkin
parhaiten romaanin aloittava lainaus Werner von Braunilta.

Luonto ei tunne tuhoutumista; se tuntee vain muutoksen.
Kaikki mitä tiede on minulle opettanut, ja yhä opettaa,
vahvistaa uskoani henkisen olemassaolomme jatkumiseen
kuoleman jälkeen. (Pynchon 1973, 1)

Erkki Kurenniemen elektronimusiikki

Kai Lassfolk

Erkki Kurenniemen aktiivisin kausi elektronimusiikin parissa ulottui 1960-luvun alusta 1970-luvun puoliväliin. Tuona aikana hän teki lukuisan määrän elektroakustisia sävellyksiä, elokuvamusiikkia ja -tehosteita, laitekokeiluja, kollektiiviteoksia sekä studion materiaalinauhoja muiden säveltäjien käyttöön. Monet hänen äänityksistään saivat sävellyksen tai teoksen aseman vasta 2000-luvulla muiden henkilöiden toimittamien levyjulkaisujen kautta. Kurenniemi on itse luonnehtinut itseään paremmin soitinrakentajaksi kuin säveltäjäksi ja kuvaillut musiikkiaan vaatimattomasti "laitetestaukseksi". Silti viimeaikainen kasvava kiinnostus Kurenniemen musiikkia kohtaan osoittaa osaltaan, että hänen äänityksillään on puhtaasti musiikillista arvoa.

Kurenniemen elektronimusiikkikappaleet voidaan jakaa karkeasti kolmeen kategoriaan: 1) synteettiset tai synteettisen kaltaiset teokset, 2) nauhakollaasit, sekä 3) soitinkokeilut ja -esittelyt. Synteettisesti tuotettu tai siltä kuulostava ääni on pääosassa Kurenniemen musiikissa. Hän ei kuitenkaan systemaattisesti dokumentoinut kappaleiden toteutusprosessia, joten kaikkien kappaleiden äänilähdettä ei varmuudella tiedetä. Valtaosa

materiaalista on kuitenkin peräisin hänen omista soittimistaan. Nauhakollaaseissa äänimateriaali koostuu pääosin valmiista, alun perin muuhun tarkoitukseen tehdyistä äänitteistä, esimerkiksi klassisista musiikkikappaleista tai Kurenniemen omista äänityksistä. Soitinkokeiluiksi ja -esittelyiksi voidaan luokitella kappaleet, jotka on tehty vastikään valmistuneella tai rakenteilla olleella soittimella, tai soittimen esittelemiseksi yleisölle.

Harvaa kappaletta voidaan kuitenkin sijoittaa yksiselitteisesti vain yhteen kategoriaan, vaan useimmiten niissä on piirteitä jopa kaikista kolmesta kategoriasta. Esimerkiksi yhdessä Jukka Ruohomäen kanssa tehty, etupäässä nauhakollaasiksi luokiteltava *Mix Master Universe* (versiot I-III 1973) sisältää synteettistä äänimateriaalia, joka on äänitetty varta vasten tätä kappaletta varten. Muita nauhakollaaseja ovat esimerkiksi *Death* (versiot I-III 1972-75) ja *Virsi* (1970). Synteettisiä tai synteettisen kaltaisia teoksia edustavat *On-Off* (1963), *Saharan uni* (osat I ja II, 1967) ja *Preludi* (1970). Soitinesittelyjä edustavat puhtaimmillaan Dico-syntetisaattorilla tehty *Improvisaatio* (1969) ja DIMI-A:lla Jukka Ruohomäen kanssa tehty *Inventio-Outventio* (1970). Soitinkokeiluiksi voidaan ainakin osin luokitella muun muassa Integroidulla syntetisoijalla tehty Hyppy-elokuvan musiikki (1964) ja Andromatic-syntetisaattorilla tehty *Antropoidien tanssi* (1968).

Vaikka Kurenniemi työskenteli aktiivisimman kautensa pääosin Helsingin yliopiston studiossa, häntä ei voida suoraan sijoittaa mihinkään akateemiseen elektroakustisen musiikin koulukuntaan, varsinkaan saksalaiseen elektronisen musiikin tai ranskalaisen konkreettisen musiikin tyyliin. Kenties lähimpinä vertailukohtina voidaan pitää San Francisco Tape Music Centerin säveltäjäkuntaa, erityisesti heidän improvisaatiolähtöisyyttään ja tapansa käyttää studiota soittimena.

Kurenniemen musiikillista työskentelytapaa on usein kutsuttu impulsiiviseksi. Kappaleet syntyivät usein, ellei aina, yhdessä päivässä, varhaisteos *On-Off:in* (1963) ja *Improvisaation* tapauksessa jopa reaaliaikaisena musisointina. Impulsiivisuus on kuitenkin vain yksi piirre, joka korostuu monissa yksittäisissä kappaleissa. Hänen musiikkituotantoaan kokonaisuutena leimaa toisaalta tietty tyyllinen koherenssi. Koherenssia tuovat esimerkiksi ostinato-osuudet, joita ei kuitenkaan venytetä minimalistisen musiikin mittoihin, vaan katkaistaan tai muunnellaan rajusti ja impulsiivisesti. Toinen yleinen tyylipiirre on kahden äänellisen elementin kontrasti, vuoropuhelu tai rinnakkaisuus. Tästä ovat esimerkkeinä *On-Off:in* urkupistemäinen taustakohinatekstuuri ja tämän päälle soitetut rajut äänieleet sekä *Preludin* ostinatokuvio ja tämän lomassa soiva hitaasti liikkuva äänigeneraattorin ääni.

Vaikka Kurenniemeä on usein kutsuttu teknologian visionääriksi, häntä voidaan pitää myös musiikillisena visionäärinä. Vaikka

hänen yksittäiset kappaleensa näyttäytyvät usein impulsiivisina tuotoksina, hänen koko tuotantonsa muodostaa systemaattisen kehityskaaren. Kappaleiden monet yksittäiset piirteet assosioituvat nykykuulijassa helposti moderneihin musiikkityyleihin, eritoten elektronisen populaarimusiikin ilmaisuun. Kurenniemi tuskin yritti tarkoituksella tehdä “tulevaisuuden musiikkia”, mutta musiikkiteknologian edelläkävijänä hän oli hyvin tietoinen siitä, millaiseen suuntaan teknologian kehitys musiikkia ja musiikkituotantoa vie. Käyttäessään välineistöä, jolla oli yhteisiä piirteitä nykyaikaisten musiikkituotantovälineiden kanssa, hän myös intuitiivisesti teki samankaltaisia ratkaisuja ja päätyi samankaltaiseen musiikki-ilmaisuun kuin monet myöhemmät musiikintekijät. Kurenniemelle ominainen metrinen toisteisuus ja sen toteuttaminen digitaalisen sekvensoinnin avulla ovatkin esimerkiksi konemusiikin tunnusmerkkejä.

Erkki Kurenniemen elektronimusiikkistudio

Mikko Ojanen

Helsingin yliopiston musiikkitieteen laitoksen lukuvuonna 1961–62 vastavalittu professori Erik Tawaststjerna halusi pysyä modernien eurooppalaisten trendien tasolla ja päätti, että laitoksella olisi syytä olla elektronimusiikkistudio. On todennäköistä, että musiikkitieteen opiskelijoilla Erkki Salmenhaaralla ja Ilkka Oramolla oli oma osuutensa päätöksen taustalla. Studiota suunnittelemaan ja rakentamaan kutsuttiin ydinfysiikan opiskelija Erkki Kurenniemi – Salmenhaaran ja Oramon kouluaikainen ystävä. Laitos maksoi tarvittavat työvälineet ja komponentit, mutta Kurenniemi ei saanut työstään palkkaa, vaan toimi niin kutsuttuna voluntääriassistenttina.

Ensimmäisen, melko konventionaalisen nauhamusiikkistudion laitteiden hankinnan, rakentamisen ja kytkennän jälkeen Kurenniemi alkoi keväällä 1964 toteuttaa kokonaisvaltaisempaa studiosuunnitelmaansa. Tätä suunnitelmaa hän oli työstänyt noin kahden vuoden ajan – muun muassa osittain yhteistyössä säveltäjä ja avantgardetaiteilija Henrik Otto Donnerin (1939–2013) kanssa. 1960-luvun alkuvuosina Donner kiersi aktiivisesti Euroopassa ja työskenteli lähes kaikissa alan keskeisissä sävellyskeskuksissa. Vaikka Kurenniemi työsti studiosuunnitelmaansa lähinnä kirjallisuuden ja saatavilla

olevien elektroniikkakomponenttien pohjalta, myös Donnerin kokemukset eri studioista olivat Kurenniemen käytettävissä. Donner ei itse ollut kiinnostunut elektroniikasta, mutta kylläkin laitteiston soivasta lopputuloksesta ja äänen elektronisista muokausmahdollisuuksista. Yliopiston studion alkuvuosina Donner ja Kurenniemi muodostivatkin tehokkaan tuotantoryhmän, jossa Kurenniemi teki kokeiluja laitteistolla ja Donner kommentoi lopputulosta. Yksi tärkeimmistä Kurenniemen ja Donnerin yhteistyökumppaneista oli kuvataiteilija Eino Ruutsalo(1921–2001), jonka kokeellisten elokuvien ääniraitoja työstettiin myös yliopiston studiossa (muun muassa Donnerin nauhakollaasi elokuvaan *Kaksi kanaa* 1962 sekä Ruutsalon ja Kurenniemen elektronimusiikki elokuvaan *Hyppy* 1965). Muita varhaisia studiossa työstettyjä teoksia ovat Kurenniemen *On-Off* (1963), joka on ensimmäinen studiosta säilynyt teos, sekä Salmenhaaran *White Label* (1963).

Kurenniemen kunnianhimoinen studiosuunnitelma poikkesi eurooppalaisista valtavirran studioista. Täysin ainutlaatuinen Kurenniemen suunnitelma ei kuitenkaan ollut, vaan esimerkiksi Tukholman elektronimusiikkistudiota suunniteltiin samansuuntaisten ajatusten pohjalta – tosin paria vuotta myöhemmin. Kurenniemi oli kiinnostunut algoritmisesta säveltämisestä, jossa kone tuottaa musiikkia annettujen ohjeiden mukaan automaattisesti. Tämän idean taustalla on nähtävissä Harry Olsonin ja Herbert Belarin jo 1950-luvulla suunnittelema

reikänauhalla ohjelmitava RCA-syntetisaattori. Toisaalta Kurenniemi toimi ydinfysiikan laitoksen vastahankitun analogiatietokoneen ohjelmoijana. Myös nämä kokemukset tietokoneen parissa inspiroivat häntä suunnittelemaan omaa studiokokonaisuuttaan automaattisen, digitaaliohjatun musiikkitietokoneen pohjalta. Idea studiosta ohjelmitavissa olevana, automaattisena musiikin tuotantokoneena voidaan nähdä toistuvan Kurenniemen sähkösoittimissa, joita hän rakensi vuosina 1964–1975.

Kurenniemi ylläpiti yliopiston studiota 1970-luvun alkuun saakka. Vuonna 1970 hän perusti Digelius Electronics Finland -yhtiön valmistamaan sähkösoittimia ja hänen panoksensa yliopistolla väheni. Työtä yliopiston studion ylläpitäjänä jatkoi Kurenniemen läheinen työtoveri säveltäjä Jukka Ruohomäki. Kurenniemen yhteistyö elektroakustisen musiikin säveltäjien ja artistien kanssa jatkui aina 1980-luvun alkuun saakka.

Soitinsuunnittelijana Kurenniemi on varhainen esimerkki soitinhakkerointi- ja tee-se-itse -toiminnasta, joka muotoutuu koko ajan aktiivisemmaksi, järjestelmällisemmäksi ja laajemmaksi harrastuksen muodoksi nykypäivän äänitaiteesta kiinnostuneiden piirissä. Kurenniemi teki soitinsuunnittelussaan keksintöjä, jotka innovaatioiksi kehittyessään olisivat toimineet sähkösoitinsuunnittelun merkittävänä virstanpylväinä. Kurenniemen työtä on useissa yhteyksissä luonnehdittu viimeistelemättömäksi – joissain tapauksissa sitä on tulkittu

myös virhe-estetiikan ja jopa epäonnistumisen näkökulmasta. Hänen studiokehittelynsä ei myöskään koskaan varsinaisesti tullut valmiiksi, vaan studio oli kaiken aikaa muutoksen ja uuden kehittelyn alla. Tarkasteltaessa Kurenniemen käyttöliittymäsuunnittelua, sekä esimerkiksi sekvensserien ja digitaalisen muistin kehittelyä, hänen työnsä näyttäytyy kuitenkin pitkäjänteisenä ja loogisena – vaikkakin impulsiivisena – suunnitteluprosessina studiosuunnittelun alkuajoista aina 1970-luvun puoleen väliin saakka.

Elektroakustisen musiikin saralla yliopiston studio toimi alan keskeisenä sävellyskeskuksena aina 1970-luvun puoleen väliin saakka. Toiminta jatkuu edelleen ja viimeaikaisen kiinnostuksen myötä Kurenniemen varhaiset soittimet on restauroitu käyttökuntoon. Monet alan toimijat jatkavat työssään Kurenniemen jalanjäljissä. Voidaan jopa ajatella, että varhaisena pioneerina Kurenniemi onnistui siinä missä muut epäonnistuivat tai eivät edes uskaltaneet yrittää. On todennäköistä, että ilman Kurenniemen soitin- ja studiokehittelyä ala Suomessa olisi ollut mitätön.

Erkki Kurenniemen elektronisen musiikin soittimet 1960- ja 1970-luvuilta

Jari Suominen

Erkki Kurenniemi suunnitteli ja rakensi 1960- ja 1970-luvuilla joukon soittimia, jotka olivat suunnitteluratkaisuiltaan ja teknologialtaan huomattavasti aikansa valtavirrasta poikkeavia. Vuosien varrella näistä soittimista on kirjoitettu lukuisia artikkeleita. Lähdekriittisiä artikkeleita on kuitenkin julkaistu ainoastaan muutama. Tämä artikkeli luo yleiskuvan soittimista nykyisen tutkimuksen valossa.

Erkki Kurenniemen soitinrakentajan ura käynnistyi lukuvuotena 1963-1964, jolloin hän aloitti Helsingin yliopiston musiikkitieteen laitoksen studioon tarkoitetun integroidun studiolaitteiston kehitystyön. Jälkeenpäin tähän laitteistoon on tavallisesti viitattu nimellä Integroitu syntesoiija. Vuodesta 1967 alkaen Kurenniemi suunnitteli ja rakensi soittimia mittatilaustyönä. Vuonna 1968 valmistuivat Sähkökvartetti M.A. Nummiselle ja Andromatic Ralph Lundstenille sekä vuonna 1969 Dico Osmo Lindemanille. 1960- ja 1970-lukujen taitteessa soittimien kehitystyö siirtyi Digelius Electronicsiin ja soittimia alettiin suunnitella teollisesti tuotettaviksi - huonolla menestyksellä. Kaikki Digeliuksen alaisuudessa valmistetut soittimet olivat nimeltään Dimi (Digital Music Instrument): Dimi-

A (1970), Dimi-O (1971), Dimix (1972), Dimi-S (1972), Dimi-T (1973) ja Dimi-6000 (1975). Soittimia Dimi-A, Dimi-S ja Dimi-6000 valmistettiin kutakin kaksi kappaletta, muita malleja ainoastaan yksi prototyypiksi luonnehdittava versio.

Kurenniemen soittimissa hyödynnetään laajalti digitaalitekniikkaa. Niillä ei kuitenkaan ole paljoakaan tekemistä tämän päivän digitaalisten syntetisaattorien kanssa. Tyypillinen Kurenniemen käyttämä äänisynteesimenetelmä käyttää korkeataajuisia kanttiaalto-oskillaattoria, jonka signaali syötetään digitaalisen taajuusjakoverkon läpi ja lopuksi suodatetaan ali- tai kaistanpäästösuotimilla. Menetelmä on läheisempää sukua perinteiselle subtraktiiviselle analogiselle äänisynteesille kuin vaikkapa digitaaliselle PCM-synteesille tai edes digitaalisille DCO-oskillaattoreille, joita alkoi ilmestyä syntetisaattorilaitteistoihin 1970-luvun lopulle tultaessa. Digitaalipiirien runsas hyväksikäyttö liittyikin äänisynteesin sijaan Kurenniemen mielenkiintoon automatisoida musiikin tuotantoa ja studiotyöskentelyä. Musiikin teoria esittää musiikin loogisena järjestelmänä, jolloin sen tuottaminen digitaalisten logiikkapiirien avustuksella on suhteellisen johdonmukaista. Esimerkiksi melodioiden generointi ja transponointi on suoraviivaista Kurenniemen soitintopologiassa.

Ensimmäisestä suunnittelemaastaan soittimesta alkaen Kurenniemi dokumentoi rakentamiensa soittimien kytkennät. Dokumentaatiot sisältävät erilaisia hahmotelmia,

komponenttilistoja sekä ajastus-, kytkentä- ja lohkokaavioita. Useimpien soittimien kohdalla dokumentaation avulla olisi mahdollista rakentaa soittimesta uusioversio. Kahden laitteen, Dimi-A:n ja kytkentäpöytä Dimix:in dokumentaatiot ovat tällä hetkellä kadoksissa. Muiden laitteiden osalta alkuperäisiä dokumentaatioita säilytetään Helsingin yliopiston musiikkitieteen laitoksen studion kokoelmissa ja Kuvataiteen keskusarkiston kokoelmissa.

Kurenniemen soittimet ovat tällä hetkellä sijoitettuina viiteen eri paikkaan. Merkittävin kokoelma on Helsingin yliopiston musiikkitieteen laitoksen studiossa, jossa ovat Integroitu syntesoija, M.A. Nummisen omistama Sähkökvartetti, Dico, Dimi-A, Dimix ja Dimi-6000. Säveltäjä Ralph Lundstenin Ruotsissa, Tukholman läänissä sijaitsevan Andromeda-studion kalustoon sisältyvät Andromatic, Dimi-O ja Dimi-S. Aiemmin Lundstenin studion laitteistoon ovat kuuluneet myös Dimi-A, toinen Dimi-S ja Dimi-6000, joista Dimi-A:n Lundsten vuonna 1978 lahjoitti Tukholman Musik- och teatermuseetin kokoelmiin. Dimi-S:n hän vuonna 2007 möi Nykyaiteen museo Kiasman kokoelmiin Helsinkiin. Lundstenin Dimi-6000:n käyttöaika jäi olemattomaksi, mutta laitteen jäänteet löytyvät yhä Andromeda-studion räkistä. Dimi-T on vuokrattu määräämättömäksi ajaksi Oslon yliopiston psykologian laitokselle.

Tällä hetkellä Kurenniemen soittimista on aktiivisessa käytössä Sähkökvartetti, Andromatic, Dico, musiikkitieteen studion Dimi-A, Dimi-O sekä molemmat Dimi-S:t. Loput soittimet eivät ole toimintakunnossa, mutta ainakin Dimi-T:n ja Integroidun syntesoijan generaattoriyksikön restaurointi on suunnitteilla. Tukholman Musik- och teatermuseetissa sijaitsevan Dimi-A:n kunnosta ei tällä hetkellä ole varmuutta.

Writers

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Jari Suominen is a musician and an artist, lives and works in Turku, Finland. Currently he is an active member of the electronic psych group Shogun Kunitoki, psychedelic power duo Jarse and Kiila, one of the motherships of Finnish forest folk underground.

Besides his work as musician he has been creating, designing and building installations, electronic gadgets and software himself and to (/with) others. He is most comfortable exploring themes of minimalism, psychedelia and naive misuse of technology in different contexts. He is also doing research on history and technology of Finnish synthesizers by Erkki Kurenniemi and performed by using them as a member of DIMIs Reconnected.

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