
everythingispossibleexceptthatwhichisdeemedimpossiblebythenatureofthings

This bulletin is composed from two primary sources, both written by Lars Bang Larsen: "A History of Irritated Material, Pyschedelic Concepts in Neo-Avant-Garde Art," his PhD dissertation (2011), and "Anti-Disciplinary Feedback and The Will to Effect," in *Mute* magazine (2011).

Cover image: Liam Gillick, *Monument to Democracy*, 2011/2012. Courtesy Air de Paris. 150 such monuments are available via castillo/corrales as individual digital pigment prints on Archival matt superior coala 180g Antalis, 80 x 60 cm, printed by Studio Bordas.

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Consider the feedback whine.

The first use of audio feedback on a commercial recording is probably the phasing intro to The Beatles' "I Feel Fine" (1964). According to Paul McCartney, the plucked A-string and its feedback loop were a lucky studio accident:

John had a semi-acoustic Gibson guitar. It had a pickup on it so it could be amplified … We were just about to walk away to listen to a take when John leaned his guitar against the amp. I can still see him doing it … it went, "Nnnnnnwahhhhh!" And we went, "What's that? Voodoo!" "No, it's feedback." "Wow, it's a great sound!" George Martin was there so we said, "Can we have that on the record?"… It was a found object, an accident caused by leaning the guitar against the amp.

The same year composer Robert Ashley used feedback in his 20 minute-long composition, *The Wolfman Tape*: a high frequency "full room feedback." The sound equipment was tuned to a pitch that encompassed the entire space, enveloping the listeners in it, allowing "even the smallest sound at the microphone to take on the illusion of moving around the room, depending on frequency and other aspects of the microphone sound." In the music of the next years, more feedback followed.

An arsenal of apparatuses was used to manipulate these sounds, from fuzzboxes and flangers to the *Echogeräte* (echo effect boxes) that Krautrockers Guru Guru listed among their instruments. Jimi Hendrix, for one, excelled in the overdriven sound, making frequent use of feedback as a coloring effect as well as a way of building up to an atonal, transcendent climax at the end of gigs. Hendrix, the proto-guitar god, could even be said to play from INSIDE his guitar—or, more properly, inside the loop from his electric guitar to its amplifier back to the guitar. Meanwhile, The Red Krayola began their concerts with a half hour of feedback, and the Grateful Dead devoted a brief section of their live shows to a feedback-driven composition. Other bands—including the Velvet Underground and The 13th Floor Elevators—would finish their gigs with their instruments leaning against the amps, playing on their own like they were alive.

Circuit-bending acid rock feedback became a kind of sonic meta-strategy. As a disaster of melody, it fulfilled the proverbial parental complaint of rock'n'roll as "just noise," producing an anarchic sense of freedom for those who stayed and listened. Lou Reed said of his feedback-only double album from 1975, the conceptual apex of experiments started with Velvet Underground in the 1960s: "Once you hear *Metal Machine Music* it frees you up. It's been done—now you can do anything."

As a pure noise effect, feedback subverted a given band's particular sound. Even if the guitarist could attain some level of control of the feedback's frequency and amplitude (by filtering the feedback path with the strings, or by shaking the instrument in front of the amplifier), she was forced to the periphery of the soundscape. Intentionality and self-expression are dethroned. All that's left is a sound beyond noise, repeating and repeating, tumbling and cascading in waves back on itself. The amplifying system has become a cosmos that creates its own music.

As amplifications of the sound were themselves amplified, oscillations in the flow of sound-material opened up the biological theatre of the listener's body. Feedback became a viral or an unclean signifying structure —balanced between sign and material, control and letting go. A sign is by definition something that is repeatable. But as an impure repetition, this feedback is a mockery of the sign's ideality: it *repeats a source by turning it into something else,* or acknowledges this source by displacing it. It is a sign because it is communicated, and material because it is sensorial— audible AND haptic—and activates the plasticity of the listener's nervous system. It is, at the same time, new and old, integration and discontinuity, overload and emptiness. As it mutates, it answers with a voice it borrowed from you in the first place.

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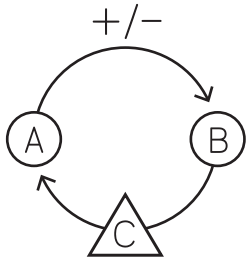
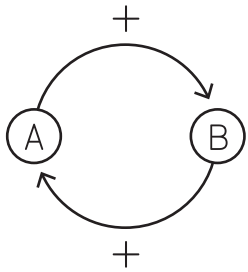
Consider the feedback whine.

MIT professor Norbert Wiener describes two discrete flavors of feedback in his 1947 book *Cybernetics*. One form maintains equilibrium and preserves circulation through maximum adaptability. This is NEGATIVE feedback. It's schematically drawn like this:



In a NEGATIVE feedback loop, C (control) reads the current value of B (output), compares this to an ideal value, then instructs A (input) to send either a higher or lower signal to B. This produces a new value which C reads again and so on. In an air-conditioned room, for example, the thermostat (C) reads the current temperature (B), which is then compared against an ideal value, corrections are made (A) and more or less cold air is pumped in. The new temperature is read and the negative feedback loop continues, the room reaching something close to a constant temperature, or adaptive equilibrium.

POSITIVE feedback, on the other hand, works *against adaptability.* To produce positive feedback, one simply removes the control functions that are otherwise located where the information loop would meet itself to control its dynamic behavior. It looks something like this:

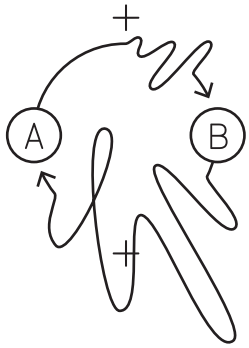


In the diagram above, there is no C to interrupt the continuous escalation of the loop: A increases B which increases A which increases B …
No self-regulating decision maker exists in the loop, and more action leads only to more action, indefinitely. Philosopher Manuel De Landa offers an easy image:

The turbulent dynamics behind an explosion are the clearest example of a system governed by positive feedback. In this case the loop is established

between the explosive substance and its temperature. The velocity of an explosion is often determined by the intensity of its temperature (the hotter the faster), but because the explosion itself generates heat, the process is self-accelerating. Unlike the thermostat, where the arrangement helps to keep temperature under control, here positive feedback forces temperature to go out of control.

The principal characteristic of negative feedback in the thermostat example is its HOMOGENIZING effect; all deviations are filtered and eliminated. Positive feedback instead, as De Landa explains, "tends to increase heterogeneity, as small original differences are amplified by the loop into large discrepancies." So the diagram actually ought to look something more like this:



Clearly audio feedback's explosive, ever-increasing dynamics is a prime example of a positive feedback loop. But because of its self-generative properties, it can also be described as a kind of organism. This is a rather different embrace of the positive feedback than the cybernetic rejection of destabilization, discrepancy, lack of control. It turns out that the accelerated, uncontrolled feedback *produces life* (and by extension, the increased homogeneity and homogenizing effects of the negative feedback are life-threatening).

Beyond being a sound beyond noise, positive feedback is also *autopoietic* —meaning self-creating, self-producing. The term, coined by biologists Humberto Maturana and Francisco Varela in their 1973 book *Autopoiesis and Cognition*, means that which is "necessary and sufficient to characterize the organization of living systems." Maturana and Varela consider cognition (or more simply, learning) to be integrally connected to self-

generation. Learning is "effective action, an action that will enable a living being to continue its existence in a definite environment as it brings forth the world. Nothing more, nothing less." By definition, then, learning is ECOLOGICAL. It requires an active correspondence with a changing environment.

Conversely, Norbert Wiener's conception of learning, which he connects directly to feedback phenomena, is internal to the system, characterized by the machine's ability to change its performance. Audio feedback, a self-generating positive and perpetual loop is, then, the sound of the amplifying system cognizing, and coming alive. It is the sound of the amplifying system *learning about learning.*

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Consider the feedback whine.

In his novel about Ken Kesey's LSD-activism, *The Electric Kool-Aid Acid Test* (1968), Tom Wolfe describes feedback as the production of a total environment with multiple sound sources. Here, Kesey and his group of Merry Pranksters prepare their infamous school bus—"Furthur"—for a stateside trip that took their acid tests on the road, "barrelling across America with the microphone picking it all up":

Sandy went to work on the wiring and rigged up a system with which they could broadcast from inside the bus, with tapes or over microphones, and it would blast outside over powerful speakers on top of the bus. There were also microphones outside that would pick up sounds along the road and broadcast them inside the bus. There was also a sound system inside the bus so you could broadcast to one another over the roar of the engine and the road. You could also broadcast over a tape mechanism so that you said something, then heard your own voice a second later in variable lag and could rap off of that if you wanted to. Or you could put on earphones and rap simultaneously off sounds from outside, coming in one ear, and sounds from inside, your own sounds, coming in the other ear. There was going to be no goddamn sound on that whole trip, outside the bus, inside the bus, or inside your own freaking larynx, that you couldn't tune in on and rap off of.

The very movement of the Merry Prankster bus became an all-encompassing, ever-renewing, mobile loop of sound-events, synchronizing everybody on and off the bus in the Pranksters' "famous reverbation configuration." The Prankster audio system hooked up several vibratory surfaces and structures: the inside and outside of the bus, the space between people, and the insides of their bodies, all of which would be compressed and stretched and fed back to the space they passed through.

Two aspects of feedback are set to work on the bus. First, feedback is modeled as a total ecology (as per Maturana and Varela) that destabilizes "conservative" cybernetic models of self-governing loops. In a simple reversal of homeostasis, the Pranksters aimed to produce disturbing information that might lead to new "liberal" understandings of the system of subjectivity itself.

One of the psychological insights of cybernetics was that people are self-corrective systems. Much like that radiator equipped with a thermostat, they protect themselves against disturbance: if external stimuli cannot be easily assimilated without internal disturbance, their self-corrective mental mechanisms will work to sidetrack and suppress them. The subject will even prefer to shut down parts of its perceptual and sensory openness to the world—its eyes, its ears, its capacity to love—in order not to be exposed.

Such ideas, voiced by Gregory Bateson and others, echo Freud's concept of a death drive that prompts the living organism towards the final stasis; the absence of desire that relieves the individual of life's tensions. Predictably, to Kesey's posse of vitalist Merry Pranksters such an anxiety-driven, self-corrective subject would be the incarnation of middle class zombiedom. But surprisingly, the cure that the Pranksters prescribed against the suburban subjectivity of non-life was ALSO essentially machinic; whoever wished to transgress the oceanic stillness of the suburbs could *lysergically* remove all functions of control and censorship of her brain and central nervous system in order to tune herself in on all interior and exterior fronts, in a ceaseless, soulful, mind-bending movement, on the road. All watched over by machines of loving grace—whether sugarcubes, micro-machines, or ecological amplifying systems—the psychedelic antics of Kesey and his Pranksters were

nothing less than an attempt at ENGINEERING a new human being the cybernetic way.

Second, questions of control and re-organization are built into the total sonic environment of the Merry Pranksters' magic bus. Feedback is used as counter-conditioning technique, something like William Burroughs's idea of a positive feedback that he called "playback" and described in his essay "The Electronic Revolution" (1970). Burroughs imagined a "biological weapon" unleashed by playing incongruous, out-of-place tape recordings in public spaces in order to break mental lines of association laid down by mass media. He saw this version of feedback as a psycho-acoustic virus that, more than just deconditioning psychological patterning, could also make sonic disturbance actual: "Playing back recordings of an accident can produce another accident." For Burroughs, the human being is no longer a time-binding animal, but engaged in developing a chaos-ophy in which all of history is unmoored and unfolded. He even titled an essay from the same year, "Feedback from Watergate to the Garden of Eden."

It is lazily accepted that the anti-authoritarianism of the hippies implied an anti-technological stance. It can't be denied that at the time there were indeed influential pastoral fantasies about dropping out and going back to nature, leaving the world of stinking machines behind for a pure and unalienated life, etc. But, the counterculture was also the site of experimentation with technology (even the psychedelic battle-cries of "turning on" and "tuning in" were essentially cybernetic). The feedback whine doesn't describe a negation of the system, but rather a way of *re-entering the system* with an intention of creating non-linear, self-reflexive dynamics by which technology can be separated from its prevailing societal tendencies and opened up to political appropriation, towards altering both the past and the future of the system.

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Consider the feedback whine.

In 1963, Finnish mathematician, nuclear physicist and musician Erriki Kurenniemi produced his first electronic work, a composition called *On-Off*. He composed this piece in the Department of Musicology at

Helsinki University, an experimental proto-digital studio he established in 1961–62. Kurenniemi describes the setup like this:

The equipment of the studio was modest: tape recorders, sound generators, and a spring echo device. The name and character of the [on-off] work refer to the acoustic phenomena that I experienced in a power plant's generator hall. The starting point for the piece was a static hum, the duration of which wouldn't [otherwise] have any creative meaning.

In a 2008 history of Finnish electronic music, Petri Kuljuntausta says that *On-Off* "sounds like the marriage of a power plant's generator and Jimi Hendrix's feedback sound." Yet, Hendrix's powerful feedback effects were only heard some four years later, in the summer of 1967.

Kurenniemi often seems to have arrived early. He collaborated with composer Terry Riley on the first Happening in Finland and with protagonists of the underground music scene in Helsinki including M.A. Numminen and Sperm. He made non-narrative short films—a kind of expanded cinema that dealt with speed, perception, and the transformation of bodies. He ran Digelius Electronics, a company that manufactured industrial microprocessors and electronic musical instruments.

Among the many instruments he designed and produced—synthesizers, effect devices, video organs, and sequencers—is the DIMI-S (1972). In order to play this "group sexophone," four performers were connected

as if to a hookah, holding electrodes and creating a transcutaneous circuit by touching each other and triggering a synthesizer. By generating changes in the electrical impulses of the players' bodies, sounds would be activated through a collective biofeedback, synaesthetically manifesting the proximity of body, emotion, and electroacoustic phenomena. His Dimi-O, an interactive video-organ from 1971, generated a similarly cross-wired feedback that transformed images into real-time sounds which were then fed back into the machine to produce colors for its screen.

But Kurenniemi's most radical project feeds himself back on himself. Until he fell ill in 2005, Kurenniemi was the archivist of his own life, creating a realtime history through the manic registration of facts and brainwaves on visual and written records, photographing incessantly, storing information on floppy disks and hard drives, filling up hundreds of hours of video and audiotapes—as well as dozens of notebooks. One notebook written in 1980 contains diary entries (meetings with people, things he has seen on TV), computer code, receipts, tickets to art exhibitions, translations of quotes (Paul Valéry, Margaret Mead), snapshots, an original drawing by the artist Olli Lyytikäinen, schema of electric circuits, a 16mm strip from an erotic film, and feverish exclamations such as "I need urgently / a beautiful body / and ugly mind / and an ugly body / and beautiful mind / I am ready, now."

On one page he lists all the girlfriends he has had; on another he's jotted down thoughts on good and evil; a severe pain in his mouth: "Vitun ikenet!" (Fucking gums!); sketches for a thinking computer called CHILD.

His notebooks compile the heuristic, the existential, and the trivial; stream of consciousness and dreams; traces of life collected in a way that any schoolboy might—yet precisely because they hoover up every detail, they are remarkably devoid of intimacy. The fact that Kurenniemi recorded his life with a pen and a tape recorder, with photos and receipts that he glued to the page, and the space all this residue takes in the basement of the Helsinki City Archive, create a melancholic frisson in relation to its imagined transfer: can material traces on cardboard and paper really be compressed and transposed into binary code? And does the virtuality of the zeroes and ones actually constitute a life?

What will happen if and when humans can be born again as pure information? Such virtual life, produced by reason, defies our imaginations. Maybe it will be a radical break that disallows the ongoing identity of the human being; maybe it will produce the effects of life in a new universal attraction between post-human subjects. In this light, Kurenniemi's self-archive can be considered akin to the intelligent ocean in Stanislaw Lem's 1961 sci-fi novel *Solaris*, which materializes the fantasies and memories of human visitors through its plasmatic movements. Like the intelligent ocean, Kurrenniemi's archive is formless and mutable, and the representations we pick out of it are particular responses to the methods and hypotheses we apply to the unlimited material it holds. In any case, the life of Erkki Kurenniemi to possibly emerge from his archive will be predicated by a new fragility: "it can be destroyed with a single command DELETE FILE."

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Consider the feedback whine.

Yet technology is not a monster, and Kurenniemi's archive is not a Frankenstein that usurps humanity. In Mika Taanila's film *Future Is Not What It Used to Be* (2002), a portrait of Kurenniemi through interviews and a montage of his short films from the 1960s, the scientist puts it succinctly: "As long as humans can misuse technology, we will never be slaves to it." To Kurenniemi, what made this creative abuse possible was the random processing of his homemade cybernetic machines, before the advent of programming and the personal computer's closed interfaces.

Others were asking similar questions at the same time. In "The Sweet Spot," Francis McKee describes computer/cognitive scientist John McCarthy who coined the term "artificial intelligence" in 1956. McCarthy began his 1979 essay "Ascribing Mental Qualities to Machines" by asking the absurd question, can thermostats could be considered to have beliefs?

When the thermostat believes the room is too cold or too hot, it sends a message saying so to the furnace … We do not ascribe to it any other beliefs; it has no opinion even about whether the heat is on or off or about the weather or about who won the battle of Waterloo. Moreover, it has

no introspective beliefs; i.e. it doesn't believe that it believes the room is too hot.

The answer certainly appears to be "no," but it's not so simple. Yes, the thermostat has no beliefs, but maybe the system it controls does. And this intersects a cornerstone of artificial intelligence research which insists that the cybernetic MACHINE must not be confused with its SUPPORT. Symbol-processing devices (computers) do not depend on the nature of their material substrates, and already Norbert Wiener in *God & Golem, Inc.* (1964) suggested that the "magic of modern automatization" makes it theoretically possible to erase distinctions between material being and message transportation, opening up prospects of eternal life through information storage.

Because it is self-generative, feedback is considered an organism which carries or EMBODIES a message, and when it comes to overcoming the dichotomy of organisms and machines, Leary and Wiener speak as if with one, fatal voice. According to Leary, the human is merely a "transient energy structure," while to Wiener, "we are but whirlpools in a river of ever-flowing water … not stuff that abides, but patterns that perpetuate themselves." A necessary conclusion, perhaps, for those who refuse to conceive of the organism as a unity, or deny any closure of the nervous system. Wiener says as much, using his own cybernetic lexicon:

Organism is opposed to chaos, to disintegration, to death, as message is to noise … It is conceptually possible for a human being to be sent over a telegraph line.

Kurenniemi's experimental research revolved around a similar assumption that the human mind can be transferred onto platforms other than living tissue. A change of the mind's material support would allow for a re-evaluation of human species-being, for example with a view to existence in environments other than Earth (which we may leave as a "museum planet" once it's served its purpose as a home for slime-based life forms). To Kurenniemi then, *desire* is the central property that distinguishes humans from machines. Machines can learn, reorganize, and create, but the passions remain proportional to human destinies. After we have attained the secret of how to extend life beyond biological death and

resolved the problem of reproduction, what happens to desire? This is the solipsistic flipside of autopoiesis: the machine's production of uncontrollable effects that unsettle subject-object communication can be understood in ecological, or object-environment, terms, but can also simply be the machine communicating with itself. Thus the machine, in its self-communication, may end up as a masturbatory pantheon for our eternal return. As Kurenniemi observes: "Maybe we'll spend eternity watching pornography."

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