A science which hesitates to
forget its founders is lost.

—A. N. Whitehead

CHAPTER 5

FEEDBACK, SUBJECTIVITY, AND PERFORMANCE

Ikeda Keiko (a.k.a. Timisoara) is setting up her gear, preparing for a solo performance as part of an all-night Noise show. A two-feet by four-feet waist-high table has been brought onto the stage—which is really just a section of the floor in one corner of the room—and she is pulling mixers, voltage converters, commercial guitar pedals, tape recorders, and home-made metal boxes of wires and buttons from a small suitcase onto the stage floor. She places the items one by one across the table, throwing the chaos together into a jumble of individual units, each brick-like effect pedal trailing a wire down to a clump of nine-volt power transformers on the floor, stuck like barnacles onto a power strip winding out to the front of the stage, its red "on" light glowing. Bending down to grab a coil of quarter-inch instrument cables, Ikeda quickly connects each piece of electronic gear to the next, plugging the output of a mixer channel into a distortion box, into a digital delay, then into a small graphic equalizer—all of them fed back into her block-like mixer at the center of the table and then back out of the mixer again into another set of pedals—a different distortion, another equalizer, a phaser, a filter, a sampler—as the system builds on itself. The outputs turn back into the inputs, amplifying chains of feed-

back loops; distortion upon distortion, delay upon delay; carefully—and for the moment, soundlessly—setting the entire system tottering on the edge of overloaded feedback. She completes her connections and is still for a moment, then leans over the table of gear precipitously and the sound suddenly begins, slamming out of the speakers, a precarious whirling roar set on the brink of implosion, revolving back into itself, spinning in shuddering circles through the crackling network of cables and boxes. The air in the room rushes out, replaced with a whirlpool of Noise.

A great challenge of this book is describing Noise without limiting its history to the boundaries of its circulation; to tell something about its creative development while recognizing its open-ended reinventions. A loop seems to be a totally enclosed system. But the changing cycle of feedback is always redirected in motion, transforming itself over and over again. Any circulation might necessarily seem to begin with an original source or input, some action or message that could be identified as an original starting point or event in time. Its path might also be followed to an end, to some place of closure where the source is received and interpreted. But feedback always changes. It generates movement by modulating the relationships between sonic and cultural practices, by constantly erasing and rewriting their beginnings and endings. The subjects of Noise, through their shifting positions in the historical loops of musical circulation, are always moving and changing, too.

In this chapter, I examine Noise's feedback in three different interrelated contexts. First, I describe feedback as part of Noise's electronic sound and the technical structure of its performance systems. This discussion of soundmaking then plugs into feedback as a metaphor for cultural exchange and reciprocity in social science. Finally, I connect Noise's out-of-control performance of sonic feedback to its rewiring of creative identity. In its radical newness and self-invention, Noise has become an anti-subject of musical history. Its feedback does not settle in a single place, or author, or moment of discovery. It breaks from continuities and influences, even from the obvious precedents of feedback in experimental rock and electronic music. If it had been hung in the balance of a linear stylistic history, Noise might have become just another "new music" whose time has come and gone. But it continues to build on itself, piling layers upon layers until it can no longer line up with other experiences of musical sound. Where does this feedback loop start? If the emergence of Noise cannot be linked to a particular event or place or work of art, performers

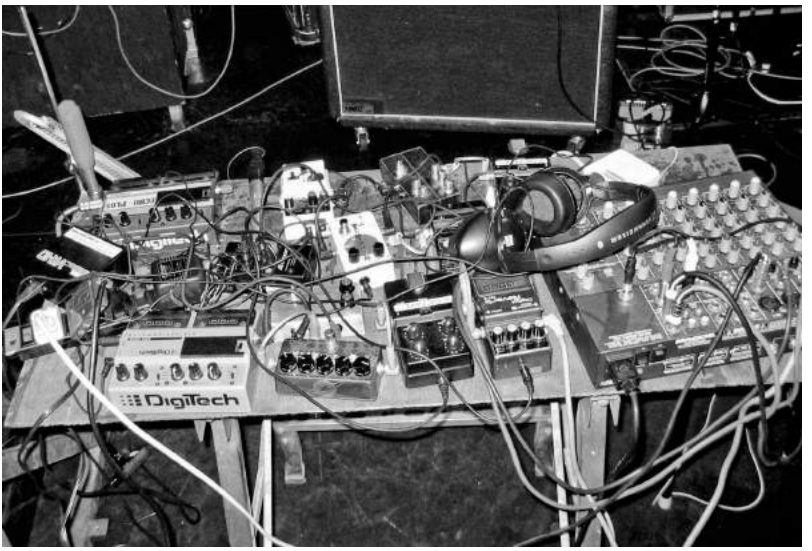
must begin with the technical practices of feedback that connect them to their machines.

THE EFFECTS OF FEEDBACK

A classic Noise setup is created from an interconnected assemblage of consumer electronics, often a group of small guitar effect pedals connected through a mixing board (figures 5.1 and 5.2). Although individual setups vary greatly, Noisicians generally work with these inexpensive guitar "stompboxes," also called "effects" (described by Japanese performers with the English transliteration *efekuto*), which are used both in live performance and in recording. True to its name, an effect usually alters the sound of an instrument (in most cases a guitar) by modulating the sound wave electronically. Japanese performers often describe their effects pedals with the word *kizai*, a slightly stiff term used to refer to equipment in a corporate or industrial context, which has been borrowed by tech-oriented hobbyists to lend an aura of purpose to their electronic gear. With its serious connotations of technical equipment, *kizai* implies a pragmatic use for electronics as functional tools of performance. This reference has an ironic undertone in the context of the cheap (and often broken) consumer electronics used to make Noise.

I want to stress that pedal-based feedback systems do not cover the entire range of sound-generating practices of Noise. The creative transformation of sound technology is the primary aesthetic goal for many performers, and few rules apply. Most performers do use consumer music products—often altered in some way—but homemade instruments or modified electronics are also common, and some use very little technical equipment at all.[1] A single live event might include setups ranging from assemblages of broken broadcast equipment to manipulated tapes and amplified metal objects, to laptop computers (whose introduction provoked a crisis among Noise artists), to homemade synthesizers, or simply a distorted electric guitar or microphone smashed against some object or the stage itself. Noisicians are quick to point out that no specific equipment is required to make Noise. As one performer puts it, "It's not about the display of technology—like, 'this is the sound that this object makes.' The 'sound source' is emotion."

Pedals come to the foreground of Noise-making practice for two reasons. First, the common use of pedal-based feedback systems has made



5.1. Defektro's (Uchino Hirofumi) performance setup, March 2003. Photo by Steven Schultz.

5.2. Last Gasp Art Laboratories' "Moouloscillo Fuzz" pedal. Courtesy of Hirofumi Uchino. Photo by the author.

Noise a recognizable style of transnational popular music performance, with its own distinct sound-making practices. Second, the technical conditions of feedback performance powerfully embody Noise's nonlinear representations of musical history. These systems reflect deep investments in cultural self-invention, through which individual Noisicians develop feedback into an individual performance of creative subjectivity. Their self-assembled electronic networks are iconic of Noise's antihistorical discourses of newness. They also reflect Noisicians' challenge to musical ideologies of authorship and stylistic influence and their emphasis on self-reinforcing relationships with technology. A feedback loop can ap-

pear as a contained circuit, but its continuity depends on the unpredictable, fluctuating connections between its constitutive parts. Feedback is not created through a linear chain of separate causes and effects (e.g., a guitar tone that goes into a distortion pedal and comes out the other end as a "distorted guitar"). It is a loop that generates sound through the interrelation of all of the individual pedals. A change in one effect changes the entire circulation of energy throughout the system.

Effects pedals are sometimes called "units" to suggest their role as individual elements within a larger system, rather than as distinct sound devices in and of themselves. The term is now used to describe individual Noise performers as well (e.g., "Japanese harsh Noise unit Government Alpha will tour the West Coast in Fall 2005"). This technology-based characterization of individual performers imagines Noise itself as an international electronic feedback loop, in which each discrete "unit" is plugged into a larger network of circulation. This metaphor is in many ways an ironic reference to the global interconnections that might be imagined through electronic music technologies. Noise performers, regardless of location, tend to use ordinary out-of-the-box commercial effects, although some rare and out-of-production items are highly prized, and a cottage industry of "boutique" pedals has sprung up in recent years. Pedals are sometimes handmade by Noise performers and engineered specifically for their ability to produce unusual effects, such as particularly jagged "harsh" distortion sounds, and other pieces are deliberately broken, "bent," or otherwise altered to change their circuitry.

By and large, effects pedals are basic consumer items, made in Japan by companies such as Boss (a subsidiary of Roland), DOD, or Digitech. Because most of the commercial effects used in a Noise setup can be readily purchased, it is not difficult for Noisicians to assemble their own setups, regardless of their training or proximity to other Noisicians. The types of effects used—primarily distortion, delay, and equalization guitar pedals—are common to most setups. However, the effects within the system are less important than the feedback loops that connect them to each other; the distinct sounds of Noise emerge from these nuances of interconnection (figures 5.3–5.5).

Despite the fact that most Noise setups draw from the same pool of commercially available gear, there is a strong expectation that a pedal-based feedback setup should sound original. Audience members and fellow soundmakers often crowd around to scrutinize the gear after the com-

5.3. MSBR setting up at Tokyo livehouse 20000V. Photo by Martin Ekelin.

pletion of a performance, checking out rare equipment and sometimes cribbing ideas. Informed observers can sometimes identify and differentiate between familiar feedback systems. One story tells of a neophyte performer who brought a camera to a show by the well-known Noisician Akita Masami (a.k.a. Merzbow) and took close-up pictures of his pedals, noting the brand of each effect box and also the way they were interconnected on the table. He promptly purchased all of the pedals and set up each and every piece in the same fashion. After a few performances, audiences openly critiqued the performer as an imitator, and he abandoned the system soon afterward. Other fans had already scrutinized Merzbow's setup, so the resemblance was quickly seen in the gear, but also, crucially, heard in the contours created by this particular system. Although the technical elements of the famous Noisician's soundworld were used differently (and possibly ineptly) by the newcomer, a few listeners could still recognize Merzbow's ghost in the machine.[2]

Although digital systems are sometimes used to create feedback, this

5.4. Kenny Sanderson and Filth the Sleep prepare for a duo performance. Photo by the author.

5.5. K2 lays out his effects. Photo by the author.

practice can be controversial. Akita began using a pair of Mac laptops for Merzbow performances around 1999. For many fans, the performative aspect of Merzbow was lost when Akita sat down behind the computer. His gestures became less visible, and the transformative machinery of feedback was hidden behind the flat glow of a translucent white apple. Despite his high-profile status, Akita's turn to the laptop did not inspire a widespread move toward digital systems in Noise.[3] In fact, it has become even more common in recent years for "harsh" Noise artists to perform with exclusively analog setups.[4] This attachment to analog gear is not necessarily a nostalgic fetish for "vintage" musical equipment. I once asked a Noisician why he forced himself to haul a pile of unwieldy, unreliable electronic gear through the backstreets of Osaka for a twenty-minute performance, instead of using a laptop, digital sampler, or stand-alone synthesizer. Rather than stressing the unique qualities of his analog gear, he emphasized his manual labor in struggling with his electronics, describing his meticulous way of putting things together and the physical act of creating the system before tearing the whole thing down again.

The interconnections between these basic units of consumer electronic gear are at the core of Noise's feedback process. Although a pedal-based Noise system employs many separate pieces of equipment, the sound of feedback is not created by the individual machines, as in an array of synthesizers, whose separate sounds are mixed together in performance. Even when they are obviously instrumental to the creation of a feedback loop, effects pedals do not simply become "Noise instruments." They do not *create* Noise in themselves, nor are they used for their intended purpose to alter the sound of an instrument, the way a fuzz box distorts the signal of an electric guitar. Rather, the sound of Noise is the feedback of the entire interconnected system.

Feedback occurs when the output of a system is fed back into the input. Plugging a microphone into an amplifier and holding it up to the speaker exemplifies a simple feedback loop. This audible, self-reinforcing feedback is called positive feedback. Because any amplifier inherently creates some low-level internal noise, its latent hum is played through the speaker, is picked up by the microphone, and then comes out of the speaker again at an increased volume, and so on. The cycle perpetually adds more "gain" to itself until the amplifier reaches the threshold of saturation—the absolute limit of amplification, where the sound loops back into itself, over and over again. Because audio feedback loops respond to changes in their am-

bient conditions (for example, moving the microphone to a different place in front of the speaker), a feedback loop can generate a number of different sounds.

Bell Labs engineers initially described the feedback sound of self-oscillating loops as "singing" (Mindell 2002). But the sounds associated with positive feedback were not recognized as musical or even as any kind of deliberate signal in themselves. Audio feedback was noise that interfered with the lines of communication: when we hear feedback, it means something has gone wrong. The classic example is that of a PA system accidentally feeding back during a speech, which signifies the speaker's lack of control. But feedback is not merely a kind of sound; it is a process of electronic transformation. This audible feedback, which marks the excessive overload of a technological system gone out of control, is the raw material of Noise's sonic production.

Popular musicians occasionally use amplifier feedback as textural or improvisational material, especially in the techniques of electric guitar in rock performance made famous by Jimi Hendrix, the Who, Link Wray, and the Velvet Underground, among others. Feedback guitar was popularized in recordings such as the Beatles' "I Feel Fine" and the Who's "My Generation" (in 1964 and 1965, respectively), although feedback had been used in performance since the 1950s by early rock guitarists such as Link Wray and Albert Collins. Many independent discoveries of feedback are reported in rock music histories. For example, in recounting the history of the mid-1960s garage group the Monks, Eddie Shaw describes his stunned sensation when guitarist Gary Burger accidentally left his guitar leaning against his amplifier: "Sound exploded. The effect was instant. It was like discovering fire. . . . We began to jump up and down, as small children do when they find something that totally amazes them and yet could be forbidden. No one would call this music" (Shaw and Klemke 1995:157).

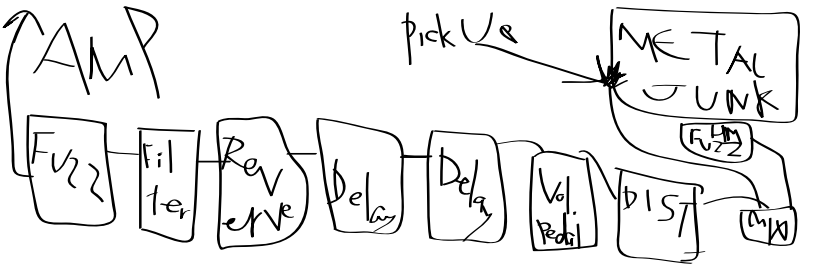
Noisicians take advantage of the sonic palette of feedback developed in rock, partly by using the same equipment that modulates and amplifies electric guitars. But the feedback loops they create are made much more complex, first by the number of different pedals—perhaps five or six, or as many as twenty—introduced into the effects chain. The effects are linked together and their outputs are fed into a central mixer; finally, the mixer's outputs are plugged back into the effects units' inputs to create the feedback loop. The sound travels through every one of the effects with each cycle, and the feedback fluctuates according to changes in the total sys-

tem. A Noisician, then, does not use a pedal to "turn on" a particular sound (as when a guitarist steps on a wah-wah pedal to create a "crying" tone). Instead, a change to one effect changes the productive conditions of the whole system.

The core process in the creation of a Noise feedback loop is the transformative effect of overload. Overload is the cumulative buildup of sound through a cycle of massively distorted amplifications. An input signal—a voice shouting, a microphone scraped on a piece of metal, or simply the internal noise generated by the system—is run through a series of amplifications, distorting the signal over and over again, eventually reaching the threshold of amplitude and overloading the channel. The sound is radically transformed through this additive chain of amplifications, which then is fed back into itself. The cumulative overload of the feedback loop piles distortions on top of distortions, massively compressing and mutating the original sound.

Overload is a kind of distortion that uses the limits of an amplification system to create and change sound. Neither the English nor the Japanese words for "amplify" are really adequate to describe the transformative qualities of overload. Though the English word suggests that a quiet sound is aurally magnified and made louder, the Japanese term *zôfuku*, based in the root *zô* (increase), implies a staged additive change that raises the gain from one distinct dynamic level to another.[5] In a feedback loop, amplification does not merely increase a sound's volume to make it louder; it changes it entirely by saturating the entire system. The process is something like magnifying and photocopying an image over and over again, until the details of the original form are totally unrecognizable.

When other effects (such as delay and equalization) are added into this overloaded cycle, the performer can cause complexly interrelated changes in the overall timbre and texture by adjusting the settings of each pedal or triggering microphonic elements in the loop. In Filth the Sleep's off-the-cuff rendition of his overload setup (sketched by the artist in figure 5.6), the sound source is a metal plate attached to a contact mic, which acts as a trigger for the amped-up effects chain of three layers of "fuzz" or distortion, two delays, reverb, and an EQ filter. The mixer feeds the whole thing back so that the chain loops back into itself when plugged into an amplifier on stage. It is important to recognize that the sound of this setup is not simply the result of the metal plate "played" through the system; it is the sound of the whole electronic circuit overloaded back into itself.



5.6. Sketch of pedal feedback setup by Filth the Sleep.

CYBERNETIC NETWORKS, CULTURAL RECIPROCITY, AND POSITIVE FEEDBACK

Radio engineers coined the term *feedback* to identify broadcasting problems in the early twentieth century, but the concept is part of a technological history of engineering that dates back to the Watt steam engine. Beyond its technical reference, the concept of feedback has come to describe a broad field of interactive sociocultural and economic relationships. Variations on this idea have been foundational in social scientific theories of exchange, from the analysis of economic markets to center–periphery models of cultural transmission to mass communication and information theory. The logics of feedback are the basis of Adam Smith's theory of a liberal self-regulating market and connect to contemporary systems dynamics, social policy and management, biological homeostasis, and recent models of artificial intelligence and Internet network flow (Mayr 1971; Richardson 1991).[6] Its loops can represent the enclosed coherence of social networks, as well as the tipping points that drive systems into interaction, collapse, and change.

The term became crucial to postwar social theory through the project of cybernetics, famously developed by the influential work of Norbert Wiener (1948, 1950), as well as by information theorists Claude Shannon and Warren Weaver (1949). Their descriptions of feedback were initially intended to help technologists develop automated solutions to reduce noise and increase efficiency in mechanical systems. But feedback was quickly incorporated into the social scientific analysis of cultural systems and human behavior in postwar visions of a self-regulating modern society. In his first two books, *Cybernetics: Or Control and Communication in the Animal and the Machine* (1948) and *The Human Use of Human Beings* (1950), Wiener described

social behavior in relation to the emerging development of automated mechano-electrical control devices, many of which were initially developed as self-correcting systems for military and communications applications.[7] Wiener's theory of cybernetics proposed to use the productive overlaps between human and mechanical capacities to organize and improve modern social function. Cybernetics also imagined society at large as a balanced hermeneutic system, which could be made more efficient by feeding back from its historical outcomes and developmental knowledge. "Feedback," as Wiener put it, "is a method of controlling a system by reinserting into it the results of its past performance" (Wiener 1950:61).

Wiener's ideas about feedback were widely adopted in cognitive psychology, linguistics, and postwar anthropology. Margaret Mead, Gregory Bateson, and Roman Jakobson were among a number of scholars who collaborated with Wiener in the Macy conferences between 1942 and 1953. Cybernetic models of feedback had a powerful influence on Claude Lévi-Strauss's structuralism, Talcott Parsons's theories of social evolution, Jacques Lacan's notions of self-reproducing language, Bateson's later views on cultural reproduction, and Anthony Giddens's theory of structuration. Wiener's visions of communication technology as an extension of the human sensorium were popularized by Marshall McLuhan's theories of network cultures where "the medium is the message." Cybernetic versions of feedback have continued to influence proposals of technologically "wired" subjectivity, from embodied cyborgian myths to expectations and critiques of a pending "posthuman" condition (Axel 2006; Haraway 1991; Hayles 1999; McLuhan 1964).

For anthropology, the central insight of cybernetic feedback was that communication was not necessarily about content but about cultural patterns of transmission. From this perspective, it became clear that cultural feedback was not a historical chain of "contact" through which knowledge was passed from one site or historical moment to another. Feedback represented the technical interplay through which societies regulate themselves into balance: it showed that cultural groups evolved through continuous interaction, rather than progressing through stages determined by heightened moments of creative innovation or conflict. Cybernetics-influenced social science used insights from neurology and linguistics to develop a symbolic analysis of the intentions, goals, and errors inherent to the historical interplay of any given system, and predict the optimal flow of energy within the entire structure. But cybernetics disregarded the effects of cul-

tural performance and participation that might diverge from the "central nervous system" of social interaction. By privileging holistic networks over semantic content, cybernetic theory disregarded the power of creative subjectivity—the variable forces of individualism, improvisation, and especially accident and failure—to short-circuit the continuity of cultural signals and cause sudden, ungovernable changes.

The complicated outcomes of cultural feedback were outlined in earlier anthropological theories of exchange, most implicitly in Marcel Mauss's comparative study of gift circulation. In the *kula* ring of the Trobriand Islands, necklaces of shells were exchanged in a circular loop of gifts, giving rise to a cultural force that compels the recipient to return the gift. This circuit of gift-giving creates an autopoetic social network, in which each participant is related to others through a "system of total services." In this context, the feedback between independent subjects generates an iconic power to create cultural relations. Circulation represents and reproduces society: "The objects," Mauss says, "are never completely separated from the men who exchange them" (Mauss 1990 [1923–24]:31). Subjects are compelled to participate in the cycles of reciprocity, and in so doing, they create and maintain a cultural system.

Mauss famously describes other, destructive trajectories of the gift, particularly the agonistic form of the potlatch practiced by Pacific Northwestern cultures. In the potlatch, objects of wealth and power are not maintained, but are ritually destroyed in compulsory displays of excessive consumption, which necessarily "go beyond all bounds" of mutuality. In grand conflagrations, clan leaders burned vast storehouses of resources—food, oil, canoes, blankets, and ceremonial objects—to generate social prestige by dissolving their own wealth. With each performance, the potlatch escalated cultural feedback to the point of transformation. Each gift must be returned with interest, building to a level of excess at which simple reciprocation becomes impossible. The existing social balance breaks into new networks of hierarchical power, as gift recipients who fail to respond are (in the case of the potlatch, quite literally) enslaved through the involuntary effects of exchange. Over generations, these lags and failures repeat themselves and create their own patterns. Creative destruction forms a positive feedback loop, which is driven by forces of excess, distortion, and overload.

Cybernetics and information theory were strongly focused on the engineering of "negative" feedback, which diminishes or acts against change

to establish systemwide efficiency and stability. Negative feedback loops are crucial to advanced circuit design because they allow electronic systems to regulate themselves, just as a driver uses sensory and physiological feedback to steer a car. Negative feedback circuits use the difference between one variable and another to establish control of the system. A classic example of negative feedback is the thermostat, which uses information from a sensor to control ambient temperature. The vast majority of engineered feedback systems are examples of negative loops, which harness feedback to correct difference and adjust for efficiency. The optimization of the gestalt network is the primary goal.

Negative feedback is fundamentally comparative and reductive; the differences between intention and actual performance are used only to create a steady state for the entire system. Rather than being absorbed in homeostasis and control, individual differences can also be accumulated and amplified. In fact, feedback often spins out of control precisely because senders and receivers are not invested in continuing a holistic social field of transmission or in emulating past performances. Instead, they change direction. When feedback becomes generative of something new—in the case of audio circuits, when it becomes a sound in itself—it is described as "positive."[8] Positive feedback loops are not self-regulating but self-reinforcing. They amplify change with each cycle, emphasizing the gain of new results over continuity and balance.

Although positive and negative feedback systems occur simultaneously and sometimes morph into one another, they represent very different trajectories of circulation. Negative feedback establishes cultural stability as part of a controlled adaptation to environmental conditions. Positive feedback, on the other hand, moves away from social equilibrium to emphasize the cumulative effects of newness and change. Bateson described this process as "schismogenesis," caused by progressive differentiation between individuals, which amplifies intercultural distortions and imbalances within groups.[9] These unbalanced cycles quickly go out of control. In political economies, positive feedback manifests crisis and breakdown. It creates chain reactions of creative destruction exemplified by violent conflict, market bubbles, social cults, and other unstable productions. It is population explosion, nuclear proliferation (and the chain reaction of fission itself), and the excessive booms and busts of a self-reinforcing capitalism that distorts the proposal of a balanced free market. In other words, positive feedback represents the vicious circle that shifts a system away

from historical stability and toward a saturation point of change that overloads the original content.

OVERLOADING MUSICAL CREATIVITY

The history of Noise, of course, is a project of positive feedback. For every critic or writer who claims that Noise has newly sprung forth sui generis in a new place with a new set of artists, there are others who claim that the form has long been atrophied, with its creative direction buried in the wake of whichever time period they have assigned as its heyday. The origins of Noise are sometimes attributed to Japanese performers, especially Merzbow but also Hijokaidan and Hanatarashi. Others argue that Noise was sparked in Europe with groups like Throbbing Gristle and Whitehouse in London and Einstürzende Neubauten in Berlin, or in North America, with the release of Lou Reed's *Metal Machine Music* in 1975. Uses of noise sounds in music are dated back to the experimental compositions and writings of John Cage, or even earlier to the authorship of *The Art of Noises* and the construction of *intonarumori* instruments by the Italian futurist Luigi Russolo in 1913.[10] Music writers often reference one or more of these contexts as starting points for later aesthetic developments of Noise, but they do little else to document historical influences or make connections between its divergent forms.

Feedback is not generated by the influence of an individual genius, the global spread of a local cultural form, or a singular history of discovery. Most Noisicians developed their sounds haphazardly, through individual trial and error with consumer music gear. Their stories do not reflect a linear chain of historical influence that could extend into the narratives of experimental music. Instead, their overlapping discoveries of feedback occur through common accidents and mistakes, as separate individuals find new ways of overloading machines on their own. The newness of Noise is based in isolated and self-regenerating personal encounters with technological equipment. This, Ônishi Aya (formerly of Osaka's Sekiri, now of London, Ontario's Nihilist Spasm Band) told me, is why Noise cannot be tied to any particular cultural location but is instead the product of individual difference: "[Noisicians] don't like to read instructions. Say they get some new electronics; they have to set it up their own way, they want to experience it themselves. That's a good thing, to me. When you start listening to music, some people check out the history, look at the label, stuff like that,

but that's not what happens with experimental musicians. And you know, that's not a difference in country; it's more of a 'human being difference.' "

Noisicians often describe their initial forays into pedal-based feedback systems through their departures from more traditional popular music ensembles, usually rock or punk bands. Many Noise acts were born in the wake of a rock group's collapse, as former members developed electronic systems from disassembled band equipment. Performers plugged into feedback as they began disconnecting from their instrumental control over musical performance. They put down their guitars and began making sounds by connecting their effects pedals together. Kenny Sanderson, a British Noisician who has lived in Tokyo since 1994, said that his initial experiments with feedback developed entirely without any sense that what he was doing could be connected with other performers at all: "I'd been making Noise since 1991. I didn't know what I was doing at the time—I knew that was what I wanted to make, and I liked the sounds, but I didn't know that people actually *got away* with it. I was playing guitar and I bought effects pedals and things like that, and I always found it more pleasurable playing around with effects knobs and things like that rather than learning chords . . . After I while I learned about Merzbow and Masonna, and I moved to Japan and I was blown away: I was like, 'Fucking hell, people *do* this!' " Sanderson's story is echoed by many other Noisicians who describe their discovery of the genre as an outcome of their solitary experimentation. Although a few had heard of Noise through recordings before beginning to perform, a majority of Noise performers developed their feedback systems in isolation from public examples.

These separate moments of creative discovery challenge linear histories of musical influence and technological invention. Tape delay feedback, for example, is a studio technique that was crucial in the recorded history of popular music, most distinctly in experimental and psychedelic rock. But tape delay or "sound-on-sound" feedback loops were accidentally encountered many times in isolated experiments with audiotape, from the earliest uses of the technology in the 1950s to the contexts of more widespread consumer availability in the 1980s and 1990s. Although histories of music recording often attribute the first use of tape delay on record to American inventor and musician Les Paul (who is also credited, controversially, with the invention of the electric guitar), other attributions of the invention of tape feedback are numerous, including engineers at Abbey Road Studios

in London; dub reggae producers like King Tubby in Kingston, Jamaica; and jazz/experimental composer Sun Ra. Practitioners often report their independent discoveries of the technique as an accidental by-product of their isolated use of tape machines. But these incidental, unsynchronized moments of sonic discovery do not add up to a linear history of technical invention or produce a singular model of stylistic development. They cycle back into distinct creative projects and separated moments of innovation. The process of feedback delay was discovered by mistake, over and over again.

These repetitive experiences of feedback are iconic of its technological production. When the output channel of a tape machine is accidentally plugged into the input channel, it feeds the signal from the playback head back into the recording head, so the sound is printed back onto the tape as an echo. Depending on how loudly the output sound is returned to the input, the delay can be repeated once or twice—like the "slapback" echo used on Elvis's voice—or fed back for more repetitions until it fades away. If the return signal is continually louder than the initial input, the repetition builds into a feedback loop. Anyone experimenting with a tape recorder might stumble on and "invent" this process for themselves, recreating the same technological conditions of discovery to hear the sounds of feedback for the first time.

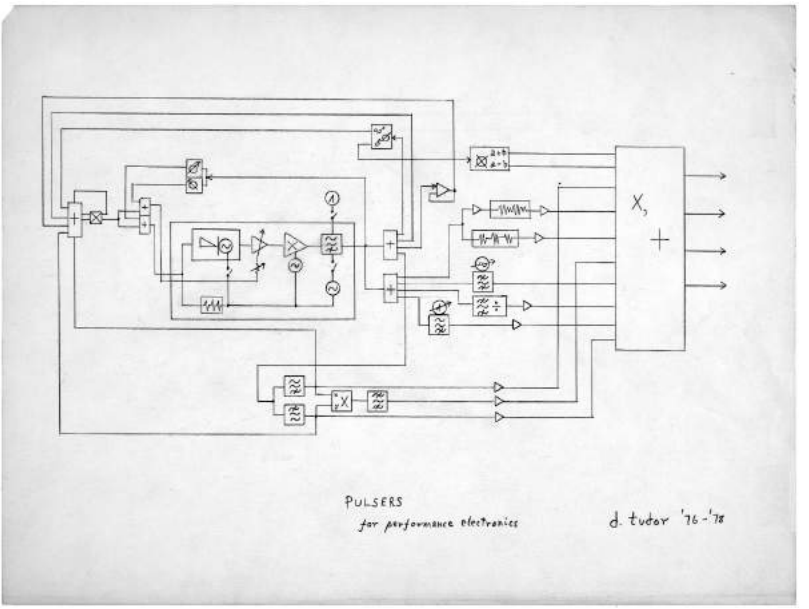
For example, North American composer Terry Riley's use of long, extended tape feedback loops became central in his early pieces, such as *A Rainbow in Curved Air* and *Music for the Gift*, which are now canonized among the first works of minimalism and live experimental music. But Riley did not learn of tape feedback until it was described by a Radio France recording engineer in 1963. He then asked a friend to reproduce the technique: "I wanted this long, repeated loop and I said 'can you create something like that?' He got it by stringing the tape between two tape recorders and feeding the signal from the second machine back to the first to recycle along with the new incoming signals. By varying the intensity of the feedback you could form the sound either into a single image without any delay or increase the intensity until it became a dense chaotic kind of sound . . . this engineer was the first to create this technique that I know of" (Riley 1995). Riley describes his tape delay as "time-lag accumulation," a process of continuous addition and modulation that mirrors the overloaded historical discourse of feedback as a musical form.[11] Feedback, he says, "generates

a lot of distortion very quickly. Each generation brings its noise from the previous generation and adds on to that. After five or six layers of sound on sound, you have a lot of information on the tape" (Riley 1995).

Because of this overlapping technological environment, Noise can be related to more established histories of postwar experimental music, especially of certain American composers whose live electronic performances might be described as formal precedents for Noise's feedback. Noisicians are deeply involved in the search for a sound-producing environment that is neither determined by a distinct composer nor fully controlled by the performer. Noise feedback, then, might have been directly influenced by the well-known concept of indeterminacy developed by composer John Cage, and especially the related performance practices of Cage's longtime collaborator David Tudor, which employed feedback systems based in homemade electronics, guitar pedals, and mixing boards.[12] Even in these live performances of feedback—in which Tudor's feedback systems very closely resemble Noise performance setups, and the sounds might also be considered precedent to those of Noise—there are significant differences. Tudor used the context of feedback networks to reduce the intentional role of the individual performer as much as possible. Noise's feedback instead represents a transformative personal struggle, in which the performer's intentions are subverted by an out-of-control relationship with an electronic system.

Tudor's feedback works were foundational for a new generation of live electronic music. His performances, mostly to support the Cunningham Dance Company, were a radical departure for contemporary electronic music, and stood as the antithesis of the laboratory-style technological progress represented by national studios for electronic music and *musique concrète* (based primarily in Western Europe, but also in the United States and Japan). Tudor created a more open-ended improvisational space for experimental music technology, and he is often described as an unsung hero of live electronic performance. Tudor used mixer feedback and commercial pedals (such as the Electro-Harmonix effect "Bass Balls") similar to those used in Noise setups (figures 5.7 and 5.8). Moreover, his description of nonlinear sound production is strikingly similar to the sourceless, nondirectional ideal of feedback in Noise. In his 1972 essay "From Piano to Electronics," Tudor explains "I no longer think, 'I'm going to do this, so I'll start with this,' and start out somewhere and then go through lots of processes in a straight line. Instead I don't start anywhere, but make a

5.7. David Tudor with his live electronics performance setup, late 1970s. Photo by Lowell Cross, courtesy of the Getty Research Institute, Los Angeles (980039) and the David Tudor Trust.



5.8. Schematic drawing for the feedback-based piece Pulsers. Courtesy of the Getty Research Institute, Los Angeles (980039) and the David Tudor Trust.

process such that a signal will be created somewhere within it, you don't know where. . . . I found out that if the components don't match, then one component is able to influence the next, so that signals are created at many points within the circuit" (Tudor 1997 [1972]:29).[13] Certainly Noise's feedback systems bear comparison with Tudor's approaches to electronic music performance. But these different uses of feedback are not correlated within a shared lineage of historical influence. Many Noise performers, as I have described, only learned about postwar experimental music after they had already invented their own feedback systems. Any attempts to construct retroactive connections with historical precedents of experimental music break down even further when considering the different ways that feedback can be performed.[14] The core difference between Noise and Tudor lies not in the sound created or the equipment used but in their different enactments of the technological relationship of feedback.

In postwar experimental music, feedback offered a way of creating unpredictable performance structures that blurred compositional intentions. Michael Nyman has described how Tudor, alongside other experimental composers such as David Behrman, Max Neuhaus, Steve Reich, and Robert

Ashley, used feedback "as the 'controlled' subject of their pieces" to create "an accumulative growth of sound mass" that "arises of its own accord" (Nyman 1999 [1974]:100). In Tudor's systems, the performer sets up a loop "such that a signal will be created somewhere within it," and then works within this "neural" environment of self-regulating feedback.[15] Noisicians, in contrast, use their electronics to embody the self-destructive imbalances of positive feedback. Personal expression is transformed in conflict with the system, through a process that Japanese performers describe as "out-of-control" (*bôsô suru*). This is not a relationship that creates a balanced sound environment. On the contrary, Noisicians appear to be in the midst of battle with their machines. Pushing against their own performance, they reveal the internal conflicts of technological subjectivity.

Performance is itself an embodied context of feedback between sound and the musical self. Musicians learn to play by reinforcing their control over their instrument as part of the process of musical learning. The musician makes a sound and listens to it in the same moment, continually adjusting the instrument to direct the sound. Physiological feedback is inherent to this training, as performers master the nuances of a physical object—their instrument—by embodying the limits of its (and their own) capabilities. In the process of learning to perform, a musician links the creation of sound to bodily self-control and internalized musical knowledge. Noisicians deliberately attempt to keep themselves from naturalizing this instrumental self-expression. To perform their own loss of control as authoritative human subjects, they cannot fully learn the system. In this, Noise's *techne* of feedback diverges from epistemologies of musical intentionality. Its modes and techniques are abstracted beyond self-expression, beyond even the flexible constructs of improvisation and experimental sound. Noise is more than merely indeterminate: it is out of control.

Noisicians are constantly adjusting and interacting with their systems, reaching across the table to pinch a tiny knob and turn it slightly, riding the fader on a micro-mixer while turning a dial across the table, or pushing both hands down into the table to shut one pedal off and another on simultaneously. Others perform their out-of-control electronics like a driver trying to steer a vehicle that has gone off the road or an industrial worker desperately working the controls of a giant machine gone haywire. In this displacement of personal agency, Noise separates itself from identities of musical improvisation. Although Noisicians often perform solo, feedback does not stress the expressive voice of an individual. It can be deeply evoca-

tive of personal emotion, but Noise is not "my sound," or even "this sound I make," but "a Noise that surrounds me and becomes my world." Feedback creates "this Noise that I am part of," not "this sound that I speak from myself."

Pedal-based systems reveal the unstable connections between Noise performers and their electronic systems. The small size of pedal effects allows a performer to crowd as many as twenty pedals onto a small table, allowing for direct and rapid access to their controls. Although a Noisician may know how to quickly locate and manipulate a specific piece of gear, the sonic results of feedback are clearly not under their control. It is certainly possible to learn the technical parameters of any electronic system, yet many Noisicians deliberately avoid becoming too familiar with their equipment. Most choose to change the components of their setups regularly to maximize accidents and unpredictable elements, even as they struggle in performance to adjust the sounds emitted by the system. On one hand, a performer passively observing the effects of an unchanging feedback loop would not be interesting. On the other hand, a result that sounded too masterfully manipulated—that sounded "played"—would lack the instability crucial to feedback performance and foreclose the ever-present possibility of breakdown and failure.

At first, it surprised me when prominent performers showed little technical knowledge of their equipment. Many claimed to be uninterested in new musical gear; they don't know how their stuff works and don't want to know. One Noisician told me that although he knows how to control his setup to some degree, "unimagined sounds happen" every time he sets up his gear, and he added that these were the sounds that made Noise interesting. When I asked him to describe the gear he had used in a recent show, he told me that he couldn't recall but pointed out that the exact setup of the gear is not important. He changed his pedals very often, he added, but even with the same gear, the feedback could nonetheless be unique for each performance. Others stressed their ability to mechanically control individual pieces of electronic equipment, without having control over the sounds produced by the system as a whole: "I totally know how to control my gear, so I can try to 'output' my favorite sounds when I play, but I can't predict the sounds—only about half of them come out like I expect them to, the rest are all accidental." Most reject the very idea of controlling their performances, arguing that they do not want to understand their feedback systems or regulate their technical operations. The American ex-

perimentalist Mike Patton put it this way: "[Electronic music] had this strange myth about it that you have to know what you are doing to get into it. It was intimidating, and it scared me away for a long time. I didn't want to buy anything because I didn't know what anything did . . . [but] when I started realizing that most of it is highly uncontrollable and illogical, it appealed to me even more, because I don't have that kind of a brain that would process that kind of information anyway. I just want to turn a fucking knob and have it make a hideous racket" (Sajbel n.d.). Yamazaki Maso (a.k.a. Masonna) similarly disclaimed any musical intentions, telling me, "I don't know how to control everything and I'm too lazy to learn—I'm not a musician, I just make Noise."

Performers constantly disrupt the feedback of their own Noise-making processes. It is common to use broken or repurposed electronics, or to destroy or violently disconnect their gear during a performance. For example, when the Tokyo-based Noisician Yoshida Yasutoshi (a.k.a. Government Alpha) set up for one performance I attended in a small bar in Providence, Rhode Island, he began by slowly plugging all of his pedals together on a small table in the middle of the room, spending a good deal of time on this process as the small audience watched. Immediately after turning on the amplifier, he climbed up a pole and dropped onto the table feet first, breaking the feedback loop apart and scattering the pedals everywhere. Yoshida immediately fell to the floor, scrabbling among the pedals to plug them back together as quickly as possible. As soon as everything was reconnected, he climbed back up the pole and scattered the pedals again, repeating this process for several minutes until he became exhausted, switching off his amplifier and abandoning the scattered jumble of gear.

BENDING THE CIRCUITS OF CONSUMER TECHNOLOGY

One of the most interesting and paradoxical aspects of Noise performance is the profound physical intimacy Noisicians have with their setups, which ultimately leaves them vulnerable to the equipment they use. Even as they destroy their electronic gear, they reveal that they are beholden to its technological authority. Despite the fact that many shows end with an out-of-control collapse, they typically begin with a ritual display of technical competence. Performers step onto the stage and immediately begin pulling gear out of zippered duffel bags or beat-up suitcases, connecting them together as quickly as possible, knowing exactly which pedal fits where.

It often takes longer to set up than to actually perform. A musician might be on stage for twenty minutes, busy with the technical tasks of unpacking equipment, connecting it together, and adjusting the whole system before performing a set that lasts a mere ten or fifteen minutes. Some Noisicians set up their gear in advance, on small portable tables at the side of the stage. Even then, just checking the connections and ensuring that the power is working properly can take several minutes. Audience members watch this setup as closely as the performance itself, knowing that this carefully controlled presentation of the system culminates in the moment it all falls apart.

Crucially, feedback can fail. Despite the expectation that their systems will go out of control, Noisicians may nonetheless lose technological control in ways that detract from their performance. During a show by Guilty Connector in the tiny Tokyo livehouse Bin Spark, one fan was so overcome that he began to throw his body onto the floor and roll around in spasms directly in front of the table of gear, with its trailing curtain of wires and cords draped over the front. After a few minutes, he finally rolled over the on/off switch on the power strip delivering current to the entire setup, which immediately snapped off; the Noise abruptly stopped and a strange silence rushed in to fill the space. The performer looked around to fix the problem, but even after the power was restored (and a couple of angry audience members dragged the fan off stage), it was difficult to build up the energy of the feedback again. After a few minutes of attempting to recover, his movements became more active and forceful, suddenly culminating as he stood to quickly overturn the table full of equipment. Though this is a common practice of Noise performance, this particular overload was especially intense because it seemed uncommonly willful. As the pedals, mixers, and cords crashed to the floor, the emotional tension of the system's failure poured into this final, deliberate collapse.

Noisicians often construct feedback systems from discarded junk. Live performances by Dan Greenwood (a.k.a. Diagram A) are cataclysmic struggles with a mountain of broken technology. It takes him a considerable amount of time to set up his electronics, due to the size and delicacy (and sheer quantity) of the gear that he employs in a typical setup (including some pieces, he told me, that do not make or alter sound at all but merely add to the visual element of the assemblage). For one concert at the New York venue Knitting Factory, his system (all of which had been packed and driven down from Massachusetts during a blinding snowstorm) in-

cluded rewired antique telephone systems, broken computer displays, and large metal contraptions amplified with contact microphones, all wired together into a primitive patch bay that left black cables strewn around the stage and dangling across the floor.

As all of this equipment is pushed into a pile and pieces are stacked on top of one another, it can be hard to determine the exact moment when the setup is complete. The performance seems to emerge from within the technical arrangement of the gear: sounds just begin to emanate from the pile as Greenwood reaches around, plugging things in and turning knobs. He straps on a rubber military gas mask containing microphones, concealing his face entirely, and attaches other electronic pieces onto his body. He dashes back and forth in front of the equipment he has amassed in the center of the floor, turning on switches, pushing buttons, pulling cords out of one area and pushing them into another, pulling things apart. Occasionally he bends forward at the waist, drops to his knees, reels backward, or falls to the floor in front of the heaps of gear, a shout becoming audible from inside the mask. Holding onto some piece of the assemblage, Greenwood jerks his body back and forth violently in front of his machines. It is unclear how the machines function—which pieces are altering the sound, which are not, and which are disconnected or never worked at all. As the performance builds, sections of the pile of gear collapse or are pulled out and thrown to the side of the stage. Somehow, this dismantling process doesn't seem deliberate—though it must be—as he smashes things together, punching parts, grabbing cords, and moving the telephone receiver around in a buzzing feedback loop.

Greenwood had started in a punk rock band, but under his influence, the band "just kept getting noisier and noisier," and eventually everyone quit. Alone with the gear, he broke the instruments down and fed the equipment back into itself. "I was in a band, and used to play with a distortion pedal when I played bass, and I'd just start doing it on my own. I started Proof of the Shooting with John Brown, and we'd just do a lot of stuff messing with the four-track [cassette recorder], and making feedback with the guitar . . . pitch-shift it, stuff like that; plugging microphones into effects. Eventually we figured out how to patch the outputs of effects into their inputs, and we just went from there." Greenwood acquired his equipment haphazardly, buying gear in bulk as cheaply as possible, regardless of make or condition. He began to pick up junked electronics deliberately for the purpose of altering, or "glitching" the original circuit:

> With a lot of the junk I use to make Noise, I feel like I'm taking garbage and making something out of it. . . . I'd get some machine at a flea market or something, and take it apart, and find a resistor in there that I can jump across to reduce or increase the resistance, and that'll sometimes make a pitch-shifting sound, or something like that. Sometimes I'll stumble across something else, like things will go into some kind of a . . . I don't know what you call it. It'll just start glitching, making sounds. . . . I'll make oscillators out of radios by putting the output into the input, things like that. In the beginning I think I just played with stuff until I found a good sound, and it would usually last as long as a recording, and as soon as I got it, I'd lose it again.

The term *glitch* is used to describe an audible malfunction of electronic sound—the sound of a circuit being shorted out and "confused" into blurting out an error, some broken noise.[16]

The manipulation of consumer electronics by altering factory-printed circuit boards is often described as "circuit-bending." This is usually done by opening up some piece of equipment (often a small synthesizer, clock, or toy) that generates sound with a preprinted circuit board and rerouting the electrical charge. To "bend" a circuit, a resistor is used to "jump" the electricity away from its intended path, forcing the signal into an alternate route or feedback loop that radically changes the parameters of the original sound. Though Noisicians often perform and record "bent" sounds in the temporary, improvised manner described by Greenwood—by randomly jumping the current on an open circuit board—new connections can be made permanent with the introduction of variable resistors. Control knobs are soldered into the existing circuit along with other modifications (mods) that allow a user to create a unique electronic device from a mass-produced piece.[17] Some instruments are modified to expand their sound-making parameters (i.e., adding controls to toy keyboards) and others to produce randomly generated electronic sounds. A classic example is the repurposed Speak 'n' Spell developed by Qubais Reed Ghazala, in which the performer rolls a steel ball over the circuit board, causing the children's toy to randomly spit out strings of the synthesized phonemes that it uses to construct and "speak" words.[18]

Not only is circuit-bending a technically simple way to produce unusual electronic sounds—by using a wire or even one's finger to short-circuit a connection—it is also inexpensive, because new instruments can be made

out of junk. But these junk electronics are more than just an adaptation of technology: they demonstrate how original sound-making contexts are created by feeding back the circuits of consumer gear. At the annual Bent Festival in New York City, for example, performances and installations are produced with altered consumer electronics, while hands-on workshops teach neophytes to use these techniques ("basically, just rip apart a toy, pull out the circuit board and start messing with it").[19]

Circuit-bending intervenes in standard consumptions of music technology. In this, it can be related to audiophile modifications of stereo gear and other forms of hobbyist tinkering that alter stock equipment. Musicians often alter their instruments to increase their control over them, and tinkering with electric guitars and other gear has been crucial to the development of technologies in rock music (Waksman 2004). Most often, tinkering takes the form of elaborate personalization of consumer gear, especially home stereo equipment. In Japan, tinkering is an especially common kind of amateur play with consumer technology. It is not unusual for hobbyists to construct elaborate audiophile sound systems or build electronic kits from magazines such as *Otona no Kagaku* (Experiments for Adults). User-driven "improvements" are sometimes viewed as a self-regulating reciprocity of consumer "feedback," in which industrial producers respond to the creative input of users by redesigning products to reflect their needs.[20]

Circuit-bending, on the other hand, makes commodities into idiosyncratic junk. Nozu Kanami, former owner of Bar Noise in Osaka, began to create noise-making machines in the late 1990s, first in the group Power Surprises and then as Destroyed Robot, although he had no formal knowledge of engineering. He describes his junk machines as a manifestation of *hansoku waza* (rule-breaking techniques) as opposed to the improvement of corporate technologies in individual consumption: "People from an engineering department make machines simply because they enjoy making machines. I'm not like that. . . . Tamiya [an electronics hobbyist company] has this huge contest, but they have this rule that you can't enter unless you use genuine parts manufactured by Tamiya. That's what I mean . . . I think many Japanese toys hinder creativity. And I think it's wrong for people to be satisfied with such toys" (Nozu 1998). In Noise electronics, circuit-bending becomes a kind of "reverse engineering" that takes apart the objects of musical consumption and reassembles them into a new form of technological subjectivity.

5.9. Haco with her Pencil Organ. Photo by Uchiike Hideto.

Circuit-bending shows that a network can be creatively manipulated by individual presence, which makes a flow of energy diverge from its established path. Even a person's body, if put into a low-current circuit, can change an electronic sound by the flesh acting as a crude resistor. For example, in Haco's "Pencil Organ," made from a home electronics kit, she holds electrodes in her hands as she traces pencil marks across a piece of paper (figure 5.9). The natural resistance of her body changes the sound of the system; her wired body, too, changes the whole circuit when touched by something else. By connecting the loop of the Pencil Organ to one's own personal energy, Haco says, "a person can become a part—the resistance—of an electronic circuit" (Haco 2004).

Noisicians do not separate their own input from the system. Despite

foregrounding the technological context of performance, their feedback stresses the human element of the human–machine relationship. Even when they are screaming within the Noise, performers are careful not to describe feedback as the outcome of personal intention or as simply their own expressive voice, amplified by an instrumental chain of sound-making gear. Noisicians prevent themselves from learning to "play" feedback, to reveal the outcome of human confrontation with an uncontrollable technological environment. Control over feedback would inevitably return it to the self-regulating realm of musical technique, and also, crucially, would distract from the inevitable overload and collapse of the system. "When I start," Greenwood told me, "I don't want to know what's going to happen. Sometimes it just rolls along and things happen and it seems like it's building up and building up—and then it can just fall apart."

FEEDING BACK FROM EVERYWHERE AT ONCE

The out-of-control performance of feedback in Noise reveals what Alfred Gell calls "the technology of enchantment," the cultural process through which societies come to believe in art as an autonomous practice, which is distinct from other forms of human creativity. By isolating artistic production as a technique beyond ordinary ability, people construct art's supernatural qualities. Objects and performances that were previously perceived as instrumental are transformed into transcendent aesthetic symbols. Through technical practices that transcend normal understanding, virtuosic performance is invested with occult power. Art becomes magical, Gell tells us, when people place its transformative powers outside of their own hands. This technology of enchantment then feeds back into "the enchantment of technology," which generates the "power that technical processes have of casting a spell over us so that we see the real world in an enchanted form" (Gell 1994:163). Performance represents a mysterious, special, and isolated technical skill, "oriented towards the production of the social consequences" that ensue from its own instrumental context. Technology, then, becomes a magical system when we conceive of its outcomes as beyond our own personal control. As GX Jupiter-Larsen puts it (in a personal history of his Noise group the Haters), "people take leadership from electricity; even more so than from the person behind the on-off switch" (Jupiter-Larsen 2010).

This is how Noise turns into Music and back again. Feedback reveals

technology's creative power, and its potential for unpredictable change. It also performs the effects of mechanical repetition that threaten the autonomous status of musical authorship. Noise is simultaneously the effect and the cause of this feedback. It is a self-reinforcing loop that does not simply maintain its place in a historical lineage of styles. Noisicians grind the gears of the machine, spitting out unresolved difference in their creative reinventions of musical history and out-of-control embodiments of technology. They weave consumer electronics into a positive loop of aesthetic connections between human and machine. But this feedback must go on, repeating and building, until the whole thing collapses on itself.

describes itself as a detailed history of Merzbow, it contains little substantive writing or historical contribution by Akita himself beyond short segments from English-language interviews and some fragmentary comments.

13 For a widely circulated example, see Akita (1999) (excerpted in Cox and Warner 2004).

14 Akita often uses the English word *outside* to describe the placement of his music. The term *outside*, or *out*, is an especially common descriptor in jazz's genre discourse, where it carries an ambivalent connotation of difference that was formative in the avant-garde status of postwar bebop and free jazz. Performers are described as "out" to connote the extreme styles that are difficult to recover into standard repertoires.

15 As in other cases of pseudonymic naming, the name "Ramones" covers up the diverse ethnicities of individual members of the group, allowing them to appear as members of the same punk rock "family."

16 Pseudonymic practices are also prominent among non-music-making participants and fans in independent music scenes (e.g., the author of the long-term punk-scene chronicle *Cometbus* is known as Aaron Cometbus).

17 For example, Yamazaki Maso became well known for his solo performances as Masonna (playing on the pronunciation of "Madonna") and then began to perform solo under the moniker Space Machine to distance his newer work from his older identity; he also played with others in the group Christine 23 Onna (detaching *onna*, the word for "woman," from Masonna).

18 Reiko A currently performs under her own performance name, solo and in collaboration with Hasegawa Hiroshi of Astro.

19 See, for example, Hegarty (2007) and Woodward (1999). Hegarty notes that "even within the prolific production of Japanese noise musicians . . . Akita could constitute a genre in his own right" (Hegarty 2007:155).

20 See the *Merzbox* web page at http://www.xtr.com/merzbox/swf/index.htm (accessed June 23, 2009). Richards goes on to suggest that shards of the glass master might be sold on an Internet auction site. To my knowledge, the sale has never materialized.

21 There are, of course, many fans that distinguish themselves by having listened to the entire *Merzbox*. Some reviewers have attempted to describe the cumulative experience of listening to each of the fifty CDs one after the other (Burns 2002; Haynes 2003).

5. FEEDBACK, SUBJECTIVITY, AND PERFORMANCE

1 In one exceptional experiment, a Japanese label solicited contributions for a "Noise unplugged" record that required each of its contributors to make a two-minute Noise piece without the use of any amplification whatsoever (the recordings have never been released).

2 Despite this initial controversy, the performer eventually became a well-respected Noisician.

3 Probably the most basic reason for this is that most Noisicians simply cannot afford to destroy a laptop computer (although I have witnessed this once).

4 The situation is markedly different in Europe, however, where many performers use laptops.

5 *Zôfuku* is the most common verb for electronic sound amplification, but the English loanword *anpurifai* is also used.

6 Richardson (1991) describes the economic industrial analysis developed as systems dynamics by Richard M. Goodwin, Herbert Simon, and Jay Forrester as a servomechanisms theory of feedback, which attempts to conceptualize the dynamic behavior of socioeconomic systems.

7 On the technological and military history of cybernetics, see Bennett (1993), Edwards (2007), Gallison (1994), and Mindell (2002).

8 There are, however, some applications in which positive feedback is not necessarily generative as a self-reinforcing loop but can be used as a stabilizing force in a larger electronic system.

9 Bateson describes schismogenesis in "complementary" and "symmetrical" relations, both of which lead to inevitable breakdown in binary exchanges. In complementary schismogenesis, A is more and more assertive and B is more and more submissive; in symmetrical schismogenesis, both A and B become increasingly assertive (Bateson 1935). Bateson later used the negative feedback theory developed in cybernetics to analyze processes of learning and epistemologies of alcoholism and recovery (Bateson 1964, 1971), and he also went on to critique the "systematic distortions" of humankind and the global ecology that result from the implementations of modern technology (M. C. Bateson 1972).

10 Cage (1961) and Russolo (1986 [1913]). See also Marinetti (1973 [1909]) on noise sounds in warfare.

11 For example, a similar long delay time-lag technique was discovered a few years later by Brian Eno in collaboration with Robert Fripp, who renamed the feedback system "Frippertronics."

12 Indeterminacy became a hallmark of institutional narratives of postwar American composition. Cage viewed indeterminacy as an intervention in the European avant-garde that defined "experimental music" in a specifically American postwar environment of radical newness. In his essay "History of Experimental Music in the United States," published in 1961 in the hugely influential volume *Silence*, Cage argues that the United States "has an intellectual climate suitable for radical experimentation," and reports a remark he made to a Dutch musician that "it must be very difficult for you in Europe to write music, for you are so close to the centers of tradition" (Cage 1961:73). Cage rehearses a particularly U.S.-based version of hegemonic globalization at the end of the essay: "It will not be easy . . .

for Europe to give up being Europe. It will, nevertheless, and must: for the world is one world now" (Cage 1961:75).

13 In the first draft of this 1972 essay, Tudor had written this last sentence as "one component *overloads* the next so that *you can create signals*" but ultimately changed "overload" to "influence" and "you can create" to the passively voiced "signals are created" (Tudor 1997 [1972]:29).

14 For example, when I first had a chance to closely observe Merzbow's pedal-based system in 1997, I had recently been introduced to some of Tudor's equipment and recognized some similarities in his electronics. When I mentioned this, Akita explained that although he had been conscious of Tudor through the work of John Cage, he had not known Tudor's electronic pieces when he began making Noise.

15 Tudor shied away from losing control of his feedback systems completely. In a 1984 interview, he commented that he doesn't like it when feedback "takes off" on its own, and that in those cases, he will shut off the system and start over. In some of Cage's "indeterminate" pieces, too, the electronic systems are clearly controlled (such as *Variations IV*, which appears to be an open-form electroacoustic improvisation). Cage's contradictory positions on indeterminacy as a separate realm from improvisation are equally complex and resonate with a desire to distinguish his "experimental music" from emergent contemporary genres such as "free improvisation."

16 *Glitch*, a term often used to describe the sounds of CDs skipping, also describes a nascent genre of experimental electronic music at the end of the 1990s (which is probably why Greenwood hesitated, during this 2004 interview, to invoke the overused and abandoned term). Glitch was created largely on laptops by emphasizing the digital errors created when sound software is forced to malfunction, resulting in clicking and interruption (Bates 2004; Cascone 2000; Kelley 2009; Sangild 2004).

17 Mods can also be created for software and are often produced in an environment of oppositional experimentation similar to physical circuit-bending (Lysloff 2003). Naturally, there are degrees of creativity inherent both in modding software and in circuit-bending. A mod for an existing electronic instrument (for example, the commonly modded sampler/synthesizer Casio SK-1) might be as simple as adding potentiometer knobs to extend the range of its existing parameters while maintaining its basic form, which some consider pointlessly unoriginal. One experimentalist exhorted circuit-benders to "stop doing mods and start actually probing circuits, maybe even leave the SK-1s alone, leave the Speak-and-Spells alone, and find something of your own" (Sajbel n.d.).

18 Ghazala, an American electronic musician who began circuit-bending in the late 1960s, is often called "the father of circuit-bending," and he has published a book of how-to articles (Ghazala 2005). His close association with the term has, of course, led many experimental electronic musicians, especially outside the

United States, to reject circuit-bending as a description for what they insist is an inventorless practice.

19 A note posted at the 2006 Bent Festival was indicative of the casual, hands-on approach to experimental learning in circuit-bending communities: "If you plan on attending Wednesday afternoon's Walkman bending workshop, in this workshop you will learn how to make a tape loop from an audio cassette and pitch-shift it with a variable resistor . . . please bring the following with you: cassette tapes—scissors—Walkmans (that you can destroy)—thin adhesive tape." A guide to a few basic mods for toys is available at Peter Edwards's website (http://casperelectronics.com/finished-pieces/casio-sa2), as well as the "circuit-bending: a bender's guide" page online at http://www.anti-theory.com/soundart/circuitbend/cb02.html.

20 Theorists in social construction of technology (SCOT) and history of science have proposed that user feedback creates a counternarrative to technological determinism through actor–network relations, showing how consumers' dialogic evaluations and remediations of technology have influenced the history of scientific development (Gitelman 2006, 1999; Pinch and Bijker 1984).

6. JAPANOISE AND TECHNOCULTURE

1 A transcription of the lecture, translated into English by Isozaki Mia, is available at http://www.japanimprov.com/yotomo/fukushima/lecture.html. All quotes here are from this translation.

2 See Project Fukushima's mission statement on their website, at http://www.pj-fukushima.jp/en/manifesto_en.html. Also see Ôtomo Yoshihide, "Let's Make 'Fukushima' a Positive Word!" at http://japanecho.net/society/0099/ (2011).

3 The joke about Genpatsu-kun had other iterations, including those of the media artist Yatani Kazuhiko, whose popular tweets in the weeks following the Fukushima meltdown represented the faulty reactor as a small boy with a stomachache. Yatani's tweets inspired a short animated film, depicting a charmingly humiliated "Lil' Reactor Boy," who struggles to keep his radiation-emitting poops and farts from leaking out and contaminating the population (like his infamous classmate Chernobyl-chan). Genpatsu-kun helped remediate an unfathomable context of public violence by literally "characterizing" the reactor into an endearing figure that might bring people closer to understanding what could happen in the aftermath of the meltdown. This disarming cuteness—through which even the catastrophic events at Fukushima can be anthropomorphized into an anime character—resonates with a familiar mode of Japanese cultural production, described by Christine Yano as "pink globalization," that ironically subverts the monstrosities of Japanese capitalism into cute and childish objects of affective identification and empathy (Yano 2006, 2009). Ôtomo's Noise machine Genpatsu-kun reveals the flip side of this cultural production, which focuses attention on the darkness of technoculture in postwar Japan.