

## 7 Stompbox Revolution: Electric Guitar Pedals and Tone

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### Introduction

First developed in the 1960s, effect pedals (also called “stompboxes” or simply “pedals”) are modular electronic accessories that can be incorporated into a guitarist’s signal chain, typically in between their guitar and amplifier. With knobs, buttons, and switches for controlling various sonic parameters, stompboxes are ideal tools for helping guitarists dial in a range of different tones, making a whole world of sound available to everyday guitarists at the mere flick of a switch. In their modularity, stompboxes allow guitarists to combine multiple effect pedals to create a near-infinite array of sounds, thus facilitating guitarists’ compulsory search for a unique and identifiable tone. Like vocal timbre, which is popularly thought to index a performer’s inner subjectivity, an electric guitarist’s tone should ideally be familiar yet totally distinctive.<sup>1</sup>

While other effect-processing formats have been around for decades, stompboxes are compact, relatively affordable, and modular, allowing guitarists to construct multi-pedal rigs with dozens of distinct tones potentially on tap. Prior to the stompbox revolution of the 1960s, electric guitarists had limited options for processing their tone: distortion was only possible with a cranked tube amplifier; echo effects were achievable with magnetic tape machines, which were bulky and required frequent servicing; and more daring modulation effects were restricted to ad hoc studio trickery or similarly impractical rotary speaker cabinets, which employed mechanical motors to physically spin two speaker horns at slightly different speeds.

Throughout the 1960s, inventors incorporated the newly widespread transistor to miniaturize existing technologies into a small and easily tweakable format, resulting in the first batch of fuzz, overdrive, and modulation effect pedals. In the 1970s, a new integrated circuit, the “bucket brigade device” (or “BBD” for short), was developed by Philips Research Labs, which allowed engineers to replace magnetic tape-based equipment with miniature solid-state components, permitting the development of portable echo effects, as well as psychedelic modulation effects like phaser,

flanger, and chorus, which were previously only available in recording studios. By the 1980s, digital computer processors opened the floodgates to processor-based effect pedals capable of shaping sound in any way imaginable.

While effect pedals are ultimately tools for shaping sound, they have also become culturally meaningful objects for myriad reasons that exceed their intended uses. Since the 2010s, a veritable “pedal culture” has developed, within which guitarists are not necessarily bound by any particular musical genre but rather by a shared devotion to effect pedals. Guitarists interested in stompboxes can now read books, follow YouTube talk shows and podcasts, and attend conventions for pedal makers and enthusiasts. Within this pedal culture, guitarists have started to understand the historical significance of the stompbox format and have begun historicizing both the technology and the culture it has inspired. In the year 2021 alone, stompbox enthusiasts authored numerous books, produced a feature-length documentary, published an illustrated children’s book, and performed a fully staged musical, all celebrating the history and culture around electric guitar effect pedals.<sup>2</sup>

In this chapter, I survey the historical development and cultural meaning of the stompbox format. Centered around three main categories of stompboxes—fuzz, delay, and modulation—this chapter foregrounds how guitarists have developed new ways of thinking about sound itself through their use of these various technologies. Throughout, I not only describe key technical innovations that mark turning points for gear history, but I also analyze how guitarists have integrated these new technologies into their musical practices. In doing so, I aim to show how the stompbox format has been central to the development of electric guitar-based musical styles since their inception in the 1960s. Then, following newer developments, I show how new musical styles have emerged that are defined by the integral and creative application of effect pedals. Ultimately, I suggest that electric guitar equipment produces not only musical sounds but also *knowledge about* musical sounds.

## Fuzz

Arguably, distortion is the sound most commonly associated with the electric guitar. Initially considered an unwanted consequence of tube-powered amplifiers, distortion gradually became an acceptable and indeed desirable sound effect within electric guitarists’ expanding stylistic toolkits.<sup>3</sup> After accidentally dropping his Fender Deluxe amplifier in 1956, Paul Burlison discovered that by halfway removing the vacuum

tube responsible for amplifying his guitar's voltage, he could purposefully get his rig to produce a raunchy, fuzzy distortion, as heard on "Train Kept A-Rollin" (1956). Like Burlison, subsequent guitarists searched for ways to deliberately overdrive their instruments. In the late 1950s and early 1960s, fuzz-hungry guitarists coaxed their rigs into overdrive by any means necessary, including inflicting damage upon their amplifiers. The iconic fuzz tones on guitarist Link Wray's 1958 hit record "Rumble," for example, are (maybe apocryphally) claimed to have been produced after Wray purposely impaled a pencil through his amplifier's paper speaker cone.<sup>4</sup>

In 1961, while Nashville session guitarist Grady Martin was laying down a solo, the studio's tube-powered mixing board began to fail, causing Martin's guitar to distort. Against conventional wisdom, the session engineer, Glenn Snoddy, preserved the distorted solo on the recording's final cut. After the record—Marty Robbins' "Don't Worry" (1961)—became a hit, subsequent guitarists clamored for the same fuzzed-out tone. To satiate the newfound need for fuzz, Snoddy designed a transistorized circuit that could approximate the distorted sound of his malfunctioning recording console. The portable outboard device, capable of reliably producing fuzz tones without damaging any equipment, was a revolutionary invention and is widely hailed as the earliest standalone fuzz pedal. Snoddy sold his design to Gibson, who released the "Fuzz Tone" under their Maestro subsidiary, becoming the first commercially available guitar effect pedal.<sup>5</sup>

Gibson's early advertisements for the Fuzz Tone show how they regarded the pedal as a tool for session musicians to mimic the sounds of various brass, woodwind, and string instruments, similarly to how synthesizers were used later in the decade. A demo disc for the Maestro Fuzz Tone recorded in 1962 advertises:

It's mellow. It's raucous. It's tender. It's raw. It's the Maestro Fuzz Tone. It opens a whole new world of music for you . . . Organ-like tones, mellow woodwinds, and whispering reeds, booming bass, and bell-clear horns. [The Fuzz Tone] makes possible all these effects, with the touch of a toe.<sup>6</sup>

On "(I Can't Get No) Satisfaction" (1965), Rolling Stones guitarist Keith Richards famously used a Fuzz Tone on the recording's main riff to imitate the sound of a horn section. "In 'Satisfaction,'" Richards recalls, "I was imagining horns, trying to imitate their sound to put on the track later when we recorded . . . But we didn't have any horns, and I was only going to lay down a dub . . . But the fuzz tone had never been heard before anywhere, and that's the sound that caught everybody's imagination."<sup>7</sup> By mimicking the sound of another instrument, Keith Richards' Fuzz Tone complicates conventional notions of timbre, which maintain that the term

refers to the instrumental source of a particular sound. In other words, a trumpet is thought to sound like a trumpet precisely because a trumpet, and no other instrument, can produce that sound. With its “timbral thievery,” the Fuzz Tone shifts our focus as listeners from the source of a sound (“I am listening to a horn section”) to the qualities of the sound itself (“This sounds fuzzy”).<sup>8</sup> So, while Richards may have intended for the riff from “Satisfaction” to be a horn line, what subsequent listeners have heard and latched onto is something else entirely, something far greater than the sum of its parts.

As guitarists sharpened their focus on playing with sound itself, effect pedals proved to be ideal tools for conceptualizing sound as a controllable entity. The materiality of analog circuitry especially has fostered a sense of physically controlling sound. In analog electronic circuits, a continuously variable signal travels (via wires and components) from point to point while each component physically modifies the movement of the signal. Like miniature Rube Goldberg machines, analog circuits bounce a signal from component to component, physically complicating its journey from point A to point B. Each switch that a guitarist flips draws new connections, new bridges between points in the circuit. Each knob they twist eases or resists the flow of current. The sense of control over sound is rendered all the more palpable when one’s knob-twisting physically alters a moving current. For this reason, analog components have themselves become the object of analysis and devotion for listeners seeking a source for their instruments’ exceptional sounds, like the antique varnish or exotic tone woods long believed to be the source of a Stradivarius violin’s exceptional tone.<sup>9</sup>

What is noteworthy about effect pedal culture is that guitarists have grafted these same centuries-old strategies for investigating and valuing old instruments onto a class of mass-produced electronic commodities. By fetishizing certain germanium transistors over others, gear connoisseurs attribute the “magic” of their tone to everyday mass-produced electronic components. As John Bowers and Vanessa Yaremchuk wax in their ode to components for *Leonardo Music Journal*, “before the Ibanez Tube Screamer there was the JRC4558 chip. Before the smooth sound of germanium fuzz, there had to be germanium, in particular in NKT-275 (‘Newmarket’) transistors.”<sup>10</sup> The authors’ reference to cryptic component codes and parenthetical insider jargon marks a specialist knowledge that transcends most consumers’ general ignorance of how their electronic devices work. On the contrary, Bowers and Yaremchuk magnify their attention to componentry, inviting their readers to join their rhapsodic intoxication with what lies beneath the proverbial “black box”: “*So let your favorite things be components . . . Let components themselves be your first*

love.”<sup>11</sup> Nowhere is this component of fetishism more prevalent than in Fuzz Face culture.

Released by Arbiter Music in late 1966, and most notably used by Jimi Hendrix, the Fuzz Face is built around the circular metal base of a microphone stand. The pedal gets its name from its anthropomorphic control layout: its two knobs, single footswitch, and curved label imply the eyes, nose, and smiling mouth of a human face. Beneath its grinning enclosure, the Fuzz Face’s circuit is relatively simple, employing only a handful of components: four resistors, three capacitors, two transistors, and two potentiometers. As such, the pedal quickly became an ideal platform for modification and experimentation. Technician Roger Mayer famously modified Hendrix’s personal Fuzz Face pedals, experimenting with different transistors for their unique sonic properties. Because its circuit is so sparse, each component takes on heightened importance for guitarists who can hold highly niche preferences for the most esoteric details about their Fuzz Face circuits. *Guitar Player* magazine has notoriously trumpeted that guitarist and tone connoisseur Eric Johnson “can hear the difference when he changes the brand of batteries in his [Fuzz Face].”<sup>12</sup>

With so few components contributing to its sound, guitarists claim (whether rightly or not) that they can discern and name even minor modifications to a Fuzz Face circuit. As a special issue of *Guitarist* magazine dedicated to effects pedals explains:

When fuzz fans talk of the magical properties of a vintage fuzz pedal they don’t mean just any Fuzz Face . . . but a good one. Find a Fuzz Face with two properly matched germanium transistors and it can sound like the voice of God; land one with a pair of drifting or mismatched germanium transistors, and it can sound like the voice of a dog.<sup>13</sup>

That minor component changes are meaningful and intelligible to listeners marks a change from Keith Richards’ use of fuzz. Whereas Richards used fuzz to index another instrument, later guitarists used fuzz as a means of controlling sound itself. By learning to aurally distinguish between silicon and germanium diodes, for example, in otherwise identical circuits, guitarists have concentrated their ear training practices all the way down to the atomic level of tone.

Following the fuzz craze of the late 1960s, guitarists sought out more amp-like flavors of distortion in the 1970s, culminating in the popularization of so-called overdrive pedals. Whereas fuzz pedals created thick distorted sounds within the pedal’s circuitry, overdrive pedals can increase a guitar’s volume before it hits a tube amplifier, causing the distortion to be produced in the amplifier as well as the pedal. The resulting overdriven

sound is meant to mimic the sounds of a loud tube amplifier. Among the many overdrive pedals created since the 1970s, the most popular, most copied, and most influential is the aptly named Tube Screamer, designed by Susumu Tamura for Maxon in 1979 and soon after distributed by Ibanez. A product of Japan's booming electronics industry, the Tube Screamer has been mass-produced in large quantities since its debut and sold at a relatively affordable price point. Accordingly, Ibanez continues to sell upwards of 10,000 Tube Screamers a year, and the pedal has been a popular "first pedal" for hundreds of thousands of beginner guitarists embarking on their gear journeys.<sup>14</sup> Yet, despite its populist circulation, the Tube Screamer has been a staple within many professional guitarists' rigs, popularized by blues rock guitarists Stevie Ray Vaughan, Eric Johnson, and John Mayer, who all count the pedal as a core component of their overdriven guitar tones.

## Delay

Many years before guitarists began experimenting with overdriven guitar tones, the earliest non-pedal effects available to guitarists were reverb and delay units. Time-based effects, as they are called, have figured prominently in the sound of recorded popular music, but until the late 1940s, they were initially restricted to use in recording studios. Many studios incorporated ambient "room sound" into their recordings via echo chambers—reverberant rooms into which the recording would be played, and the echoes recorded and mixed back into the production.<sup>15</sup> In the late 1940s, jazz guitarist Les Paul devised a novel recording technique for producing artificial echo effects using magnetic tape.<sup>16</sup> The reel-to-reel tape machines, then standard for recording audio, contained one head for recording and one for playback. Due to the physical distance between the two heads, any sounds captured by the recording head would play back after a short delay. When mixed with the original dry signal, this delayed signal created the illusion of an echo. By varying the tape speed and/or the distance between the recording and playback heads, the delay time could be made longer or shorter.

In the wake of Les Paul's hit record, "How High the Moon" (1951), which features a rapid echo to add a subtle sense of space to the recording, tape delay machines became a popular fixture in recording studios and electric guitar rigs alike. The "slapback" echo produced by short delay times became an integral component of the early rock 'n' roll sound in the mid 1950s. On early Elvis Presley recordings, like his 1955 hit "Mystery Train," lead guitarist Scotty Moore can be heard using an EchoSonic

amplifier with built-in tape delay, designed by legendary engineer Ray Butts, for his signature slapback echo. Though the EchoSonic has been called the “holy grail” of the rockabilly sound, Butts produced fewer than eighty amplifiers. Tape delay reached the masses in the early 1960s when Maestro released their widely influential Echoplex standalone tape delay machine, designed by Mike Battle and based on Butts’ original design. The Echoplex remains one of the most sought-after guitar effects, having been used on countless recordings by some of rock’s biggest musicians, including Eddie Van Halen (“Ain’t Talkin’ Bout Love,” 1978), The Police’s Andy Summers (“Walking on the Moon,” 1979), and Eric Johnson (“Cliffs of Dover,” 1990).

Queen guitarist and famous tinkerer Brian May modified his Echoplex to produce a small number of long repeats with which he would harmonize, building layered canon-like harmonies similar to Les Paul’s sound-on-sound technique. Most clearly illustrated on the unaccompanied guitar interlude on Queen’s “Brighton Rock” (1974), May’s multipart self-harmonizing trick became a staple of his unaccompanied guitar solos during Queen’s live concerts (see “Brighton Rock Solo” from Queen’s many live recordings).<sup>17</sup> During these performances, May’s “dry” guitar signal and the echoes are spatially separated in the stereo mix, so it is easy to distinguish between the notes he plays and those repeated by the Echoplex. Mirroring the evolution of fuzz described above, earlier uses of artificial echo sought to convincingly replicate existing sounds, namely reverberant room sounds. However, in May’s multipart harmonies, the tape delay becomes an instrument in its own right.

While tape delays remain highly coveted to this day, they prove impractical for most guitarists’ needs. Because they require a mechanical motor to spin a spool of magnetic tape, they are physically bulky (making them difficult to transport) and need frequent servicing to remain operable. Likewise, the tape can become crinkled, producing a fluttering, stuttered echo, and the fidelity of the repeats can degrade with repeated use, becoming darker and more distorted. In 1969, Philips Research Labs developed a new solid-state technology that would facilitate the development of pedal-sized delay effects that required no moving parts. The BBD is a small integrated circuit consisting of several hundred stages of capacitors and transistors. At each stage, a charge is momentarily stored in the capacitor, while the transistor acts as a gate, permitting the charge to progress to the next capacitor after a fixed amount of time, determined by an internal clock. With each “tick” of the clock, every other stage of the BBD circuit is either turned “on” or “off.” When on, the charge can pass. Because every other stage is off, the charge can only move one stage at a time, therefore regulating the rate at which the signal moves through the

circuit. By conducting the voltage more slowly, the audio signal is effectively “delayed” for a period of time. Although these operations occur over fractions of a second, by stacking several hundred stages in series, the analog signal can be delayed up to 600 milliseconds or so. When this delayed signal is wired in parallel with the “dry” guitar signal, an echo effect is achieved.

With this newly available BBD technology, several manufacturers developed compact delay pedals in the early 1970s, including MXR and Electro-Harmonix. The latter’s Deluxe Memory Man (DMM), designed by Howard Davis in 1976, stands as the pinnacle of analog delay design. Utilizing the capabilities of BBD technology, the DMM produces all-analog repeats while also modulating the pitch of the repeats to create a warbly wash, similar to the fluctuations in pitch that occur with a tape echo. By imitating the warbly repeats of an old and crinkled tape machine, analog delay pedals retain what was once an unintended bug from an older technology and frame it as a desirable feature, much like how guitarists learned to adopt the unintended distortion of their tube amplifiers. This pattern continues for contemporary digital delay pedals, whose repeats can perfectly replicate an original signal. However, because listeners have become accustomed to hearing dark and warbly repeats, a pristine digital delay can be a bit uncanny. As such, some of the most popular digital delay pedals created today are accurate emulations of tape and analog delay units—bugs and all. That guitarists obsess over the quality of their echo repeats—whether they are dark and murky, or bright and pristine—is further testament to their gradually intensifying focus on the quality of sound itself.

Shortly after its release, U2’s The Edge became an early adopter of the DMM and developed his signature playing style around the pedal’s rhythmic affordances. Whereas earlier guitarists had favored quiet repeats that could sit unobtrusively beneath a main guitar part to produce a sense of space, The Edge recognized that he could use the pedal’s delayed repeats in the foreground as melodic and rhythmic complements to his undelayed guitar signal, an extension of Brian May’s self-harmonizing technique. In a scene from the 2008 documentary film, *It Might Get Loud*, The Edge describes how the DMM’s delayed repeats inspired him to explore new approaches to playing the electric guitar:

I got this echo unit [the DMM], and I brought it back to rehearsal. I just got totally into playing but listening to the return echo filling in notes that I’m not playing, like two guitar players, rather than one. [The delayed echo is] the exact same thing [I play], but it’s just a little bit off to one side. I could see ways to use it that had never been used, and suddenly everything changed.<sup>18</sup>



Table 7.1 *Combined effect of a dotted eighth delay with a steady eighth-note rhythm*

| Beat count                          | 1 | e | & | uh | 2 | e | & | uh | 3 | e | & | uh | 4 | e | & | uh |   |  |    |   |   |  |    |   |   |    |   |  |    |
|-------------------------------------|---|---|---|----|---|---|---|----|---|---|---|----|---|---|---|----|---|--|----|---|---|--|----|---|---|----|---|--|----|
| Eighth notes played by The Edge     | 1 |   |   |    | 2 |   |   |    | 3 |   |   |    | 4 |   |   |    | 5 |  |    |   | 6 |  |    |   | 7 |    |   |  | 8  |
| Dotted-eighth-note repeats from DMM |   |   |   | 1* |   |   |   | 2* |   |   |   | 3* |   |   |   | 4* |   |  | 5* |   |   |  | 6* |   |   | 7* |   |  | 8* |
| Combined rhythm                     | 1 |   |   | 1* | 2 |   |   | 2* | 3 |   |   | 3* | 4 |   |   | 4* | 5 |  | 5* | 6 |   |  | 6* | 7 |   | 7* | 8 |  | 8* |

I use numbers 1 through 8 to count each separate pick-stroke by The Edge. Asterisks are used to indicate the repeated articulation of each note as produced by the DMM.

Using the DMM, The Edge composed riffs that exploited the pedal's delayed repeats to create lines that would be otherwise unplayable.

On U2's first album, *Boy* (1980), The Edge uses the DMM throughout, but the seeds of his idiosyncratic playing style are perhaps best illustrated by the opening riff to the song "The Electric Co." With the DMM's repeats set to the equivalent of a dotted eighth-note rhythm, The Edge plays a stream of eighth notes ("1 and 2 and 3 and 4 and . . ."). With a dotted eighth delay, the two signals combine to create a steady stream of *sixteenth* notes ("1 e and uh 2 e and uh 3 e and uh 4 e and uh . . ."). However, more than simply doubling the rhythm, the resulting sixteenth-note line is created by staggered repetitions of already played notes, producing a distinctive pattern alternating between played and repeated notes. This pattern would not only be difficult to play without a dotted eighth delay, but by playing eighth notes, each adjacent note can sustain and cascade over one another, a sound only achievable through delay. As Table 7.1 shows, the delayed repeats occupy the silence between the eighth notes played by The Edge, rendering his syncopated rhythm only playable with a delay pedal. Without the DMM, half of the riff's notes would be missing. This delay trick became a favorite technique for The Edge and the foundation for subsequent U2 hits, especially "Pride (In the Name of Love)" and "Bad" from the band's 1984 album *The Unforgettable Fire*; and "I Still Haven't Found What I'm Looking For" and the jangly guitar parts on "Where the Streets Have No Name" from *Joshua Tree* (1987).

## Modulation

Throughout the 1960s and 1970s, the fundamental sound of the electric guitar changed, wedging the gap between the acoustic and electric guitar even further. Modulation effects in particular have permitted guitarists to alter their tone such that they can produce un-guitar-like sounds. The term

“modulation” refers to an impossibly broad swath of technologies and sounds, making it difficult to define in brief, though simply, many modulation effects involve varying a guitar’s frequency or pitch in some way. As with delay, modulation effects began as mechanical standalone options that were later miniaturized and expanded upon with new BBD technologies.

### **Rotary and Phaser**

Among the earliest modulation effects used by guitarists was the Leslie rotary speaker, initially designed for use with organs. Leslie cabinets consist of two speaker horns—one for high frequencies and a larger horn for lower frequencies—which both physically spin (at different speeds) inside the cabinet. The unsynchronized horn speeds produce a warbly movement of pitch that can be set slow for subtle undulations, or fast for a quick, stuttering effect. The Beatles were among the first to run their guitars through the Leslie cabinet, and its rotary effects can be heard on songs like “Sun King” and “Something” from their album *Abbey Road* (1969). The rotary speaker has remained a popular effect among electric guitarists and can be heard on Stevie Ray Vaughan’s “Cold Shot” (1984) and Soundgarden’s “Black Hole Sun” (1994).

In 1968, Japanese company Shin-ei developed the Uni-Vibe pedal, which utilized four photo bulbs to create a phase-shifting effect similar to the Leslie rotary cabinet. Although the widely held assumption that the Uni-Vibe was created to mimic the sound of a Leslie cabinet is untrue, the sonic resemblance is undeniable, and many guitarists employ the pedal much like they would a bulky rotary cabinet. One of the earliest, and most famous, adopters of the Uni-Vibe pedal was Jimi Hendrix, who used the pedal on his rebellious rendition of the “Star Spangled Banner” at Woodstock in 1969. Following in Hendrix’s shadow, blues guitarist Robin Trower has been closely associated with the Uni-Vibe pedal for its prominent use on recordings like “Bridge of Sighs” from 1974.

In the early 1970s, a new generation of phase-shifting pedals was created, including the famous MXR Phase 90 in 1974, which splits a signal in two: one signal remains unaffected, while the second is oscillated to move in and out of phase with the first, producing characteristic nodes where the two signals cancel each other out. Eddie Van Halen notably used the phaser in a subtle setting on his bombastic solo track “Eruption” and to more dramatic effect on the song “Atomic Punk,” both from his band’s 1978 debut album. In the latter’s scratchy intro, although Van Halen plays the same unpitched note on his guitar, the phaser’s frequency sweep creates the effect of cyclical melodic movement. Like The Edge’s rhythmic use of delay, Van Halen’s riff would sound utterly unrecognizable without

the sweeping arc of his Phase 90, rendering the pedal an integral component of the song's composition.

### **Chorus**

On Shin-ei's first Uni-Vibe pedals, there was a toggle switch to choose between "vibrato" and "chorus" effects. The distinction is simple—a vibrato effect modulates the entire signal's pitch up and down, while a chorus signal blends the "wet" modulated signal with the "dry" unaffected signal. By adding subtle pitch movement to a dry guitar signal, chorus effects can create the illusion of there being more than one guitar, mimicking the subtle fluctuations in phrasing between multiple performers. In 1976, Boss released the CE-1, the earliest commercially available chorus pedal, utilizing the same kind of chips BBD used to produce analog delay effects. Varying the chip's delay time (faster and slower) results in cyclical fluctuations in pitch (sharp and flat), similar to the warble of a poorly maintained tape machine. While plenty of guitarists utilized chorus in the 1970s—including Boston's Tom Scholz, Rush's Alex Lifeson, and jazz guitarist John Scofield—the effect reached its apex in the following decade when its pervasive (and some might say excessive) use within Top 40 pop recordings arguably defined the sound of an entire era. In particular, heavily chorused guitars created the sheen distinctive to 1980s pop music, as heard on songs such as Prince's "Purple Rain" (1984), Bryan Adams' "Run to You" (1984), and Def Leppard's "Hysteria" (1987). In the 1980s, many guitarists briefly ditched effect pedals in favor of the rack-mount format, which enabled them to incorporate studio-quality effect processors into their guitar rigs. By the 1990s, however, rack-mounted effect units and their heavily processed tones had fallen out of favor, and guitarists such as Kurt Cobain used analog chorus pedals for a more lo-fi effect, as on Nirvana's "Come As You Are" (1991). In recent years, guitarists have revitalized the 1980s heavy-handed approach to chorus tones, as heard on Japanese Breakfast's "Be Sweet" (2021) or John Mayer's "Shot in the Dark" (2021).

### **Flanger**

If chorus effects produce a subtle sense of width, flanger pedals are a comparably dramatic option. Flanging occurs when an audio signal is split in two, and the second signal is delayed by a very short time (less than 20 milliseconds). The delay time is continuously modulated faster and slower, producing audible peaks along the harmonic series, perceptible as a metallic "whooshing" sound. Early flanging effects were created by feeding a signal to two tape machines and altering the speed of one by lightly pressing a finger onto the spinning tape reel. By the 1970s, portable

analog flanger pedals were designed around newly available BBD technology. With analog flanger pedals, the sweeping flanging sound can be fed back into the input of the BBD circuit via a variable “feedback” control, altering the intensity of the flanging effect. When set with little feedback, flanger pedals can sound somewhat chorus-like. On early recordings by The Police—like “Message in a Bottle” (1979), for example—the subtle wobble of guitarist Andy Summers’s Electro-Harmonix Electric Mistress flanger is often mistaken for a chorus pedal. With higher feedback levels, flanger pedals produce the intense “jet-plane” doppler effect for which they are known. One of the quintessential uses of the jet-flanging sound is the opening riff to Van Halen’s “And the Cradle Will Rock” (1980). Like the opening to “Atomic Punk,” Van Halen uses his left hand to mute his guitar’s strings, playing the same unpitched sound throughout the song’s opening riff, while the sweeping overtones that create the riff’s melodic contour are entirely produced within the BBD circuitry of his MXR 117 flanger pedal. Aside from their distinct rhythms, both “Atomic Punk” and “And the Cradle Will Rock” are substantially similar, with their unique DNA being produced by the phaser and flanger, respectively.

Severe jet-flanging effects, however, can be tiresome to listen to and have typically been reserved for dramatic effect in brief sections of a song’s arrangement. For example, it became common throughout the 1970s to apply flanger to the bridge of a rock song, often to the entire recorded mix. As a formal feature, flanging became a way to sonically differentiate between sections. Listen, for example, to the sweeping flanger effects used on the bridge sections of Eagles’ “Life in the Fast Lane” (1976), The Doobie Brothers’ “Listen to The Music” (1976), Lenny Kravitz’s “Are You Gonna Go My Way” (1993), Foo Fighters’ “Hey Johnny Park” (1997), and the psychedelic ending to Jimi Hendrix’s “Bold as Love” (1967).

## Pedal-Based Music

Expanding on the approaches described above, wherein guitarists utilize effect pedals as compositional tools to create riffs and playing techniques, more recently, entirely new genres of music have emerged based on the integral use of effect pedals. As early as the late 1980s, groups such as My Bloody Valentine chained multiple effect pedals together to create lush walls of sound that pushed the electric guitar into uncharted territory. On their 1991 recording “Only Shallow,” guitarist Kevin Shields’ distinctive pedal-forward style can be heard on the heavily effected guitar melody in the song’s opening section. The “shoegaze” style, which My Bloody Valentine forged, is recognized as among the first genres of music to be

defined almost exclusively by the liberal use of effect pedals.<sup>19</sup> Many shoegaze guitarists construct their rigs around elaborate pedalboards consisting of dozens of different effects. In concert, these pedalboards can physically take up much of the stage floor, generating a visual spectacle of technical excess matched only by the equally over-the-top sonic textures created by said pedalboards.

Since the late 2010s, ambient and loop-based genres of music have developed around the idea of using a pedalboard as an instrument in its own right. In addition to the fuzz, delay, and modulation pedals described so far, ambient musicians have also favored newer digital “granular” and “micro” loopers, which can chop up and rearrange an audio sample into randomly generated combinations. Whereas traditional looping pedals faithfully reproduce an exact copy of a recorded audio sample, granular and micro loopers employ digital algorithms to alter the timbre, pitch, rhythm, and sequence of notes inputted by the player, creating new melodic sequences that are distinct from what the musician played. For this reason, Robert Strachan has described this class of pedals as “textural” effects, because they affect not only timbre but rather, “the effects pedal is a sounding agent in itself and has the ability to affect *all* of the parameters (such as timbre, melody, harmony, and time) that we find musically meaningful.”<sup>20</sup>

This approach to looping can be heard on “Habit Tapes,” Volumes 1 and 2 (2022), two mixtapes curated by pedal maker Chase Bliss (whose Mood, Habit, and Blooper pedals are all central to this emerging genre) to show off the musical capabilities of their Habit pedal.<sup>21</sup> They describe the Habit as follows:

A digital tape reel that records every sound that enters the pedal. As long as Habit is on, it’s recording. At any moment, you can scan back into this history and play moments from the past – instead of, or alongside the present. This architecture makes a pile of interesting things possible: never-before-heard delays, bizarre loops and transitions, and even entire songs captured right inside the pedal.<sup>22</sup>

Through granular and micro looping, the pedalboard becomes a kind of coauthor, operating with its own degree of agency, playing back new melodies and rhythms generated from a provided sample. Using a guitar, synthesizer, violin, bass, harp, etc. to generate a short sample on a looper pedal, players then send the audio loop to assorted effects on their pedalboard, often physically setting their instrument aside to focus on twisting knobs and engaging switches. Within this new performance landscape, musicians are encouraged to play the pedal, rather than the guitar. The knobs and switches on the pedal’s interface become a dominant playing surface, equal to (or at times more important than) the guitar’s fretboard.

Here, the guitar behaves like a tone generator for a modular synthesizer, merely providing pitch content for subsequent stages of signal processing.

This shift in performance practice is growing in popularity, and since 2020, numerous granular/micro loopers and ambient pedals have made Reverb.com's lists of best-selling effect pedals, representing a sea change among gear consumers.<sup>23</sup> Yet, despite the centrality of effect pedals in contemporary guitar practice, there persists among certain guitarists a belief that an over-reliance on technology is anathema to authentic musical performance. Embracing long-standing tropes about technology's corrupting influence, some critics position effect pedal use and music making as two separate activities, suggesting that those guitarists preoccupied with chasing sound do so at the expense of "actually playing" their instrument. Indeed, as Jan-Peter Herbst and Jonas Menze describe in their study of "Gear Acquisition Syndrome," for many musicians, "thinking about gear and finding strategies to improve one's rig can take precedence over practising and playing, to a point when dealing with equipment becomes more important than making music."<sup>24</sup> However, in light of the development of pedal-based musical styles, I suggest that the distinction between dealing with equipment and making music is becoming increasingly blurred.

Musicologist Mike D'Errico highlights a gradual shift taking place in "the structure of media design" from linear narrative to exploration. On the internet, for example, users are encouraged to follow distractions onto interlinked pages, and with maximalist feature-heavy software interfaces, "musicians explore the interface rather than use it for specific purposes or intentions."<sup>25</sup> Likewise, a guitarist's pedalboard behaves like a networked interface to be explored, rather than used. Beyond simply dialing in a sound and then making music, guitarists can now embrace distractions and find themselves lost in the endless sonic possibilities afforded by their equipment. Chase Bliss, for example, describe their Mood pedal as "a musical chemistry set," inviting users to "transfer, combine, and get lost."<sup>26</sup> Indeed, with many contemporary effect pedals, the goal, then, is not to find a sound for the subsequent creation of music, but rather to explore sound itself, as it is embodied in gear and hardware interfaces.

## Conclusion

Since the mid 1960s, stompboxes have been ubiquitous tone-sculpting tools among electric guitar players across all styles, generations, and backgrounds. On live performance stages, in recording studios, and even in amateur bedroom practice sessions, effect pedals figure prominently in

the everyday musical practices of electric guitarists who can spend hours at a time linking multiple effect pedals together and twisting knobs to find the elusive sounds in their heads. As opposed to traditional practice routines, through which a player might familiarize themselves with scales, melodies, or rhythmic gestures, practices based around effect pedals typically pursue a control over sound itself. As electric guitar historian Dave Hunter describes, the pleasures associated with a good sound can be somewhat hypnotic: “With truly outstanding guitar tone at my fingertips, I am capable of sitting for hours on end playing the same simple chords and riffs, just feeding off the way that the multidimensionality of the sound triggers whatever pleasure mechanism it is that exists within the human sense of hearing.”<sup>27</sup>

What guitarists know and value about tone is often personal, subjective, sensual, even irrational. Whereas pitch, melody, and associated musical parameters invite logical contemplation, tone and timbre privilege the act of listening, of being present with sound. To know something about tone is to feel something in the complex encounters between body, sound, and technology.

Through their use of various sound-shaping tools, electric guitarists have learned how to listen, and what to listen for. By and large, the favorite of these tools for contemporary electric guitarists has been the effect pedal. In this sense, they are exemplary “instruments of theory,” which produce not only musical sounds, but also *knowledge about* musical sounds.<sup>28</sup> Certain musical instruments afford certain ways of thinking about music more than others. But whereas the piano keyboard, for example, readily affords demonstrations of harmony and voice leading, I suggest that effect pedals can generate knowledge about tone and timbre. With knobs for tweaking parameters of an instrument’s tone, effect pedals permit guitarists to explore sound itself and produce knowledge about it, much like a modular synthesizer might work for a keyboard player. With these affordances, electric guitarists have utilized effect pedals to develop new approaches to musical performance and composition that foreground sound itself.

As I have shown in this chapter, effect pedals have played an important role in how electric guitarists have come to understand sound itself as a controllable entity. From the earliest available fuzz pedals to the latest digital loopers, guitarists’ orientation toward sound has been influenced by the technologies through which they can shape and control it. Since the 1960s, effect pedals have been an integral technology in many electric guitarists’ creative practices. In this sense, guitarists approach effect pedals as instruments in their own right. The sounds these pedals produce are not mere byproducts of musical performance, but rather, for many guitarists, the sound of a particular pedal is, in fact, constitutive of their musical identity.

## Notes

1. For more on electric guitarists' search for a unique tone, see Robert Fink, Melinda Latour, and Zachary Wallmark (eds.), *The Relentless Pursuit of Tone: Timbre in Popular Music* (Oxford University Press, 2018); and David Matthew Brounley, "That Sound in Your Head: Guitar Tone Values in the Entrepreneurial Age," unpublished PhD thesis, Stony Brook University (2022).
2. See Ronald Light, *Pedal Culture: Guitar Effects Pedals as Cultural Artifacts* (Backbeat Books, 2021); Michael Lux and Daniel Orkin, directors, *The Pedal Movie*, Reverb (2021); Billy Cardigan, *My Daddy Has 100 Pedals* (Amazon, 2021); JHS Pedals, "Guitar Pedals—A Historically Accurate Musical Comedy," YouTube (2021). Available at [www.youtube.com/watch?v=gXZgOyFN54k](https://www.youtube.com/watch?v=gXZgOyFN54k) (accessed October 14, 2022).
3. For a more thorough accounting of the history of electric guitar distortion, see Michael Hicks, *Sixties Rock: Garage, Psychedelic, and Other Satisfactions* (University of Illinois Press, 2000), pp. 12–22.
4. Steve Waksman, "The Turn to Noise: Rock Guitar from the 1950s to the 1970s," in *The Cambridge Companion to the Guitar*, edited by Victor Anand Coelho (Cambridge University Press, 2003), pp. 109–121.
5. Nicholas Wedyke, "The History and Origins of the Iconic Maestro FZ-1 Fuzz-Tone," *Guitar World* (October 20, 2021). Available at [www.guitarworld.com/features/history-of-the-maestro-fz1](https://www.guitarworld.com/features/history-of-the-maestro-fz1) (accessed October 14, 2022).
6. Recording accessible at: Adriaan Täckman, "Maestro Fuzz-Tone FZ-1. Demonstration Record 1962," YouTube (2012). Available at [www.youtube.com/watch?v=VAWwBEx3Qkc](https://www.youtube.com/watch?v=VAWwBEx3Qkc) (accessed October 14, 2022).
7. Keith Richards, *Life: Keith Richards* (Pheonix, 2010).
8. See Jonathan De Souza, "Timbral Thievery: Synthesizers and Sonic Materiality," in *The Oxford Handbook of Timbre*, edited by Emily Dolan and Alexander Rehding (Oxford University Press, 2021), pp. 346–379.
9. For more on how guitarists locate tone in analog electronics, see Erik Broess, "Unobtainable: Electric Guitar Gear & The Mythology of Tone," unpublished PhD thesis, University of Pennsylvania (2023).
10. John Bowers and Vanessa Yaremchuk, "The Priority of the Component, or in Praise of Capricious Circuitry," *Leonardo Music Journal* 17 (2007): 39.
11. *Ibid.* Emphasis in original.
12. Tom Wheeler, "The Grunge & The Glory," *Guitar Player* (October 1992), p. 41.
13. Dave Hunter, "The FX Evolution," in *The Guitarist Guide to Effects Pedals Seventh Edition*, special issue of *Guitarist Magazine*, edited by Owen Bailey, Jamie Dickson, and Ross Hamilton (2021), p. 8.
14. Lindsay Tucker, "Green Giant: History of the Tube Screamer," *Premier Guitar* (October 18, 2011). Available at [www.premierguitar.com/gear/tube-screamer-history](https://www.premierguitar.com/gear/tube-screamer-history) (accessed October 14, 2022).
15. For histories of delay and reverb effects, see Peter Doyle, "'My Blue Heaven' to 'Race with the Devil': Echo, Reverb and (Dis)ordered Space in Early Popular Music Recording," *Popular Music* 23/1 (January 2004): 31–49; Doyle, *Echo and Reverb: Fabricating Space in Popular Music Recording, 1900–1960* (Wesleyan University Press, 2005); and Jonathan Sterne, "Space within Space: Artificial Reverb and the Detachable Echo," *Grey Room* 60 (Summer 2015).
16. Ian S. Port, *The Birth of Loud: Leo Fender, Les Paul, and the Guitar-Pioneering Rivalry that Shaped Rock 'n' Roll* (Scribner, 2019), p. 33. See also, Steve Waksman, *Instruments of Desire: The Electric Guitar and the Shaping of Musical Experience* (Harvard University Press, 1999), ch. 2; and Brian Kane, *Sound Unseen: Acousmatic Sound in Theory and Practice* (Oxford University Press, 2014), ch. 6.
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18. Paulo Brandão, "It Might Get Loud – The Edge 'suddenly, everything changed . . .'" YouTube (2015), circa 0:51. Available at [www.youtube.com/watch?v=YfvDQxmPQdM&t=42s](https://www.youtube.com/watch?v=YfvDQxmPQdM&t=42s) (accessed October 14, 2022).
19. The term "shoegaze" is derived, in part, because much of a performance consists of guitarists gazing downward at their effect pedals.



20. Robert Strachan, "Grains, Glitches and Infinite Space: Guitar Effects Pedals, Digitization and Textural Guitar Aesthetics," in *21st Century Guitar: Evolutions and Augmentations*, edited by Richard Perks and John McGrath (Bloomsbury, 2023), p. 154. Emphasis added.
21. "Habit Tapes" can be accessed at: <https://chaseblissrecords.bandcamp.com/album/habitapes-vol-1> (accessed June 2, 2023).
22. Chase Bliss, "Habit: Echo Maker." Available at [www.chasebliss.com/habit](http://www.chasebliss.com/habit) (accessed June 2, 2023).
23. Dab Orkin, "The Best-Selling Pedals of 2020," Reverb (2020). Available at <https://reverb.com/news/the-best-selling-pedals-of-2020> (accessed June 2, 2023).
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25. Mike D'Errico, *Push: Software Design and Cultural Politics of Music Production* (Oxford University Press, 2022), p. 5.
26. Chase Bliss, "Mood: Instant Ambience." Available at [www.chasebliss.com/mood](http://www.chasebliss.com/mood) (accessed June 2, 2023).
27. Dave Hunter, *Tone Manual: Discovering Your Ultimate Electric Guitar Sound* (Backbeat Books, 2011), p. 7.
28. Alexander Rehding, "Instruments of Music Theory," *Music Theory Online* 22/4 (December 2016).

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- Thompson, Art, *Stompbox: A History of Guitar Fuzzes, Flangers, Phasers, Echoes & Wahs* (Miller Freeman Books, 1997).

## Recommended Viewing

- Lux, Michael, and Daniel Orkin, directors, *The Pedal Movie*. Reverb.com (2021). Available at <https://reverb.com/page/the-pedal-movie> (accessed October 19, 2022).
- That Pedal Show. YouTube. [www.youtube.com/c/thatpedalshow](http://www.youtube.com/c/thatpedalshow).
- The JHS Show. YouTube. [www.youtube.com/@jhs pedals](http://www.youtube.com/@jhs pedals).

